Appendix C
Biological Resources

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C1. Site Characterization Study Report

SITE CHARACTERIZATION STUDY REPORT

Fountain Wind Project
Shasta County, California

Prepared for:

Pacific Wind Development, LLC

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EXECUTIVE SUMMARY

Pacific Wind Development, LLC (Pacific Wind) is considering development of a wind energy facility in northern California, referred to as the Fountain Wind Project (Project). The proposed Project encompasses approximately 32,600 acres (50.9 square miles [mi^2]) of private land in central Shasta County. An initial Site Characterization Study (SCS), which identified potential environmental risks and considerations in the siting of the Project (previously referred to as the McCloud Wind Resource Area), was conducted in 2011 but never released. Since that time, Pacific Wind has refined the project boundary and layout in an effort to avoid potential impacts to environmentally sensitive resources. The objective of this revised SCS is to provide information needed to address questions posed under Tier 1 (Preliminary Site Evaluation) and Tier 2 (Site Characterization) of the United States Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines. The information contained herein reflects a desktop analysis of publicly available information that pertains to plants, animals, and habitat features, within the refined 2017 Project boundary, that may be important considerations during the initial stages of Project planning and development. Environmental resources within the Project boundary (Project Area) and the surrounding 2-mile (3.2-kilometer [km]) buffer (Evaluation Area) were examined through a search of existing data. In addition, an initial reconnaissance-level site visit was conducted in October, 2016, to provide additional cursory, baseline information on landscape and habitat features potentially important during Project development.

The dominant vegetation community within the Project and Evaluation Areas is early seral mixed coniferous forest (post-fire and unburned) with smaller amounts of mixed montane chaparral, logged areas, and mixed montane riparian forest/scrub. Late seral forest is lacking primarily due to effects from fire and management for timber production. Based on review of state and federal databases, no state- or federal-listed or candidate plant species are known to occur within the Project or Evaluation Areas, and only one listed plant species, slender Orcutt grass, is known to occur within 10 miles (16 km) of the Project Area; however, suitable vernal pool habitat appears absent from the Project Area and this species is unlikely to occur. Four plant species designated as rare or sensitive by the California Native Plant Society (CNPS) have been documented within the Project Area, and based on habitats present, several other CNPS-sensitive plants have at least some potential to occur. No sensitive habitats or sensitive river drainages are known to occur within the Project or Evaluation Areas, however, two sensitive habitats, alkali seep and northern interior cypress forest, have at least some potential to occur.

There are 17 diurnal raptor species, 11 owl species, and one vulture species that may occur in or near the Project Area at some point during the year. Of the raptor and vulture species with potential to occur within the Project Area, one species is state endangered (bald eagle), one species is state threatened (Swainson's hawk), three species are state fully protected (golden eagle, American peregrine falcon, and white-tailed kite), four species are state Species of Special Concern (SSC; northern harrier, northern goshawk, California spotted owl, and long-eared owl), and four species are maintained on the California Department of Fish and Wildlife's

(CDFW) watch list (Cooper's hawk, ferruginous hawk, merlin, prairie falcon, osprey, and sharp-shinned hawk). Nesting habitat for forest-dependent raptor species is present within the Project Area.

Seventeen bat species have the potential to occur in and around the Project Area. The likelihood of occurrence for these species varies as most prefer habitat with particular characteristics during certain different life history stages (e.g., breeding, roosting, drinking, and migrating). Five of these species are considered California SSC by the CDFW including: pallid bat, spotted bat, Townsend's big-eared bat, western red bat, and western mastiff bat. None of these species are considered threatened or endangered by the USFWS.

The USFWS lists seven species protected by, or under review through, the Endangered Species Act with at least some potential (i.e., unlikely, possible, or likely) to occur in the Project Area: Yellow-billed cuckoo, gray wolf, Sierra Nevada red fox, western pond turtle, California red-legged frog, Shasta crayfish, and Valley elderberry longhorn beetle. Eight state listed or fully protected birds (American peregrine falcon, bald eagle, bank swallow, golden eagle, greater sandhill crane, Swainson's hawk, tricolored blackbird, and willow flycatcher), three state listed mammals (Sierra Nevada red fox, gray wolf, and California wolverine), one amphibian (Shasta salamander), and one invertebrate (Shasta crayfish) have at least some potential to occur in the Project Area. Additionally, 29 species designated as state SSC or watch list species have at least some potential to occur in the Project Area including 13 birds, nine mammals, five amphibians, one reptile, and one fish.

Based on this SCS, significant adverse impacts to species of concern are not anticipated; however, due to the potential for occurrence of some sensitive plant and wildlife species within the Project Area, it is recommended that Tier 3 site-specific studies be conducted to further refine potential risk assessments for these species. The following Tier 3 studies are recommended prior to construction in order to more clearly assess the potential risk to sensitive plants and wildlife: year-round large bird/eagle use surveys, small bird use surveys, raptor nest surveys with particular emphasis on bald and golden eagles, bat acoustic surveys, and a habitat assessment/rare plant survey. Additional species-specific surveys may be warranted following consultation with wildlife agencies and a more detailed habitat assessment.

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INTRODUCTION

Pacific Wind Development, LLC (Pacific Wind) is considering development of a wind energy facility in central Shasta County, California referred to as the Fountain Wind Project (Project). Many wind energy developers now choose to utilize the United States Fish and Wildlife Service (USFWS) voluntary wind project development guidelines, which provide a template for a staged planning process when exploring a potential wind energy project. The Land-based Wind Energy Guidelines (WEG; USFWS 2012a) are intended to function in concert with the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS 2013), and promote intentional tiered project development which strategically minimizes impacts to wildlife. This tiered approach includes: Tier 1 - Preliminary Site Evaluation; Tier 2 - Site Characterization; Tier 3 - Field Studies to Document Site Wildlife and Habitat and Predict Project Impacts; Tier 4 - Post-construction Studies to Document Impacts; Tier 5 - Other Post-construction Studies.

In 2011, prior to the release of the WEG, an initial Site Characterization Study (SCS), which identified potential environmental risks and considerations in the early siting of the Project (previously referred to as the McCloud Wind Resource Area), was prepared but never released. Since that time, Pacific Wind has refined the Project boundary and layout in an effort to avoid potential impacts to environmentally sensitive resources. The original 2011 project boundary in relation to the current (2017) Project boundary is illustrated in Figure 1. In late 2016, Pacific Wind contracted Western Ecosystems Technology, Inc. (WEST) to prepare a revised SCS to describe and evaluate environmental resources within the refined Fountain Wind Project (Project Area) and the surrounding 2-mile (mi; 3.2-kilometer [km]) buffer (Evaluation Area; Figure 2) to address questions posed under Tier 1 and Tier 2 of the WEG. The overall purpose of this revised SCS is to identify the biotic and abiotic environmental characteristics of the Project and Evaluation Areas, evaluate potential impacts to these resources from wind energy development, and inform whether additional environmental resource surveys or assessments are warranted. Identification of resource issues early in the planning process allows developers of wind energy facilities to identify, avoid, and minimize future problems which may occur.

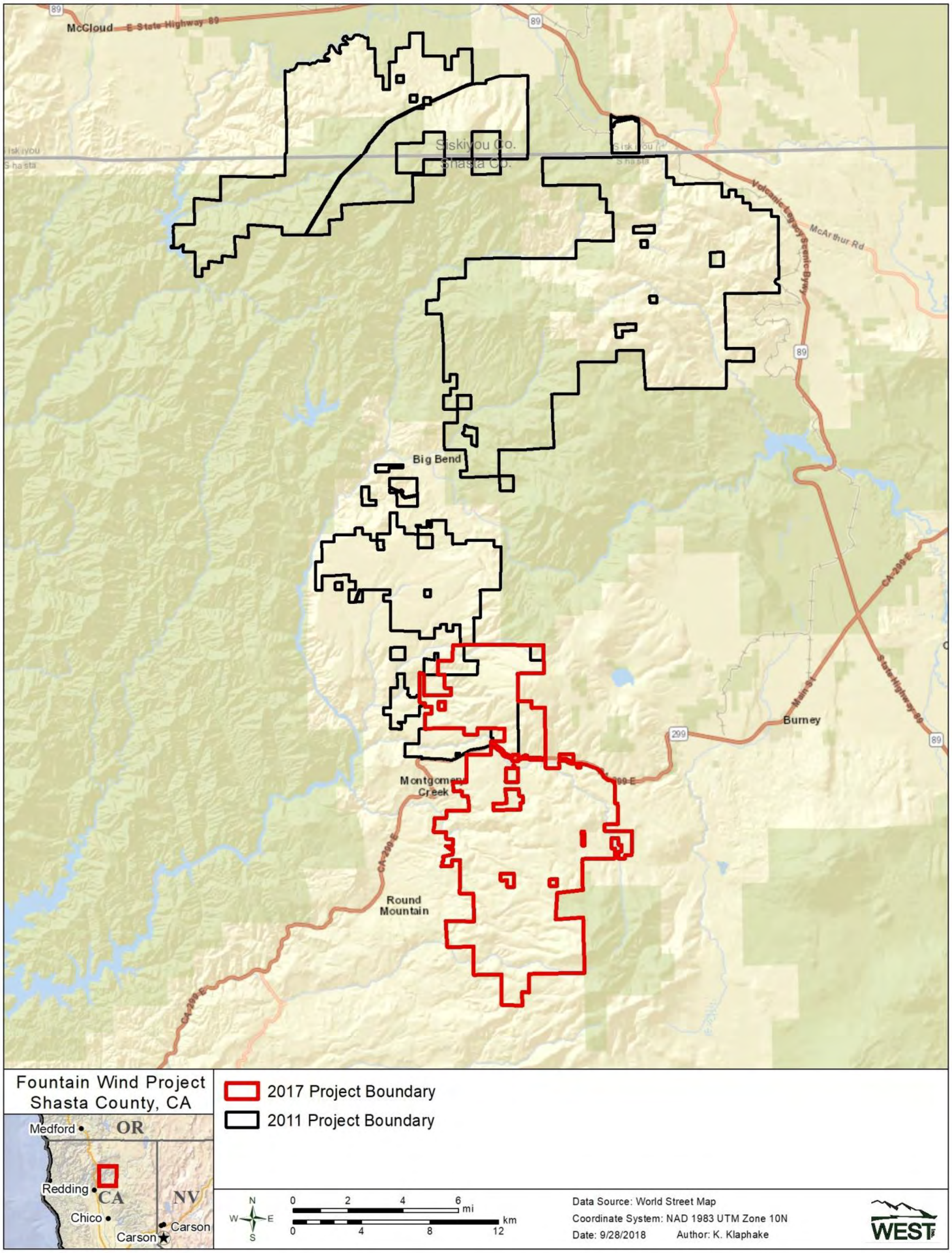

Figure 1. Location of the Fountain Wind Project in relation to the original 2011 project boundary (previously referred to as the McCloud Wind Resource Area).

STUDY AREA

The Project Area currently encompasses approximately 32,600 acres (50.9 square miles [mi^2]) within Shasta County in northern California west of the community of Burney and northeast of the larger community of Redding (Figure 2). The east-west running California State Route 299 bisects the northern portion of the Project Area, and the Hatchet Ridge Wind Farm (Hatchet Ridge), in operation since 2010, is located immediately to the north and east. The Lassen National Forest is located to the southeast of the Project and the Shasta-Trinity National Forest is located to the north and east (Figure 2). The Project Area is privately owned and actively managed for timber production.

The proposed Project falls within the Cascades Ecological Region (ecoregion; Griffith et al. 2016), which is a Level III ecoregion primarily covering parts of Oregon and Washington but also including a discontinuous land area near Mt. Shasta in California. This ecoregion is characterized by underlying volcanic rock strata and a physiography defined by recurring periods of glaciation. With high plateaus and valleys that trend east, this ecoregion includes steep ridges as well as both active and dormant volcanoes, and is marked by a generally mesic, temperate climate which supports productive coniferous forests. At higher elevations, subalpine meadows provide habitat for unique flora and fauna.

Topography within the Project Area is characterized by gently rolling hills that transition to relatively steep, low mountains, with elevations ranging from approximately 2,156 feet (ft; 657 meters [m]) in the southwestern corner of the Project Area to 6,814 ft (2,077 m) near Snow Mountain in the southeast (Figures 3 and 4). Significant waterways within the Project Area include the north and south forks of Montgomery Creek. The dominant vegetation community within the Project is Sierran mixed conifer forest; however, the structure and species composition of this community varies greatly with slope, aspect, elevation, and disturbance (e.g., fire and forest management). Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*).

The site drains to the north and west into the Pit River and Sacramento River watersheds. A number of permanent and intermittent streams run throughout the Project Area, flowing primarily to the west and northwest. The primary drainages in the north are Hatchet Creek and Montgomery Creek (north and south forks), while Cedar Creek and Little Cow Creek drain the southern portions of the Project Area. Riparian vegetation along these creeks includes various willow species (*Salix* spp.), thinleaf alder (*Alnus incana* ssp. *tenuifolia*), several species of maple (*Acer* spp.), mountain dogwood (*Cornus nuttallii*), and California hazel (*Corylus cornata* var. *californica*). Soils within the Project Area are primarily composed of the Cohasset, Windy, McCarthy and Lyonsville-Jiggs series and range from stony to clay loams that have formed in residuum weathered from volcanic rock (USDA Natural Resources Conservation Service [NRCS] 2017).

Modern land use of the Project Area is primarily management for timber production. Timber management and harvest operations are currently being conducted primarily within the southern half of the site. As such, the entire Project Area is essentially a managed forest system (see Figure 5). In late August, 1992, the Fountain Fire burned approximately 64,000 acres (100 mi^2) in and around the Project, including an area encompassing the central half of the Project (see Figures 5 and 6). Post-fire management included salvage logging, site preparation, and planting in the year following the fire. Within 5 years of the fire, approximately 17 million seedlings were planted in areas previously supporting timber (Zhang et al. 2008). Species planted included ponderosa pine, Douglas-fir, and white fir at 10-ft (3.0-m) spacing, with incense cedar planted along stream buffers. To reduce competition for (tree) seedling establishment, growth regulator herbicides were applied in many areas that had been colonized by manzanita (*Arctostaphylos* spp.) and California-lilac (*Ceanothus* spp.; Zhang et al. 2008).

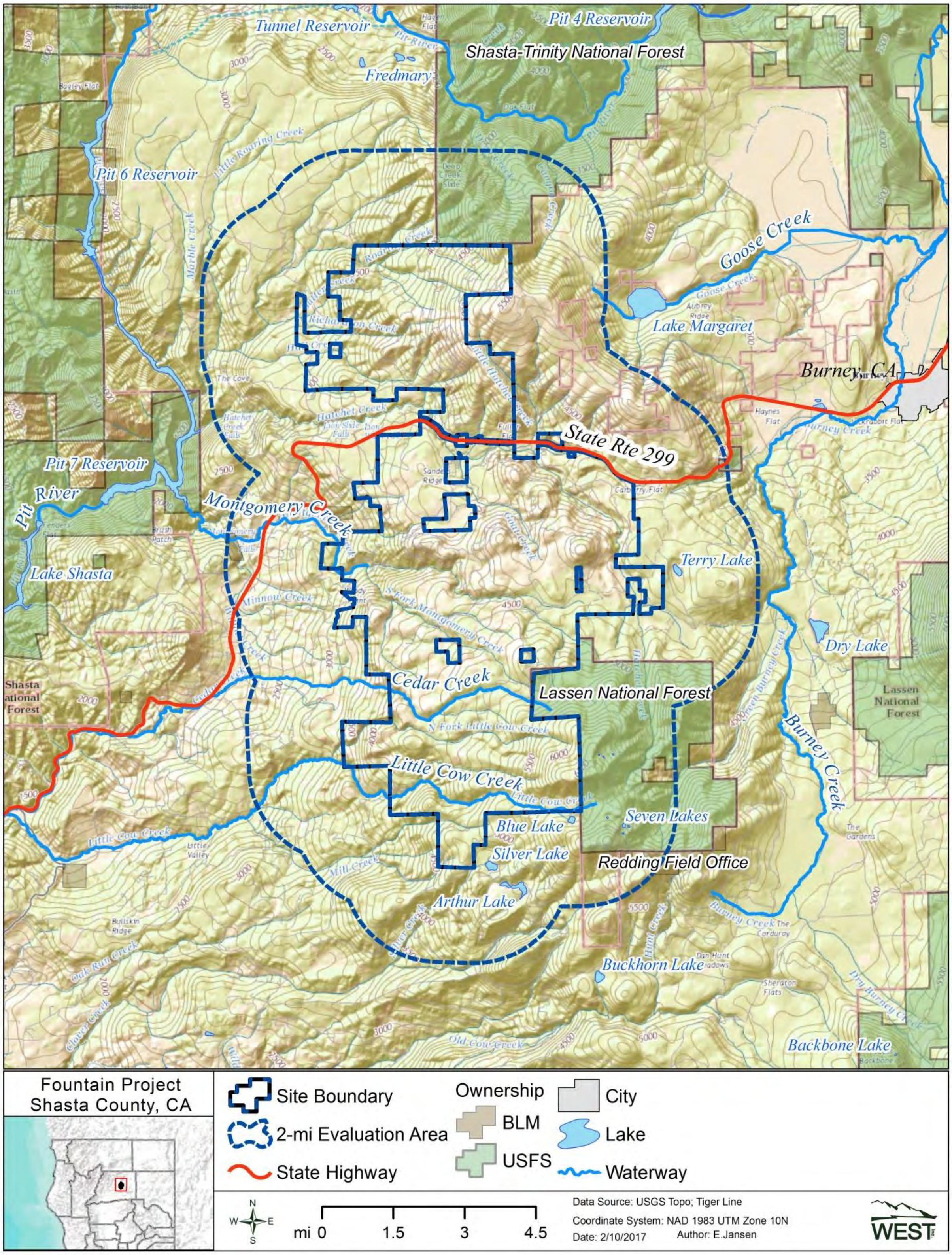

Figure 2. Overview of the Fountain Wind Project Area and surrounding Evaluation Area.

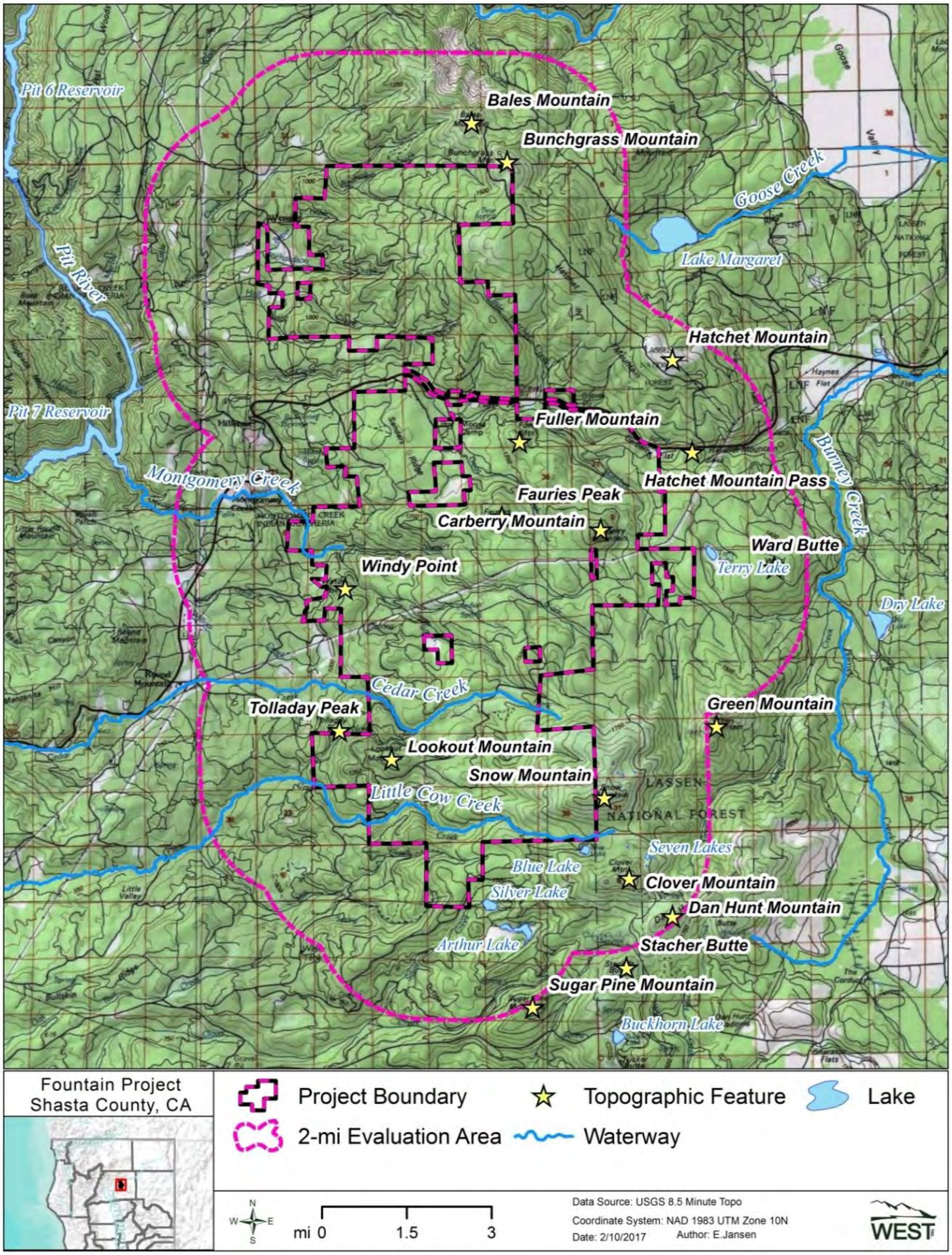

Figure 3. Major topographic and water features within the Fountain Wind Project Area and surrounding Evaluation Area.

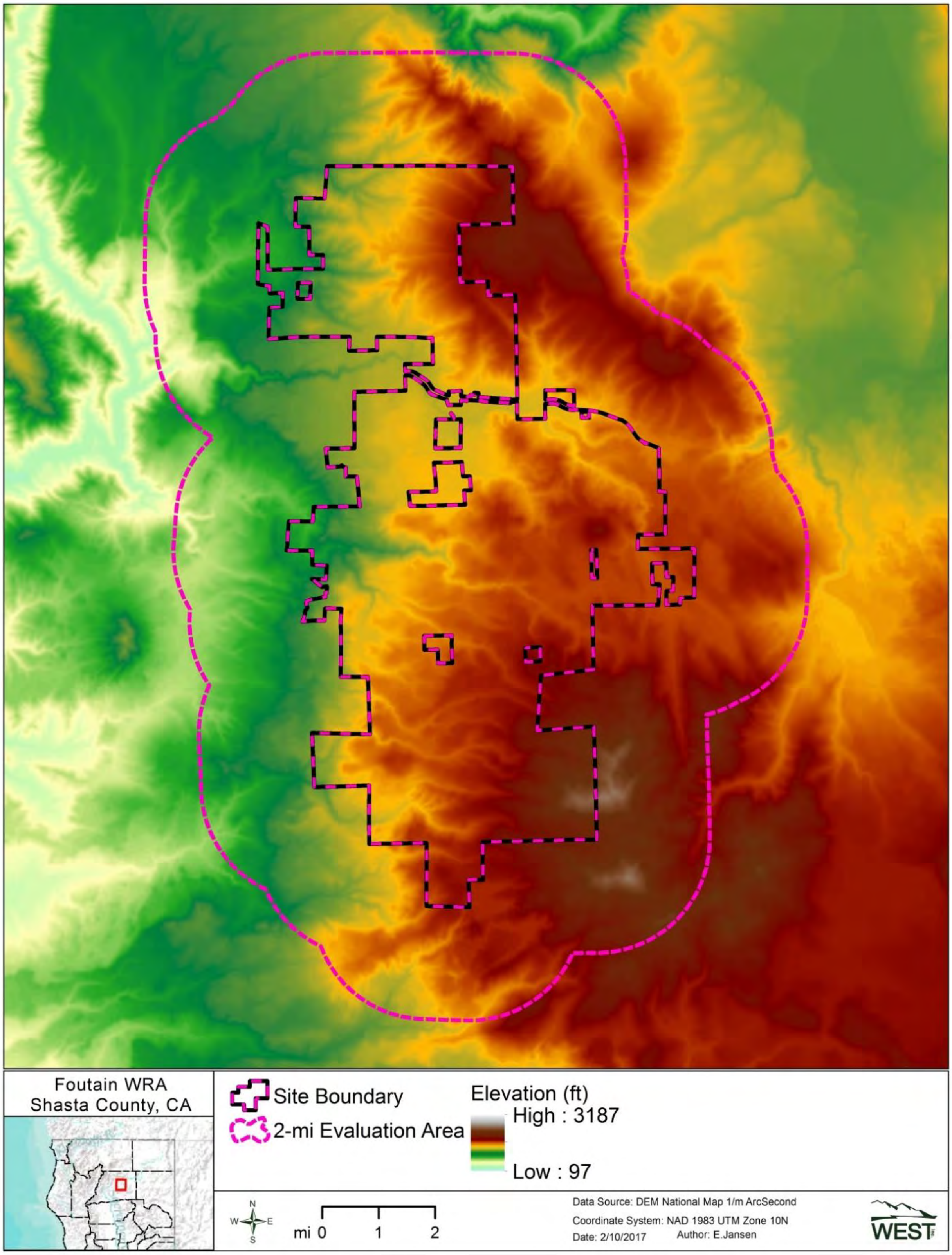

Figure 4. Digital elevation model of the Fountain Wind Project Area and surrounding Evaluation Area.

METHODS

Environmental resources within the Project Area and surrounding Evaluation Area were examined through a search of existing publicly available data and an initial reconnaissance-level site visit. The initial site visit occurred October 19–21, 2016 and entailed a preliminary examination of the area from accessible public and private roads. Biological features and potential wildlife habitat surveyed during the site visit included plant communities, topographic and geological features, potential raptor nesting habitat, habitat for prey populations, and potential bat roosting and foraging habitat. However, due to the relatively late seasonal timing of the site visit, little information was gathered on plant communities. Photographs of the Project and Evaluation Areas are presented in Appendix A.

Published literature, field guides, and public data sets were among the resources reviewed to identify known environmental resources within the Project Area and Evaluation Area. The information presented in this analysis was obtained from the following sources:

- Previous (not released) SCS prepared in 2011 for an earlier version of the Project (referred to as the McCloud Wind Resource Area);
- Bat Conservation International (BCI) species accounts and range maps (BCI 2017);
- California Wildlife Habitat Relationships (CWHR) information system, life history accounts and range maps, maintained by the California Department of Fish and Wildlife (CDFW; CWHR 2017);
- California Natural Diversity Database (CNDDB), maintained by the CDFW, county-level species occurrence information (CNDDB 2017);
- California Native Plant Society's (CNPS) *Online Inventory of Rare and Endangered Plants of California* (CNPS 2017);
- List of Important Bird Areas (IBAs) by the National Audubon Society (Audubon 2017);
- USDA Soil Survey Geographic (SSURGO) data (NRCS 2017);
- U.S. Fish and Wildlife Service (USFWS) Critical Habitat designations (USFWS 2017a);
- USFWS National Wetland Inventory (NWI) data (USFWS NWI 2016);
- USFWS county-level species occurrence information (USFWS 2017b);
- U.S. Geological Survey (USGS) regional Breeding Bird Survey (BBS) data (USGS 1999; Sauer et al. 2014);
- USGS National Land Cover Dataset (NLCD; USGS NLCD 2011); and
- USGS topographic maps and digital elevation data (USGS 2015, USGS DEM 2016).

WEST determined the likelihood a sensitive animal or plant species may occur within the Project by considering the species' range, habitat suitability within the Project, species' mobility, population size, and records of occurrence within or adjacent to the Project. Based on these factors, the likelihood of occurrence was defined for each sensitive species using the following categories:

- None – Project outside the species known range, no suitable habitat within the Project, restricted mobility and small population size.
- Unlikely – Project outside the species known range and suitable habitat appears absent within the Project; however, due to the species mobility and population size, species may occur within the Project during migration or other times of the year.
- Possible – Project is located within the range of the species but contains marginal suitable habitat; species highly mobile and may occur year-round.
- Likely – Project is located within the range of the species and contains suitable habitat; records of species occurrence in the surrounding area but absent from the Project.
- Occurs – Records of species occurrence within the Project based on CNDDB data or other survey data.

LAND COVER AND VEGETATION

The proposed Project Area encompasses 32,613 acres (50.96 mi^2). According to the NLCD (USGS NLCD 2011), the dominant cover type within the Project Area is evergreen forest, covering 17,906.65 acres (27.98 mi^2), or 54.9% of the Project Area (Table 1; Figure 5). A further 38.3% of the Project Area is composed of shrub/scrub (12,501.61 acres [19.53 mi^2]), and 4.5% of herbaceous land cover types (1,478.82 acres [2.21 mi^2]). The remaining 2.2% of the Project Area is covered by small amounts of deciduous forest (334.85 acres [0.52 mi^2]), barren land (194.63 acres [0.30 mi^2]), mixed forest (91.14 acres [0.14 mi^2]), developed lands (80.04 acres [0.13 mi^2]), emergent wetlands (20.40 acres [0.03 mi^2]), and cultivated cropland (5.29 acres [0.01 mi^2]; Table 1; Figure 5).

The Evaluation Area encompasses 95,199 acres (148.75 mi^2). Composition of the Evaluation Area is generally similar to that of the Project Area with evergreen forest, scrub/shrub, and herbaceous cover types composing the majority of the land cover (59.2%, 32.1%, and 4.8%, respectively; Table 1; Figure 6). The Evaluation Area does contain small amounts of open water (78.47 acres [0.12 mi^2]), medium and high intensity developed lands (24.26 acres [0.04 mi^2]), and woody wetlands (9.14 acres [0.01 mi^2]) that are not present within the Project Area.

Table 1. Land use and habitat types present within the Fountain Wind Project Area and Evaluation Area.

	Project Area		Evaluation Area*	
Cover Type	**Acres**	**Percent (%)**	**Acres**	**Percent (%)**
Evergreen Forest	17,906.65	54.9	56,356.78	59.2
Shrub/Scrub	12,501.61	38.3	30,523.34	32.1
Herbaceous	1,478.82	4.5	4,599.68	4.8
Deciduous Forest	334.85	1.0	1,560.33	1.6
Barren Land	194.63	0.6	380.61	0.4
Mixed Forest	91.14	0.3	408.03	0.4
Developed, Open Space	73.20	0.2	947.35	1.0
Emergent Herbaceous Wetlands	20.40	0.1	85.26	0.1
Developed, Low Intensity	6.84	< 0.1	71.73	0.1
Cultivated Crops	5.29	< 0.1	154.07	0.2
Open Water	-	-	78.47	0.1
Developed, Medium Intensity	-	-	15.79	< 0.1
Woody Wetlands	-	-	9.14	< 0.1
Developed, High Intensity	-	-	8.47	< 0.1
Total	**32,613.43**	**100**	**95,199.05**	**100**

Data obtained from USGS NLCD, compiled from satellite imagery (USGS NLCD 2011).
*Project Area plus surrounding 2-mile buffer.

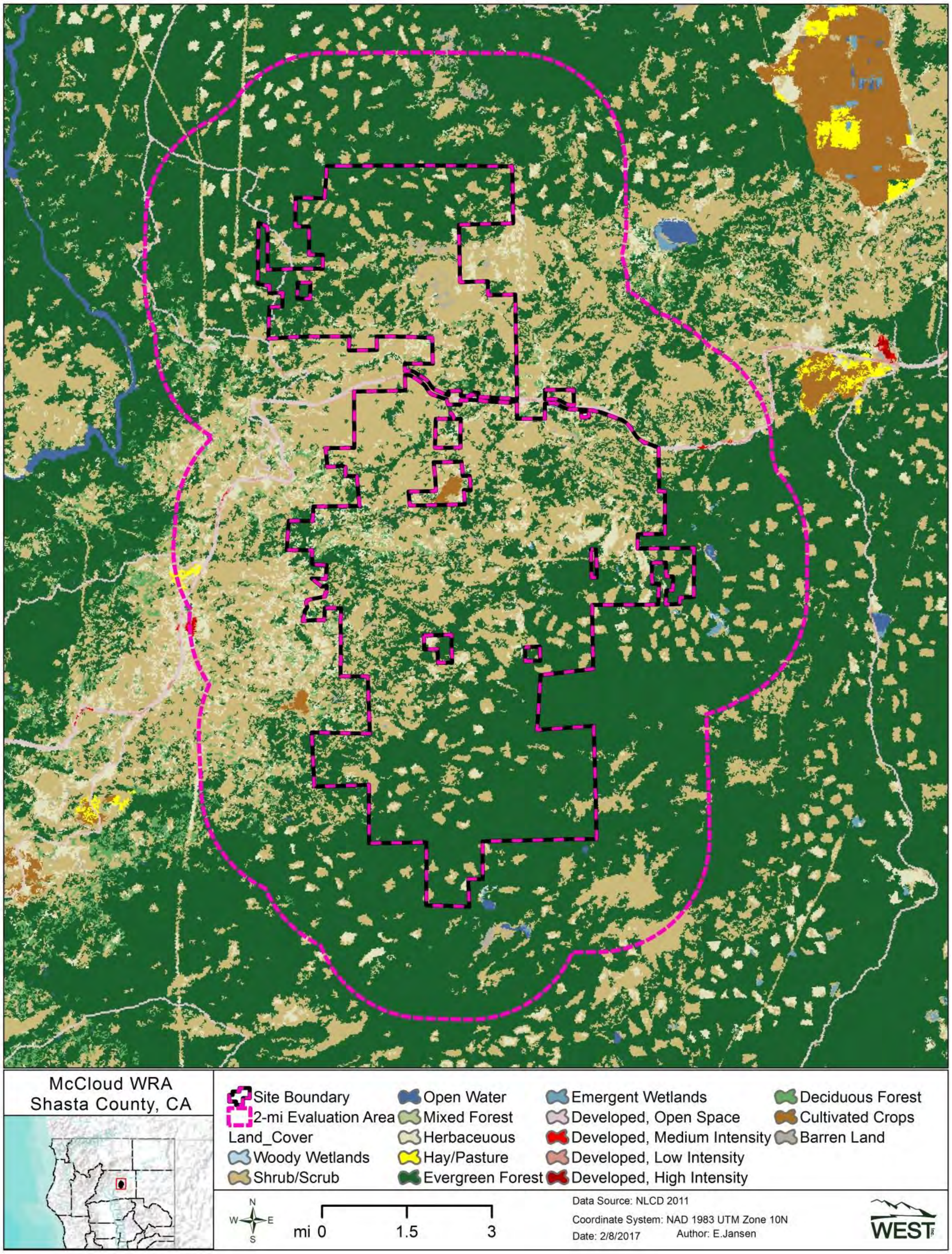

Figure 5. Land cover within the Fountain Wind Project Area and Evaluation Area (USGS NLCD 2011).

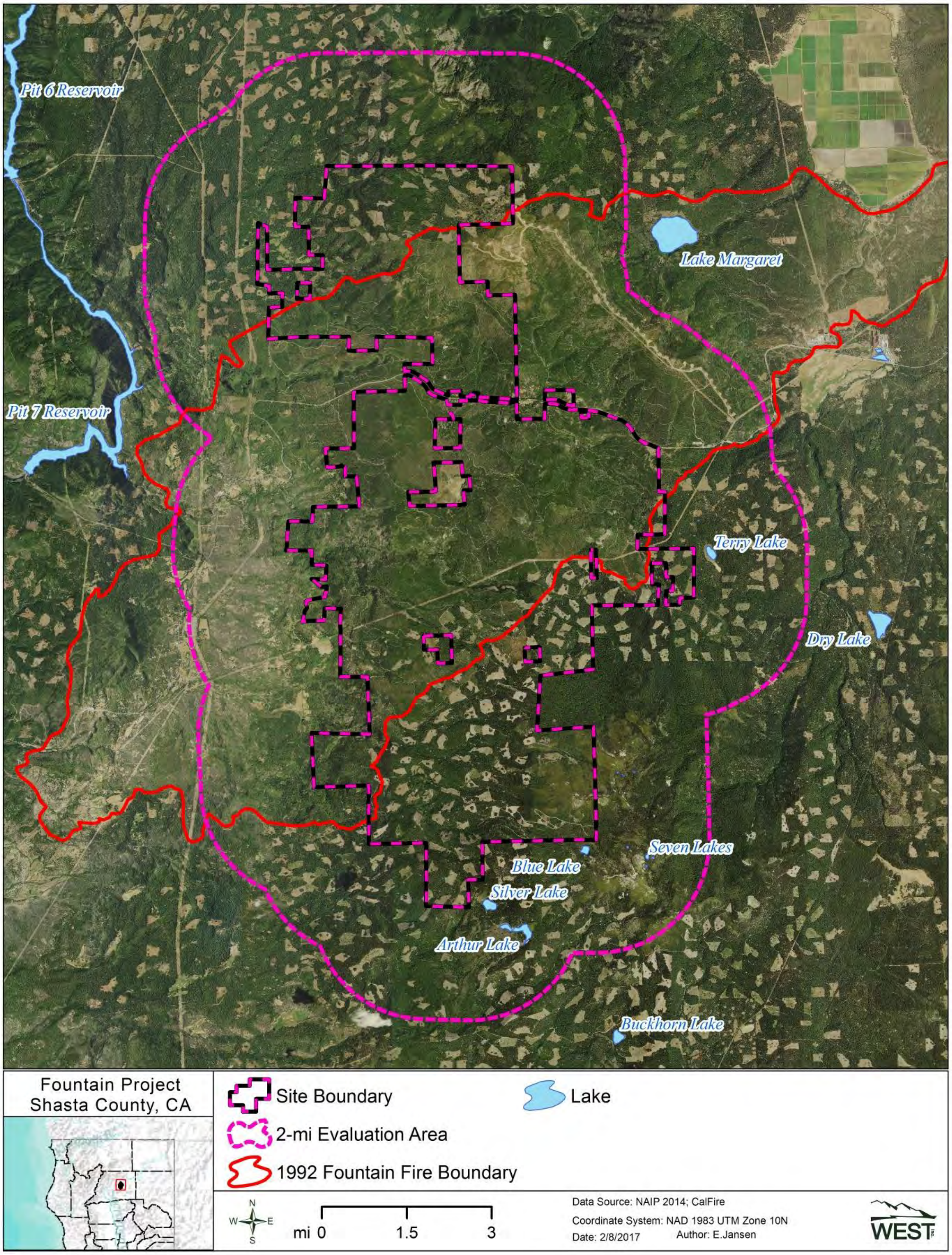

Figure 6. Aerial photograph of the Fountain Wind Project Area and Evaluation Area with 1992 Fountain Fire boundary.

Special Status Plant Species

Plants can be directly impacted by wind energy facilities due to loss of individuals or populations from construction and habitat alteration. Based on data from the CNPS, 191 plant species that occur in Shasta County are considered sensitive. The extensive listing of rare plants was narrowed through cross-reference of databases (CNPS 2017, CNDDB 2017, USFWS 2017b) and identification of range of occurrence, habitat types, and elevational ranges for the Project Area. Based on this review, two federal-listed plant species were identified with at least some potential to occur within the Project Area: Greene's tuctoria (*Tuctoria greenei*) and slender Orcutt grass (*Orcuttia tenuis*; Table 2). However, based on the absence of vernal pools and open grasslands within the Project Area, these species are unlikely to occur. Federally designated critical habitat for slender Orcutt grass is located approximately 6.0 miles (9.7 km) north of the Project Area. This species is discussed in more detail below. No federal-listed or candidate plant species are known to occur within the Project Area or Evaluation Area.

At the state level, based on review of the CNDDB and CNPS databases, 61 state-listed or rare, or CNPS sensitive plants with at least some potential to occur within the Project Area were identified (Table 3). Of these 61 special status plant species, four have been documented within the Project Area: Butte County morning-glory (*Calystegia atriplicifolia* ssp. *buttensis*), rattlesnake fern (*Botrypus virginianus*), northern clarkia (*Clarkia borealis* ssp. *borealis*), and English Peak greenbriar (*Smilax jamesii*; Figure 7). These four species are designated as sensitive by the CNPS, and are tracked by the CNPS, but are not covered by state or federal management regulations.

Table 2. Federal listed plant species with potential for occurrence in or near the Fountain Wind Project.

Listed Species	Federal Status*	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
Greene's tuctoria *Tuctoria greenei*	E	Yes	Dry bottoms of vernal pools in open grassland; 30 – 1,070 m (98 – 3,510 ft)	**Unlikely.** Suitable vernal pool habitat absent
slender Orcutt grass *Orcuttia tenuis*	T	Yes	Vernal pools	**Unlikely.** Suitable vernal pool habitat absent; CNDDB documents occurrence 6.0 miles (9.7 km) to the northeast of the site

*E: federally-listed endangered species; T: federally-listed threatened species
Information from CNDDB 2017, USFWS 2017b

Slender Orcutt Grass

An annual grass restricted to vernal pools, slender Orcutt grass is endemic to California and is listed as both a federal threatened and state endangered species (CNPS 2017, USFWS 2017b). Slender Orcutt grass can be found in valley grassland, foothill woodland, freshwater wetland, and wetland-riparian communities. It is threatened by agriculture, residential development, grazing, recreational activity, logging, fire, and non-native plant invasion (Calflora 2017). The species has not been documented within the Project or Evaluation Areas, and due to the apparent lack of suitable vernal pool habitat, the species is unlikely to occur. The CNDDB lists occurrences of this species approximately 6.0 mi to the northeast of the Project Area, in the Goose Valley area (CNPS 2017). The USFWS has designated critical habitat for this species on the northeastern side of Goose Valley, approximately 6 miles from the Project (USFWS 2017a).

Table 3. State listed/rare and CNPS sensitive plant species with potential to occur in or near the Fountain Wind Project.

Species	State Status*	CNPS Status**	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
Shasta ageratina *Agertina shastensis*		1B.2	Yes	Rocky, often carbonate sites; lower montane coniferous forest	**Possible.** CNDDB documents species occurrence 10 miles west of site
vanilla-grass *Anthoxanthum nitens* ssp. *nitens*		2B.3	No	Meadows and seeps	**Possible.** Suitable wetland habitat limited within site
Klamath manzanita *Arctostaphylos klamathensis*		1B.2	Yes	Chaparral and upper montane and subalpine coniferous forests; rocky outcrops and slopes	**Possible.** Suitable habitat present within the site; CNDDB documents only 2 occurrences in Shasta County
marbled wild-ginger *Asarum marmoratum*		2B.3	No	Understory of lower montane coniferous forests	**Possible.** Suitable habitat present within the site
northern spleenwort *Asplenium septentrionale*		2B.3	No	Chaparral and montane coniferous forests; form grass-like tufts in granitic rock crevices	**Possible.** Suitable habitat present within the site
upswept moonwort *Botrychium ascendens*		2B.3	No	Lower montane coniferous forests; grassy fields and woodlands near springs and creeks	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County
scalloped moonwort *Botrychium crenulatum*		2B.2	No	Lower montane coniferous forests; moist meadows near creeks; marshes	**Possible.** CNDDB documents species occurrence three miles(five km) south of site
mingan moonwort *Botrychium minganense*		2B.2	No	Creek banks in mixed conifer forests	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County
western goblin *Botrychium montanum*		2B.1	No	Creek banks in old-growth coniferous forests	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County
northwestern moonwort *Botrychium pinnatum*		2B.3	No	Montane coniferous forests; in meadows or along creek banks	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County

Table 3. State listed/rare and CNPS sensitive plant species with potential to occur in or near the Fountain Wind Project.

Species	State Status*	CNPS Status**	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
rattlesnake fern *Botrypus virginianus*		2B.2	No	Streams; bogs and fens; lower montane coniferous forest; meadows and seeps	**Occurs.** CNDDB documents species occurrence near southern boundary of site and locations to north and south of site
watershield *Brasenia schreberi*		2B.3	No	Freshwater marshes and swamps	**Possible.** Potentially suitable wetland habitat limited within site; CNDDB documents presence seven miles east of site
long-haired star-tulip *Calochortus longebarbatus* var. *longebarbatus*		1B.2	No	Clay, mesic sites in Great Basin scrub, lower montane coniferous forest openings, meadows and seeps	**Possible.** CNDDB documents species presence 3.5 miles (5.6 km) east of site
Callahan's mariposa lily *Calochortus syntrophus*		1B.1	Yes	Cismontane woodland; vernally mesic valley and foothill grassland	**Possible.** CNDDB documents species presence 2.5 miles (4.0 km)south of site
Butte County morning-glory *Calystegia atriplicifolia* ssp. *buttensis*		4.2	Yes	Rocky, sometimes roadsides; lower montane coniferous forest	**Occurs.** CNDDB documents species presence in northwestern portion of site and numerous locations to north and east of site
Castle Crags harebell *Campanula shelteri*		1B.3	Yes	In protected rock crevices in granite; lower montane coniferous forests	**Possible,** if suitable granitic rock outcrops present
bristly sedge *Carex comosa*		2B.1	No	Marshes and swamps (lake margins); valley and foothill grasslands	**Possible.** Suitable wetland habitat limited within site, but CNDDB documents species presence six miles (10 km) north of site
woolly-fruited sedge *Carex lasiocarpa*		2B.3	No	Bogs and fens; freshwater marshes and swamps, lake margins	**Possible.** Potentially suitable wetland habitat limited within site; CNDDB documents presence six miles north of site
Shasta clarkia *Clarkia borealis* ssp. *arida*		1B.1	Yes	Cismontane woodlands	**Possible.** CNDDB documents species presence seven miles to east of site
northern clarkia *Clarkia borealis* ssp. *borealis*		1B.3	Yes	Cismontane woodland; lower montane coniferous forest	**Occurs.** CNDDB documents species occurrence near western boundary of site and at numerous locations to northeast

Table 3. State listed/rare and CNPS sensitive plant species with potential to occur in or near the Fountain Wind Project.

Species	State Status*	CNPS Status**	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
silky cryptantha *Cryptantha crinite*		1B.2	Yes	Gravelly streambeds of cismontane woodlands, valley foothill grasslands, lower montane coniferous forests, and riparian forests	**Possible.** CNDDB documents occurrence 8.5 miles (13.7 km)south of site
English sundew *Drosera anglica*		2B.3	No	Bogs and fens; meadows	**Possible.** Suitable wetland habitat limited within site; CNDDB documents species presence seven miles to northeast of site
Oregon fireweed *Epilobium oreganum*		1B.2	No	Montane coniferous forests; in and near springs and bogs; sometimes on serpentine	**Possible;** but suitable wetland habitat limited within site
Tracy's eriastrum *Eriastrum tracyi*	R	1B.2	Yes	Chaparral, cismontane woodlands; gravelly shale or clay, often in open areas	**Possible.** Potential suitable habitat within site; nearest known occurrence is 20+ miles to northeast of site
blushing wild buckwheat *Eriogonum ursinum var. erubescens*		1B.3	Yes	Rocky sites within lower montane coniferous forest and montane chaparral	**Possible.** Suitable rocky habitat may be present within site
Shasta limestone monkeyflower *Erythranthe taylorii*		1B.1	Yes	Openings, carbonate crevices and rocky outcrops of cismontane woodlands and lower montane coniferous forest	**Possible.** Suitable rocky habitat may be present within site
Klamath fawn lily *Erythronium klamathense*		2.2	No	Meadows and seeps; upper montane coniferous forest	**Possible.** Suitable wetland habitat limited within site
Shasta fawn lily *Erythronium shastense*		1B.2	Yes	Usually carbonate, rocky, north-facing or shaded slopes in cismontane woodland and lower montane coniferous forest	**Possible.** Suitable habitat may be present within site
Butte County fritillary *Fritillaria eastwoodiae*		3.2	Yes	Chaparral, cismontane woodlands, lower montane coniferous forest; usually on dry slopes; serpentine, red clay or sandy soil	**Likely.** CNDDB documents species presence in southwest corner of site and numerous locations in site vicinity

Table 3. State listed/rare and CNPS sensitive plant species with potential to occur in or near the Fountain Wind Project.

Species	State Status*	CNPS Status**	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
Boggs Lake hedge-hyssop *Gratiola heterosepala*	E	1B.2	No	Freshwater marshes and swamps, vernal pools; clay soils	**Unlikely.** Suitable wetland habitat very limited within site
Stebbins' harmonia *Harmonia stebbinsii*		1B.2	Yes	Chaparral and lower montane coniferous forests; in ultramafic soils, often along roads	**Possible,** if ultramafic soils present within appropriate habitats on site
little hulsea *Hulsea nana*		2B.3	No	Alpine boulder and rock fields, subalpine coniferous forests; volcanic substrates	**Unlikely.** Suitable habitat not present; CNDDB documents species presence nine (15 km) miles to east of site.
Castle Crags ivesia *Ivesia longibracteata*		1B.3	Yes	Crevices in granitic cliffs; lower montane coniferous forests	**Possible**. Suitable cliff habitat may be present
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*		1B.1	Yes	Vernally mesic meadows and seeps; valley and foothill grassland; vernal pools	**Possible.** Suitable habitat present on site; CNDDB documents species occurrence seven miles to northeast of site
Santa Lucia dwarf rush *Juncus luciensis*		1B.2	Yes	Vernal pools, ephemeral drainages, wet meadows habitats and streamsides	**Possible.** Suitable habitat present on site; CNDDB documents occurrence five miles (eight km) to east of site
Cantelow's lewisia *Lewisia cantelovii*		1B.2	Yes	Mesic, granite; lower montane coniferous forest; cismontane woodland	**Possible.** Suitable habitat may be present within site
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*		1B.2	No	Mesic; cismontane woodland; meadows and seeps	**Possible.** Suitable wetland habitat limited within site
woolly meadowfoam *Limnanthes floccosa* ssp. *floccosa*		4.2	No	Vernally mesic; cismontane woodland; valley and foothill grassland; vernal pools	**Possible.** Suitable habitat present within site; CNDDB documents occurrence 8.5 miles northeast of site
tufted loosestrife *Lysimachia thyrsiflora*		2B.3	No	Meadows and seeps; mesic; upper montane coniferous forest	**Possible.** Suitable habitat present within site; CNDDB documents occurrence seven miles east of site
three-ranked hump moss *Meesia triquetra*		4.2	No	Bogs and fens; mesic; subalpine and upper montane coniferous forests	**Possible.** Suitable wetland habitat limited within site

Table 3. State listed/rare and CNPS sensitive plant species with potential to occur in or near the Fountain Wind Project.

Species	State Status*	CNPS Status**	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
broad-nerved hump moss *Meesia uliginosa*		2B.2	No	Moss on damp soil within meadows and seeps, bogs and fens, upper montane coniferous forest, and subalpine coniferous forest	**Possible.** Suitable wetland habitat limited within site
Egg Lake monkeyflower *Diplacus pygmaeus*		4.2	No	Vernally mesic, streamsides, volcanic, clay	**Possible.** Potentially suitable habitat present within site
Shasta snow-wreath *Neviusia cliftonii*		1B.2	Yes	Lower montane coniferous forests, riparian woodlands; shady, north-facing or sheltered canyons	**Possible.** Suitable habitat present within site; CNDDB documents occurrence six miles west of site
slender Orcutt grass *Orcuttia tenuis*	E	1B.1	Yes	Vernal pools	**Unlikely.** Suitable vernal pool habitat absent; CNDDB documents occurrence seven miles to northeast of site
Cascade grass-of-Parnassus *Parnassia cirrata* var. *intermedia*		2B.2	No	Rock serpentine soils; montane coniferous forests, meadows and seeps, bogs and fens; 780 – 1,980 m	**Possible.** Suitable wetland habitat limited within site
thread-leaved beardtongue *Penstemon filiformis*		1B.3	Yes	Cismontane woodlands and lower montane coniferous forests; dry stony sites, grassy openings, and meadows	**Possible.** Potential suitable habitat present within site
Scott Mountain howellanthus *Howellanthus dalesianus*		4.3	Yes	Subalpine, lower, and upper montane coniferous forest; meadows and seeps	**Possible,** but suitable wetland habitat limited within site
Engelmann spruce *Picea engelmannii*		2B.2	No	Upper montane coniferous forest	**Possible.** Potential suitable habitat on site; nearest CNDDB occurrence approximately 16 miles northeast of site
Sierra blue grass *Poa sierra*		1B.3	Yes	Lower montane coniferous forests; shady, moist, rock slopes; often in canyons	**Possible.** Potential suitable habitat present within site; CNDDB documents occurrence six miles to west of site

Table 3. State listed/rare and CNPS sensitive plant species with potential to occur in or near the Fountain Wind Project.

Species	State Status*	CNPS Status**	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
Modoc County knotweed *Polygonum polygaloides* ssp. *esotericum*		1B.1	Yes	Mesic; Great Basin scrub; lower montane coniferous forest	**Possible.** Potential suitable habitat within site
Pacific fuzz wort *Ptilidium californicum*		4.3	No	Epiphytic on trees and decaying logs in lower and upper montane coniferous forest	**Possible.** Potential suitable habitat may be present within site; CNDDB reports species occurrence within 10 miles (north) of site
marsh sckullcap *Scutellaria galericulata*		2B.2	No	Marshes and swamps of lower montane coniferous forests	**Possible.** Suitable wetland habitat limited within site
Canyon Creek stonecrop *Sedum obtusatum* ssp. *paradisum*		1B.3	Yes	In crevices of exposed granite; chaparral and coniferous forests; 1,060 – 1,860 m	**Possible,** if suitable exposed granite habitat present
long-stiped campion *Silene occidentalis* ssp. *longistipitata*		1B.2	Yes	Lower and upper montane coniferous forest	**Possible.** Suitable habitat present within site; CNDDB documents occurrence within five miles to east and northeast of site
Klamath Mountain catchfly *Silene salmonacea*		1B.2	Yes	Openings, usually serpentine, within lower montane coniferous forest	**Possible.** Potential suitable habitat within site
English Peak greenbriar *Smilax jamesii*		4.2	Yes	Streambanks and lake margins; lower and upper montane forest	**Occurs.** CNDDB documents species presence at numerous locations in the north end of the Project
hairy marsh hedge-nettle *Stachys pilosa*		2B.3	No	Mesic sites in Great Basin scrub	**Unlikely.** Suitable scrub habitat not present; CNDDB documents species presence four miles (six km) east of site
long-leaved starwort *Stellaria longifolia*		2B.2	No	Meadows and seeps, riparian woodlands	**Possible.** CNDDB documents species presence seven miles to northeast of site
obtuse startwort *Stellaria obtusa*		4.3	No	Montane coniferous forests and riparian woodlands; along streams or seeps	**Possible.** Potential suitable habitat within site; nearest known occurrence approximately 30 miles southeast of site

Table 3. State listed/rare and CNPS sensitive plant species with potential to occur in or near the Fountain Wind Project.

Species	State Status*	CNPS Status**	CA Endemic	Habitat Requirements	Potential for Occurrence within the Project Area
Shasta huckleberry *Vaccinium shastense* ssp. *shastense*		1B.3	Yes	Acidic, mesic site; often on streambanks; sometimes on rocky outcrops, seeps, roadsides, and disturbed areas within chaparral, lower montane and subalpine coniferous forest, and riparian forest	**Possible.** Suitable habitat may be present within site
oval-leaved viburnum *Viburnum ellipticum*		2B.3	No	Chaparral, cismontane woodlands, and lower montane coniferous forests	**Possible.** Potential suitable habitat within site; nearest known occurrence approximately 16 miles southwest of site

Information from CNPS 2017, CNDDB 2017, USFWS 2017b.
*E: State-listed endangered species; R: State-listed rare species (CNDDB 2017)
**CNPS: California Native Plant Society rare species categories (CNPS 2001):
CNPS 1B.1: Plants seriously threatened in California and at a minimum rare elsewhere.
CNPS 1B.2: Plants fairly threatened in California and at a minimum rare elsewhere.
CNPS 1B.3: Plants not vey threatened in California and at a minimum rare elsewhere.
CNPS 2B.1: Plants seriously threatened in California but more common elsewhere
CNPS 2B.2: Plants fairly threatened in California but more common elsewhere.
CNPS 2B.3: Plants which are not very threatened in California and are more common elsewhere.
CNPS 3.2: Plants believed to be fairly threatened in California, but about which more information is needed.
CNPS 4.2: Fairly threatened plants with a limited distribution in California.
CNPS 4.3: Plants which are not very threatened but have a limited distribution in California.

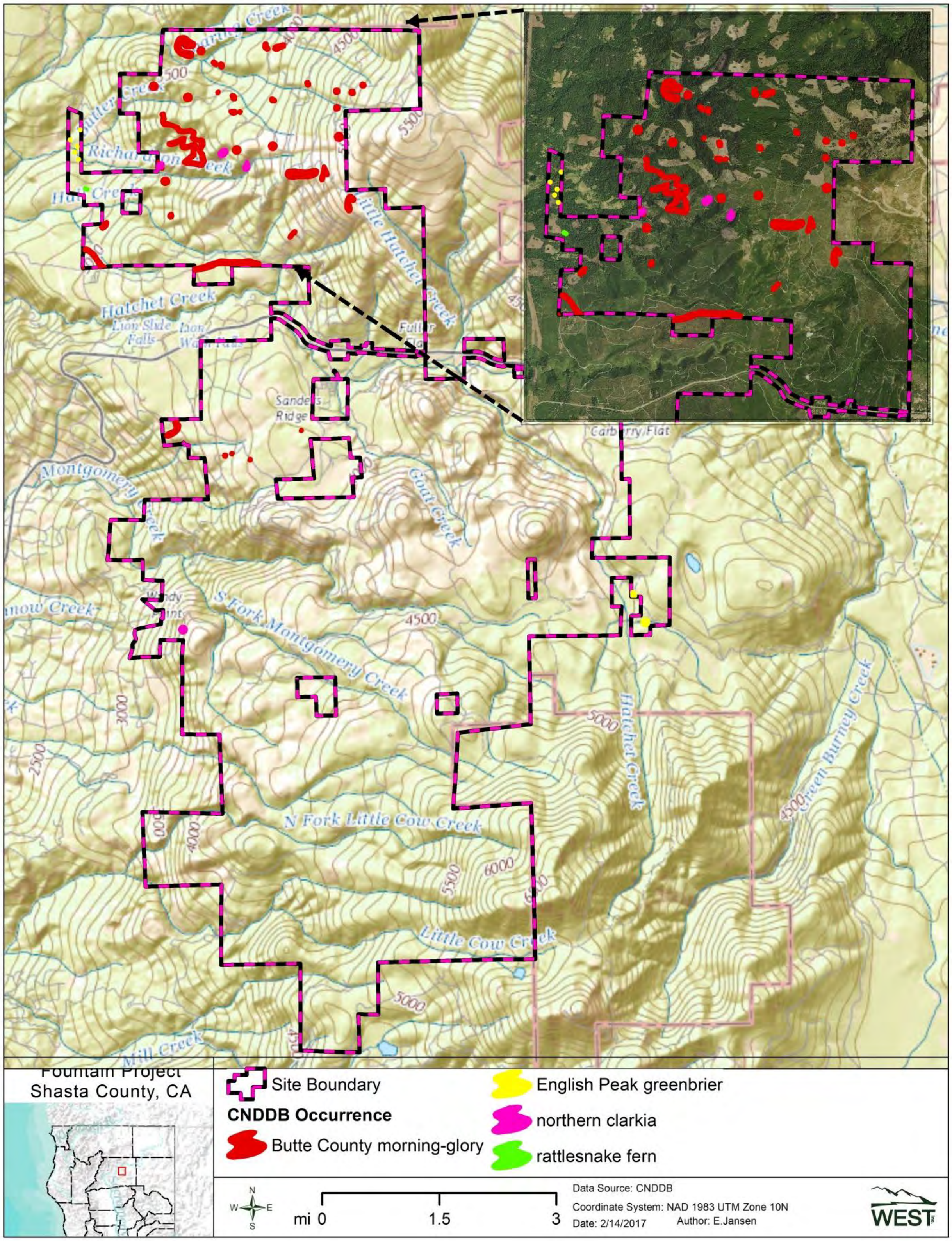

Figure 7. Records of previously-documented state sensitive plant species within the Fountain Wind Project.

Sensitive Habitats

The CNDDB (2017) identified three sensitive natural communities and one river drainage important to sensitive fish species within 10 miles of the Project Area (Table 4). The sensitive communities are: alkali seep, northern basalt flow vernal pool, and northern interior cypress forest. While none of these have been documented as occurring within the Project or Evaluation Areas, alkali seep and northern cypress forest have at least some potential to occur within the Project Area. The sensitive river drainage is the lower Pit River/Canyon River drainage, which was designated for the conservation of the hardhead (*Mylopharodon conocephalus*) and Tule perch (*Hysterocarpus traskii*). This section of the Pit/Canyon River is located approximately 2.5 miles (4 km) to the northwest of the Project Area and streams located within the Project Area are generally not suitable for these two fish species.

Table 4. State designated sensitive habitats and drainages occurring within 10 miles of the Fountain Wind Project.

Habitats	Description	Potential for Occurrence in the Project Area
Alkali seep	Permanently wet or moist alkaline soils; scattered throughout the desert regions of California but less common in other areas	**Unlikely.** Closest occurrence in CNDDB is approximately 5.7 miles from southwest corner of Project Area
Northern basalt flow vernal pool	Occur in small depressions on top of massive basalt flows; pools fill and empty many times during the winter, and have extremely thin soils over the solid bedrock that prevents downward rainwater percolation	**None.** Vernal pool habitat absent from the Project Area; closest occurrence in CNDDB is 7 miles from the northeast corner of the Project.
Northern interior cypress forest	An open, fire-maintained scrubby "forest" dominated by one of several *Cupressus* species; typified by dry, rocky, sterile, often ultramafic soils, in mesic sites associated with montane coniferous forest	**Possible.** CNDDB identifies two sites within several miles, east and west of the Project Area
Drainages	**Species of Interest**	**Potential for Occurrence in the Project Area**
Lower Pit River/Canyon River	hardhead, Tule perch	**None.** Portion of river occurs approximately 2.5 miles to the west and north of Project Area; streams in Project Area generally not suitable for species of interest

Data obtained from CNDDB 2017

Wetlands and Riparian Areas

Digital NWI data (USFWS NWI 2016) were assessed for the Project and Evaluation Areas. According to the NWI, only 2.0% of the Project Area is composed of wetland habitat (Table 5; Figure 8). Forested/shrub wetland is the dominant wetland type in the Project Area, composing 55.0% (351.24 acres [0.55 mi^2]) of all wetland habitat. Riverine habitats compose a further

41.4% (263.90 acres [0.41 mi^2]), and the remaining 3.1% of wetlands is composed of very small areas of emergent wetland (22.86 acres [0.04 mi^2]) and pond (0.20 acres [less than 0.01 mi^2]) habitat. A number of permanent and intermittent creeks run throughout the Project Area, flowing primarily to the west and northwest. The primary drainages in the north of the Project Area are Hatchet Creek and Montgomery Creek, while Cedar Creek and Little Cow Creek drain the southern portions of the site (Figure 4).

The Evaluation Area has a slightly smaller proportion of wetland habitat than the Project Area (1.3%) with forested/shrub wetland composing 50.7% (1,206.85 acres [1.89 mi^2]), and riverine composing a further 30.8% (733.05 acres [1.15 mi^2]; Table 5; Figure 8). The remaining 18.5% of wetlands are composed of smaller amounts of emergent wetlands (350.69 acres [0.55 mi^2]) and pond habitat (91.19 acres [0.14 mi^2]). At its closest points, the Pit River occurs about 2.5 miles (4.0 km) to the west of the Project and 2.5 miles to the north (Figure 8). Additionally, a small lake with associated emergent wetlands occurs approximately 2.5 miles to the northeast (Lake Margaret) and Goose Valley, with more extensive emergent wetlands, occurs approximately 5.0 miles (8.0 km) to the northeast of the Project (Figure 8).

Table 5. Wetland types present within the Fountain Wind Project Area and Evaluation Area. Data were obtained from the USFWS National Wetlands Inventory (USFWS NWI 2016).

	Project Area		Evaluation Area	
Cover Type	**Acres**	**Percent (%)**	**Acres**	**Percent (%)**
Forested/Shrub Wetland	351.24	55.0	1,206.85	50.7
Riverine	263.90	41.4	733.05	30.8
Emergent Wetland	22.86	3.5	350.69	14.7
Pond	0.20	0.1	91.19	3.8
Total	**638.20**	**100**	**2,381.78**	**100**

Data obtained from NWI database (USFWS NWI 2016).

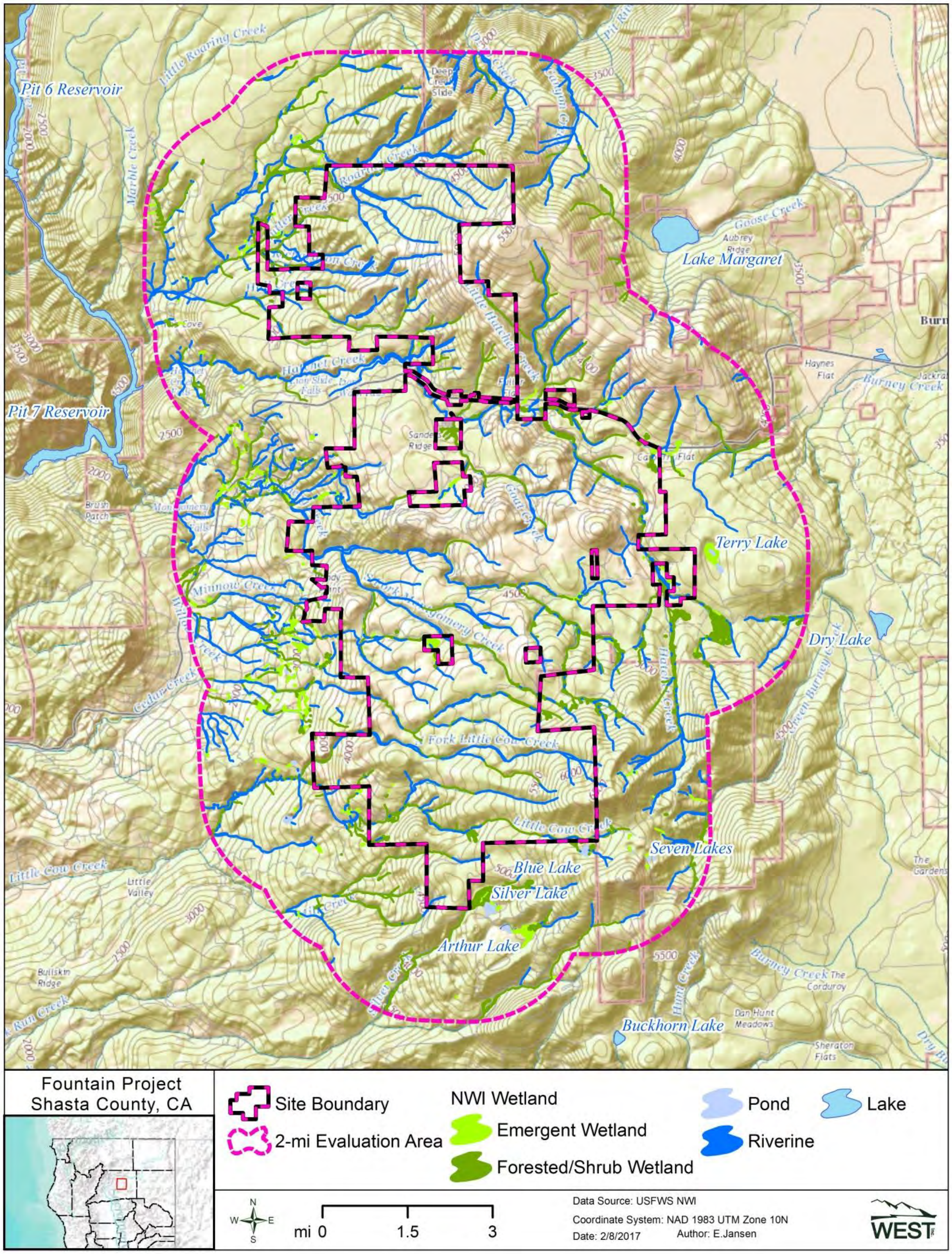

Figure 8. National Wetland Inventory map of the Fountain Wind Project Area and Evaluation Area (USFWS NWI 2016).

Vegetation Summary and Conclusions

The primary vegetation community within the Project Area is mixed conifer forest, a large portion (59%) of which burned in the 1992 Fountain Fire and is currently in a state of post-fire regeneration or succession. Smaller areas of mixed montane chaparral and logged areas (i.e., clear cuts) are scattered throughout both the Project and Evaluation Areas, and include the majority of remaining habitat. Riparian and wetland vegetation is present in the form of mixed montane riparian forest/shrub and riverine habitats, with much smaller areas of wet montane meadow and open water. Based on the NWI (USFWS NWI 2016), only 2.0% of the Project Area is classified as wetland habitat. No federal and/or state listed or candidate plant species are known to occur within the Project or Evaluation Areas; however one species, slender Orcutt grass (a federal threatened and state endangered species; CNPS 2017, CNDDB 2017, USFWS 2017b) is known to occur within 10 miles of the Project. Four CNPS sensitive species are also known to occur within the Project Area, and based on habitats present, there is potential for several other sensitive species to occur as well. Two sensitive habitats, alkali seep and northern cypress forest, have at least some potential to occur within the Project Area. A habitat assessment and rare/sensitive plant survey, as well as a Wetland and Waters of the U.S. survey, are recommended once the Project layout is determined.

WILDLIFE RESOURCES

Raptors

Species Likely to Occur in the Area

Information on the distribution of diurnal raptors, owls, and vultures was collected from the CWHR System (CWHR 2017). Seventeen raptor species have the potential to occur in the Project and Evaluation Areas. In addition, one species of vulture, and 11 species of owl may occur (Table 8).

Of the 17 diurnal raptors with at least some potential to occur within the Project (Table 8), seven species are likely to breed within the Project and/or Evaluation Areas: American kestrel (*Falco sparverius*), bald eagle (*Haliaeetus leucocephalus*), Cooper's hawk (*Accipiter cooperii*), northern goshawk (*Accipiter gentilis*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), and sharp-shinned hawk (*Accipiter striatus*). Golden eagle (*Aquila chrysaetos*), American peregrine falcon (*Falco peregrines*), and prairie falcon (*Falco mexicanus*) are considered uncommon permanent residents of the region; however, suitable nesting and foraging habitat is generally absent from the Project Area and these species are likely to occur only as uncommon visitors and/or migrants. Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), and white-tailed kite (*Elanus leucurus*) likely breed in grassland, agricultural areas, and other open habitats adjacent to the Project Area and may also migrate through the area, but are unlikely to occur within the forested habitats which dominate the Project Area. Four additional species may occur as winter residents in the region: ferruginous hawk (*Buteo regalis*), merlin (*Falco columbarius*), red-shouldered hawk (*Buteo lineatus*), and rough-legged hawk (*Buteo* *lagopus*). Each of these species has the potential to occur within the Project Area; however, ferruginous and rough-legged hawks would more typically be found in open habitat in the surrounding landscape. Additionally, turkey vultures (*Cathartes aura*) may breed within the Project and Evaluation Areas.

Nine owl species potentially nest within the Project Area or surrounding area: barn owl (*Tyto alba*), barred owl (*Strix varia*), flammulated owl (*Otus flammeolus*), great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), northern pygmy owl (*Glaucidium gnoma*), northern saw-whet owl (*Aegolius acadicus*), California spotted owl (*Strix occidentalis occidentalis*), and western screech-owl (*Megascops kennicottii*; Table 8). Additionally, short-eared owl (*Asio flammeus*) may be a permanent resident and breeder regionally, and burrowing owl (*Athene cunicularia*) may be a winter resident regionally but neither is likely to be found in the forested habitats of the Project or Evaluation Areas.

Both bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA; BGEPA 1940), and in California the bald eagle is a state endangered species and the golden eagle is a state fully-protected species (CDFW 2017). Currently, the relative level of eagle use of the Project Area is unknown; bald eagles are known to occur in the Project vicinity (CNDDB 2017). Year round eagle use surveys, consistent with the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS 2013) and the WEG (USFWS 2012a), will help estimate the use of the Project Area by eagles and other raptor species. Of the non-eagle diurnal raptor and vulture species potentially occurring within the Project Area, one species is state threatened (Swainson’s hawk), two species are state fully protected (white-tailed kite and American peregrine falcon), two species are state Species of Special Concern (SSC; northern harrier and northern goshawk), and six species are maintained on the CDFW’s watch list (Cooper’s hawk, ferruginous hawk, merlin, prairie falcon, osprey, and sharp-shinned hawk; CDFW 2017). Of the owl species potentially occurring within the Project Area, two species are considered state SSC: California spotted owl and long-eared owl (CDFW 2017).

At the Hatchet Ridge Wind Farm located immediately to the east of the Project Area, a total of three raptor fatalities (two red-tailed hawks and one sharp-shinned hawk) and one turkey vulture fatality were documented during two years of fatality monitoring at each of Hatchet Ridge’s 44 turbines (Tetra Tech 2013a), providing insight into relative raptor use of an adjacent area.

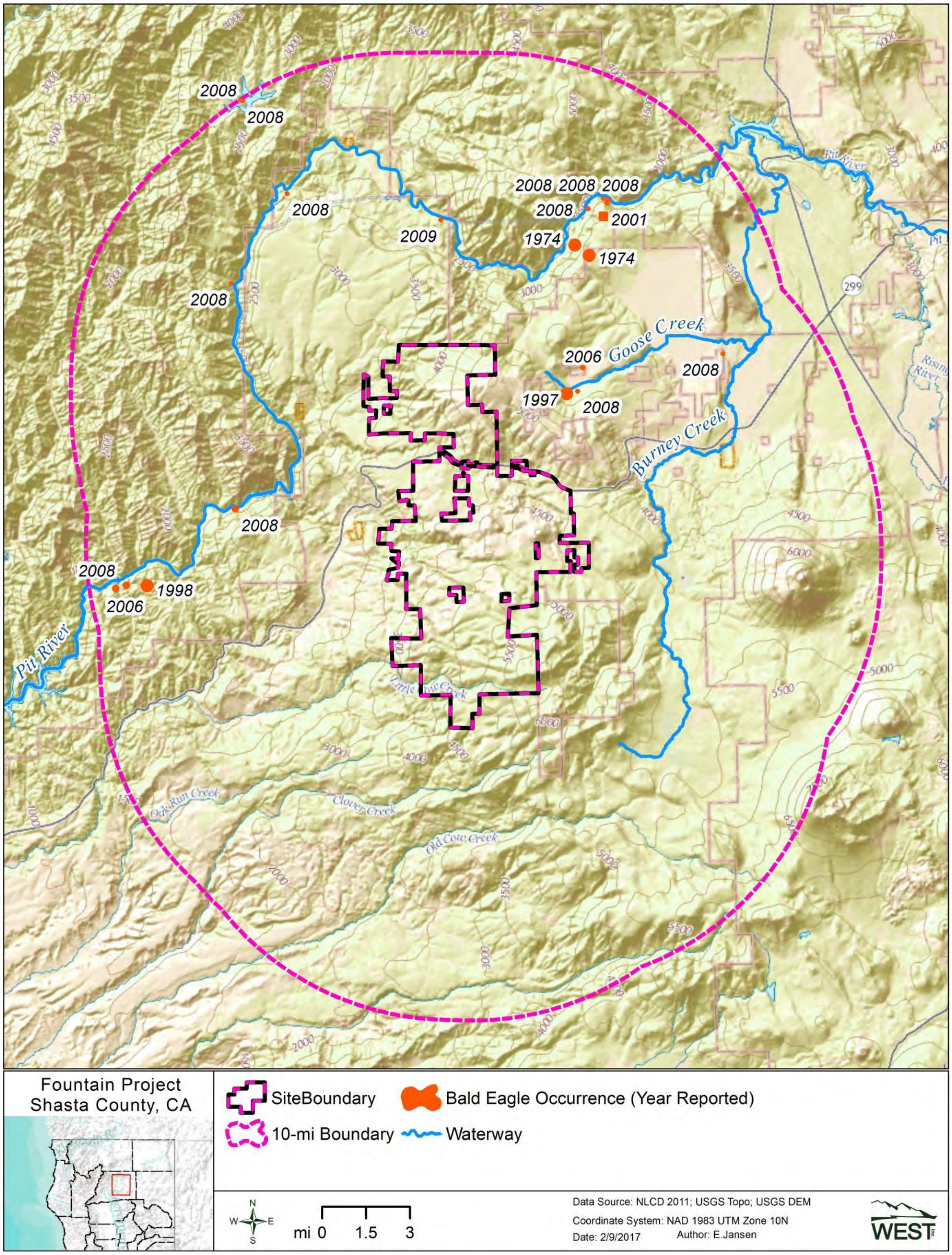

Figure 9. Bald eagle records within 10 miles of the Fountain Wind Project (CNDDB 2017).

Table 6. Diurnal raptor species, owl species, and vulture species with potential to occur within the Fountain Wind Project.

Species	Habitat	Potential for occurrence within the Project Area
Raptors		
American kestrel *Falco sparverius*	Occurs in most open habitats in a variety of shrub and early successional forest habitats and forest openings; nests in cavities	**Likely.** Likely breeder and year-round resident of Project Area
American peregrine falcon *Falco peregrinus anatum*	Uncommon resident and migrant; frequents bodies of water in open areas with cliff and canyons nearby for cover and nesting	**Likely.** May occur as transient or migrant; suitable foraging/nesting habitat generally absent from Project Area
bald eagle *Haliaeetus leucocephalus*	Permanent resident in California; requires large, old-growth trees or snags in remote, mixed stands near water; roosts communally in winter	**Likely.** Nesting and foraging habitat generally absent from Project Area but present in site vicinity
Cooper's hawk *Accipiter cooperii*	Dense stands of oak, deciduous riparian, or other forest habitats near water used most	**Likely.** Likely breeder and year-round resident; observed during September site visits
ferruginous hawk *Buteo regalis*	Winters throughout much of California; requires large, open tracts of grassland, sparse shrub or desert habitats for foraging	**Unlikely.** Regional winter resident but not likely to forage in forested habitats of Project Area; potential to migrate over Project Area
golden eagle *Aquila chrysaetos*	Uncommon permanent resident and migrant throughout California; uses rolling foothills and mountainous terrain, open mountain slopes, and cliffs and rock outcrops	**Possible.** Nesting habitat generally absent in area but potential to occur as transient or migrant within Project Area
merlin *Falco columbarius*	Frequents open habitats at low elevations near water and tree stands; favors coastlines, lakeshores, and wetlands	**Possible.** May occur as winter resident and/or migrant
northern goshawk *Accipiter gentilis*	Prefers mid- and high-elevations, and mature, dense conifer forests	**Occurs.** Number of historic observations within Project Area. Potential breeder and year-round resident
northern harrier *Circus cyaneus*	Frequents meadows, grasslands, open rangelands, fresh and saltwater emergent wetlands; seldom found in wooded habitats	**Unlikely.** Occurs regionally but not likely to occur in forested habitats of Project Area
osprey *Pandion haliaetus*	Associated strictly with large, fish-bearing waters primarily in pine and mixed-conifer forests; nests in large trees and snags near open water	**Occurs.** Nesting and foraging habitat generally absent from Project Area but present in site vicinity; may occur as transient or migrant through site

Table 6. Diurnal raptor species, owl species, and vulture species with potential to occur within the Fountain Wind Project.

Species	Habitat	Potential for occurrence within the Project Area
prairie falcon *Falco mexicanus*	Nests in open terrain with canyons, cliffs, escarpments, and rock outcrops; uses open habitat for foraging (grassland, savannahs, rangelands, and desert scrub)	**Possible.** May occur as transient or migrant; suitable foraging/nesting habitat generally absent from Project Area
red-shouldered hawk *Buteo lineatus*	Dense riparian areas with adjacent edges, swamps, marshes, and wet meadows for hunting	**Possible.** Occurs regionally as breeder and winter resident; suitable habitat generally not present within the Project Area
red-tailed hawk *Buteo jamaicensis*	Nearly all habitats at all elevations including grasslands, cropland, open brush habitats, and open woodlands	**Likely.** Observed during site visits; common permanent resident, breeder, and migrant
rough-legged hawk *Buteo lagopus*	Winters throughout much of California; frequents open areas near riparian or other wooded habitats	**Possible.** May occur in as winter resident or migrant
sharp-shinned hawk *Accipiter striatus*	Breeds in fairly dense conifer and broad-leaved forests; fairly common migrant and winter resident throughout California except in areas with deep snow	**Likely.** Potential breeder and year-round resident
Swainson's hawk *Buteo swainsoni*	Open desert, grassland, or cropland containing scattered, large trees or small groves	**Possible.** Preferred habitat absent but may occur as transient or migrant within Project Area
white-tailed kite *Elanus leucurus*	Costal and valley lowlands; open stages of most habitats mainly in cismontane California, often near agricultural areas	**Unlikely.** Occurs regionally, but not likely to occur in forested habitats of Project Area
Vultures		
turkey vulture *Cathartes aura*	Open stages of most habitats that provide adequate cliff or large trees for nesting, roosting, and resting	**Likely.** Observed during site visits; common summer resident and potential uncommon to rare winter resident
Owls		
barn owl *Tyto alba*	Occurs in open habitats including grassland, chaparral, riparian, and other wetlands; nests/roosts in trees, snags, and cavities in cliffs	**Likely.** May occur as breeder and year-round resident.
barred owl *Strix varia*	Range has expanded into California in past 20 years; inhabits a variety of forest types including redwood (*Sequoia* spp.), Douglas fir, and mixed-conifer	**Possible.** May occur as year-round resident

Table 6. Diurnal raptor species, owl species, and vulture species with potential to occur within the Fountain Wind Project.

Species	Habitat	Potential for occurrence within the Project Area
burrowing owl *Athene cunicularia*	Resident of open, dry grassland and desert habitats and in open stages of pinyon-juniper (*Pinus-Juniperus* spp.) and pine habitats	**Unlikely.** Winter resident regionally; but unlikely to occur in forested habitats of Project Area
California spotted owl *Strix occidentalis occidentalis*	In northern California, associated with dense, old-growth, multi-layered mixed-conifer, redwood, and Douglas fir forests	**Occurs.** Project Area located at edge of range and high quality nesting/roosting habitat generally not present; may forage within or disperse through site; historical records of occurrence in Project Area (CDFG 2011a)
flammulated owl *Otus flammeolus*	Inhabits a variety of conifer habitats from ponderosa pine to red fir forests with low to intermediate canopy closure	**Likely.** Likely occurs as summer resident
great horned owl *Bubo virginianus*	Uses a variety of forests with meadows and other openings from valley foothill hardwood to mixed conifer forest	**Likely.** Likely breeder and year-round resident of the Project Area
long-eared owl *Asio otus*	Frequents dense, riparian and live oak (*Quercus agrifolia*) thickets near meadow edges, and nearby woodland and forest habitats; also found in dense conifer stands at higher elevations	**Possible.** May occur as breeder and year-round resident
northern pygmy owl *Glaucidium gnoma*	Occurs in most forest habitats in California especially valley foothill hardwood, mixed conifer, valley foothill riparian, and montane riparian	**Likely.** Likely occurs as year-round resident
northern saw-whet owl *Aegolius acadicus*	Common in mature riparian, oak, and mixed-conifer habitats with intermediate canopy closure	**Likely.** Likely occurs as year-round resident
short-eared owl *Asio flammeus*	Found in open, treeless areas with elevated sites for perching, and dense vegetation for roosting and nesting	**Unlikely.** Regional year-round or winter resident but not likely to occur in forested habitats of Project Area
western screech-owl *Megascops kennicottii*	Yearlong resident of open oak, pinyon-juniper, riparian, and mixed-conifer habitats; nests and roost in tree cavities	**Likely.** Likely occurs as year-round resident

Potential Raptor Nesting Habitat

Abundant nesting habitat for forest-nesting raptor species is present within the Project and Evaluation Areas. Those raptor species most likely to be found nesting within the Project's mixed conifer forest, based on habitat alone, are: Cooper's hawk, sharp-shinned hawk, northern goshawk, California spotted owl, flammulated owl, northern pygmy owl, and northern saw-whet owl. The Fountain Fire, which burned much of the central half of the Project Area in 1992, has limited the amount of nesting habitat for some forest-nesting species, but may be suitable for species preferring more open forest and scrub habitats (i.e., early seral) for nesting (e.g., American kestrel, red-tailed hawk, great horned owl, and western screech-owl). Nesting habitat for bald and golden eagles is generally absent from the Project Area; however, bald eagles likely nest within several miles of the Project Area at sites associated with larger rivers and water bodies.

Areas of Potentially High Prey Density

Rodents (e.g., woodrats [*Neotoma* spp.], chipmunks, and squirrels), lagomorphs (e.g., snowshoe hare), and passerines (i.e., songbirds) are the prey categories most likely to occur within the Project Area. The numerous, scattered clear cuts within the Project and Evaluation Areas likely provide excellent edge habitat for these species and may provide a concentrated food source for some raptors. Fish are also prey for raptors such as osprey and bald eagles. However, larger rivers and streams preferred by these species are absent from the Project and Evaluation Areas.

Proposed California Condor Reintroduction in Northern California

The California condor, which historically ranged throughout the western U.S., steadily declined throughout the 20th century and was close to extinction by the 1980's. The last known occurrence of a condor in northern California was in the early 20th century. In 1987, the last of the free-flying condors were taken into captivity. As a result of reintroduction efforts that began in southern California in 1992, the current range of the California condor includes California's southern coastal ranges from Big Sur to Ventura County, east through the Transverse Range and the southern Sierra Nevada, with other populations now occurring northern Baja California and in the Grand Canyon ecoregion in Arizona. The total populations in these areas now number more than 420 birds (USFWS 2016).

In early 2016 the USFWS initiated a formal agreement with the Yurok Tribe of Northern California, the National Park Service's Redwood National Park, California State Parks, and the Ventana Wildlife Society to assess the feasibility of releasing California condors in coastal northern California and southern Oregon with the idea that more widely dispersed populations will enhance recovery efforts. Public meetings are scheduled for January of 2017 and if approved, the reintroduction Plan could be initiated as early as 2018.

While the proposed reintroduction site, the Bald Hills of Redwood National Park, is located approximately 105 miles (169 km) west of the Project, the California condor is a wide-ranging species known to cover up to 140 miles (225 km) in a day, particularly outside of nesting season. During breeding season, reproductive pairs typically fly less than 44 miles from the nest site (Snyder and Schmitt 2002). If reintroduction efforts are successful, the presence of condors in more inland portions of the state, including the Project Area, is a possibility; however, the likelihood of occurrence within the Project Area is not currently known. If the reintroduction plan is approved, reintroduced condors would be considered an experimental population, defined as members of a listed species that are geographically separate from other populations of the same species. It is unknown what designation this experimental condor population would have (i.e., essential or non-essential) and, therefore, what level of protection the population may be provided under the Endangered Species Act (ESA; ESA 1973) and the California Endangered Species Act (CESA; CESA 1984). An experimental population that is deemed nonessential may be subject to relaxed restrictions compared to other populations of the same species. Currently, the reintroduced condor population occurring in Arizona, Nevada, and Utah is designated as a nonessential experimental population (USFWS 2016).

Bird Migration

The Project is located within the Pacific Flyway, a major north-south flyway for migratory birds which extends from Alaska to Patagonia and spans the western U.S. from the Pacific Ocean inland to the Rocky Mountains. . The Project and Evaluation Areas contains stopover habitat (i.e., habitat where migratory species may stop to rest, drink, and refuel) for raptors, songbirds, waterfowl, and shorebirds in the form of forest, grassland, shrub-scrub, and smaller areas of riparian and wetland habitat.

Migrating Raptors

Several factors influence the migratory paths of raptors; one of the most significant influences is geography. Ridgelines and the shorelines of large bodies of water are used by migrating raptors because they provide conditions necessary for energy-efficient travel over long distances (Liguori 2005) and serve as navigational aids. For these reasons, raptors tend to follow corridors or pathways along prominent ridges with defined edges or along shorelines during migration. While it is certain that raptors migrate through the Project Area, higher, north-south trending ridgelines are generally east of the Project Area. There does not appear to be any specific features in the Project or Evaluation Areas that would concentrate or funnel raptors during migration. Additionally, there are no significant open river corridors or large lakes within the Project or Evaluation Areas that would attract or concentrate raptor movements. At its closest point, the Pit River runs approximately 0.5 miles to the west and north of the Evaluation Area and Lake Margaret lies approximately 0.5 miles to the east of the Evaluation Area (see Figure 3).

Migrating Passerines

Passerines are by far the most abundant bird group in most terrestrial ecosystems (NRC 2007). In inland areas, it is generally assumed that nocturnal migrating passerines move in broad fronts rather than along specific topographical features (Gauthreaux et al. 2003, NRC 2007). Many species of songbirds migrate at night and may collide with tall man-made structures, though no large mortality events on the scale of those observed at communication towers (National Wind Coordinating Collaborative [NWCC] 2004) have been documented at wind energy facilities in North America. Based on the two-year fatality monitoring study conducted at Hatchet Ridge, seasonal avian mortality was observed to be low (Tetra Tech 2013a). During the first year of monitoring (2010-2011) a total of 30 songbird fatalities were documented with 23 of the fatalities (77%) found during the spring and fall migration period. During the second year of study (2011-2012), nine songbird fatalities were documented with five of the fatalities (56%) recorded during the spring and fall (Tetra Tech 2013a). It should be noted that many of the songbird fatalities found at Hatchet Ridge were resident species, rather than nocturnal migrants, and increased mortality in spring may simply reflect a general increase in avian activity. The results of the Hatchet Ridge fatality study suggest generally low risk to passerines and no disproportionate impacts to nocturnal migrants at the Project.

Breeding Birds

Important Bird Areas

The Audubon Society has identified Important Bird Areas (IBAs) throughout the Western Hemisphere that provide essential habitat for birds (Audubon 2017). These IBAs include sites for breeding, wintering, and migrating birds and can range from only a few acres to thousands of acres in size. There are no identified IBAs within 20 miles of the Project Area. The closest IBAs to the Project are the Fall River Valley IBA, located 20 miles (32 km) to the northeast, and the Upper McCloud IBA located 28 miles (45 km) to the north-northwest. These two IBAs are discussed below.

The Fall River Valley IBA is formed by the Pit and Fall Rivers. This is an area of transition between the Cascade Mountains and the Modoc Plateau, resulting in important habitat diversity including mixed oak-coniferous forest, oak-dominated chaparral, and large, shallow lakes with extensive marshy borders (Audubon 2017). This 54,000 acre (84 mi^2) site supports a high diversity of ducks and shorebirds, including breeding sandhill cranes (*Grus canadensis*). Thousands of ducks and geese over-winter here, and the site provides a staging area for migrating species such as the cackling Canada goose (*Branta hutchinsii*), a rare subspecies. The Pit and Fall rivers support large populations of breeding and wintering bald eagles and osprey and the open valley provides important winter foraging habitat for raptors. Swainson's hawks, long-billed curlews (*Numenius americanus*), burrowing owls, black swifts (*Cypseloides niger*), and tricolored blackbirds (*Agelaius tricolor*) are known to nest in the valley, while bank swallows (*Riparia riparia*), a state threatened species (CDFW 2017), are known to nest along the Pit River (Audubon 2017). The majority of this area is privately owned and used for grazing and irrigated agriculture although there are two state parks within the valley.

The Upper McCloud River IBA is located southeast of Mt. Shasta in Siskiyou County and supports a diverse breeding bird community representative of the Cascade Mountain ecoregion. This IBA encompasses 835 acres (1.3 mi^2) of extensive riparian and wetland habitat supporting populations of species dependent upon these habitats. The site is notable for a large population of breeding willow flycatchers (*Empidonax traillii*), a state endangered species (Audubon 2017, CDFW 2017). The land is primarily managed by the USDA Forest Service, with some private inholdings.

USFWS Birds of Conservation Concern

The USFWS lists 11 birds of conservation concern within the Sierra Nevada Bird Conservation Region (USFWS 2008). These species do not receive special protection unless they are also listed by the USFWS under the ESA (1973) or by the CDFW, but have been identified as vulnerable to population declines in the Conservation Region by the USFWS. Of these, four species are diurnal raptors or owls (bald eagle, American peregrine falcon, flammulated owl, and spotted owl) and have the potential to occur within the Project Area (see Raptors section above). The remaining seven species on the list also have at least some potential to occur within the Project Area. These species include: black swift (*Cypseloides niger*), calliope hummingbird (*Stellula calliope*), Cassin's finch (*Carpodacus cassinii*), Lewis's woodpecker (*Melanerpes lewis*), olive-sided flycatcher (*Contopus cooperi*), Williamson's sapsucker (*Sphyrapicus thyroideus*), and willow flycatcher. The willow flycatcher is listed as a state endangered species (CDFW 2017), and while high quality nesting habitat for the species appears to be absent from the Project Area, there is potential for individuals to migrate through the area. Both black swift and olive-sided flycatcher are also state SSC (CDFW 2017).

USGS Breeding Bird Survey

The closest USGS BBS (USGS 1999) routes to the Project are the Hat Creek Route, which starts 12 miles (19 km) to the east of the Project Area and extends southward, and the Shasta Lake Route, which is located 13 miles (21 km) northwest of the Project Area (Figure 10). Breeding bird survey routes are 24.5 miles (39.4 km) long and consist of 50 stations distributed along the length of the route where three minute counts are conducted (USGS 2001). Information gathered from the survey allows some indication of species that may use the Project Area and surrounding region either transiently or for breeding habitat during the summer.

The Hat Creek route has been monitored for 37 years between 1973 and 2013, while the Shasta Lake route has been monitored for 36 years between 1972 and 2012 (Sauer et al. 2014). A total of 144 unique species were observed along these two routes including 15 vulture or raptor species (turkey vulture, osprey, bald eagle, northern harrier, sharp-shinned hawk, Cooper's hawk, northern goshawk, red-shouldered hawk, red-tailed hawk, golden eagle, American kestrel, (American) peregrine falcon, western screech-owl, great horned owl, and northern pygmy owl; Sauer et al. 2014). The most common species seen along these BBS routes, with an average of more than 30 individuals sighted per year, are: cliff swallow (*Petrochelidon pyrrhonota*), black-headed grosbeak (*Pheucticus melanocephalus*), mountain chickadee (*Poecile gambeli*), western tanager (*Piranga ludoviciana*), orange-crowned warbler (*Vermivora celata*), spotted towhee (*Pipilo maculates*), black-throated gray warbler (*Setophaga nigrescens*), and acorn woodpecker (*Melanerpes formicivorus*). One state endangered species (bald eagle) and two state fully protected species (golden eagle and [American] peregrine falcon) have been observed along these routes (CDFW 2017). Additionally, nine state SSC (northern harrier, northern goshawk, olive-sided flycatcher, black swift, Vaux's swift [*Chaetura* *vauxi*], purple martin [*Progne subis*], yellow warbler [*Setophaga petechial*], yellow-headed blackbird [*Xanthocephalus xanthocephalus*], and yellow-breasted chat [*Icteria virens*]) and three state watch list species (osprey, Cooper's hawk, and sharp-shinned hawk) have also been observed (CDFW 2017). Seven species designated by the USFWS as species of conservation concern within the Sierra Nevada Region have been observed along these routes: bald eagle, (American) peregrine falcon, black swift, calliope hummingbird, Williamson's sapsucker, olive-sided flycatcher, and Cassin's finch (USFWS 2008, Sauer et al. 2014).

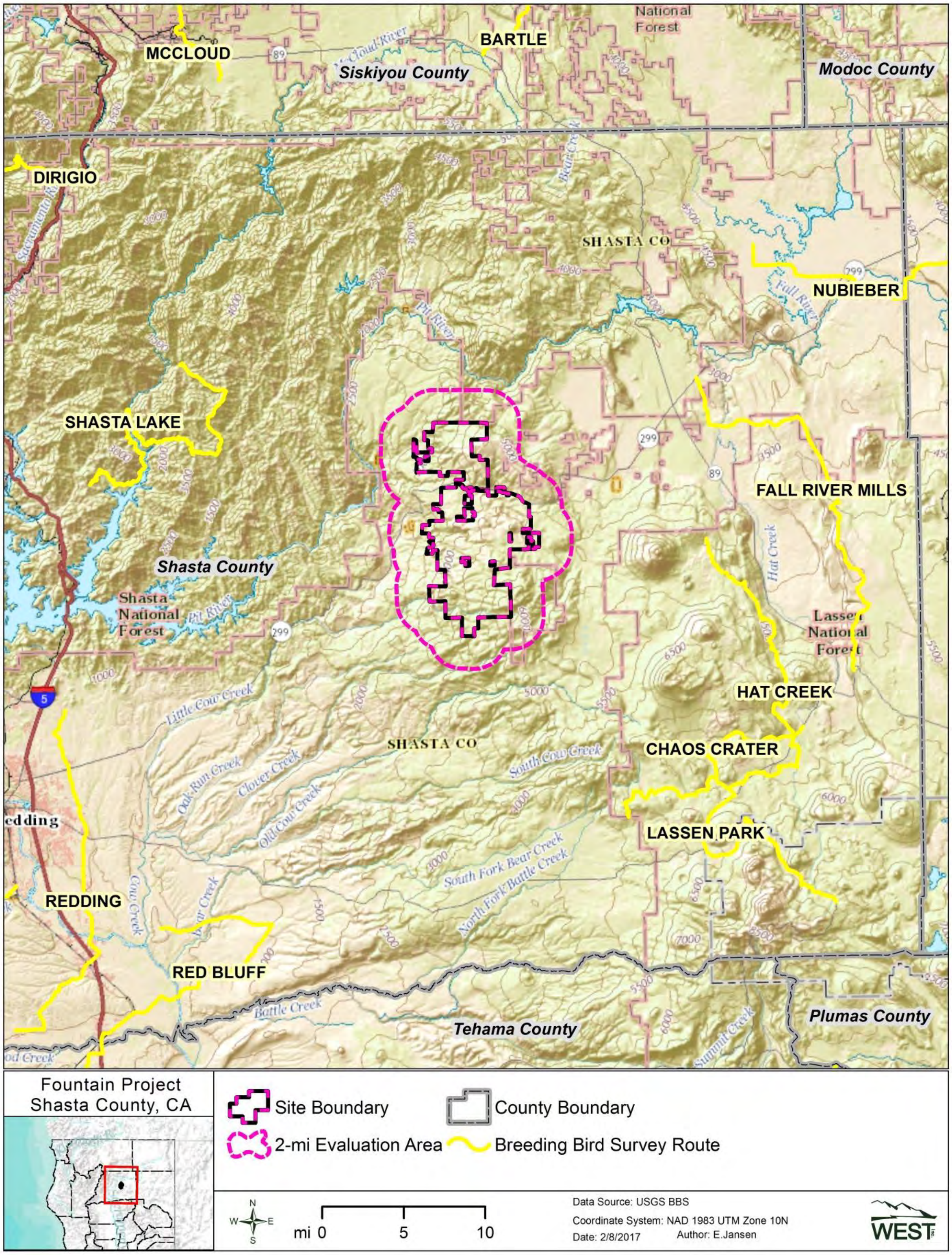

Figure 10. Breeding Bird Survey (BBS) routes closest to Fountain Wind Project.

Bats

Species Likely to Occur in the Area

Due to the lack of complete understanding of bat populations in North America, species and relative abundance of bats occurring within the Project Area are difficult to determine. Based on range maps and species accounts from BCI (2016) and the CWHR (2017), 23 species of bat are known to occur in California, with 17 species having an approximate range and habitat requirements that include the Project and Evaluation Areas (Table 7). All of these species would find suitable habitat within the Project Area, many for breeding, and have the potential to occur within the Project at some time during the year. Five bat species with potential to occur within the Project Area are designated as SSC by the CDFW (2017): Pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), spotted bat (*Euderma maculatum*), western mastiff bat (*Eumops perotis*), and western red bat (*Lasiurus blossevillii*).

Table 7. Bat species within potential to occur within the Fountain Wind Project.

Species	Habitat	Potential for Occurrence in the Project Area
big brown bat *Eptesicus fuscus*	Found in all vegetation types; roosts in buildings and man-made structures	**Likely.** Year-round resident
Brazilian free-tailed bat *Tadarida brasiliensis*	Woodlands, mixed conifer forests; roosts in caves, mines, tunnels, crevices	**Likely.** Summer or year-round resident, however suitable roosting habitat appears limited
California bat *Myotis californicus*	Woodland and forest from sea level through mixed conifer; crevice roosting, buildings, under bark, caves and mines	**Likely.** May occur as year-round resident
canyon bat *Parastrellus hesperus*	Common in arid brushlands, grasslands, and woodlands; uncommon in conifer forests; roosts in rocky canyon walls and cliffs	**Unlikely.** Preferred desert scrub and grassland habitat not present within Project Area; roosting habitat absent
fringed bat *Myotis thysandodes*	Valley foothill hardwood and hardwood-conifer; 4,000-7,000 ft (1,219-2,134 m); roosts in caves, buildings, crevices, and mines	**Possible.** May occur as year-round resident; roosting habitat limited
hoary bat *Lasiurus cinereus*	Woodland and forest with dense foliage; solitary, tree-roosting species; long-distance migrant	**Likely.** Summer resident and migrant
little brown bat *Myotis lucifugus*	Mid- to high-elevation forests; roosts in buildings, trees, under rock or wood; limited by roost sites	**Likely.** Year-round resident
long-eared bat *Myotis evotis*	Coniferous woodland, and forest habitat preferred; roosts in buildings, crevices, snags and under bark	**Likely.** Year-round resident
long-legged bat *Myotis volans*	Woodland and forest habitats above 4,000 ft (1,219 m); roosts in rock crevices, buildings, tree bark	**Likely.** Year-round resident

Table 7. Bat species within potential to occur within the Fountain Wind Project.

Species	Habitat	Potential for Occurrence in the Project Area
pallid bat* *Antrozous pallidus*	Woodlands, forests; roosts in caves, crevices, mines, hollow trees	**Possible.** May occur as year-round resident
silver-haired bat *Lasionycteris noctivagans*	Montane coniferous forest, valley foothill woodlands; roosts in hollow trees, snags, buildings, rock crevices, under bark; long-distance migrant	**Occurs.** Summer or year-round resident and migrant through Project Area. Historic records of occurrence within the Project Area
spotted bat* *Euderma maculatum*	Grasslands, mixed conifer forests, sea level to 10,000 ft (3,048 m); prefers rock crevices, cliffs optimal	**Possible.** May occur as year-round resident; roosting habitat limited within Project Area
Townsend's big-eared bat* *Corynorhinus townsendii*	All habitats except alpine and sub-alpine; caves, mines, tunnels, etc.; roosting sites most important limiting resource	**Possible.** May occur as year-round resident; roosting habitat limited within Project Area
western mastiff bat* *Eumops perotis*	Open semi-arid to arid habitats including conifer and deciduous woodlands; roosts in high rock crevices, cliffs, and tall buildings	**Possible.** May forage within Project Area year-round; roost sites appear to be absent
western red bat* *Lasiurus blossevillii*	Forests and woodlands from sea level up through mixed conifer forests; roosts primarily in trees; migratory	**Likely.** Summer resident and migrant
western small-footed bat *Myotis ciliolabrum*	Arid wooded and brushy uplands, sea level to 8,900ft (2,713 m); caves, buildings, mines, crevices, occasionally under bridges and bark	**Possible.** May occur as summer or year-round resident
Yuma bat *Myotis yumanensis*	Open forests and woodlands are preferred habitats; foraging closely tied to water sources; roosts in caves, buildings, mines, under bridges	**Possible.** May occur as year-round resident; open water foraging habitat limited within site

* California Species of Special Concern (CDFW 2017)
Species list based on range maps and species accounts from BCI (2017) and CWHR (2017)

Bat fatalities at wind energy facilities were first noted during bird surveys in the early 1990s (Orloff and Flannery 1992). However, it was not until reports estimated high numbers of bat fatalities at sites in West Virginia (Kerns and Kerlinger 2004) and Tennessee (Fiedler 2004) that concern was elevated and alliances such as the Bats and Wind Energy Cooperative (BWEC) were established to determine the extent of bat mortality at wind power facilities and to develop solutions to the potential problem (Arnett 2007). The NRC published findings of the Committee on Environmental Impacts of Wind Energy Projects, whose task was to provide a comprehensive review of scientific literature pertaining to the effects of wind energy facilities on the local environment (NRC 2007). Bat casualties have been reported from most wind energy facilities where post-construction fatality data are publicly available. Reported estimates of bat mortality at wind energy facilities have ranged from 0.02 – 53.3 fatalities per megawatt (MW) per year (Arnett et al. 2008). Although some wind power facilities have comparatively high numbers of bat fatalities (Arnett et al. 2008), these figures may be underestimates due to relatively high levels of scavenger removal rates (over 70 percent of bat carcasses removed within 24 hours) and low searcher efficiency, especially where vegetation is relatively high (Arnett 2005b). The small body size of bats also contributes to a lower detection rate compared to that of larger carcasses (e.g., raptors).

Studies conducted at other wind energy facilities have documented use of areas within and around the facilities by resident or breeding bats during the summer reproductive period. However, these species are rarely found as casualties at turbines (Johnson 2005). To date, most bat casualties at wind energy facilities are migratory species (e.g., hoary, silver-haired, and eastern red bats), which conduct relatively long fall migrations between summer roosts and wintering areas (Gruver 2002, Johnson et al. 2003b). For unknown reasons, bat mortality rates are disproportionately high during the fall compared with the spring migration period. However, it may be that tree-roosting bats fly at lower altitudes (AGL) during spring migration than during fall migration. For example, hoary bats fly 3 to 16 ft (1 to 5 m) above the ground while migrating through New Mexico in the spring, but apparently not in the fall (Cryan and Veilleux 2007). Similarly, a hoary bat collided with an aircraft above Oklahoma at an altitude of 8,000 ft (2,438 m) in October of 2001 (Peurach 2003), which may support the theory that bats generally fly at higher altitudes in the fall.

At least 19 bat species have been recovered during carcass searches or incidentally at wind energy facilities throughout the U.S. and of these, nine species are potential residents or migrants within the Project (Table 8). At the adjacent Hatchet Ridge site, a total of 42 bat fatalities were documented during two years of fatality monitoring from 2010 – 2012, for an estimated annual fatality rate of 5.13 bats/turbine/year for the first year of the study and 12.02 bats/turbine/year for the second year (Tetra Tech 2013a). Consistent with the trend observed at other western wind energy projects, the majority of bat fatalities found at Hatchet Ridge were migratory species, with the majority of fatalities found during the fall migration period. It is estimated that impacts to bats at the Project may be similar to that observed at Hatchet Ridge; however, due to an overall lack of knowledge regarding bat and wind turbine interactions, it is difficult to determine definitive risk to bats posed by development of the Project.

Table 8. Summary of bat fatalities (by species) from wind energy facilities in North America.

Common Name	Scientific Name	# Fatalities[1]	% Composition
hoary bat[2]	*Lasiurus cinereus*	5,498	36.6
eastern red bat	*Lasiurus borealis*	3,711	24.7
silver-haired bat[2]	*Lasionycteris noctivagans*	2,594	17.3
little brown bat[2]	*Myotis lucifugus*	1,038	6.9
tricolored bat	*Perimyotis subflavus*	644	4.3
big brown bat[2]	*Eptesicus fuscus*	582	3.9
Mexican free-tailed bat[2]	*Tadarida brasiliensis*	517	3.4
unidentified bat		326	2.2
unidentified *Myotis*	*Myotis* spp.	39	0.3
northern long-eared bat	*Myotis septentrionalis*	30	0.2
Seminole bat	*Lasiurus seminolus*	14	0.1
western red bat[2]	*Lasiurus blossevillii*	13	0.1
evening bat	*Nycticeius humeralis*	7	<0.1
big free-tailed bat	*Nyctinomops macrotis*	6	<0.1
unidentified free-tailed bat		3	<0.1
western yellow bat	*Lasiurus xanthinus*	3	<0.1
eastern small-footed bat	*Myotis leibii*	2	<0.1
Indiana bat	*Myotis sodalis*	2	<0.1
pocketed free-tailed bat	*Nyctinomops femorosacca*	2	<0.1
unidentified Lasiurus bat	*Lasiurus* spp.	2	<0.1
canyon bat[2]	*Pipistrellus hesperus*	1	<0.1
cave bat	*Myotis velifer*	1	<0.1
long-legged bat[2]	*Myotis volans*	1	<0.1
Total	**19 species**	**15,036**	**100**

[1] These are raw data and are not corrected for searcher efficiency or scavenging.
[2] Potential resident or migrant in the Project (Harvey et al. 1999, BCI 2016).
Cumulative fatalities and species from data compiled by Western EcoSystems Technology, Inc. from publicly available fatality documents (see Appendix B).
Additional notes on bat species and numbers:
Indiana bat fatalities in this table are also reported by USFWS (2010, 2011a). Five additional Indiana bat fatalities have been reported (USFWS 2011b, 2012b, 2012c; Pruitt and Okajima 2014), but as little additional data is available, they are not included in this summary of bats found as fatalities.
One long-eared bat (*Myotis evotis*) was an incidental fatality recorded at Tehachapi, California (Anderson et al. 2004), but was not part of a formal search and is not included above.
An additional 677 bat fatalities (evening bat, eastern red bat, hoary bat, tricolored bat, Mexican free-tailed bat, and unidentified bat) have been found in Texas (Hale and Karsten 2010), but the number of fatalities by species is not reported.
Canyon bat formerly known as western pipistrelle (*Pipistrellus hesperus*), and tricolored bat formerly known as eastern pipistrelle (*Pipistrellus subflavus*; BCI 2015a, 2015b).

Federal Listed Species

Thirteen federal endangered, threatened, or candidate wildlife species have been documented as occurring within Shasta County based on data obtained from the USFWS (2017b) and the CNDDB (2017; Table 9). Most of these species have highly restricted ranges or occupy specialized habitats which do not occur within the Project or Evaluation Areas, and therefore have little or no likelihood of occurrence. The Sierra Nevada red fox (*Vulpes vulpes necator*) and the California red-legged frog (*Rana draytonii*) have at least some potential to occur within the Project Area as suitable habitats may to present; however, both species are rare in the region and have not been documented as occurring in the Project or Evaluation Areas (CNDDB

2017). The gray wolf (*Canis lupus*), extirpated from California in the 1920's, is not currently known to occur in the Project Area, although populations in Oregon are expanding and wolves were recorded in Shasta and Lassen Counties in 2015 and 2016. It is possible that this wide-ranging species will eventually occupy habitats within the Project Area (Kovacs et al. 2016). The western pond turtle is currently under review for potential listing under the ESA (USFWS 2017b), is known to occur just southwest of the Project Area (Figure 11), and suitable habitat is present within the Project Area. The yellow-billed cuckoo (*Coccyzus americanus*), Shasta crayfish (*Pacifastacus fortis*), and Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) each have a very low likelihood of occurrence based on current known ranges and habitat requirements. Federal listed species with at least some potential (i.e., unlikely or possible) to occur within the Project Area are discussed in greater detail below.

Table 9. Federal listed, candidate, or under review wildlife species with potential to occur within the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence in the Project Area
Birds			
northern spotted owl *Strix occidentalis caurina*	T	Mature forest, multi-layered mixed conifers	**None.** In Shasta County, northern subspecies occurs only north of the Pit River, which is outside of the Project Area
yellow-billed cuckoo *Coccyzus americanus*	T	Riparian forest along the broad, lower flood-bottoms of larger river systems; nests in riparian jungles of willow often mixed with cottonwoods	**Unlikely.** Rare breeder throughout California. Not known to occur near Project Area; suitable riparian habitat generally not present within the Project Area
Mammals			
gray wolf *Canis lupus*	E	Habitat generalists, historically occupying diverse habitats including tundra, forests, grasslands, and deserts	**Possible.** No documented observations in the CNDDB for Shasta County since 1924; however, populations in Oregon are expanding and natural recolonization of northern California is occurring, with confirmed presence in Siskiyou and Lassen Counties in 2015 and 2016, respectively; suitable habitat is present within the Project Area

Table 9. Federal listed, candidate, or under review wildlife species with potential to occur within the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence in the Project Area
Sierra Nevada red fox *Vulpes vulpes necator*	C	Historically found from the Cascades down to the Sierra Nevada. Inhabit a variety of habitats from wet meadows to forested areas, typically at elevations above 5,000 feet. Currently restricted to several small populations in California and Oregon.	**Unlikely.** Known from only a few observations in CNDDB; Project falls within historical range but outside of species known occupied range.
Amphibians			
California red-legged frog *Rana draytonii*	T	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation	**Unlikely.** No known occurrences within Shasta County (CNDDB 2017); however, some suitable stream habitat may be present within Project Area
Reptiles			
western pond turtle *Emys marmorata*	UR	Aquatic species requiring ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation	**Possible.** Suitable aquatic habitat limited within the Project Area, but may be present within pools of larger creeks or ponds; CNDDB documents species presence near southwest corner of Project Area
Fish			
bull trout *Salvelinus confluentus*	T	Deep pools in cold rivers and large tributary streams, often in moderate to fast currents; also large coldwater lakes and reservoirs; historically found only in the McCloud River system	**None.** No suitable stream habitat present within Project Area; believed to be extinct in California
Chinook salmon *Oncorhynchus tshawytscha*	T (spring-run) E (winter-run)	Large freshwater streams and rivers and estuaries for spawning; require deep, cold, flowing water	**None.** No suitable stream habitat present within Project Area
steelhead (Central Valley DPS) *Oncorhynchus mykiss irideus*	T	Sacramento and San Joaquin rivers and their tributaries	**None.** Range lies to the west and south of the Project Area; no suitable stream habitat present within Project Area
Invertebrates			
conservancy fairy shrimp *Branchinecta conservatio*	E	Turbid, slightly alkaline, large, deep, vernal pools and winter lakes in California grassland areas	**None.** Suitable vernal pool habitat absent within Project Area

Table 9. Federal listed, candidate, or under review wildlife species with potential to occur within the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence in the Project Area
Shasta crayfish *Pacifastacus fortis*	E	Cool, spring-fed headwaters with clean, volcanic cobbles, over sand and gravel substrates	**Unlikely.** Known only from the Fall River and Hat Creek subdrainages of the Pit River system
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*)	**Unlikely.** Known only to occur in locations west and south of Project Area in California's Central Valley
vernal pool fairy shrimp *Branchinecta lynchi*	T	Small, clear-water depression pools and grassed swales; endemic to grasslands of the Central Valley, central coast mountains, and south coast mountains	**None.** Known only from isolated locations in lower elevations of Shasta County; suitable vernal pool habitat absent from Project Area
vernal pool tadpole shrimp *Lepidurus packardi*	E	Vernal pools and swales in the Sacramento Valley containing clear to highly turbid water	**None.** Known only from isolated locations in lower elevations of Shasta County; suitable vernal pool habitat absent from Project Area

E: federally-listed endangered species; T: federally-listed threatened species; C: federal candidate species for listing; UR: under review (petitioned for listing but 90-day/12-month finding not published, also possible candidate but Candidate Notice of Review [CNOR] not signed)
Species status from USFWS 2017b, CNDDB 2017

Yellow-billed Cuckoo

The yellow-billed cuckoo is a federal threatened species (USFWS 2017b), as well as a California state endangered species (CDFW 2017). This species inhabits deciduous riparian thickets or forests with dense, low-level or understory foliage which occur adjacent to slow-moving watercourses. Willow is almost always a dominant component of the vegetation (CWHR 2017). The western subspecies (*C. a. occidentalis*) has disappeared over much of it former range in California and other western states, primarily due to habitat loss. In California, yellow-billed cuckoos now occur only as rare summer residents of valley foothill and desert riparian habitats in scattered locations across the state (CWHR 2017). The species' current range in California is generally south of the Project, and riparian willow habitats used by the cuckoo are not present in the Project, though they may occur in the surrounding region. The CNDDB (2017) lists no known occurrences of the species in the Project; however, the USFWS (2017b) lists the species as occurring or potentially occurring in Shasta County. The potential for yellow-billed cuckoos to occur in the Project Area is unlikely given their highly-restricted range and lack of suitable habitat.

Gray Wolf

The gray wolf is currently an endangered species at both the federal (USFWS 2017b) and state level (CDFW 2017). The species was believed to be extirpated from the state of California in the 1920's and from much of its range in the United States by the mid-1930's. In 1995 and 1996, populations were reintroduced in Idaho and Yellowstone National Park in Wyoming and have expanded rapidly. As of 2014, Washington's wolf population was estimated to be 68 individuals, while Oregon's population was estimated to be 81 individuals (Kovacs et al. 2016). A lone wolf dispersed into northern California from Oregon in 2011, prompting the state listing of the gray wolf under CESA in 2014. In 2015, cameras deployed in Siskiyou County recorded two adult wolves and four pups, suggesting the natural recolonization of northern California by gray wolves (Kovacs et al. 2016); since that time wolves have also been documented in Lassen County. Gray wolves are habitat generalists, historically occupying diverse habitats including tundra, forests, grasslands, and deserts. Primary habitat requirements are the presence of adequate ungulate prey, water, and low human contact (CWHR 2017). It is possible that gray wolves currently inhabit (or travel through) the Project Area, and the probability of occurrence will likely increase in the future as populations in the Pacific Northwest in general, and California specifically, continue to expand.

Sierra Nevada Red Fox

The Sierra Nevada red fox is a candidate for federal listing (USFWS 2017b) as well as a state-listed threatened species (CDFW 2017). Its historical range is believed to include an area from the Oregon Cascades southward to the northern Sierra Nevada and then south along the Sierran crest to Tulare County (CWHR 2017). Red foxes appear to prefer red fir (*Abies magnifica*) and lodgepole pine (*Pinus contorta*) forests in the subalpine zone and alpine fellfields of the Sierra Nevada, but may also use wet meadows, mixed conifer, montane chaparral, and pine habitats. They may hunt in forest openings, meadows, and barren rocky areas associated with high elevation habitats, typically above 5,000 ft (1,524 m), using dense vegetation and rocky areas for cover and den sites (CWHR 2017). The Project lies outside the known occupied range of the Sierra Nevada red fox; the species is currently known to occur in California in two loosely clustered "sighting areas" (i.e., Lassen and Sonoran Pass; USFWS 2015). There are no known records of the species occurring within 10 miles of the Project (CNDDB 2017). Given their highly restricted range, Sierra Nevada red fox are unlikely to occur in the Project Area.

California Red-legged Frog

The California red-legged frog is a federal threatened species (USFWS 2017b) occurring along the coast ranges from Mendocino County south and in portions of the Sierra Nevada and Cascades, usually below 3,900 ft (1,200 m) in elevation (CWHR 2017). California red-legged frogs inhabit quiet pools of streams, marshes, and occasionally ponds, preferring shorelines with extensive vegetation (CWHR 2017). The species requires permanent or nearly permanent pools for larval development; therefore intermittent streams must retain water in pools year-round for the species' survival. The Project Area lies at the northern extent of the species' range and suitable aquatic habitat may be present within the Project Area; however, no California red-legged frog occurrences have been documented in Shasta County (CNDDB 2017).

Western Pond Turtle

The western pond turtle is currently Under Review (UR) by the USFWS (2017b), a status applied to species petitioned for listing but for which a 90-day or 12-month finding has not been published in the Federal Register. This status may also apply to species under review through the candidate process, but for which the Candidate Notice of Review (CNOR) has not been signed. The western pond turtle is a medium-sized pooled water dwelling turtle that historically ranged from southern California north to Puget Sound in Washington, including much of California's Central Valley. It prefers habitat with plentiful aquatic vegetation, with either rocky or muddy bottoms, and where exposed banks are present for basking. Although in decline across much of their range due to habitat loss and competition with red-eared sliders (*Trachemys scripta elegans*) and painted turtles (*Chrysemys picta*), western pond turtles are still found throughout northwestern California south to San Francisco bay, including much of Shasta County (CHWR 2017). Western pond turtles occur from sea level up to approximately 6,700 ft (2,042 m) in a variety of aquatic habitats (CHWR 2017). Because this species still occupies a variety of habitats in California, including a known location just southwest of the Project (Figure 11), it is possible that it may occur in the Project Area.

Shasta Crayfish

The Shasta crayfish is listed as both a federal and state endangered species (CDFW 2017, USFWS 2017b). The species inhabits cool, clear, spring-fed lakes, rivers, and streams, usually at or near a spring inflow source where waters show little annual fluctuation in temperature and remain cool during summer. In general, Shasta crayfish habitat is defined by the availability of volcanic rock cobble and boulders on sand or gravel to provide refuge from predators (USFWS 1998). While potential food resources, water temperature, and water chemistry may also influence the species distribution, the range of conditions where Shasta crayfish occur is considerable and detailed information of the species ecology is limited. Currently the species range is limited to the midsections of the Pit River drainage, primarily the Fall River and Hat Creek subdrainages in Shasta County. Isolated populations identified within these subdrainages occur between 12 and 28 miles (19.3 to 45.1 km) to the east and northeast of the Project (USFWS 1998).

Valley Elderberry Longhorn Beetle

The Valley elderberry longhorn beetle, a federal threatened species (USFWS 2017b), is a medium-sized beetle endemic to the Central Valley of California. The beetle is found only in association with its host plant, blue elderberry (*Sambucus mexicanus*; USFWS 2006). Currently, the beetle ranges from southern Shasta County south to Fresno County within the Central Valley; however, range-wide population trend data is scarce. While the beetle's host plant, blue elderberry, likely occurs within the Project Area, the beetle is currently known only from lower elevations south and southwest of the Project and has not been identified as occurring within 10 miles.

State Listed Species

The CNDDB (2017b) lists 16 state endangered, threatened, candidate, or fully protected species with documented occurrence in Shasta County, including eight birds, three mammals, one amphibian, three fish, and one invertebrate (Table 10). With the exception of the three fish species which require larger streams and rivers than those present within the Project Area, each of the species has at least some potential (i.e., unlikely, possible, likely, or known) to occur within the Project Area at some point in the year, either as residents or migrants within the site, and nine species have at least a moderate potential to occur. With the exception of the Sierra Nevada red fox, gray wolf, and the Shasta crayfish, which are also federal listed or candidate species and therefore presented above, state listed species with at least some potential to occur within the Project Area are discussed in greater detail below.

Table 10. State listed or candidate wildlife species with potential to occur within the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence in the Project Area
Birds			
American peregrine falcon *Falco peregrines anatum*	FP	Uncommon resident and migrant; frequents bodies of water in open areas with cliff and canyons nearby for cover and nesting	**Possible.** May occur as transient or migrant; suitable foraging/nesting habitat generally absent from Project Area
bald eagle *Haliaeetus leucocephalus*	E	Requires large, old-growth trees or snags in remote, mixed stands near water; roosts communally in winter	**Possible.** Nesting and foraging habitat generally absent from Project Area but present in site vicinity; CNDDB documents several occurrences within five miles of Project Area
bank swallow *Riparia riparia*	T	Nests colonially in riparian and lowland habitats; requires vertical banks/cliffs with fine-textured soils near streams, rivers, lakes to dig nest cavity	**Possible.** Not known to occur in site vicinity and suitable nesting habitat unlikely to occur on site; may forage within, or migrate through Project Area
golden eagle *Aquila chrysaetos*	FP	Uncommon permanent resident and migrant throughout California; uses rolling foothills and mountainous terrain, open mountain slopes, and cliffs and rock outcrops	**Possible.** Nesting habitat generally absent within site and vicinity but potential to occur as transient or migrant within Project Area
greater sandhill crane *Grus canadensis tabida*	T	Wet meadows, shallow lacustrine, and emergent wetlands for nesting and foraging; winters in Central Valley	**Possible.** Probable migrant over Project Area; suitable nesting/stopover habitat generally absent from site but may breed in open wetlands in region
Swainson's hawk *Buteo swainsoni*	T	Open desert, grassland, or cropland containing scattered, large trees or small groves	**Possible.** Preferred habitat absent but may occur as migrant over Project Area
tricolored blackbird *Agelaius tricolor*	C	Highly colonial species, most numerous in Central Valley & vicinity; requires open water, protected nesting substrate, & nearby foraging area	**Unlikely.** Breeds regionally, but suitable nesting habitat appears absent within Project Area; known to nest within the Fall River Valley approximately 20 miles to northeast of site; may occur as migrant through site
willow flycatcher *Empidonax traillii*	E	Wet meadow and montane riparian habitat 2,000-8,000 ft (610-2,438 m); most often in broad open river valley or large mountain meadows with lush growth of shrubby willows	**Possible.** Nesting habitat appears to be absent, but may occur as spring/fall migrant in riparian habitats within Project Area

Table 10. State listed or candidate wildlife species with potential to occur within the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence in the Project Area
Mammals			
Sierra Nevada red fox* *Vulpes vulpes necator*	T	Historically found from the Cascades down to the Sierra Nevada. Inhabit a variety of habitats from wet meadows to forested areas, typically at elevations above 5,000 feet. Currently restricted to several small populations in California and Oregon.	**Unlikely.** Known from only a few observations in CNDDB; Project falls within historical range but outside of species known occupied range.
California wolverine *Gulo gulo*	T	Scarce resident of North Coast Mountains and Sierra Nevada; uses mixed-conifer, red fir, and lodgepole habitats in northern Sierra	**Unlikely.** Known range is generally to north and east of Project Area; however, some suitable habitat may occur on site; CNDDB documents occurrence in 1968 along the northeastern boundary of Project Area
gray wolf* *Canis lupus*	E	Habitat generalists, historically occupying diverse habitats including tundra, forests, grasslands, and deserts	**Possible.** No documented observations in the CNDDB for Shasta County since 1924; however, populations in Oregon are expanding and natural recolonization of northern California is occurring, with confirmed presence in Siskiyou and Lassen Counties in 2015 and 2016, respectively; suitable habitat is present within the Project Area
Amphibians			
Shasta salamander *Hydromantes shastae*	T	Cool, wet rivers and valleys near limestone fissures or caves; occurs in valley foothill, hardwood conifers, ponderosa pine, and mixed conifer habitats in vicinity of Shasta Reservoir	**Unlikely.** Site is outside of species known range; suitable habitat appears to be absent; CNDDB documents species presence five miles to west of Project Area
Fishes			
bull trout *Salvelinus confluentus*	E	Deep pools in cold rivers and large tributary streams, often in moderate to fast currents; also large coldwater lakes and reservoirs; historically found only in the McCloud River system	**None.** No suitable stream habitat present within Project Area; believed to be extinct in California
Chinook salmon *Oncorhynchus tshawytscha*	T (spring-run) E (winter-run)	Large freshwater streams and rivers and estuaries for spawning; require deep, cold, flowing water	**None.** No suitable stream habitat present within Project Area

Table 10. State listed or candidate wildlife species with potential to occur within the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence in the Project Area
rough sculpin *Cottus asperrimus*	T	Primarily on muddy bottoms of large streams; restricted to Pit River and the Hat Creek and Fall River subdrainages	**None.** Suitable large stream habitat absent from Project Area is out of species known range
Invertebrates			
Shasta crayfish* *Pacifastacus fortis*	E	Cool, spring-fed headwaters with clean, volcanic cobbles, over sand and gravel substrates	**Unlikely.** Known only from the Fall River and Hat Creek subdrainages of the Pit River system

E: state-listed endangered species; T: state-listed threatened species; C: state candidate species for listing; FP: fully-protected species
Species status from CNDDB 2017, CDFW 2017
*species account included in federal listed species section above

American Peregrine Falcon

An uncommon breeding resident and uncommon migrant, the peregrine falcon was delisted as a federal endangered species in 1999 and as a California endangered species in 2009. The peregrine falcon remains, however, a state fully-protected species (CDFW 2017). Active nesting sites are known to exist in the mountains of northern California and the species is often found wintering inland. Additionally, individuals may migrate into California from more northerly breeding sites. This species commonly breeds in woodlands and forests, with wetlands and riparian habitats being an important year-round component of occupied habitat (CWHR 2017). Nests are typically situated on ledges of vertical rocky cliffs or river bluffs; however, tundra mounds, tree hollows, large stick nests of other species, and man-made structures (e.g., ledges of tall city buildings) may be used for nesting. When not breeding, peregrine falcons occur in areas with high prey concentrations such as farmlands, marshes, lakeshores, tidal flats, broad river valleys, and cities (CWHR 2017). The CNDDB currently has no record(s) of the peregrine falcon occurring within 10 miles of the Project Area; however, the species has been observed on the nearby Shasta Lake BBS Route (Sauer et al. 2014). No obvious suitable nesting habitat was observed within the Project Area during the preliminary site visit although isolated nest sites on the Project and in the surrounding region may occur. There is also potential for the species to forage within the site and surrounding area, particularly within wetlands and riparian habitats, or to pass through the Project during migration.

Bald Eagle

The bald eagle is listed as a state endangered species and is considered a fully protected species in California (CDFW 2017). The species is further projected under the federal BGEPA (1940). Historically, bald eagles occurred throughout California. However, current breeding distribution is limited primarily to mountainous habitat in the northern quarter of the state (CWHR 2017). Bald eagle nesting territories are typically found in pine and mixed conifer forests associated with lakes, reservoirs, rivers, or other large water bodies with abundant fish (CWHR 2017). While there are suitable nesting sites within the Project Area, there are no large water bodies that would typically be necessary to support nesting bald eagles in northern California. Suitable nesting, foraging, and wintering habitat may be available on lakes and rivers in the surrounding region, and bald eagles may occasionally fly over the Project while migrating or commuting between or among foraging areas. The CNDDB (2017) documents the occurrence of bald eagles to the north, northeast, and west of the Project, primarily in association with larger rivers and lakes in the region, and bald eagle have been observed on the nearby Shasta Lake BBS Route (Sauer et al. 2014).

Bank Swallow

Found primarily in riparian and other lowland habitats, the bank swallow, a state threatened species (CDFW 2017), was historically relatively common in California. Currently, scattered colonies exist throughout central and northern California, including Shasta County (CWHR 2017). This species also occurs as a migrant in the California interior and in mixed flocks with other swallow species. Primarily a colonial breeder, the bank swallow requires cliffs, bluffs, and river banks with fine-textured or sandy soils in which to excavate nest burrows. It typically feeds over grassland, shrubland, savannah, and open riparian areas (CWHR 2017). The nearest known colony of bank swallows occurs along the Pit River within the Fall River Valley IBA, 20 miles east of the Project. Bank swallows may forage within the Project Area, and may fly over the Project during migration; however, waterways within the site do not appear to provide suitable habitat for nesting colonies.

Golden Eagle

The golden eagle, a state fully protected species (CDFW 2017) further protected under the BGEPA (1940), is an uncommon permanent resident and migrant throughout all of California, except the central portions of the Central Valley (CWHR 2017). The species is generally more common in southern California than in the northern part of the state. Golden eagles inhabit rolling foothill and mountainous terrain, including prairies, arctic and alpine tundra, wide, arid plateaus deeply cut by streams and canyons, and open mountain slopes. Golden eagles construct large platform nests of sticks and greenery on rock ledges or cliffs, or in large trees within open habitats. While suitable cliffs and open woodlands preferred for nesting are limited within the Project Area, there is potential for golden eagles to forage within the site or to pass through the Project during migration. There is also potential for the species to nest within suitable habitats in the surrounding region.

Greater Sandhill Crane

Historically, greater sandhill cranes (*Grus canadensis tabida*) were common breeders on the Modoc Plateau of northeastern California. Now listed as threatened by the CDFW (2017), their numbers and breeding range have been greatly reduced. The species nests in open areas of wet meadows that are typically interspersed with tall, emergent marsh vegetation. Sandhill cranes forage in pastures, flooded grain fields, and seasonal wetlands during migration and on their wintering grounds, and forage in emergent marsh and meadow habitats during the nesting season, preferring relatively treeless plains (CWHR 2017). During the spring, sandhill cranes are known to use habitats in the Fall River Valley IBA 20 miles east of the Project Area. While appropriate habitat for the species is generally absent from the Project and Evaluation Areas, the species likely uses open areas in the surrounding landscape and may pass over the Project Area during migration.

Swainson's Hawk

The Swainson's hawk, a state threatened species (CDFW 2017), is an uncommon breeding resident and migrant in northeastern California. The species breeds in North America and migrates to Central and South American for the winter. In California, the hawk is restricted to portions of the Central Valley and Great Basin where suitable foraging habitat is available (CDFW 2017). Swainson's hawks typically nest in trees along riparian corridors or in isolated trees or small groves in sparsely vegetated flatlands. They forage in adjacent grassland, shrubland, suitable grain or alfalfa fields, or livestock pastures. The forested habitats composing the majority of the Project Area are generally not suitable for nesting or foraging; however, more open areas adjacent to the Project may provide suitable habitat. This species is a likely migrant throughout the Project Area in spring and fall.

Tricolored Blackbird

The tricolored blackbird is a candidate for state endangered listing in California (CDFW 2017). The species in highly colonial, breeding near freshwater, preferably in emergent wetland with tall dense cattails or tules, but also in thickets of willow, blackberry, and tall herbs (CWHR 2017). They forage on insects primarily in grassland and cropland habitat within a few kilometers of their breeding locations (CWHR 2017). Tricolored blackbirds are most numerous in the Central Valley of California but also occur locally in northeastern California (CWHR 2017). While the species is not migratory over most of it range, populations in the northeast of the state are believed to migrate south in winter. Flocks become nomadic in fall in search of food. There are a number of documented occurrences of tricolored blackbirds in Shasta County, although none within 10 mi (16 km) of the Project Area (CNDDB 2017; Figure 11). The species is known to occur within the Fall River IBA, approximately 20 miles northeast of the Project. Breeding habitat for the species is generally absent from the Project and Evaluation Areas; however, tricolored blackbirds may occur in the area during fall and winter as migrants or during foraging.

Willow Flycatcher

The willow flycatcher is listed as an endangered species by the state of California (CDFW 2017). Historically, the willow flycatcher was a common summer resident throughout California, with a breeding range extending wherever extensive willow thickets occurred (CDFW 2017). Currently, only small, scattered nesting populations exist in isolated wet meadows and riparian areas of the Sierra Nevada and Cascade ranges, and along the Kern, Santa Margarita, San Luis Rey, and Santa Ynez Rivers in southern California. The species requires dense willow thickets for nesting and roosting and low exposed branches from which to sing and perch while foraging. It is consistently absent from habitat where heavy livestock grazing has removed the lower branches of woody riparian vegetation. The willow flycatcher is also a fairly common spring and fall migrant, especially in riparian habitats, at lower elevations throughout the state. Some willow riparian areas are found in the vicinity of the Project, notably along Hatchet Creek and within several small meadows within the Project Area. These riparian areas could potentially provide suitable breeding habitat for the species, as could riparian habitat along Burney Creek, approximately 3 miles (4.8 km) to the northeast. It is likely that the species occurs within the Project Area during migration, particularly within riparian areas.

California Wolverine

The California wolverine is currently a state-threatened species in California (CDFW 2017). Within mixed conifer, red fir, and lodgepole pine habitats in the northern Sierra Nevada, the wolverine is generally found between 4,300 and 7,300 ft (1,311 and 2,225 m). Wolverines feed primarily on carrion and small mammals but will take larger prey as opportunity allows and have been known to force bears (*Ursus* spp.) and mountain lions (*Puma concolor*) off carcasses (CWHR 2017). The species prefers habitats with little human interference, hunting in open areas and using dense forest cover and snow for rest and reproduction. It is generally scarce throughout its range but can travel vast distances (CWHR 2017). Suitable forested habitat and winter snow cover are available within southeastern portions of the Project; however, intense human activity in the form of logging likely deters use of the Project Area by wolverines. The CNDDB (2017) documents several occurrences of wolverines to the east of the Project Area, including along the northeastern boundary of the Project Area; however, these records are dated from 1966 to 1975.

Shasta Salamander

The distribution of the Shasta salamander (*Hydromantes shastae*), a state-listed threatened species (CDFW 2017), is discontinuous in limestone areas of Shasta County. It is uncommon, with numerous, isolated populations occurring in limestone areas in valley-foothill hardwood-conifer, ponderosa pine, and mixed-conifer habitat from 1,100 to 2,550 ft (335 to 777 m; CWHR 2017). Shasta salamanders appear to be active during the rainy periods of fall, winter, and spring, using logs, rocks, limestone slabs and talus as surface cover (CWHR 2017). During dry periods it retreats to limestone fissures and caverns or deep limestone talus. The Shasta salamander has a restricted range occurring only in the vicinity of Shasta Reservoir to the west of the Project, and suitable habitat for the species does not appear to be present within the Project Area.

State Species of Concern and Watch List Species

Based on data obtained from the CNDDB (2017), as well as on known species distributions and habitat requirements, 32 species or subspecies designated as state SSC or species maintained on the CDFW's watch list, have at least some potential to occur within the region (Table 11). Of the 32 species or subspecies listed in the table below, 26 species have at least a moderate potential to occur within the Project Area, including 12 birds, nine mammals, four amphibians, and one reptile. The remaining species have highly restricted ranges or occupy specialized habitats which do not occur within the Project or Evaluation Areas, and therefore have little or no likelihood of occurrence within the Project.

Table 11. California species of special concern and watch list species with potential to occur in the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence within Project Area
Birds			
black swift *Cypseloides niger*	SSC	Nests in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; breeds very locally in Sierra Nevada and Cascades	**Unlikely.** Suitable nesting habitat absent from Project Area, may forage within site; known to nest within the Fall River Valley approx. 20 miles to northeast
California spotted owl *Strix occidentalis occidentalis*	SSC	Mature forest, multi-layered mixed conifers	**Possible.** Historical occurrence in Project Area (CNDDB 2017); may occur as year-round resident in mixed conifer forests, particularly in southern Project Area
Cooper's hawk *Accipiter cooperii*	WL	Dense stands of oak, deciduous riparian, or other forest habitats near water used most	**Likely.** Potential breeder and year-round resident of Project Area
merlin *Falco columbarius*	WL	Frequents open habitats at low elevations near water and tree stands; favors coastlines, lakeshores, and wetlands	**Possible.** May occur as winter resident and/or migrant in Project Area
northern goshawk *Accipiter gentilis*	SSC	Prefers mid- and high-elevations, and mature, dense conifer forests	**Likely.** Potential breeder and year-round resident; CNDDB documents several occurrences within the Project Area
northern harrier *Circus cyaneus*	SSC	Frequents meadows, grasslands, open rangelands, fresh and saltwater emergent wetlands; seldom found in wooded habitats	**Possible.** Occurs regionally; may forage within more open habitats of the Project Area
osprey *Pandion haliaetus*	WL	Associated strictly with large, fish-bearing waters primarily in pine and mixed-conifer forests; nests in large trees and snags near open water	**Likely.** Nesting and foraging habitat generally absent from Project Area but present in site vicinity; CNDDB documents several occurrences within 5 miles of Project Area
prairie falcon *Falco mexicanus*	WL	Nests in open terrain with canyons, cliffs, escarpments, and rock outcrops; uses open habitat for foraging (grassland, savannahs, rangelands, and desert scrub)	**Possible.** May occur as transient or migrant; suitable foraging/nesting habitat generally absent from Project Area

Table 11. California species of special concern and watch list species with potential to occur in the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence within Project Area
purple martin *Progne subis*	SSC	Inhabits open woodlands and low elevation coniferous forests; nests in old woodpecker cavities, but also human-made structures, often in tall isolated tree/snag	**Possible.** Suitable habitat appears to be present within Project Area; potential summer resident or migrant; CNDDB documents species presence seven miles west of site along the Pit River
sharp-shinned hawk *Accipiter striatus*	WL	Breeds in fairly dense conifer and broad-leaved forests; fairly common migrant and winter resident throughout California expect in areas with deep snow	**Likely.** Potential breeder and year-round resident of Project Area
Vaux's swift *Chaetura vauxi*	SSC	Summer resident of northern California and fairly common spring/fall migrant throughout state; prefers redwood and Douglas fir forests; occasionally in other conifer forest types; nests and roosts in large hollow trees and snags; preference for foraging over rivers and lakes	**Possible.** Suitable habitat present within Project Area; potential breeder and migrant
yellow-breasted chat *Icteria virens*	SSC	Uncommon summer resident of coastal California and interior foothills; inhabits riparian thickets of willow and other brushy vegetation near watercourses; nests in dense shrubs along rivers and streams	**Likely.** Suitable habitat present within Project Area; potential breeder and migrant
yellow warbler *Setophaga petechia*	SSC	Uncommon summer resident and fairly common migrant throughout much of California; nests in riparian woodlands from coastal and desert lowlands up to 8,000 ft (2,500 m) in Sierra Nevada; also nests in montane chaparral and open conifer forests with brushy understory	**Likely.** Suitable habitat present within Project Area; potential breeder and migrant
Mammals			
American badger *Taxidea taxus*	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soil for digging burrows	**Possible.** Open habitats preferred by species are generally absent from Project Area; CNDDB documents species presence 6.5 miles (10.5 km) east of site

Table 11. California species of special concern and watch list species with potential to occur in the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence within Project Area
fisher (Northern California ESU) *Pekania pennanti*	SSC	Intermediate to large-tree stages of coniferous forest; deciduous riparian habitat	**Likely.** May occur as uncommon permanent resident; CNDDB documents several occurrences within and near the Project Area; Northern California ESU (covers the Project) considered not warranted for listing, while Southern Sierra ESU was state listed as threatened in 2016; fisher in/adjacent to Project Area have only SSC status
Oregon snowshoe hare *Lepus americanus klamathensis*	SSC	Prefers edge, heterogeneous habitats, and areas with dense understory, particularly in riparian habitats	**Possible.** Suitable habitat appears present within the Project Area
Sierra Nevada mountain beaver *Aplodontia rufa californica*	SSC	Dense riparian-deciduous and open, brushy stages of most forest types	**Possible.** Suitable riparian habitat appears to occur in Project Area.
pallid bat *Antrozous pallidus*	SSC	Woodlands, forests; roosts in caves, crevices, mines, hollow trees	**Possible.** May occur as year-round resident in Project Area
spotted bat *Euderma maculatum*	SSC	Grasslands, mixed conifer forests, sea level to 10,000 ft (3,048 m); prefers rock crevices, cliffs optimal	**Possible.** May occur as year-round resident, however, roosting habitat limited within Project Area
Townsend's big-eared bat *Corynorhinus townsendii*	SSC	All habitats except alpine and sub-alpine; caves, mines, tunnels, etc.; roosting sites most important limiting resource	**Possible.** May occur as year-round resident; roosting habitat limited within Project Area
western mastiff bat *Eumops perotis*	SSC	Open semi-arid to arid habitats including conifer and deciduous woodlands; roosts in high rock crevices, cliffs, and tall buildings	**Possible.** May forage within Project Area year-round; roost sites appear to be absent
western red bat *Lasiurus blossevillii*	SSC	Forests and woodlands from sea level up through mixed conifer forests; roosts primarily in trees; migratory	**Likely.** Summer resident and migrant in Project Area
Amphibians			
Cascades frog *Rana cascadae*	SSC	Montane aquatic habitat such as mountain lakes, small streams, and ponds in meadows; open coniferous forests; standing water required for reproduction; hibernates in mud on bottom of lake/pond during winter	**Possible.** Suitable aquatic habitats limited within site, but may occur within several small ponds within and adjacent to Project Area; outside of species known range; CNDDB documents species presence 0.7 miles (1.1 km) south of site

Table 11. California species of special concern and watch list species with potential to occur in the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence within Project Area
foothill yellow-legged frog *Rana boylii*	SSC	Partly shaded shallow streams and riffles with a rock substrate in variety of habitats	**Possible.** Potentially suitable shallow stream habitat present throughout Project Area; CNDDB documents species presence 4 miles south of site
Pacific tailed frog *Ascaphus truei*	SSC	Restricted to perennial montane streams; occurs in montane hardwood-conifer, redwood, Douglas-fir and ponderosa pine habitats	**Likely.** Potentially suitable stream habitat present within southern portions of the Project Area; CNDDB documents species presence near center of Project Area
southern long-toed salamander *Ambystoma macrodactylum sigillatum*	SSC	High elevation meadows and lakes in the Sierra Nevada, Cascade, and Klamath mountains.	**Possible.** Suitable habitat may be present in Project Area
western spadefoot *Spea hammondii*	SSC	Ranges throughout the Central Valley and adjacent foothills; occurs primarily in grasslands, but occasional populations also occur in valley-foothill hardwood woodlands	**Unlikely.** Range is west and south of the Project; suitable habitat does not appear to be present
Reptiles			
western pond turtle *Emys marmorata*	SSC	Aquatic species requiring ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation	**Possible.** Suitable aquatic habitat limited within the Project Area, but may be present within pools of larger creeks or ponds; CNDDB documents species presence near southwest corner of site; under review for federal listing

Table 11. California species of special concern and watch list species with potential to occur in the Fountain Wind Project.

Species	Status	Habitat	Potential for Occurrence within Project Area
Fishes			
bigeye marbled sculpin *Cottus klamathensis macrops*	SSC	Large, cool spring-fed streams, but has adapted to conditions in some reservoirs	**None.** Suitable stream habitat not present within the Project Area
hardhead *Mylopharodon conocephalus*	SSC	Undisturbed areas of large mid to low-elevation streams and reservoirs; clear, deep pools with sand/gravel/boulder bottoms and slow water velocity	**None.** Suitable stream habitat not present within the Project Area
McCloud River redband trout *Oncorhynchus mykiss* ssp. 2	SSC	Small spring-fed tributaries of the McCloud River	**None.** Project Area is outside of the species current range
Pacific lamprey *Entosphenus tridentatus*	SSC	Swift-current gravel-bottomed areas of cold, clear streams and rivers	**None.** Suitable stream habitat not present within the Project Area
Pit roach *Lavinia symmetricus mitrulus*	SSC	Found in upper Pit River and its tributaries, and tributaries to Goose Lake; inhabits deep pools, but also in areas of low flows, moderate gradients, warm temperatures and mats of vegetation	**Unlikely.** Suitable stream habitat appears absent from Project Area; CNDDB documents species occurrence 2.7 miles (4.3 km) north of site within the Pit River

SSC: California species of special concern; WL: California watch list species
Species status and information from CNDDB 2017

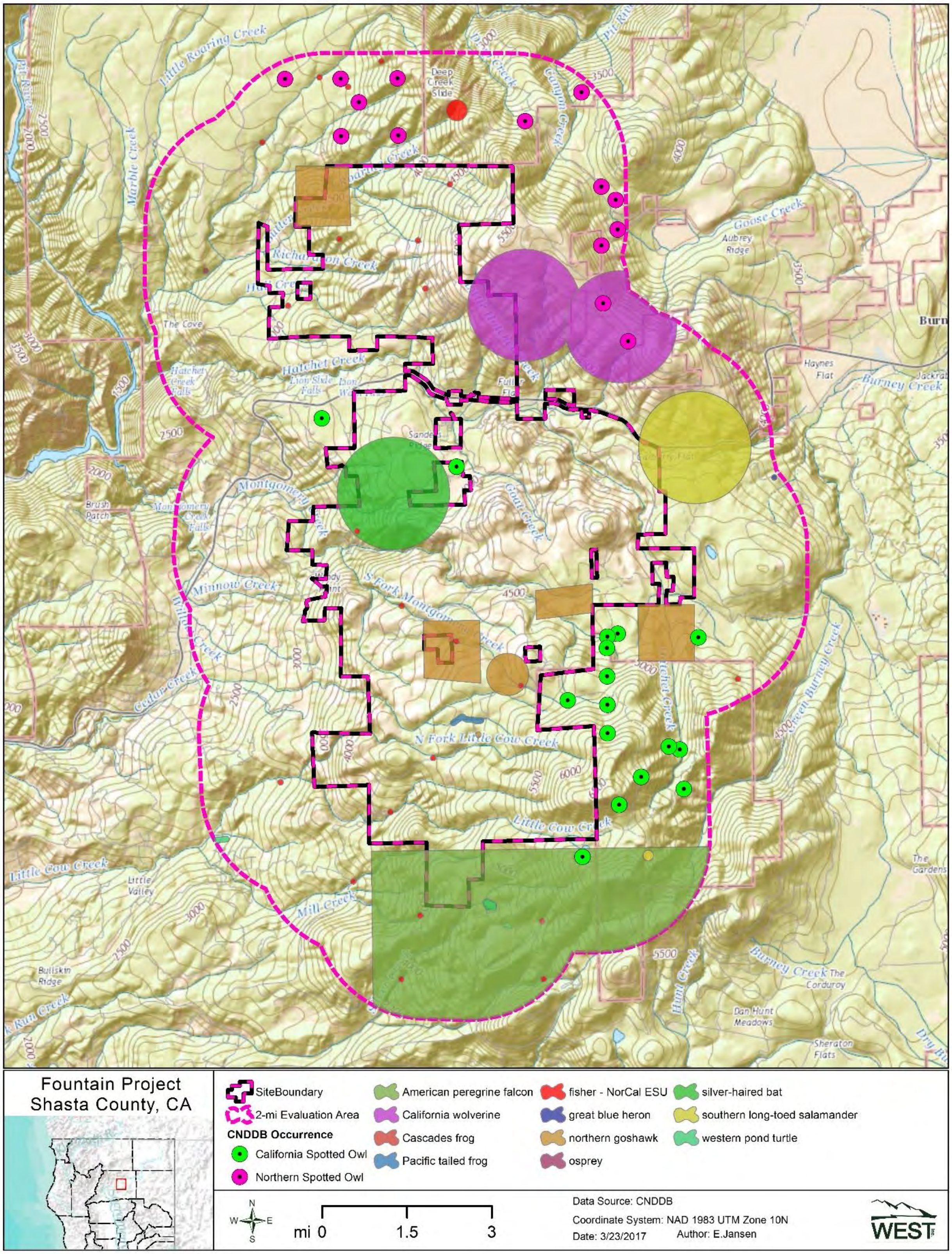

Figure 11. Records of previously documented state sensitive wildlife species within the Fountain Wind Project and surrounding Evaluation Area.

SUMMARY

Table 12 summarizes key wildlife considerations for the Project. Of the wildlife species protected by or under review through the federal ESA (1973), seven species have at least some potential to occur within the Project Area (yellow-billed cuckoo, gray wolf, Sierra Nevada red fox, western pond turtle, California red-legged frog, Shasta crayfish, and Valley elderberry longhorn beetle), although only the Sierra Nevada red fox, gray wolf, and western pond turtle have at least a moderate potential for occurrence. Thirteen species with state threatened, endangered, or fully-protected status have at least some potential to occur in the Project Area: American peregrine falcon, bald eagle, bank swallow, greater sandhill crane, golden eagle, Swainson's hawk, tricolored blackbird, willow flycatcher, California wolverine, gray wolf, Sierra Nevada red fox, Shasta salamander, and Shasta crayfish. Additionally, 29 species designated as state SSC or watch list species have at least some potential to occur in the Project Area including 13 birds, nine mammals, five amphibians, one reptile and one fish. No state and/or federal listed or candidate plants species are known to occur within the Project or Evaluation Areas; however, one listed plant species (slender Orcutt grass) is known to occur within 10 miles of the Project Area. Four CNPS-designated sensitive plant species are known to occur within the Project Area and several others have the potential to occur.

Seventeen raptor species have the potential to occur as residents and/or migrants in the Project Area. In addition, 11 species of owl and one species of vulture may also occur in the Project Area. Nesting habitat for forest-dependent raptor species is present throughout the Project and Evaluation Areas.

While not currently an issue for the Project, it is anticipated that California condors could be reintroduced to northern coastal California in the next several years. If reintroduction efforts are successful, there is a possibility that condors could inhabit more inland portions of northern California, including the Project Area, at some point in the future. However, the likelihood of this is currently unknown.

The Project Area is located within the Pacific Flyway and numerous birds likely migrate through the region. The Project Area is characterized by rolling mountain terrain that generally would not be expected to concentrate or funnel raptors during migration. Potential exists for migrating raptors to use updrafts and thermals created by topography and to be attracted to riparian areas within the Project and Evaluation Areas. The Project Area also contains stopover habitat for songbirds, waterfowl, and shorebirds in the form of conifer forest, scrub-shrub, and riparian and wetland habitats.

Relatively high bat mortality at other wind energy facilities in North America is a concern, and some species that appear to be at greatest risk, such as hoary and silver-haired bats, are likely to occur in the Project Area, particularly during migration, and 15 additional bat species have the potential to occur within the Project. The Project Area has ample forest that could provide roosting habitat for bats and sufficient wetland and riparian habitat that may be important foraging or drinking habitat.

Table 12. Summary of the potential for wildlife and plant conflicts in the proposed Fountain Wind Project[1]; VH = Very High, H = High, M = Moderate, and L = Low

Issue	VH	H	M	L	Notes
Raptor nest sites			X		Dense early- to mid-seral forest with some larger individual trees likely provides some raptor nesting habitat.
Concentrated raptor flight areas			X		A number of raptors are likely to use the Project Area but site characteristics not expected to concentrate raptor flight activity or migratory activity.
Avian migratory pathways			X		Project Area located along the Pacific Flyway and suitable stopover habitat present; extensive riparian/wetland habitat absent. Potential use by migrating passerines, but not likely used as concentrated migration pathway or stopover area.
Raptor prey species			X		Potential for rodents, lagomorphs, and prey bird species to occur within Project Area, but not likely in high concentrations.
Federal protected species			X		Two federal listed, candidate, or under review species have at least a moderate potential to occur; five additional species have a low likelihood of occurrence.
State protected species		X			Eight state-listed, candidate, or fully-protected species have at least a moderate potential to occur, and five others have a low likelihood of occurrence. Twenty-nine state species of special concern (SSC) or watch list species also have potential to occur.
Uniqueness of habitat				X	Habitat and land use within the Project Area is similar to the surrounding area. Three sensitive habitats and one sensitive river drainage are found in the vicinity. Two IBAs are within 30 miles (48 km).
Rare plants			X		One federal and/or state listed plant known to occur within 10 miles of the Project Area; four CNPS sensitive species are known to occur in Project Area and several others have potential to occur.
Bats		X			Seventeen bat species have at least some potential to occur within the Project Area, five of which are state SSC. Bat species that have shown relatively high levels of fatalities at wind energy facilities are likely to be present.

[1]Summarized for the Project as a whole but the habitats within the Project Area vary in their ability to support species of concern.

USFWS Land-Based Wind Energy Guidelines Tier 2 Questions

Chapter 3 of the USFWS WEG (2012a) includes seven Tier 2 questions which should be addressed during site characterization efforts. A contextual review of these questions after synthesis of a SCS report may help identify areas where existing data do not sufficiently address potential impacts to biological resources which may occur through development of a wind energy facility, and should serve to guide formulation of project-specific Tier 3 study plans intended to fill data gaps. This SCS report has attempted to answer the Tier 2 questions through a desktop review of publicly available information. However, some data gaps remain; recommended field studies intended to fill data gaps are included in the following section (Conclusion and Next Steps). It is also useful to consider the seven Tier 2 questions individually in the context of this SCS; although the previous Summary section includes much pertinent information, it does not specifically relate SCS report findings to Tier 2 questions. The following list describes how this report has addressed specific Tier 2 questions, where information related to these questions can be found in this report, and what if any data gaps remain:

1. Are known species of concern present on the proposed site, or is habitat (including designated critical habitat) present for these species?

   There are three federal-listed species with at least a moderate potential to occur in the Project (see Federal Listed Species section), 13 state listed species or species with full protection with at least moderate potential to occur (see State Listed Species section), and 26 state SSC or watch list species (see State Species of Concern and Watch List Species section) with potential to occur. No federal or state listed plant species are known to occur in the Project or Evaluation Areas; however four CNPS sensitive plants have been documented within the Project Area and several other have the potential to occur (see Special Status Plant Species section). There is no designated critical habitat for any wildlife or plant species in the Project. Tier 3 field studies will help confirm presence or absence of many of these species (see Conclusion and Next Steps section).

2. Does the landscape contain areas where development is precluded by law or designated as sensitive according to scientifically credible information?

   A desktop review of publicly available information did not reveal any areas on the landscape where development is precluded by law, although 2.0 % of the Project Area is classified as wetlands (see Wetlands and Riparian Areas section). Two categorized sensitive habitats have the potential to occur in Project Area including alkali seep and northern interior cypress forest (see Sensitive Habitats section). Tier 3 field studies will help determine the presence or absence of any sensitive areas in the Project (see Conclusion and Next Steps section).

3. Are there plant communities of concern present or likely to be present at the site?

No federal or state listed plant species are known to occur in the Project or Evaluation Areas; however one listed species (see Slender Orcutt Grass section) in known to occur within 10 miles of the Project. Numerous CNPS-designated sensitive plant species have potential to occur in the Project Area and four have been documented as occurring in the Project Area (see Special Status Plant Species section). Tier 3 field studies will help determine the occurrence of plant communities of concern at the Project (see Conclusion and Next Steps section).

4. Are there known critical areas of congregation of species of concern, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopover or corridors, leks, or other areas of seasonal importance?

   There are not any known critical areas of congregation of species of concern within the Project Area, although numerous scattered clearcuts throughout the Project might concentrate prey for raptors (see Areas of Potentially High Prey Density). It is likely that there are other areas (e.g., pooled water, large trees) within the Project and Evaluation Areas which may serve as congregation points for birds and bats, and possibly bird and bat species of concern (see Wetlands and Riparian Areas and Potential Raptor Nesting Habitat sections). Tier 3 field studies will help determine the presence or absence of critical congregation areas in the Project (see Conclusion and Next Steps section).

5. Using best available scientific information has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?

   The Project Area consists exclusively of private lands managed for timber production. As such, modern land use of the Project has already led to a fragmented landscape (see Table 1), and it is unlikely that populations of species with high fragmentation concern are present. However, Tier 3 field studies will help determine whether any species prone to impacts from habitat fragmentation are present (see Conclusion and Next Steps section).

6. Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?

   Many species of birds and bats are likely to use the Project Area at some point during the year (see Raptors, Bird Migration, Breeding Birds and Bats sections); individual species accounts for listed birds are also included (see Federal Listed Species and State Listed Species sections). There are 17 diurnal raptor species, 11 owls, and one vulture which have the potential to occur within the Project. Of these, seven raptors, nine owls, and one vulture may breed within the Project or Evaluation Areas, including state-listed bald eagles and Swainson's hawks, as well as other sensitive bird species (see Raptors *section). Diurnal raptors, some owls, and vultures are known to be at risk by wind energy facilities. There are 17 species of bats with the potential to occur in the Project (see Bats section), including both hoary and silver-haired bats, which are known to be at risk by wind energy facilities; an additional seven of 19 species recorded as fatalities at wind facilities may occur at the Project. Tier 3 field studies will help refine the species present.*

7. Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?

   Based on the design of the proposed Project and following a desktop review of publicly available information on the Project and Evaluation Areas, there does not appear to be a potential for significant adverse impacts to species of concern that could occur through development of the Fountain Wind Project (see Conclusion and Next Steps section). However, a number of pre-construction baseline biological studies are recommended in order to properly characterize wildlife use and evaluate the biotic resources within the Project Area (see Conclusion and Next Steps section).

CONCLUSION AND NEXT STEPS

Based on this SCS, the Project does not appear to have a high potential for conflict with the majority of wildlife and plant issues listed in Table 12. Regardless, a number of pre-construction baseline wildlife and botanical studies are recommended for the Project with the purpose of characterizing wildlife use (particularly avian and bat use) within the Project Area, estimating impacts of the proposed facility on sensitive wildlife and botanical resources, and to assist with siting project facilities to minimize impacts to the extent practicable. Baseline studies recommended at this time are presented in Table 13 and include the following:

- Year round large bird/eagle use surveys consistent with recommendations presented in the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS 2013), designed to characterize bald and golden eagle use of the Project Area. Eagle surveys will include collection of use data for other raptor and large bird species.
- Small bird use surveys, consistent with recommendations presented in the WEG (USFWS 2012a) and the California Wind Energy Guidelines (CEC and CDFG 2007), designed to evaluate small bird use of the Project Area.
- Nesting raptor surveys with an emphasis on bald and golden eagles and other sensitive raptor species as recommended in the WEG (USFWS 2012a) and the ECPG (USFWS 2013).
- Bat acoustic monitoring during the spring, summer, and fall using methods recommended in the WEG (USFWS 2012a) and the California Wind Energy Guidelines (CEC and CDFG 2007).

- A habitat assessment and rare plant survey, following methods consistent with CDFW protocols for surveying and evaluating impacts to special status plants and natural communities (CDFG 2009).

The large bird/eagle and small bird use surveys listed above should be sufficient to provide a baseline assessment of species composition, spatial and temporal use, and risk assessment for bird species occurring within the Project Area and the need for additional studies or more detailed spatial distribution mapping. Early and regular consultation with the USFWS and CDFW is recommended, as it is possible that additional species-specific surveys for sensitive bird, mammal, and amphibian species may be encouraged by these agencies. The following Table (13) includes a column for Tier 2 questions. This is intended to highlight how recommended Tier 3 field studies will address information gaps identified during Tier 2 site characterization, and ties directly to information presented in the preceding USFWS Land-Based Wind Energy Guidelines Tier 2 section.

Table 13. Recommended Pre-construction Wildlife and Botanical Studies for the Fountain Wind Project.

Study	Purpose	Information Gaps Addressed from USFWS Tier 2 Question(s)	Timing
Large bird / Eagle use surveys	To assess spatial and temporal use of the Project Area by bald and golden eagles and other raptor species	Question 1, Question 4, Question 6, Question 7	Year-round
Small bird use surveys	To assess spatial and temporal avian use of the Project Area, with a focus of small bird use	Question 1, Question 4, Question 5, Question 6	Year-round
Nesting raptor surveys	To locate nests that may be subject to disturbance and/or displacement effects from Project construction and/or operation, particularly nests of bald or golden eagles or other sensitive raptor species	Question 1, Question 4, Question 5, Question 6, Question 7	Twice during late winter through early summer breeding season
Bat acoustic surveys	To estimate the level of, and seasonal and spatial patterns of, bat activity within the Project Area	Question 1, Question 5, Question 6, Question 7	A continuous spring, summer, and fall survey period
Habitat assessment and rare plant survey	To determine the presence, as well as the spatial distribution, of state and federal threatened and endangered species, CNPS rare species, species of concern, and other special-status plant species within the Project Area	Question 1, Question 2, Question 3, Question 5, Question 7	Spring and early summer when target sensitive species are in flower

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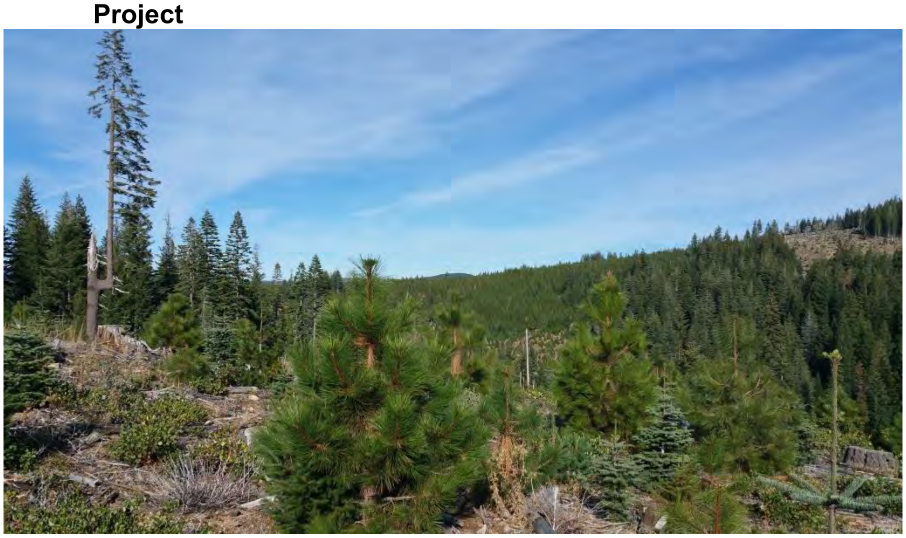
Appendix A. Photographs Taken During the Preliminary Site Visit to the Fountain Wind Project in October 2016


Variable-aged stand structure found throughout the Fountain Wind Project


Regenerating stand with shrub cover and residual leave trees

Typical clear cut with new regeneration

View across private timber land in the northern section of Fountain Wind Project

Landscape view of uneven-aged stands within the Fountain Wind Project

Brushy riparian area within early- to mid-seral conifer stand

Appendix B. Citations for Table 8 for Publicly Available Fatality Reports from Wind Energy Facilities in North America that have Reported Bat Fatalities

Appendix B. Summary of publicly available studies at modern North American wind energy facilities that report fatality and species data for bats.

Data from the following sources:

Project, Location	Reference	Project, Location	Reference
Alite, CA (09-10)	Chatfield et al. 2010	Maple Ridge, NY (07-08)	Jain et al. 2009d
Alta Wind I, CA (11-12)	Chatfield et al. 2012	Maple Ridge, NY (12)	Tidhar et al. 2013a
Alta Wind I-V, CA (13-14)	Chatfield et al. 2014	Marengo I, WA (09-10)	URS Corporation 2010b
Alta Wind II-V, CA (11-12)	Chatfieldet al. 2012	Marengo II, WA (09-10)	URS Corporation 2010c
Alta VIII, CA (12-13)	Chatfield and Bay 2014	Mars Hill, ME (07)	Stantec 2008
Barton I & II, IA (10-11)	Derby et al. 2011a	Mars Hill, ME (08)	Stantec 2009a
Barton Chapel, TX (09-10)	WEST 2011	McBride, Alb (04)	Brown and Hamilton 2004
Beech Ridge, WV (12)	Tidhar et al. 2013b	Melancthon, Ont (Phase I; 07)	Stantec Ltd. 2008
Beech Ridge, WV (13)	Young et al. 2014b	Meyersdale, PA (04)	Arnett et al. 2005a
Big Blue, MN (13)	Fagen Engineering 2014	Milford I, UT (10-11)	Stantec 2011b
Big Blue, MN (14)	Fagen Engineering 2015	Milford I & II, UT (11-12)	Stantec 2012b
Big Horn, WA (06-07)	Kronner et al. 2008	Montezuma I, CA (11)	ICF International 2012
Big Smile, OK (12-13)	Derby et al. 2013b	Montezuma I, CA (12)	ICF International 2013
Biglow Canyon, OR (Phase I; 08)	Jeffrey et al. 2009a	Montezuma II, CA (12-13)	Harvey & Associates 2013
Biglow Canyon, OR (Phase I; 09)	Enk et al. 2010	Moraine II, MN (09)	Derby et al. 2010d
Biglow Canyon, OR (Phase II; 09-10)	Enk et al. 2011a	Mount Storm, WV (Fall 08)	Young et al. 2009b
Biglow Canyon, OR (Phase II; 10-11)	Enk et al. 2012b	Mount Storm, WV (09)	Young et al. 2009a, 2010b
Biglow Canyon, OR (Phase III; 10-11)	Enk et al. 2012a	Mount Storm, WV (10)	Young et al. 2010a, 2011b
Blue Sky Green Field, WI (08; 09)	Gruver et al. 2009	Mount Storm, WV (11)	Young et al. 2011a, 2012b
Buena Vista, CA (08-09)	Insignia Environmental 2009	Mountaineer, WV (03)	Kerns and Kerlinger 2004
Buffalo Gap I, TX (06)	Tierney 2007	Mountaineer, WV (04)	Arnett et al. 2005a
Buffalo Gap II, TX (07-08)	Tierney 2009	Munnsville, NY (08)	Stantec 2009b
Buffalo Mountain, TN (00-03)	Nicholson et al. 2005	Mustang Hills, CA (12-13)	Chatfield and Bay 2014
Buffalo Mountain, TN (05)	Fiedler et al. 2007	Nine Canyon, WA (02-03)	Erickson et al. 2003
Buffalo Ridge, MN (94-95)	Osborn et al. 1996, 2000	Nine Canyon II, WA (04)	Erickson et al. 2005
Buffalo Ridge, MN (00)	Krenz and McMillan 2000	Noble Altona, NY (10)	Jain et al. 2011b
Buffalo Ridge, MN (Phase I; 96)	Johnson et al. 2000	Noble Altona, NY (11)	Kerlinger et al. 2011b
Buffalo Ridge, MN (Phase I; 97)	Johnson et al. 2000	Noble Bliss, NY (08)	Jain et al.2009e
Buffalo Ridge, MN (Phase I; 98)	Johnson et al. 2000	Noble Bliss, NY (09)	Jain et al. 2010a
Buffalo Ridge, MN (Phase I; 99)	Johnson et al. 2000	Noble Bliss/Wethersfield, NY (11)	Kerlinger et al. 2011a
Buffalo Ridge, MN (Phase II; 98)	Johnson et al. 2000	Noble Chateaugay, NY (10)	Jain et al. 2011c
Buffalo Ridge, MN (Phase II; 99)	Johnson et al. 2000	Noble Clinton, NY (08)	Jain et al. 2009c
Buffalo Ridge, MN (Phase II; 01/Lake Benton I)	Johnson et al. 2004	Noble Clinton, NY (09)	Jain et al. 2010b
Buffalo Ridge, MN (Phase II; 02/Lake Benton I)	Johnson et al. 2004	Noble Ellenburg, NY (08)	Jain et al. 2009b
Buffalo Ridge, MN (Phase III; 99)	Johnson et al. 2000	Noble Ellenburg, NY (09)	Jain et al. 2010c
Buffalo Ridge, MN (Phase III; 01/Lake Benton II)	Johnson et al. 2004	Noble Wethersfield, NY (10)	Jain et al. 2011a
Buffalo Ridge, MN (Phase III; 02/Lake Benton II)	Johnson et al. 2004	NPPD Ainsworth, NE (06)	Derby et al. 2007
Buffalo Ridge I, SD (09-10)	Derby et al. 2010b	Oklahoma Wind Energy Center, OK (04; 05)	Piorkowski and O'Connell 2010
Buffalo Ridge II, SD (11-12)	Derby et al. 2012a	Pacific, CA (12-13)	Sapphos 2014
Casselman, PA (08)	Arnett et al. 2009	Palouse Wind, WA (12-13)	Stantec 2013a
Casselman, PA (09)	Arnett et al. 2010	Pebble Springs, OR (09-10)	Gritski and Kronner 2010b
Castle River, Alb. (01)	Brown and Hamilton 2006a	Pine Tree, CA (09-10)	BioResource Consultants 2010
Castle River, Alb. (02)	Brown and Hamilton 2006a	Pinnacle, WV (12)	Hein et al. 2013a
Cedar Ridge, WI (09)	BHE Environmental 2010	Pinnacle Operational Mitigation Study (12)	Hein et al. 2013b
Cedar Ridge, WI (10)	BHE Environmental 2011	Pinyon Pines I & II, CA (13-14)	Chatfield and Russo 2014
Cohocton/Dutch Hill, NY (09)	Stantec 2010	Pioneer Prairie I, IA (Phase II; 11-12)	Chodachek et al. 2012
Cohocton/Dutch Hills, NY (10)	Stantec 2011a	Pioneer Prairie II, IA (13)	Chodachek et al. 2014
Combine Hills, OR (Phase I; 04-05)	Young et al. 2006	Pioneer Trail, IL (12-13)	ARCADIS U.S. 2013
Combine Hills, OR (11)	Enz et al. 2012	Prairie Rose, MN (14)	Chodachek et al. 2015
Condon, OR	Fishman Ecological Services 2003	PrairieWinds ND1 (Minot), ND (10)	Derby et al. 2011c
Crescent Ridge, IL (05-06)	Kerlinger et al. 2007	PrairieWinds ND1 (Minot), ND (11)	Derby et al. 2012c
Criterion, MD (11)	Young et al. 2012a	PrairieWinds SD1 (Crow Lake), SD (11-12)	Derby et al. 2012d
Criterion, MD (12)	Young et al. 2013	PrairieWinds SD1 (Crow Lake), SD (12-13)	Derby et al. 2013a
Criterion, MD (13)	Young et al. 2014a	PrairieWinds SD1 (Crow Lake), SD (13-14)	Derby et al. 2014
Crystal Lake II, IA (09)	Derby et al. 2010a	Rail Splitter, IL (12-13)	Good et al. 2013b
Diablo Winds, CA (05-07)	WEST 2006, 2008	Record Hill, ME (12)	Stantec 2013b
Dillon, CA (08-09)	Chatfield et al. 2009	Record Hill, ME (14)	Stantec 2015
Dry Lake I, AZ (09-10)	Thompson et al. 2011	Red Canyon, TX (06-07)	Miller 2008
Dry Lake II, AZ (11-12)	Thompson and Bay 2012	Red Hills, OK (12-13)	Derby et al. 2013c
Elkhorn, OR (08)	Jeffrey et a. 2009b	Ripley, Ont (08)	Jacques Whitford 2009
Elkhorn, OR (10)	Enk et al. 2011b	Ripley, Ont (08-09)	Golder Associates 2010
Elm Creek, MN (09-10)	Derby et al. 2010c	Rollins, ME (12)	Stantec 2013c
Elm Creek II, MN (11-12)	Derby et al. 2012b	Rugby, ND (10-11)	Derby et al. 2011b
Foote Creek Rim, WY (Phase I; 99)	Young et al. 2003	Searsburg, VT (97)	Kerlinger 2002a
Foote Creek Rim, WY (Phase I; 00)	Young et al. 2003	Sheffield, VT (12)	Martin et al. 2013

Appendix B. Summary of publicly available studies at modern North American wind energy facilities that report fatality and species data for bats.

Data from the following sources:

Project, Location	Reference	Project, Location	Reference
Foote Creek Rim, WY (Phase I; 01-02)	Young et al. 2003	Sheffield Operational Mitigation Study (12)	Martinet al. 2013
Forward Energy Center, WI (08-10)	Grodsky and Drake 2011	Shiloh I, CA (06-09)	Kerlinger et al. 2009
Fowler I, IN (09)	Johnson et al. 2010a	Shiloh II, CA (09-10)	Kerlinger et al. 2010
Fowler III, IN (09)	Johnson et al. 2010b	Shiloh II, CA (10-11)	Kerlinger et al. 2013a
Fowler I, II, III, IN (10)	Good et al. 2011	Shiloh III, CA (12-13)	Kerlinger et al. 2013b
Fowler I, II, III, IN (11)	Good et al. 2012	SMUD Solano, CA (04-05)	Erickson and Sharp 2005
Fowler I, II, III, IN (12)	Good et al. 2013c	Solano III, CA (12-13)	AECOM 2013
Goodnoe, WA (09-10)	URS Corporation 2010a	Spruce Mountain, ME (12)	Tetra Tech 2013b
Grand Ridge I, IL (09-10)	Derby et al. 2010g	Stateline, OR/WA (01-02)	Erickson et al. 2004
Harrow, Ont (10)	Natural Resource Solutions 2011	Stateline, OR/WA (03)	Erickson et al. 2004
Harvest Wind, WA (10-12)	Downes and Gritski 2012a	Stateline, OR/WA (06)	Erickson et al. 2007
Hay Canyon, OR (09-10)	Gritski and Kronner 2010a	Steel Winds I, NY	Grehan 2008
Heritage Garden I, MI (12-14)	Kerlinger et al. 2014	Steel Winds I & II, NY (12)	Stantec 2013d
High Sheldon, NY (10)	Tidhar et al. 2012a	Stetson Mountain I, ME (09)	Stantec 2009c
High Sheldon, NY (11)	Tidhar et al. 2012b	Stetson Mountain I, ME (11)	Normandeau Associates 2011
High Winds, CA (03-04)	Kerlinger et al. 2006	Stetson Mountain I, ME (13)	Stantec 2014
High Winds, CA (04-05)	Kerlinger et al. 2006	Stetson Mountain II, ME (10)	Normandeau Associates 2010
Hopkins Ridge, WA (06)	Young et al. 2007	Stetson Mountain II, ME (12)	Stantec 2013e
Hopkins Ridge, WA (08)	Young et al. 2009c	Summerview, Alb (05-06)	Brown and Hamilton 2006b
Jersey Atlantic, NJ (08)	NJAS 2008a, 2008b, 2009	Summerview, Alb (06; 07)	Baerwald 2008
Judith Gap, MT (06-07)	TRC 2008	Top Crop I & II, IL (12-13)	Good et al. 2013a
Judith Gap, MT (09)	Poulton and Erickson 2010	Top of Iowa, IA (03)	Jain 2005
Kewaunee County, WI (99-01)	Howe et al. 2002	Top of Iowa, IA (04)	Jain 2005
Kibby, ME (11)	Stantec 2012a	Tuolumne (Windy Point I), WA (09-10)	Enz and Bay 2010
Kittitas Valley, WA (11-12)	Stantec Consulting 2012	Vansycle, OR (99)	Erickson et al. 2000
Kittitas Valley, WA (12-13)	Stantec Consulting 2013	Vantage, WA (10-11)	Ventus Environmental Solutions 2012
Klondike, OR (02-03)	Johnson et al. 2003a	Vasco, CA (12-13)	Brown et al. 2013
Klondike II, OR (05-06)	NWC and WEST 2007	Wessington Springs, SD (09)	Derby et al. 2010f
Klondike III (Phase I), OR (07-09)	Gritski et al. 2010	Wessington Springs, SD (10)	Derby et al. 2011d
Klondike IIIa (Phase II), OR (08-10)	Gritski et al. 2011	White Creek, WA (07-11)	Downes and Gritski 2012b
Lakefield Wind, MN (12)	Minnesota Public Utilities Commission (MPUC) 2012	Wild Horse, WA (07)	Erickson et al. 2008
Leaning Juniper, OR (06-08)	Gritski et al. 2008	Windy Flats, WA (10-11)	Enz et al. 2011
Lempster, NH (09)	Tidhar et al. 2010	Winnebago, IA (09-10)	Derby et al. 2010e
Lempster, NH (10)	Tidhar et al. 2011	Wolfe Island, Ont (May-June 09)	Stantec Ltd. 2010a
Linden Ranch, WA (10-11)	Enz and Bay 2011	Wolfe Island, Ont (July-December 09)	Stantec Ltd. 2010b
Locust Ridge, PA (Phase II; 09)	Arnett et al. 2011	Wolfe Island, Ont (January-June 10)	Stantec Ltd. 2011a
Locust Ridge, PA (Phase II; 10)	Arnett et al. 2011	Wolfe Island, Ont (July-December 10)	Stantec Ltd. 2011b
Madison, NY (01-02)	Kerlinger 2002b	Wolfe Island, Ont (January-June 11)	Stantec Ltd. 2011c
Maple Ridge, NY (06)	Jain et al. 2007	Wolfe Island, Ont (July-December 11)	Stantec Ltd. 2012
Maple Ridge, NY (07)	Jain et al. 2009a	Wolfe Island, Ont (January-June 12)	Stantec Ltd. 2014

Two Indiana bat fatalities are reported by USFWS (2010, 2011a), among other reports. Five additional Indiana bat fatalities have been reported (USFWS 2011b, 2012b, 2012c; Pruitt and Okajima 2014), but are not included in this list of public reports. One incidental long-eared bat (*Myotis evotis*) was recorded at Tehachapi, California (Anderson et al. 2004), but is not included in this list of public reports. Additional bat fatalities (evening bat, eastern red bat, hoary bat, tricolored bat, Mexican free-tailed bat, and unidentified bat) have been found in Texas (Hale and Karsten 2010), but the number of fatalities by species is not reported.

C2. Aquatic Resources Survey Report

Fountain Wind Energy Project

Aquatic Resources Survey Report

December 23, 2019

Prepared for:

Fountain Wind LLC
1001 McKinney Street, Suite 700
Houston, TX 77002

Prepared by:

Stantec Consulting Services Inc.
100 California Street, Suite 1000
San Francisco, CA 94111

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Acronyms and Abbreviations

ac	Acre
ºF	degrees Fahrenheit
ft	foot/feet
OHWM	ordinary high water mark
Project	Fountain Wind Project
Stantec	Stantec Consulting Services Inc.
USACE	United States Army Corps of Engineers

Executive Summary

On behalf of Fountain Wind LLC (Fountain Wind), Stantec Consulting Services Inc. (Stantec) conducted a delineation of potential waters of the United States including wetlands occurring in the 6,118.06-acre (ac) Fountain Wind Project survey area near the community of Montgomery Creek in Shasta County, California. The survey area includes the 4,000 ac project area plus appropriate buffers and also includes areas previously proposed for development under and earlier project iteration. The delineation was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual*[1] and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*[2]. A total of 51.900 acres (ac) of potential waters of the United States were mapped within the survey area and include fresh emergent wetland (0.967 ac, 156 linear feet [ft]), riparian wetland (26.808 ac), seasonal wetland (0.120 ac), vegetated ditch (0.174 ac, 2,432 linear ft), wetland meadow (8.714 ac), wetland seep/spring (1.809 ac), ephemeral stream (0.559 ac, 10,224.323 linear ft), intermittent stream (2.861 ac, 24,900 linear ft), non-vegetated ditch (0.239 ac, 4,975 linear ft), perennial stream (9.468 ac, 30,495.398 linear ft), and pond (0.181 ac).

This delineation documents and describes aquatic features and wetlands occurring within the project survey area that may be waters of the United States. The report provides sufficient information that may be used to support a Preliminary Jurisdictional Determination from the United States Army Corps of Engineers (USACE), which would be subject to verification by USACE, Sacramento District. Stantec advises all parties to treat the information contained herein as preliminary until USACE provides written verification of the boundaries of its jurisdiction.

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[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Technical Report Y-87-1.
[2] United States Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0).

1.0 INTRODUCTION

Fountain Wind LLC, is proposing to construct and operate the Fountain Wind Project (project), an industrial-scale renewable energy generation facility to be located in Shasta County, California (Figure 1). The project would consist of up to 72 wind turbines and associated facilities, including wind measurement towers, an electrical collection system, access roads, construction staging areas, an operations and maintenance facility, and a transmission interconnection and associated point of interconnection. The project would have a nameplate capacity of up to 216 megawatts.

Wind turbines would be installed on land owned and managed by Shasta Cascade Timberlands, LLC. Proposed turbine locations are situated east of Round Mountain, in Shasta County, California (Figure 1).

Stantec conducted a delineation of aquatic resources to support project permitting. This Aquatic Resources Survey Report summarizes the methods and results of Stantec's survey of potentially jurisdictional waters.

The survey area encompasses a total of 6,118.06 acres (ac) within a project area encompassing approximately 29,500 acres (Figure 1). It includes a 700-foot (ft) radius centered on proposed turbine locations, a 200- to 400-ft corridor centered on project roads, a 300-ft corridor centered on the electrical collection line, a 200-ft buffer around proposed project facilities, and a 100-ft buffer around proposed construction staging areas.

The delineation comprised three surveys efforts: the first in 2017, the second in 2018, and the third in 2019. The initial survey effort was conducted between October and December 2017 and was focused on tower locations, access roads, construction staging areas, and an operations and maintenance facility for a prior project iteration. The second survey effort was conducted in August 2018 and was focused on the electrical collection line, a transmission interconnection and associated point of interconnection, additional staging areas, and expanded buffers around some areas surveyed during 2017. The third survey effort conducted in October 2019 was focused on several modifications to the project site plan and expanded buffers around various project components. The 2017, 2018, and 2019 surveys provide a comprehensive survey of the project site, including the most current site plan and associated survey buffers (Figure 1-3).

2.0 ENVIRONMENTAL SETTING

The survey area is within coniferous forest habitat near the southern end of the Cascade Range, between two volcanoes: Lassen Peak and Mount Shasta. The area's climate is characterized as Mediterranean with moderate winters and hot, dry summers. Based on data collected from the National Oceanic and Atmospheric Administration Western Regional Climate Center Applied Climate Information System Buckhorn station, precipitation occurs as rain and snow within the survey area. The average annual precipitation is approximately 68 inches with an average annual snowfall of 70 inches (Western Regional Climate Center 2019). Air temperatures range between an average January high of 58 degrees Fahrenheit (ºF), and an average July high of 99ºF. The annual average high is approximately 101ºF (Western Regional Climate Center 2019). The growing season (i.e., 50% probability of air temperature 28ºF or higher) in the study area is approximately 120 days and occurs between May and September.

The project would be built on privately owned and managed lands in rural, unincorporated Shasta County, 3 miles east of Montgomery Creek, 7 miles west of Burney, and 28 miles northeast of Redding. The survey area is accessible from Highway 299 west of Hatchet Peak and is in the quadrangles, townships, ranges, and sections shown in Table 1. The project would be located to the west and south of the existing Hatchet Ridge Wind Farm, along several ridgelines and peaks.

Table 1. Survey Area Locations

Quadrangle(s)	Township	Range	Section(s)
Hatchet Mountain Pass Miller Mountain	33 North	1 East	3
Hatchet Mountain Pass Montgomery Creek	34 North	1 East	1–4, 8, 10–17, 20–28, 33–36
Hatchet Mountain Pass	34 North	2 East	5–8, 18
Chalk Mountain Hatchet Mountain Pass Roaring Creek	35 North	1 East	8–10, 13–15, 21–28, 33–36
Hatchet Mountain Pass	35 North	2 East	29–32

The survey area consists primarily of managed timberlands. Approximately half the survey area is within the boundary of the area burned in the 1992 Fountain Fire. The portion of the survey area that is within the fire boundary is predominantly ponderosa pine (*Pinus ponderosa*) forest, while the remaining survey area is predominantly mixed conifer forest. There are grassland, hardwood, and chaparral inclusions scattered throughout the survey area. In addition to timber production, a few areas are managed for cattle grazing.

2.1 TOPOGRAPHY AND HYDROLOGY

The survey area is in the Sacramento River Basin (Central Valley Region), which covers 17.42 million ac and includes the entire Sacramento River watershed. The Sacramento River Basin is divided into 24 hydrologic units and is further divided into hydrologic areas and hydrologic subareas. The survey area is located within two hydrological units: Whitmore and Pit River (Table 2). Each of the hydrologic units within the survey area ultimately flow west to the Sacramento River. The survey area crosses numerous unnamed drainages and wetlands as well as several named drainages, including Richardson Creek, Little Hatchet Creek, Hatchet Creek, Carberry Creek, Goat Creek, North Fork Montgomery Creek, Indian Spring, South Fork Montgomery Creek, Cedar Creek, North Fork Little Cow Creek, Little Cow Creek, and Mill Creek. Hydrology for these features is provided by sheet flow, snow melt, seeps, springs, and groundwater. Several of the streams provide hydrology that supports adjacent riparian wetlands.

Table 2. Hydrologic Units, Areas, and Subareas within the Survey Area

Hydrological Units	Hydrological Areas	Hydrological Subareas
526.00 Pit River	526.10 Lower Pit River	26.13 Montgomery Creek 26.14 Hatchet Creek
507.00 Whitmore	507.30 Cow Creek	07.33 Little Cow Creek

Source: Water Quality Control Plan for the Central Valley Region (RWQCB 2018)

Topography within the survey area varies widely from gently sloping mountain meadows to steep hillsides and drainages. The survey area occurs between 3,550 and 6,300 ft in elevation. Named topographical features occurring in the survey area include Carberry Flat, Carberry Mountain, Fauries Peak, Fuller Flat, Fuller Mountain, Lookout Mountain, and Sanders Ridge.

2.2 VEGETATION COMMUNITIES

Stantec biologists classified vegetation communities within the survey area during the aquatic resources survey. Vegetation communities are based on descriptions provided in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988) and are as follows:

Barren. Barren occurs as dirt and paved roads and their associated road shoulders. Vegetation is usually not present, although sparse cover of grasses and forbs or weedy species occasionally occurs on road shoulders or infrequently used roads.

Fresh Emergent Wetland. Fresh emergent wetland occurs in a seasonally inundated pond and within a few low gradient streams in the survey area. Plant species observed in fresh emergent wetlands include common tule (*Schoenoplectus acutus*), Rocky Mountain pond-lily (*Nuphar polysepala*), reed canary grass (*Phalaris arundinacea*), smartweed (*Persicaria* sp.), small fruited bulrush (*Scirpus microcarpus*), and American brooklime (*Veronica americana*).

Lodgepole Pine. Lodgepole pine occurs at higher elevations within the survey area. The lodgepole pine vegetation community is bordered by and interspersed among the wet meadow vegetation community at the headwaters of the North Fork of Montgomery Creek. Lodgepole pine (*Pinus contorta*) is the dominant overstory species, while understory species include cascara (*Frangula purshiana*), western blueberry (*Vaccinium uliginosum*), Douglas spiraea (*Spiraea douglasii*), California oat grass (*Danthonia californica*), tufted hair grass (*Deschampsia cespitosa*), and Bigelow's sneezeweed (*Helenium bigelovii*).

***Montane Hardwood**.* Montane hardwood occurs on a hillside west of Carberry Flat. The dominant overstory species is California black oak (*Quercus kelloggii*). The understory consists of a moderate canopy of deer brush (*Ceanothus integerrimus*) and snowberry (*Symphoricarpos albus*), with a sparse herbaceous layer of Pacific starflower (*Lysimachia latifolia*).

***Montane Chaparral**.* Montane chaparral occurs at a few locations throughout the survey area, including at the highest elevations in the southeastern portion of the survey area. It is composed of a dense shrub layer and borders woodlands or forest. Shrub species present include of Brewer's oak (*Quercus garryana*), green leaf manzanita (*Arctostaphylos patula*), dear brush, and other manzanita (*Arctostaphylos* spp.) and ceanothus (*Ceanothus* spp.) species. The herbaceous layer is poorly developed.

***Montane Riparian**.* The montane riparian community occurs adjacent to streams and ponds and around some seep springs in the survey area. Many of the riparian areas are dominated by shrubs, including arroyo willow (*Salix lasiolepis*), Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scouleriana*), vine maple (*Acer circinatum*), and mountain alder (*Alnus incana*). Some of the larger streams also support tree species, including white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), and big-leaf maple (*Acer macrophyllum*). Other shrubs include American dogwood (*Cornus sericea*), wild rose (*Rosa* sp.), and Himalayan blackberry (*Rubus armeniacus*). Herbaceous species include sedges (*Carex* sp.), western lady fern (*Athyrium filix-femina*), cow parsnip (*Heracleum maximum*), horsetail (*Equisetum* spp.), hedge nettle (*Stachys ajugoides*), creeping wild ginger (*Asarum caudatum*), stream violet (*Viola glabella*), western columbine (*Aquilegia formosa*), California tiger lily (*Lilium pardalinum*), and ridged manna grass (*Glyceria striata*).

Perennial Grassland. Perennial grasslands occur around Carberry Flat. The herbaceous layer is dominant and includes meadow foxtail (*Alopecurus pratensis*), Kentucky blue grass (*Poa pratensis*), blue wild-rye (*Elymus glaucus*), common velvet grass (*Holcus lanatus*), gumweed (*Grindelia* sp.), sticky cinquefoil (*Drymocallis glandulosa*), and common yarrow (*Achillea millefolium*).

Ponderosa Pine. Ponderosa pine occurs in the northern portion of the survey area in plantations established after the Fountain Fire in 1992. These stands are dense, with ponderosa pine dominating the overstory canopy. However, there is some natural regeneration of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), and California black oak. The understory layer varies from dense shrubs including manzanita (*Arctostaphylos* spp.), ceanothus (*Ceanothus* spp.), mountain dogwood (*Cornus nuttallii*), bush chinquapin (*Chrysolepis sempervirens*), Oregon boxwood (*Paxistima myrsinites*), thimbleberry (*Rubus parviflorus*), and bitter cherry (*Prunus emarginata*) to sparse grasses and forbs including blue wild-rye, Pacific starflower, fireweed (*Chamerion angustifolium*), and bracken fern (*Pteridium aquilinum*).

Riverine. Riverine vegetation occurs in the larger streams and is dominated by run and riffle areas with boulder, cobble, gravel, and sand substrates. Vegetation within the active river channel is sparse with occasional clumps of sedges.

Sierran Mixed Conifer. Sierran mixed conifer occurs throughout the unburned southern portion of the survey area. Dominant conifers include ponderosa pine, Douglas-fir, white fir, incense-cedar, and sugar pine (*Pinus lambertiana*). A few deciduous trees occur irregularly among the conifers, including California black oak and big-leaf maple. The understory varies greatly from dense stands with little understory to more open stands supporting many of the same understory species listed under the ponderosa pine vegetation community

Wet Meadow. Wet meadows occur in gently sloping areas adjacent to lodgepole pine and perennial grassland vegetation communities. They also occur as openings on seepy hillsides surrounded by Sierran mixed conifer or ponderosa pine forest, interspersed with montane riparian vegetation. Herbaceous vegetation dominates wetland meadows, including big-leaf sedge (*Carex amplifolia*), rushes (*Juncus* spp.), spearmint (*Mentha spicata*), tundra aster (*Oreostemma alpigenum*), western mountain aster (*Symphyotrichum spathulatum*), white-flowered bog-orchid (*Platanthera dilatata*), giant checkerbloom (*Sidalcea gigantea*), narrow leaved lotus (*Hosackia oblongifolia*), three petaled bedstraw (*Galium trifidum*), pull-up muhly (*Muhlenbergia filiformis*), seep monkey flower (*Mimulus guttatus*), tufted hair grass, and cultivated timothy (*Phleum pratense*).

2.3 SOIL

Shasta County spans five geologic provinces: the Klamath Range, Coast Range, Great Valley, Cascade Range, and Modoc Plateau. The survey area is in the Cascade Range Province within the Cohasset-Windy-McCarthy soil association. This soil association is composed of gently sloping to steep soils underlain by volcanic rock (Soil Conservation Service and Forest Service 1974). The U.S. Department of Agriculture Natural Resources Conservation

Service has mapped 27 soil map units within the survey area (NRCS 2019) (Table 3, Figure 2). Two of the soil map units are rated as hydric, while the remaining 25 are not hydric and do not have any hydric components.

Table 3. Soil Map Units Within the Survey Area

Map Unit Symbol	Map Unit Name	Hydric Rating Status
Cohasset-McCarthy complex, 0 to 30 percent slopes	CrD	N
Cohasset-McCarthy complex, 30 to 50 percent slopes	CrE	N
Cohasset-McCarthy complex, 50 to 70 percent slopes	CrG	N
Cohasset loam, 0 to 30 percent slopes	ClD	N
Cohasset stony loam, 0 to 30 percent slopes	CmD	N
Cohasset stony loam, 10 to 50 percent slopes	CmE	N
Cohasset very stony loam, moderately deep, 8 to 50 percent slopes	CoE	N
Colluvial land	CsF	N
Gardens-Jacksback complex, 0 to 2 percent slopes	169, 169im	Y
Gasper-Scarface complex, moist, 2 to 15 percent slopes	172, 172im	N
Gasper-Scarface complex, moist, 15 to 30 percent slopes	173, 173im	N
Gasper-Scarface complex, moist, 30 to 50 percent slopes	174, 174im	N
Goulder gravelly sandy loam, 15 to 30 percent slopes	179, 179im	N
Jacksback loam, 2 to 9 percent slopes	190, 190im	Y
Lyonsville-Jiggs complex, deep, 10 to 50 percent slopes	LhE	N
Lyonsville-Jiggs soils, 50 to 70 percent slopes	LkF	N
Nanny gravelly sandy loam, 0 to 8 percent slopes	NaB	N
Nanny stony sandy loam, 0 to 8 percent slopes	NbB	N
Obie-Mounthat complex, 5 to 15 percent slopes	266, 266im	N
Obie-Mounthat complex, 30 to 50 percent slopes	268, 268im	N
Rubbleland	RyF	N
Stukel complex, 15 to 30 percent slopes	316	N
Toomes very rocky loam, 0 to 50 percent slopes	TcE	N
Windy and McCarthy stony sandy loams, 0 to 30 percent slopes	WeD	N
Windy and McCarthy very rocky sandy loams, 8 to 50 percent slopes	WgE	N
Windy and McCarthy very stony sandy loams, 30 to 50 percent slopes	WfE	N
Windy and McCarthy very stony sandy loams, 50 to 75 percent slopes	WfG	N

Source: Natural Resources Conservation Service. 2019. USDA Web Soil Survey. Available: http://websoilsurvey.nrcs.usda.gov. Accessed October 2019.

3.0 METHODS

The delineation reflects three phases of work: desktop review, field assessment, and classification. Each is described below.

3.1 DESKTOP REVIEW

Prior to conducting fieldwork, Stantec biologists reviewed the following resources:

- U.S. Fish and Wildlife Service National Wetland Inventory (USFWS 2019);
- Google Earth aerial imagery dating back to 1984;
- U.S. Geological Survey 7.5-minute topographic maps (USGS 1990a,b,c; 1995a,b); and
- U.S. Geological Survey National Hydrography Dataset (USGS 2019)

These resources were used to identify potential aquatic features based on changes in vegetation, topographic changes, or visible drainage patterns. Prior to field surveys, potential features were digitized into a working field map that was then used as a reference during field surveys.

3.2 AQUATIC RESOURCES FIELD ASSESSMENT

The aquatic resources field survey was conducted between October 10, 2017, and August 30, 2018, by the following Stantec biologists:

- John Holson
- Allison Loveless
- Andrew Sorci
- Gabe Youngblood

The 2019 field survey was conducted between October 14 and 18, 2019, by the following Stantec biologists:

- John Holson
- Sheryl Creer
- Cristian Singer
- Brendan Cohen
- Sara Cortez

The qualifications of these biologists are provided in Appendix E.

3.2.1 Wetlands

Stantec biologists delineated potential wetlands and classified them into different types based on function, hydrological source/regime, topography, plant species composition, and origin (i.e., natural vs. man-made). Stantec conducted an on-site routine delineation of wetlands of the United States based on field observations of positive indicators for wetland vegetation, hydrology, and soils. The routine delineation includes establishing sample points and investigating three parameters at each point to determine and document the wetland-upland boundary. This methodology is consistent with the approach outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation*

Manual: Western Mountains Valleys and Coast (USACE 2010). At least one set of data points was selected to best represent the wetland feature type and the adjacent uplands. Data points were also placed in suspect areas to confirm wetland or upland status.

Wetland boundaries were determined by following a combination of the limits of hydrophytic vegetation, limits of observed wetland hydrology, topographic breaks, and aerial ortho-photo interpretation. Sample pits and wetland boundaries were mapped using a sub-meter-accurate Bad Elf™ Global Positioning Service Unit paired with Collector for ArcGIS™. All spatial data was collected in the World Geodetic System (WGS84) datum. Representative photographs were also taken of sample points and features (Appendix D). All potential wetland areas were evaluated to identify their connection to onsite and offsite hydrologic resources, and all potentially jurisdictional wetland areas were mapped if they met all three USACE-required parameters.

Plant taxonomy follows the Jepson Flora Project (2019). Wetland indicator status for plant species was confirmed with *The National Wetland Plant List* (Lichvar et al. 2016). Soil pits were excavated in representative wetland features to a depth sufficient to document the presence or confirm the absence of hydric soil or wetland hydrology indicators. Positive indicators of hydric soils were observed in the field following the criteria outlined in *Field Indicators of Hydric Soils in the United States* (Vasilas et al. 2017). Soil hue and chroma were determined using a Munsell® soil color chart. The hydric status of each soil map unit occurring in the survey area was reviewed using the Web Soil Survey (NRCS 2019). Stantec biologists used the Cowardin et al. (1979) system, as amended by subsequent updates (Federal Geographic Data Committee 2013) to assign all features a Cowardin type.

3.2.2 Other Waters

Stantec biologists delineated non-wetland features and classified them into different types based on function, hydrological source/regime, and origin (i.e., natural vs. man-made). These features were designated “other waters” of the United States and were delineated based on indicators of an ordinary high water mark (OHWM) and bed and banks. The OHWM was determined using the approach outlined in *A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (USACE 2014). Other waters are jurisdictional either (1) by rule or (2) because they have a significant nexus to a traditional navigable water (TNW), interstate water, territorial sea, or impoundment of a water of the U.S. Waters jurisdictional by rule are defined as (1) a TNW, interstate water, territorial sea, or impoundment of a water of the U.S. or (2) a tributary to or adjacent to a interstate water, territorial sea, or impoundment of a water of the U.S. (33 CFR 328.4). Delineation and potential jurisdiction of other waters was based guidance in USACE regulations (33 CFR 328.3 and 33 CFR 328.4). Physical characteristics of an OHWM include, but are not limited to, the following conditions: a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter and debris, leaf litter disturbed or washed away, scour, deposition, presence of bed and bank, and water staining. Either a data point was selected to best represent the OHWM of other waters or attributes were averaged along the length of the feature within the survey area.

A custom data dictionary in Collector was used to ensure consistent data collection in the field, and all spatial data was collected in the WGS84 datum. The following attributes were collected or measured for each mapped drainage: average OHWM width and depth, average top-of-bank width and depth, hydrologic regime, OHWM indicators, substrate below OHWM, substrate above OHWM and depth of water (if present). Representative photographs of features were also taken (Appendix D). In some instances, culverts or drainages were obscured by thick brush or inaccessible due to steep terrain. In these cases, full-color aerial imagery and/or topographic maps were used to assist mapping the jurisdictional features. All potentially jurisdictional drainages with primary or secondary indicators of OHWM and bed and bank were mapped and assumed to have either connectivity in some capacity (subsurface, adjacent, etc.) or a significant nexus with traditionally navigable waters as defined by the Clean Water Rule. Stantec biologists used the Cowardin et al. (1979) system, as amended by subsequent updates (Federal Geographic Data Committee 2013) to assign all features a Cowardin type.

3.2.3 Data Points and Delineation Map

Seventy-eight 3-parameter data points were used to characterize and document each wetland and the adjacent upland or other water feature type. The boundaries of delineated features and the associated data points were mapped using a Trimble Mapping Grade Global Positioning System (GPS) capable of sub-foot accuracy. Where the use of the GPS was not practicable, or satellites were not available, the features were delineated utilizing ortho-rectified color aerial photographs. The GPS and hand-drawn location data were overlaid onto an aerial photograph of the survey area to develop the delineation map.

4.0 RESULTS

Stantec biologists mapped 38.592 ac of wetlands and 13.311 ac (70,595.54 linear ft) of other waters (Appendix A). A summary of the delineated features is presented in Table 4, routine wetland determination data forms are presented in Appendix B, a plant list is provided in Appendix C, and representative photographs of the delineated features and data point locations are presented in Appendix D.

Table 4. Summary of Potentially Jurisdictional Aquatic Resources within the Survey Area

Feature Type	Acres	Linear Feet	Cowardin Code[1]
Wetlands			
Fresh Emergent Wetland	0.967	156[2]	PEM
Riparian Wetland	26.808	N/A	PSS, PFO
Seasonal Wetland	0.120	N/A	PEM
Vegetated Ditch	0.174	2,432	PEM
Wetland Meadow	8.714	N/A	PEM, PSS, PFO
Wetland Seep/Spring	1.809	N/A	PEM, PSS
Subtotal – Wetlands	**38.592**	**2,588**	
Other Waters			
Ephemeral Stream	0.559	10,224	R4SB
Intermittent Stream	2.861	24,900	R4SB
Non-vegetated Ditch	0.239	4,975	R4
Perennial Stream	9.468	30,495	R3UB
Pond	0.181	N/A	PUB
Subtotal – Other waters	**13.311**	**70,595**	
Total Jurisdictional Area	**51.900**	**73,183**	

[1] PEM = palustrine emergent, PSS = palustrine scrub-shrub, PFO = palustrine forested, R4SB = riverine intermittent streambed, R4 = Riverine intermittent, R3UB = riverine upper perennial unconsolidated bottom, PUB = palustrine unconsolidated bottom. Codes based on Cowardin et al. 1979.

[2] Linear distance for stream segments mapped as fresh emergent wetlands.

4.1 WETLANDS

Stantec biologists mapped 206 wetlands and classified them into 1 of 6 wetland types: fresh emergent wetland, riparian wetland, seasonal wetland, vegetated ditch, wetland meadow, and wetland seep/spring. In total, Stantec biologists examined and mapped 5 fresh emergent wetlands, 134 riparian wetlands, 5 seasonal wetlands, 12 vegetated ditches, 17 wetland meadows and 33 wetland seep/springs within the survey area. They also categorized mapped wetlands into 1 of 3 Cowardin classifications: palustrine emergent, palustrine forested, and palustrine scrub-shrub habitats (Figure 3).

4.1.1 Vegetation

Fresh Emergent Wetland

Fresh emergent wetlands occur infrequently throughout the survey area. They are associated with ponded depressions and low gradient vegetated portions of perennial stream channels. Vegetation found in fresh emergent wetlands includes American brooklime (OBL[3]), marsh purslane (*Ludwigia palustris*, OBL), common tule (OBL), Rocky Mountain pond-lily (OBL), and ridged manna grass (OBL).

Riparian Wetland

Riparian wetlands are the most common wetland type in the survey area. They are most often associated with intermittent or perennial drainages. Riparian wetlands in the survey area consist of tree- or shrub-dominated features. Dominant species within the survey area include white alder (FACW), Oregon ash (FACW), mountain alder (FACW), American dogwood (FACW), and Pacific willow (FACW). An herbaceous understory is often present and includes ridged manna grass (OBL), reed canary grass (FACW), hedge nettle (OBL), western lady fern (FAC), horsetail (*Equisetum* spp., FAC-OBL), stream violet (FACW), California tiger lily (FACW), and cow parsnip (FAC).

Seasonal Wetland

Seasonal wetlands occur infrequently in the survey area in a variety of landscape positions from shallow depressions to hillslopes. Seasonal wetlands are typically dominated by herbaceous vegetation that dies back during the dry season. Species present in seasonal wetlands include annual hair grass (*Deschampsia danthonioides*, FACW), Baltic rush (*Juncus balticus*, FACW), needle spikerush (*Eleocharis acicularis*, OBL), white brodiaea (*Triteleia hyacinthine*, FAC), and needleleaf navarretia (*Navarretia intertexta*, FACW).

[3] FAC = facultative. FACU = facultative upland, FACW = facultative wetland, OBL = obligate, UPL = upland. Status based on Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.

Vegetated Ditch

Vegetated ditches are man-made ditches that support a hydrologic regime sufficient to support hydrophytic vegetation. Vegetated ditches in the survey area typically convey water from perennial streams to areas outside the survey area for agricultural use. Herbaceous vegetation dominates these features including small fruited bulrush (OBL), western mountain aster (FAC), and big-leaf sedge (OBL).

Wetland Meadow

The wetland meadow classification is used for low gradient features in the survey area. Wetland meadows are dominated by herbaceous vegetation, including lamp rush (*Juncus effusus*, FACW), spearmint (FACW), big-leaf sedge (OBL), southern beaked sedge (*Carex utriculata*, OBL), white-flowered bog-orchid (FACW), Bigelow's sneezeweed (FACW), tufted hair grass (FACW), western mountain aster (FAC), long-stalked clover (FAC), and California oat grass (FAC). Wetland meadows at the headwaters of the North Fork of Montgomery Creek also support trees and shrubs, including lodgepole pine (FAC), Douglas spiraea (FACW), cascara (FAC), and western blueberry (FACW).

Wetland Seep/Spring

Wetland seep/springs occur as large, seepy hillsides or smaller seeps associated with road cuts. Herbaceous vegetation dominates these features, although hillside seeps often have shrubs or trees scattered throughout the wetland. Species observed in seep spring wetlands include white alder, mountain alder, Pacific yew (*Taxus brevifolia*, FAC), vine maple (FAC), Pacific willow (FACW), arroyo willow (FACW), pull-up muhly (FACW), giant checkerbloom (UPL), California tiger lily (FACW), narrow-leaved lotus (OBL), western mountain aster (FAC), seep monkey flower (OBL), Tinker's penny (*Hypericum anagalloides*, OBL), grayswamp whiteheads (*Sphenosciadium capitellatum*, FACW), and feathery false lily of the valley (*Maianthemum racemosum,* FAC).

4.1.2 Soils

Stantec biologists examined soils at wetland and upland data points. Several hydric soil indicators were observed in soil samples, including Histosol (A1), Histic Epipedon (A2), Hydrogen Sulfide (A4), Sandy Mucky Mineral (S1), Sandy Redox (S5), Loamy Mucky Mineral (F1), Loamy Gleyed Matrix (F2), Depleted Matrix (F3), Redox Dark Surface (F6), and Depleted Dark Surface (F7). Stantec documented problematic hydric soils in riparian wetlands, a seasonal wetland, a wetland meadow, and a vegetated ditch. Problematic soils in riparian wetlands were associated with vegetated gravel bars where indicators of hydric soils are often absent due to deposition of new soil material, low iron and manganese levels, and lack of organic content. The only seasonal wetland with problematic hydric soils occurred on a hillslope with shallow soils over bedrock. Soils in the vegetated ditch were inundated at the time of the survey and the feature was dominated by obligate hydrophytic vegetation. The vegetated ditch in question appears to be inundated perennially based on historical imagery. The wetland meadow with problematic hydric soils was inundated at the time of the survey and exhibited a positive reaction to alpha-alpha-Dipyridyl, indicating a presence of ferrous (Fe^{++}) iron. In addition, Stantec observed and documented dominant hydrophytic vegetation and indicators of wetland hydrology at four locations where problematic hydric soils were observed in wetland determinations.

4.1.3 Hydrology

Stantec biologists evaluated wetland hydrology at all established data points. Several primary indicators of wetland hydrology were observed within wetlands, including surface water (A1), high water table (A2), saturation (A3), water marks (B1), sediment deposits (B2), drift deposits (B3), algal mat or crust (B4), inundation visible on aerial imagery (B7), water stained leaves (B9), hydrogen sulfide odor (C1), oxidized rhizospheres (C3), and saturation visible on aerial imagery (C9). Stantec biologists also observed secondary indicators of wetland hydrology including drainage patterns (B10), geomorphic position (D2), and FAC-neutral test (D5).

4.2 OTHER WATERS

Stantec biologists mapped a total of 284 features designated “other waters” and classified them into 1 of 5 other waters types: ephemeral stream, intermittent stream, non-vegetated ditch, perennial stream, and pond. In total, Stantec biologists examined and mapped 41 ephemeral streams, 110 intermittent streams, 21 non-vegetated ditches, 109 perennial stream segments, and 3 ponds within the survey area. They also categorized other waters into one of four Cowardin classifications: riverine intermittent streambed, riverine intermittent, riverine upper perennial unconsolidated bottom, and palustrine unconsolidated bottom habitats (Figure 3).

4.2.1 Ephemeral Stream

Ephemeral streams exhibit indicators of scour and deposition, minor drift lines, and sediment deposits, but lack indication of a ground water component. Hydrology is provided by sheet flow during precipitation events. The poorly defined hydrology indicators, proximity to the headwaters, and small sizes of the ephemeral streams indicate short duration flow and lack of a groundwater component. Stantec biologists mapped 41 ephemeral stream segments within the survey area, which range from 1 to 6 ft wide. The streambed is devoid of vegetation and exhibit dominant substrates of soil, rock, and gravel. Drift deposits were the most commonly observed OHWM indicator in ephemeral streams.

4.2.2 Intermittent Stream

Intermittent streams flow seasonally but are fed by a groundwater component in addition to precipitation and sheet flow from adjacent slopes. Stantec biologists mapped 110 intermittent stream segments within the survey area. They are characterized as bed and bank features that exhibit indicators of scour, deposition, watermarks, and drift lines. Intermittent streams range from 1 to 20 ft wide and some support adjacent riparian wetlands. Rock, gravel, and soil are the dominant stream substrates. A few of the intermittent stream segments are named streams, including Richardson Creek and the upper reaches of Little Hatchet Creek.

4.2.3 Perennial Stream

Perennial streams are characterized by year-round surface water. Stantec biologists mapped 109 perennial stream segments within the survey area. They are characterized as features with bed and bank that exhibit indicators of scour, deposition, watermarks, and drift lines. Stream widths vary between 2 and 90 ft, and several of the perennial streams support adjacent riparian wetlands. Cobble, gravel, and sand are the dominant substrates in perennial streams. Several of the perennial stream segments are named streams, including Hatchet Creek, the lower reaches of Little Hatchet Creek, Carberry Creek, Goat Creek, the North and South Forks of Montgomery Creek, North Fork of Cedar Creek, the North Fork of Little Cow Creek, Little Cow Creek, and Mill Creek.

4.2.4 Non-Vegetated Ditch

Non-vegetated ditches are man-made ditches that do not support hydrophytic vegetation, have OHWM and bed and bank, and are connected to a wetland or other water. There were two types of non-vegetated ditches in the survey area: roadside ditches that convey runoff from adjacent roads to wetlands or other waters, and irrigation ditches that convey water from streams or vegetated ditches. Stantec biologists mapped 21 non-vegetated ditch segments within the survey area, which range from 1 to 8 ft wide. Soil, rock, and gravel are the dominant substrates in non-vegetated ditches.

4.2.5 Pond

Ponds in the survey area are constructed features either with a seasonally high water table or created by pooling water adjacent to natural springs. Stantec biologists mapped three ponds in the survey area. They occur adjacent to fresh emergent wetlands or wetland seep/springs but lack the vegetation component required to qualify as wetlands. Ponds were either fully inundated at the time of the survey or the ordinary high water mark was delineated based on drift deposits and inundation visible on historical imagery.

4.3 NEGATIVE OBSERVATIONS

There were some areas where existing data (i.e., National Wetland Inventory and National Hydrography Dataset) indicated features were present (e.g., headwaters of streams), but no evidence of overland flow or indicators of wetlands were observed during the field examination. No features were mapped at these locations and because there was no physical evidence of any wetland or other waters feature, no data was taken at these locations.

5.0 CONCLUSION

Potential waters of the United States, including wetlands, delineated within the survey area occupy a total of 51.900 ac in the survey area and include fresh emergent wetland (0.967 ac, 156 linear ft), riparian wetland (26.808 ac), seasonal wetland (0.120 ac), vegetated ditch (0.174 ac, 2,432 ft), wetland meadow (8.714 ac), wetland seep/spring (1.809 ac), ephemeral stream (0.559 ac, 10,224 linear ft), intermittent stream (2.784 ac, 24,900 linear ft), non-vegetated ditch (0.239 ac, 4,975 linear ft), perennial stream (9.468 ac, 30,495 linear ft), and pond (0.181 ac).

Determinations of waters of the United States, including wetlands, are based on current conditions, (i.e., normal circumstances) and made in accordance with June 2015t U.S. Environmental Protection Agency and USACE guidance (33 CFR 328). Determinations may be subject to verification by the USACE. Stantec advises all interested parties to treat the information contained herein as preliminary as written verification of jurisdictional boundaries by USACE may be required.

6.0 REFERENCES

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_____. 1990b. Montgomery Creek, California 7.5-minute topographic quadrangle. Denver, Colorado: U.S. Department of the Interior

_____. 1990c. Roaring Creek, California 7.5-minute topographic quadrangle. Denver, Colorado: U.S. Department of the Interior.

_____. 1995a. Hatchet Mountain Pass, California 7.5-minute topographic quadrangle. Denver, Colorado: U.S. Department of the Interior.

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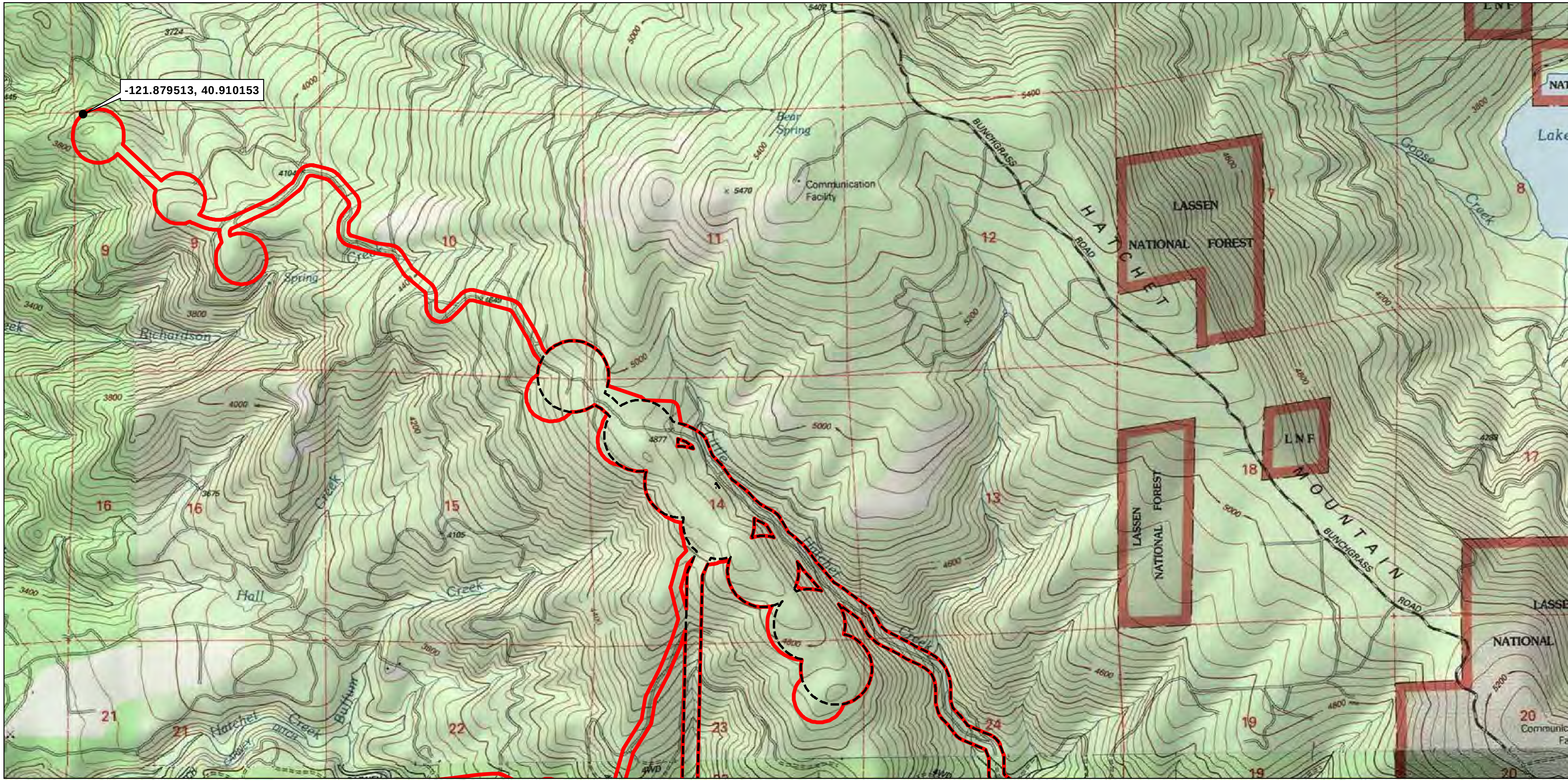
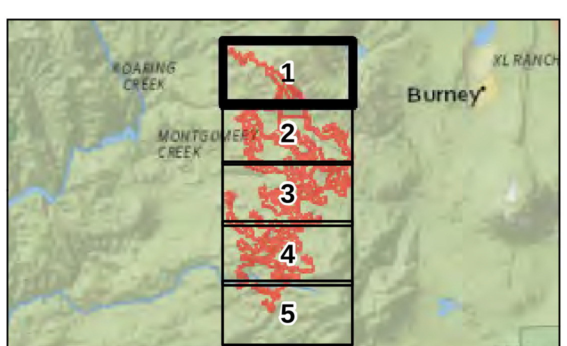
FIGURES





Survey Area (6,118 acres)

Project Site

Notes

1. Coordinate System: NAD 1983 UTM Zone 10N
2. Base map: ESRI USA Topo Maps web mapping service.
3. USGS Quad:
Chalk Mountain, Hatchet Mountain Pass, Montgomery Creek, Miller Mountain, Roaring Creek
4. Public Land Survey
Township 33 North Range 1 East
Township 33 North Range 2 East
Township 34 North Range 1 East
Township 34 North Range 2 East
Township 35 North Range 1 East

0 2,000 4,000 Feet

(At original document size of 11x17)
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Stantec

Project Location
Shasta County, California

Prepared by REM on 2019-10-31
TR by GC on 2019-11-01
IR Review by SC on 2019-11-05

Client/Project
185804576
ConnectGen Operating LLC
Fountain Wind Project

Figure No.
1
DRAFT

Title
Project Location

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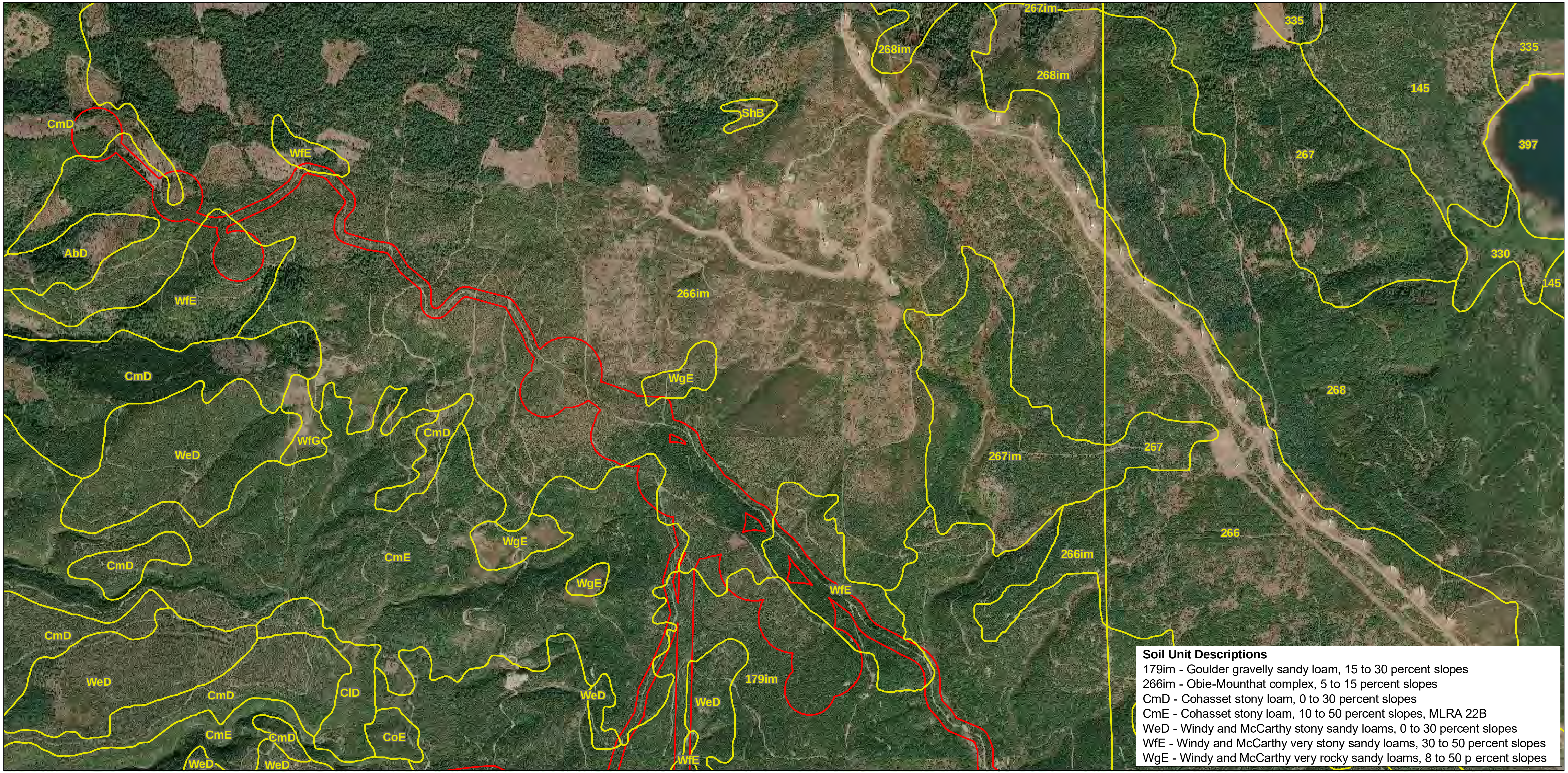
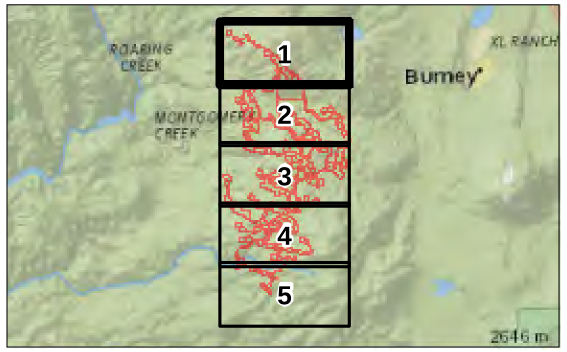


Soil Unit Descriptions

179im - Goulder gravelly sandy loam, 15 to 30 percent slopes
266im - Obie-Mounthat complex, 5 to 15 percent slopes
CmD - Cohasset stony loam, 0 to 30 percent slopes
CmE - Cohasset stony loam, 10 to 50 percent slopes, MLRA 22B
WeD - Windy and McCarthy stony sandy loams, 0 to 30 percent slopes
WfE - Windy and McCarthy very stony sandy loams, 30 to 50 percent slopes
WgE - Windy and McCarthy very rocky sandy loams, 8 to 50 p ercent slopes



Survey Area (6,118 acres)
Soil Unit Boundary

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Notes
1. Coordinate System: NAD 1983 UTM Zone 10N
2. Base map: ESRI World Imagery Map web mapping service.
3. Soils Data Source: USDA Natural Resources Conservation Services SSURGO Soils Database

Stantec

Project Location
Shasta County, California

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Client/Project 185804576
ConnectGen Operating LLC
Fountain Wind Project

Figure No.
2 **DRAFT**

Title
Soils

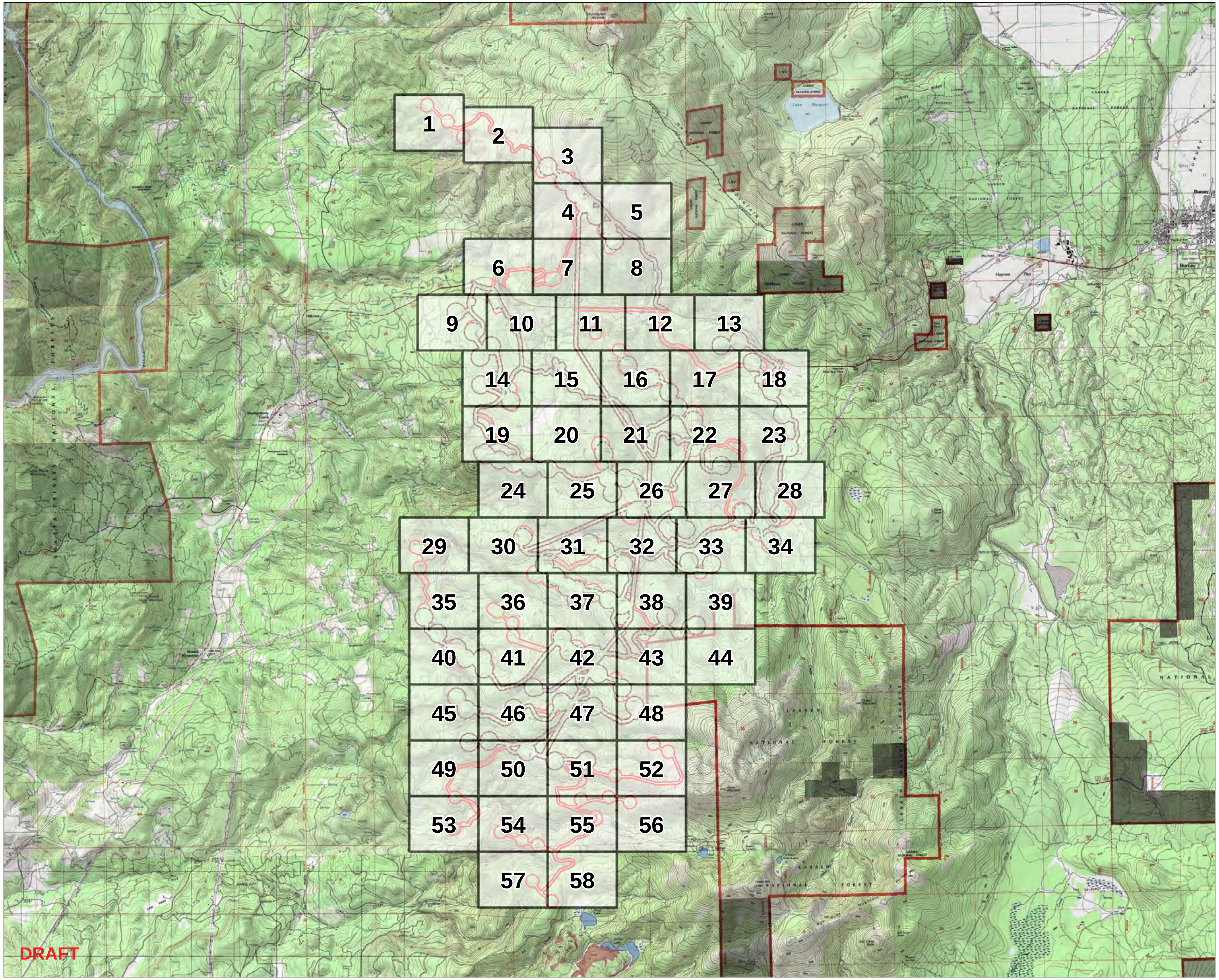

Figure No.
3 Overview

Title
Potential Waters of the United States

DRAFT

Client/Project 185804576
ConnectGen Generating LLC
Fountain Wind Project

Project Location
Shasta County, California

Prepared by REM on 2019-11-01
TR by GC on 2019-11-01
IR Review by SC on 2019-11-05

N

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(At original document size of 24x36)
1:42,000

Survey Area (6,118 acres)
Project Site

Notes
1. Delineators: John Holson, Allison Loveless, Andrew Sorci, Gabe Youngblood
2. Delineation Dates: October-December 2017, August 2018
3. Coordinate System: NAD 1983 UTM Zone 10N
4. Base map: ESRI USA Topo Maps web mapping service

Stantec

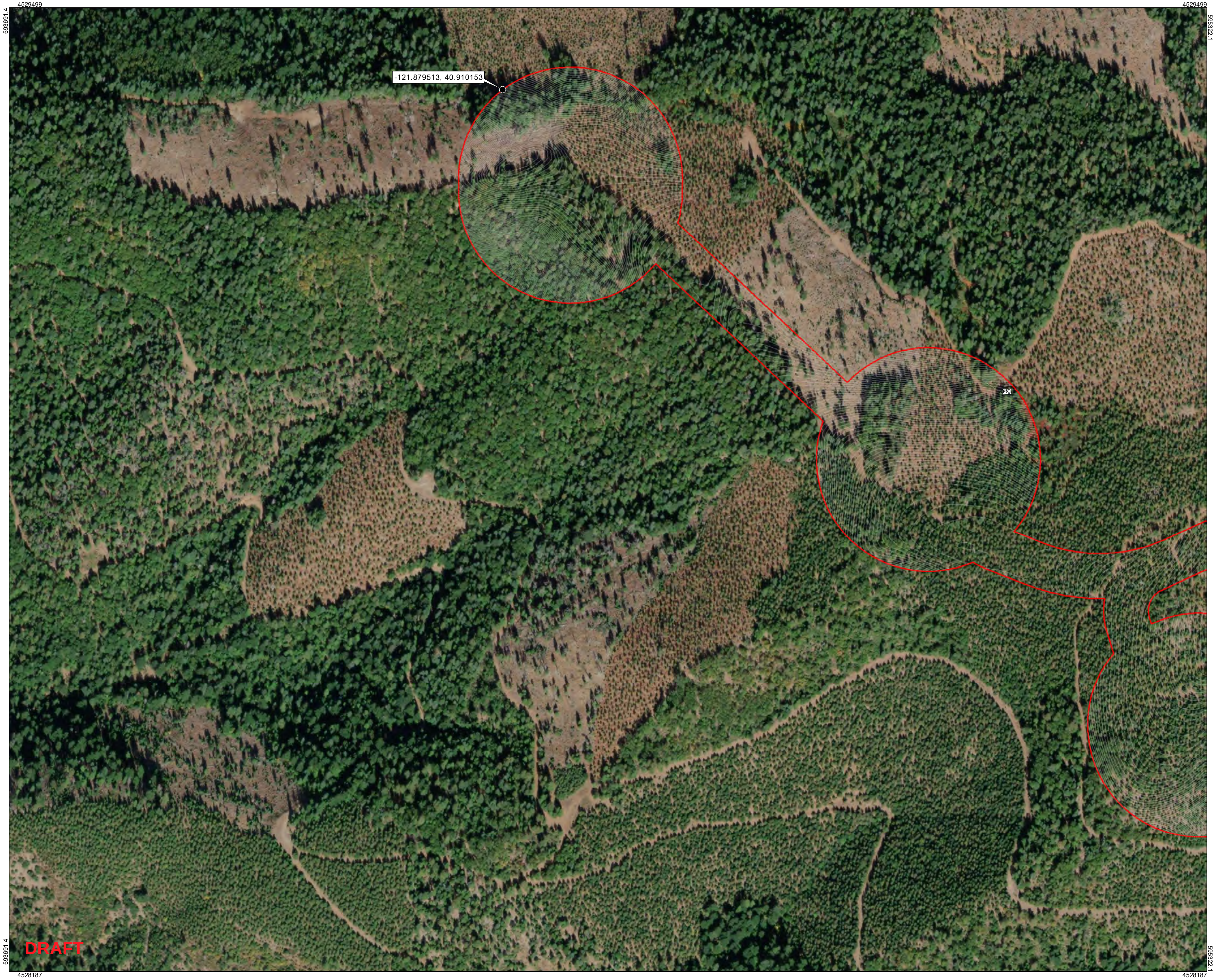

Figure No.
3

DRAFT

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Fountain Wind Project

Project Location
Shasta County, California

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IR Review by SC on 2019-11-05

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0 200 400 Feet
(At original document size of 24x36)
1:2,400

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- 2 ft Contour
- Culvert
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Waters of the United States (2019)

Type
- Riparian Wetland (2.520 acres)
- Wetland Meadow (0.340 acre)
- Wetland Seep/Spring (0.019 acre)

Other Waters
- Ephemeral Stream (0.118 acres)
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Waters of the United States (2017, 2018)

Type
- Fresh Emergent Wetland (0.967 acre)
- Riparian Wetland (24.288 acres)
- Seasonal Wetland (0.120 acre)
- Vegetated Ditch (0.174 acre)
- Wetland Meadow (8.374 acres)
- Wetland Seep/Spring (1.790 acres)

Other Waters
- Ephemeral Stream (0.441 acre)
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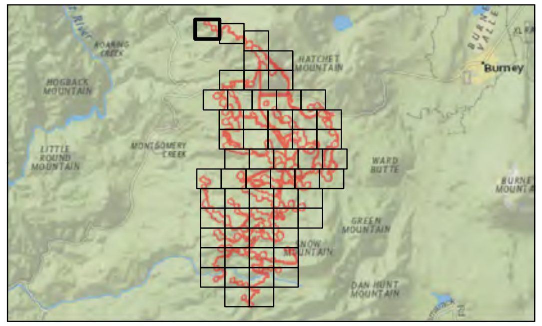

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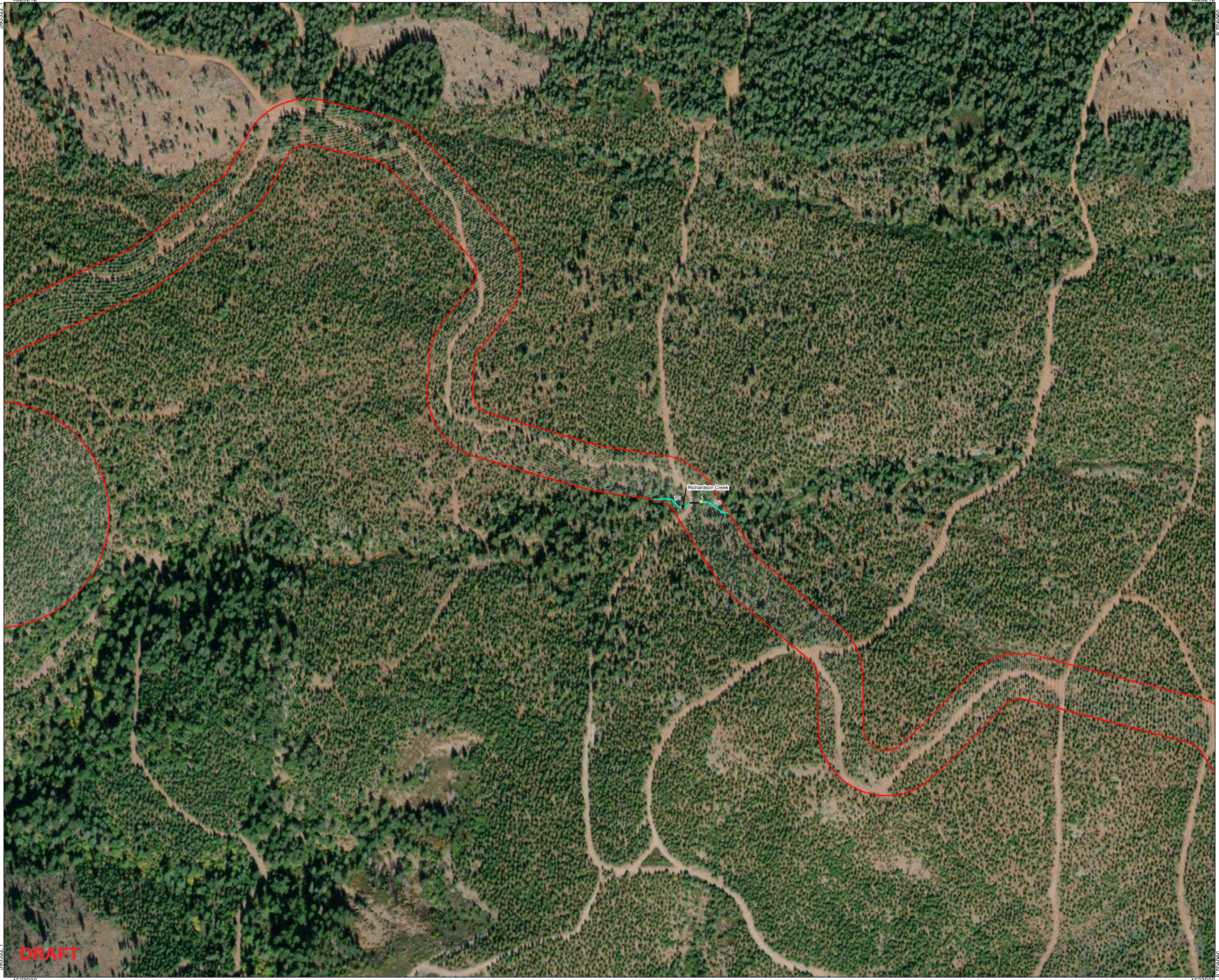

Figure No.
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Client/Project — 185804576
ConnectGen Generating LLC
Fountain Wind Project

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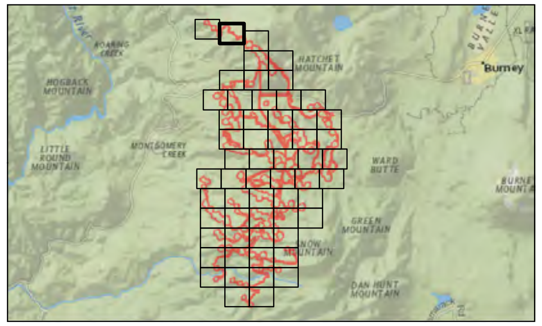

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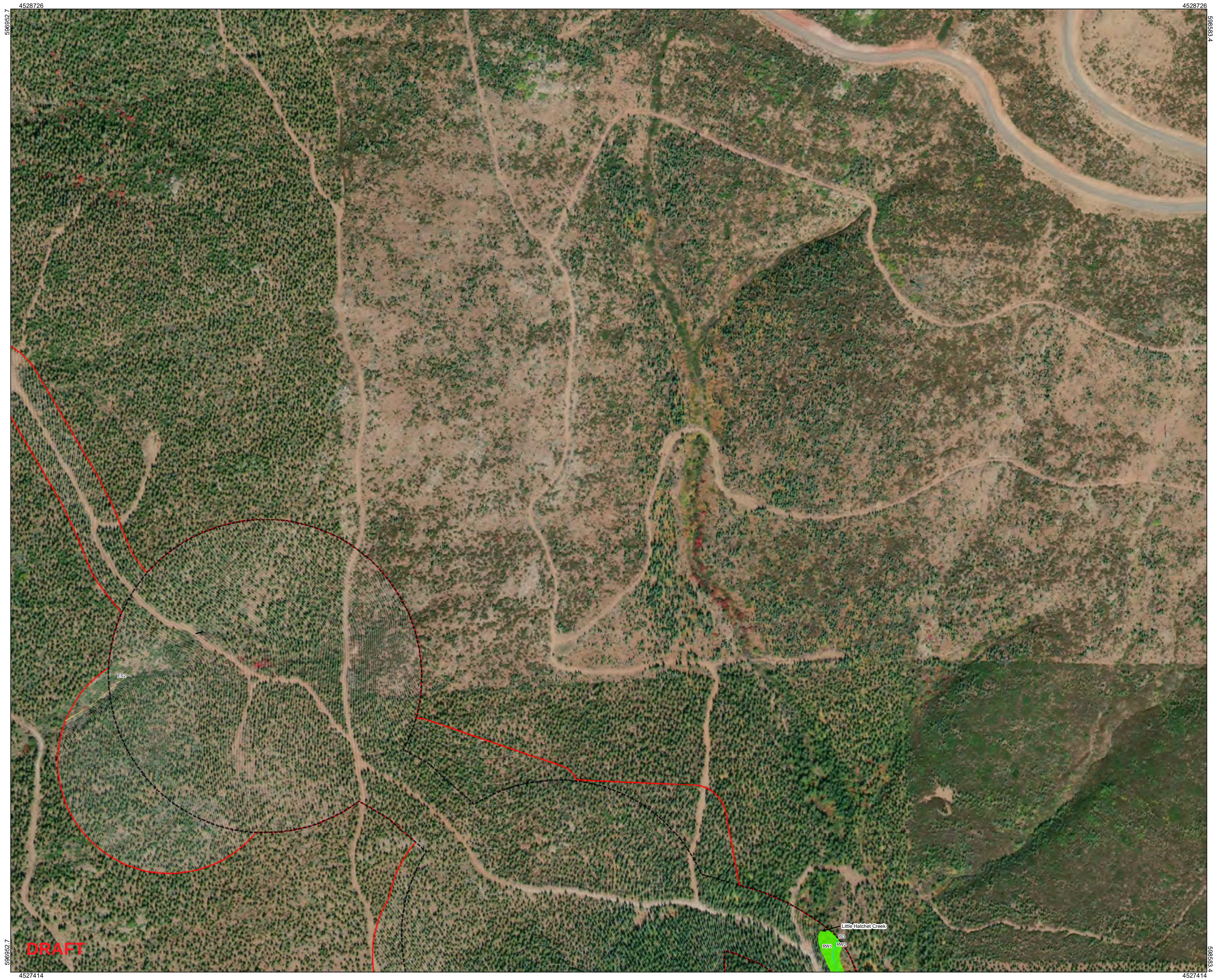

Figure No.
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Client/Project 185804576
ConnectGen Generating LLC
Fountain Wind Project

Project Location
Shasta County, California

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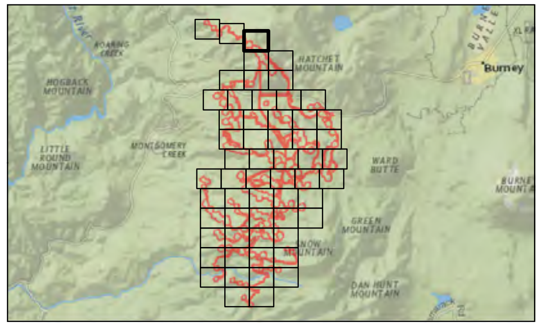

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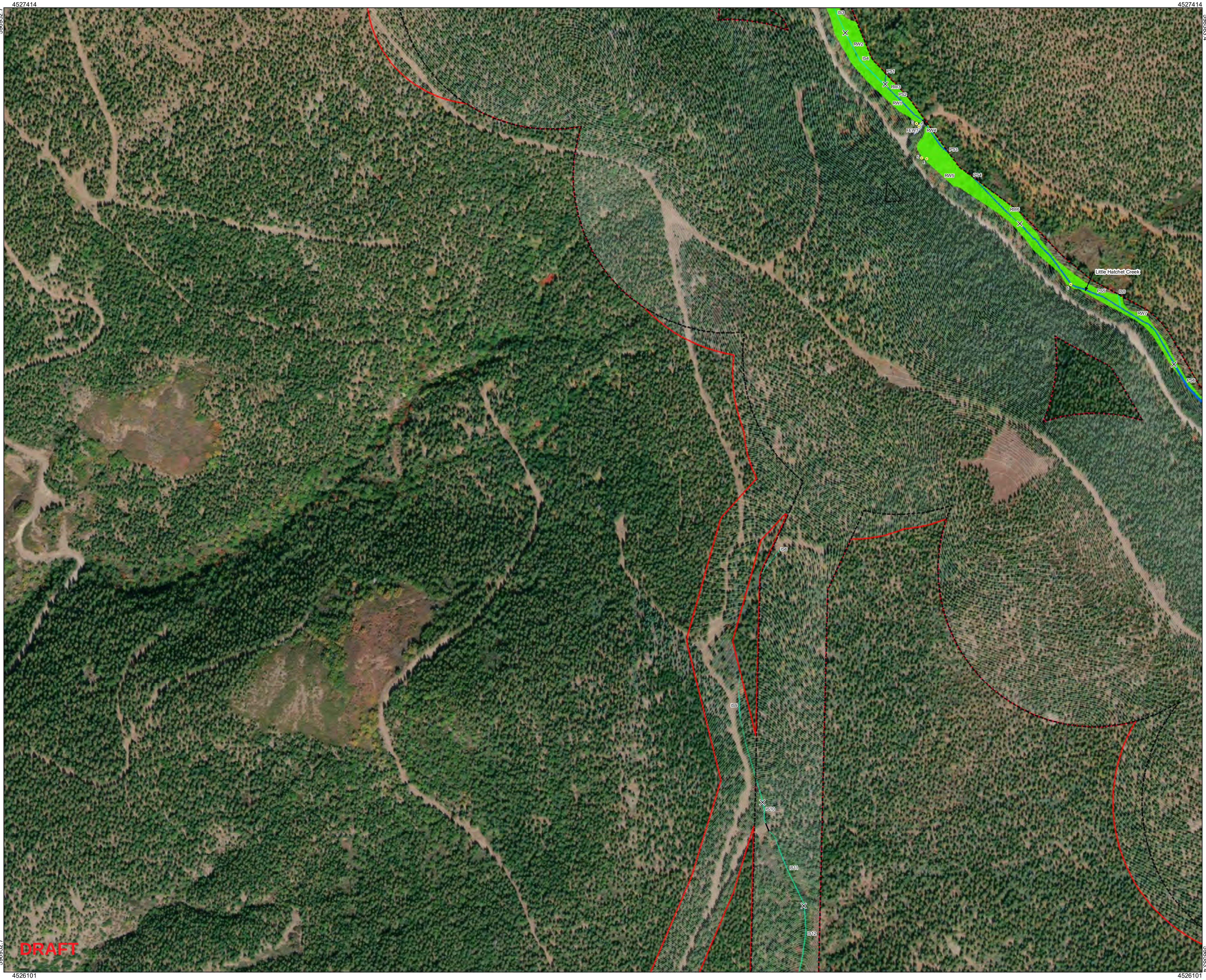

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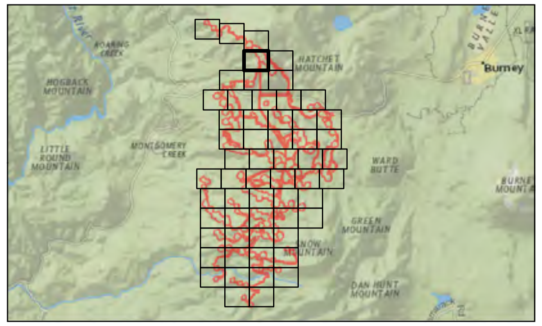

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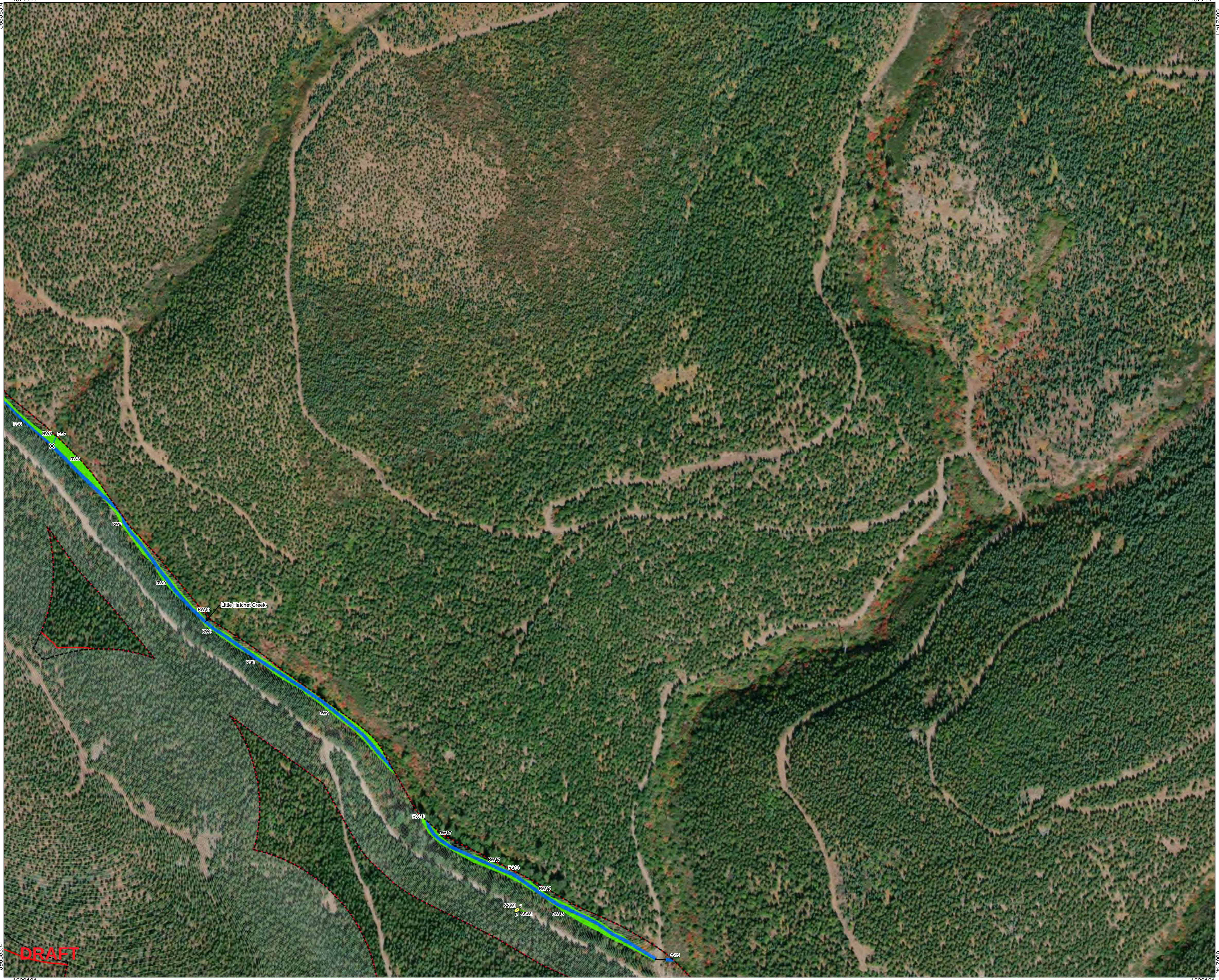

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Client/Project 185804576
ConnectGen Generating LLC
Fountain Wind Project

Project Location
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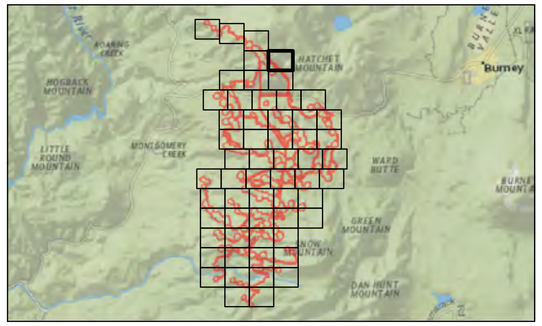

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ConnectGen Generating LLC
Fountain Wind Project
185804576

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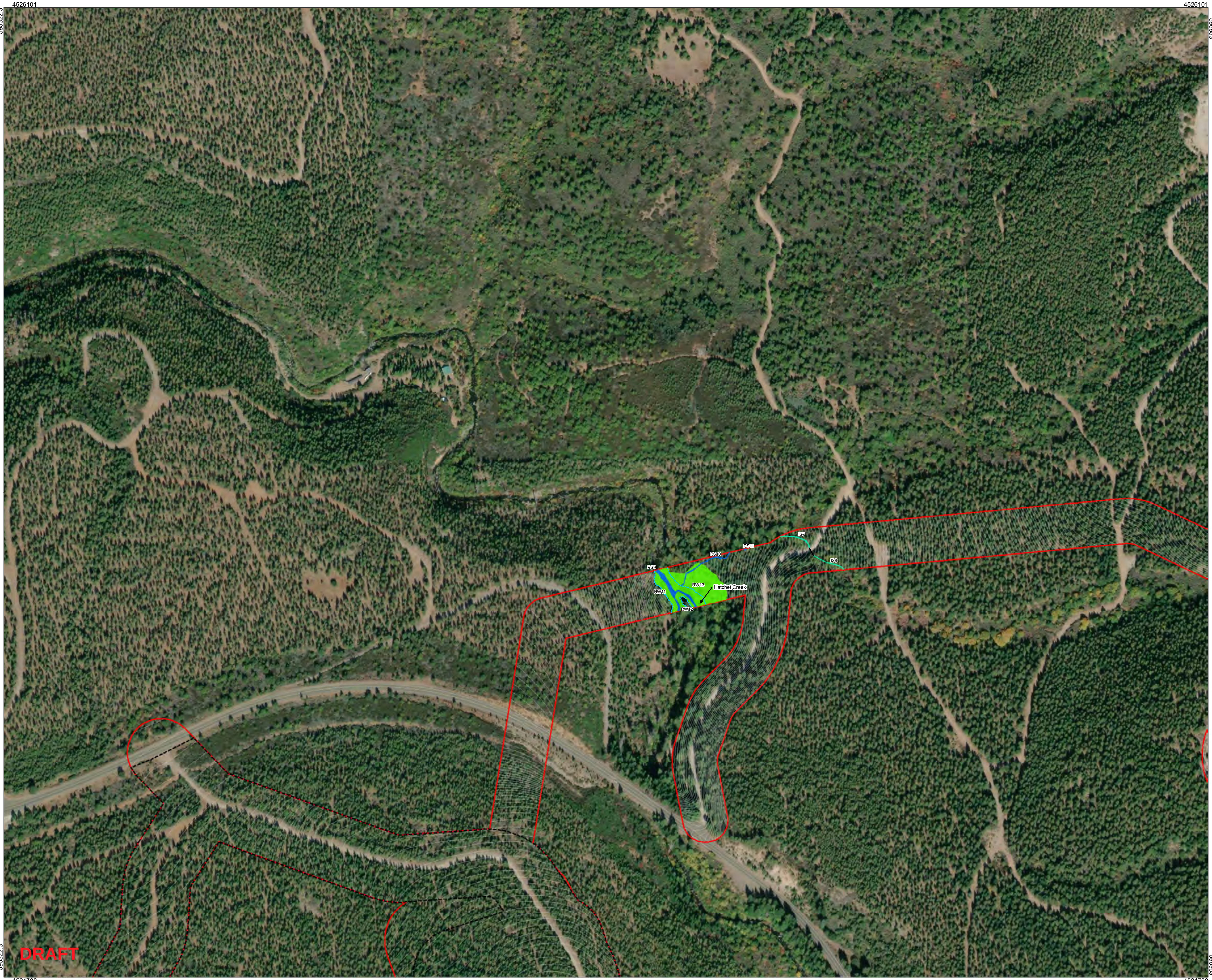

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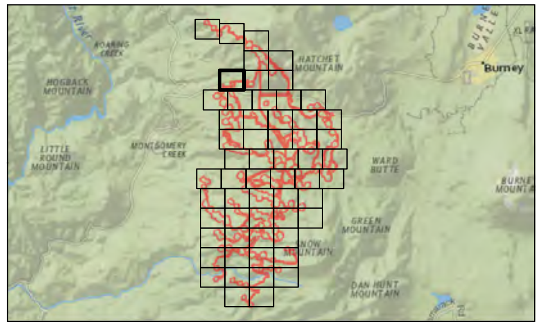

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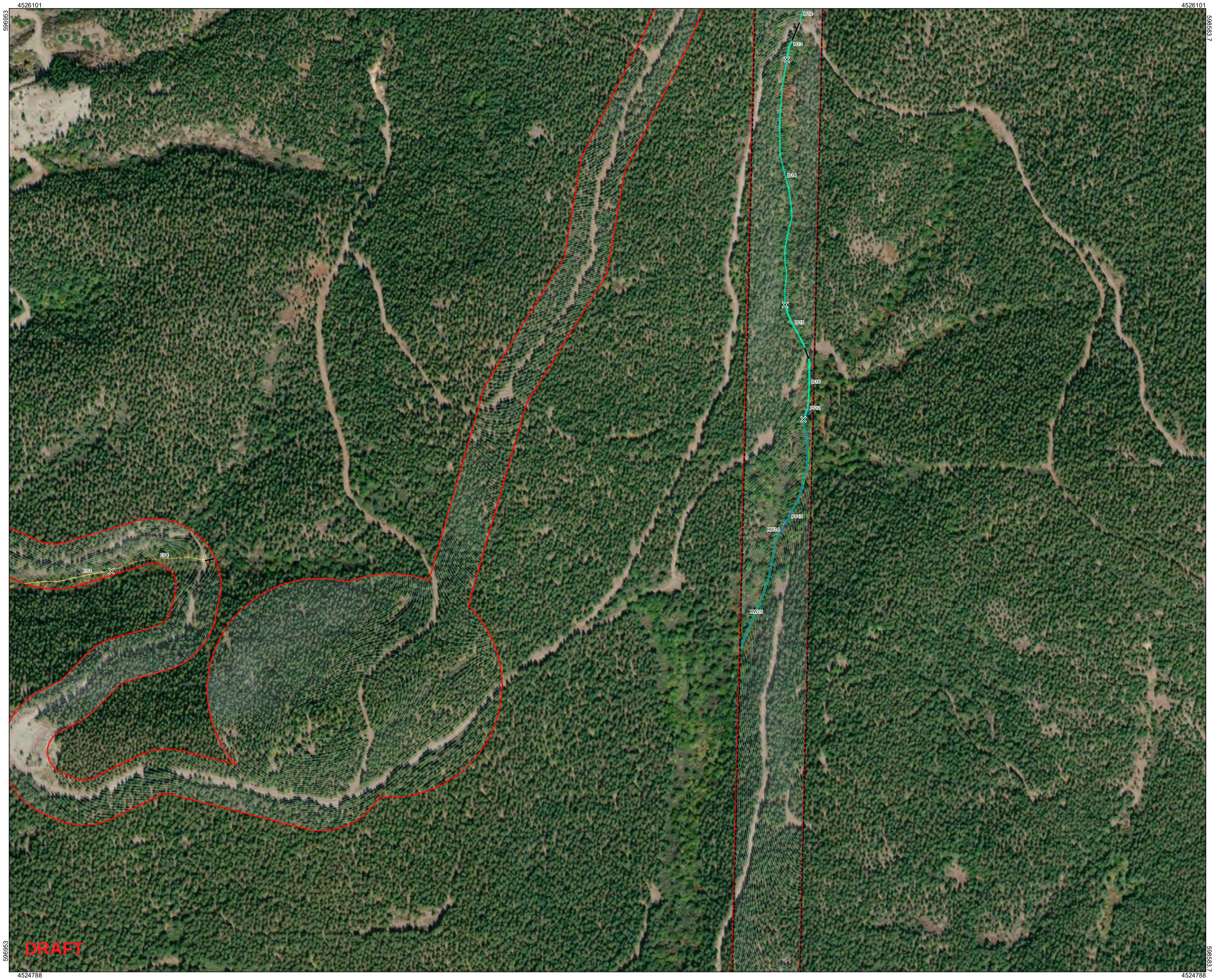

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Type
- Fresh Emergent Wetland (0.967 acre)
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- Seasonal Wetland (0.120 acre)
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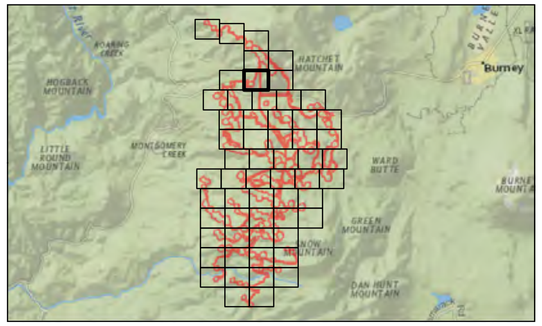

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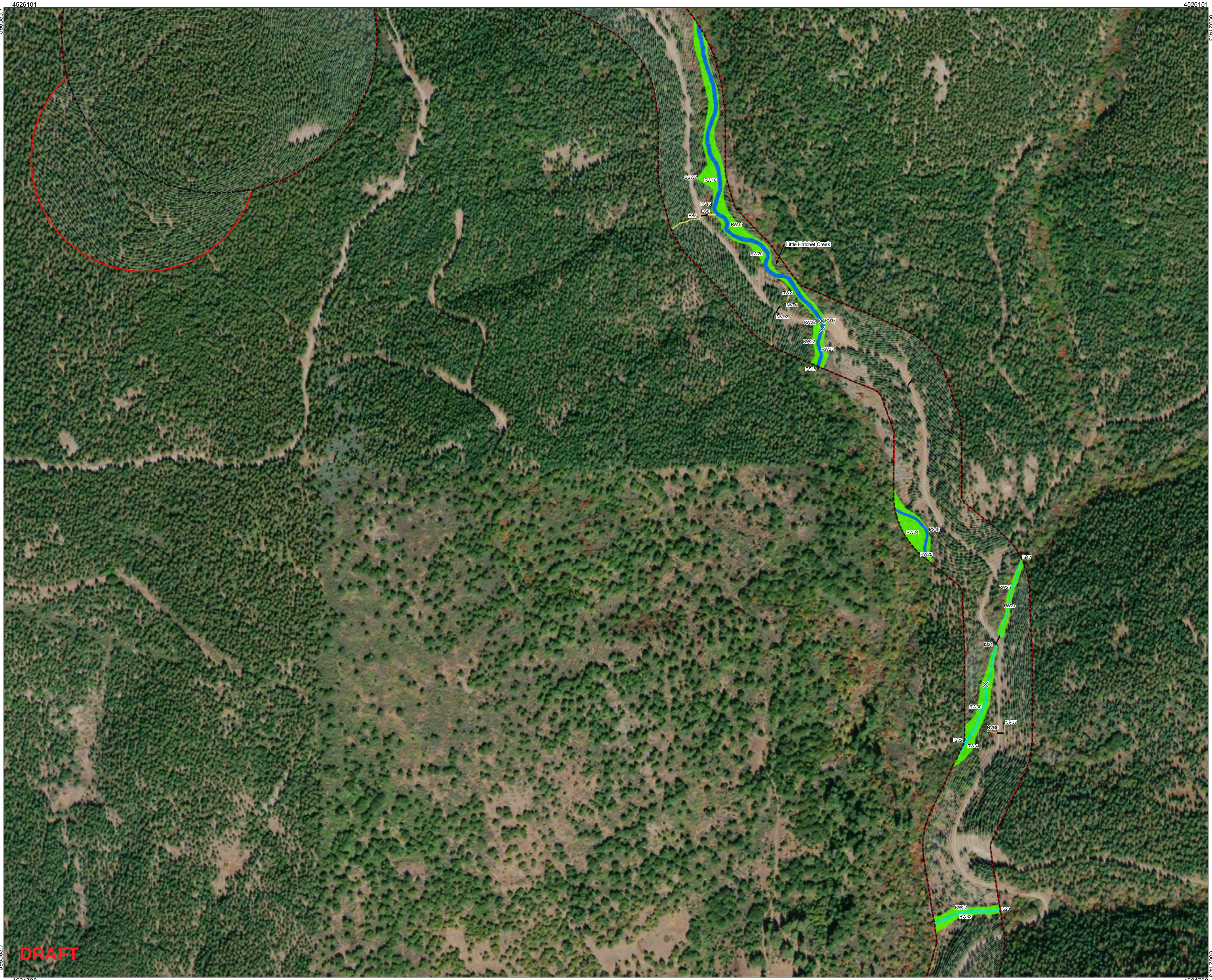

Figure No.
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Title
Potential Waters of the United States

Client/Project
185804576
ConnectGen Generating LLC
Fountain Wind Project

Project Location
Shasta County, California

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IR Review by SC on 2019-11-05

N
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Feet
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1:2,400

- Survey Area (6,118 acres)
- Project Site
- 2 ft Contour
- Culvert
- Historic Ditch
- Ordinary High Water Mark
- 3-Parameter Data Point
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Waters of the United States (2019)

Type
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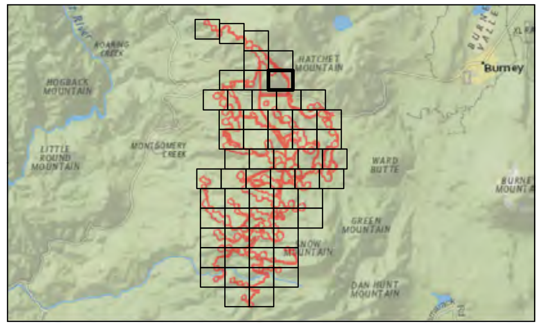

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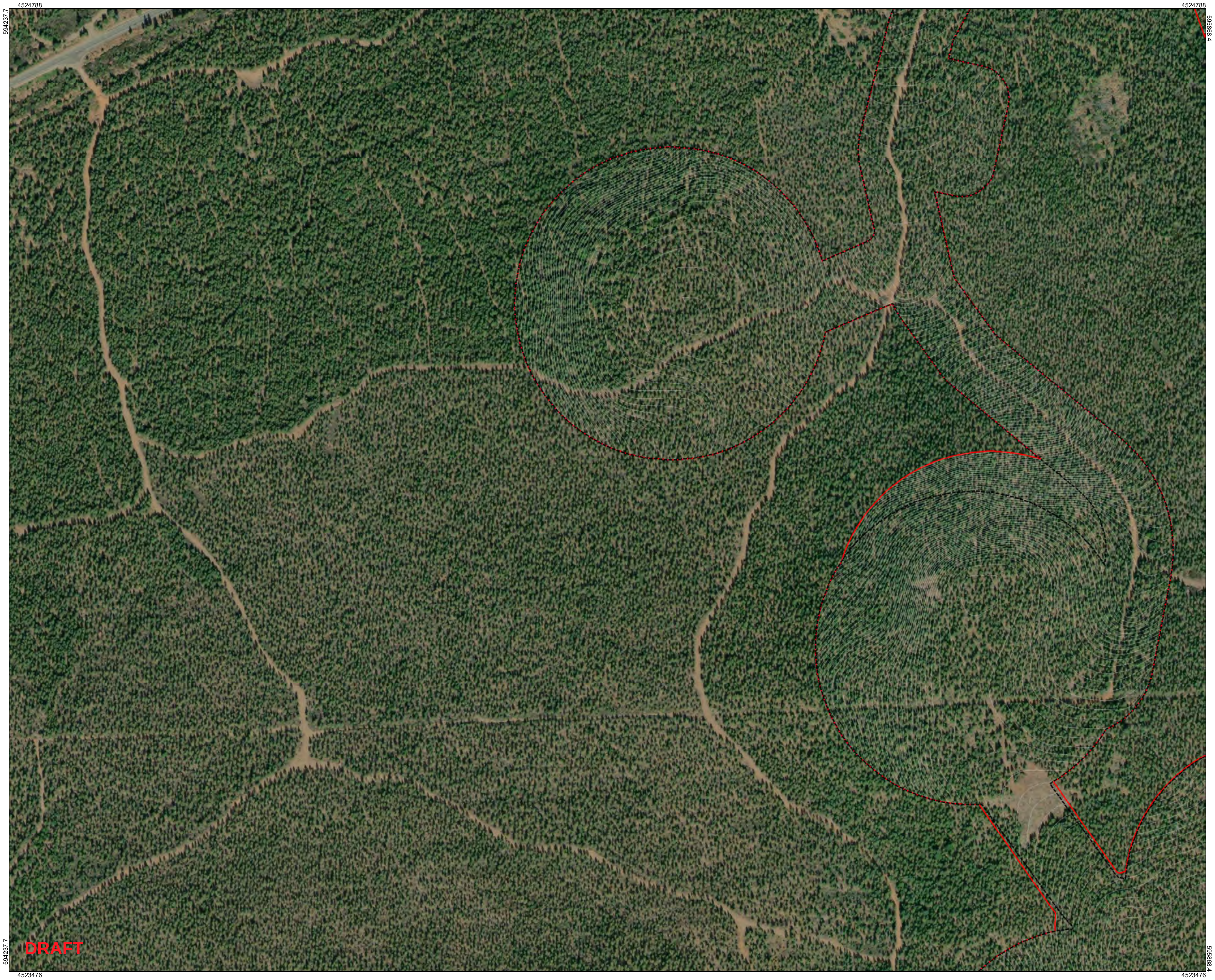

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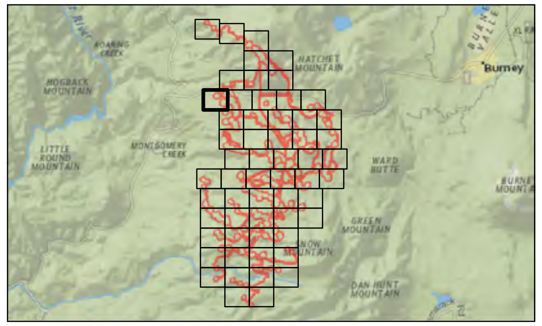

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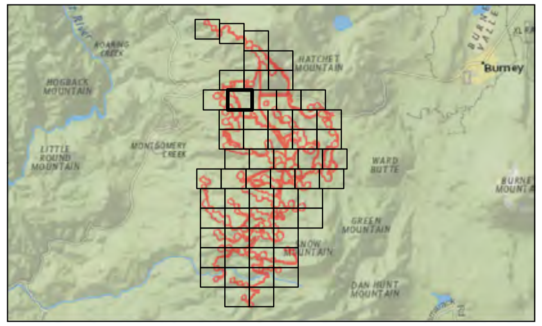

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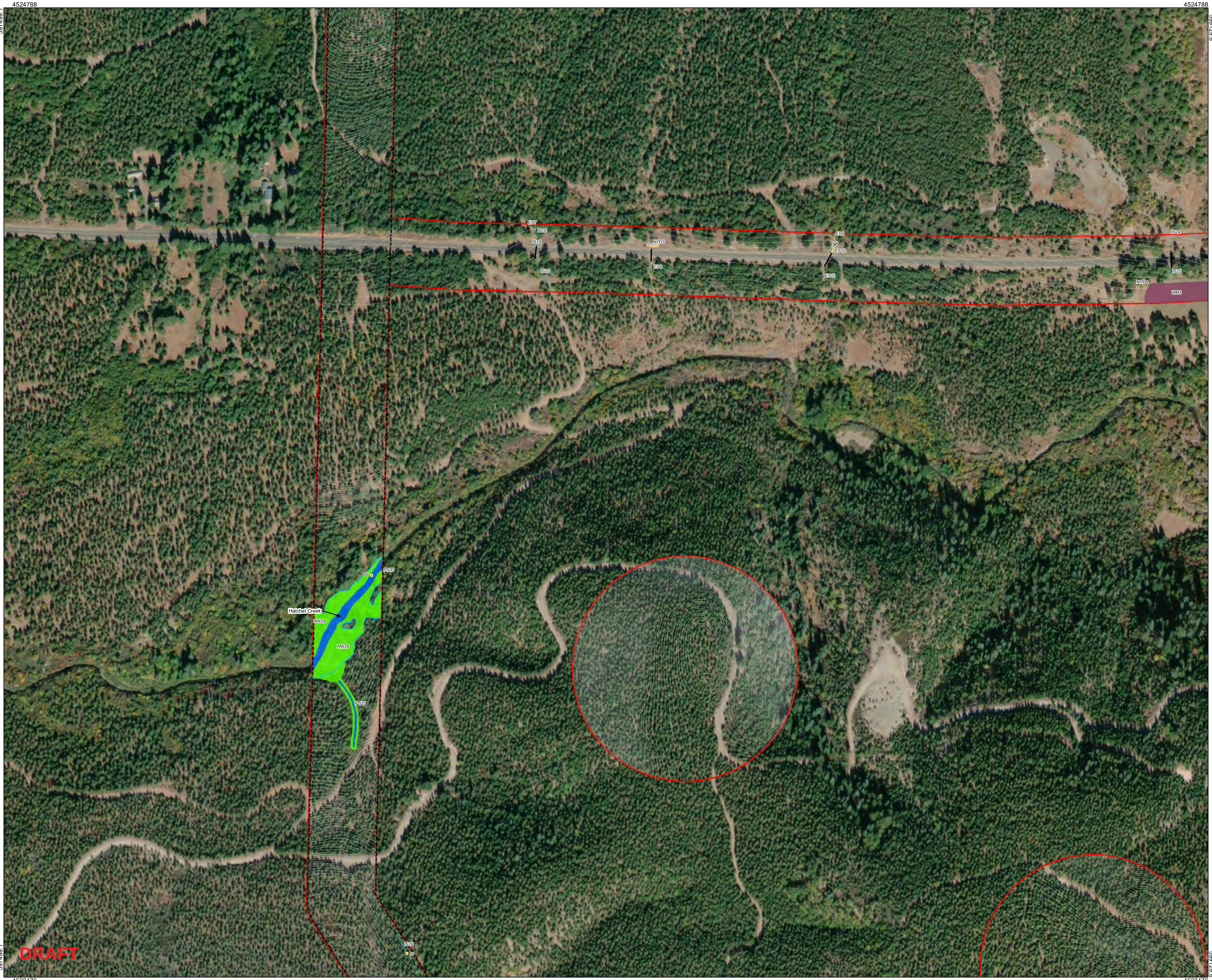

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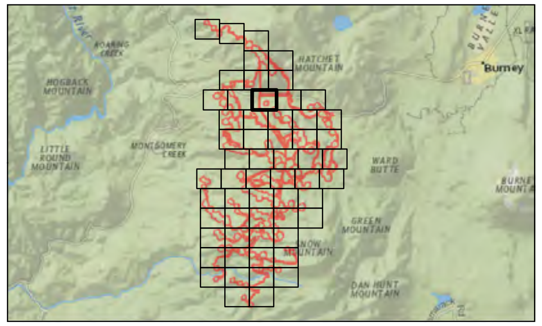

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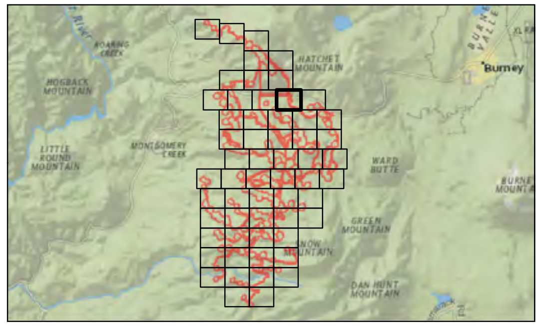

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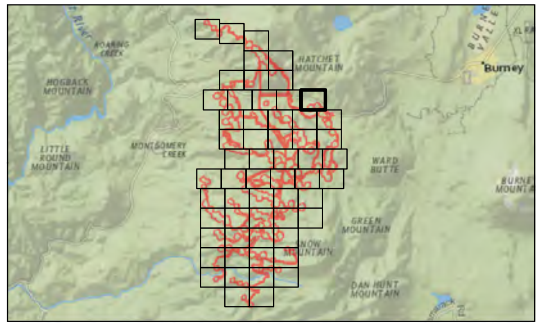

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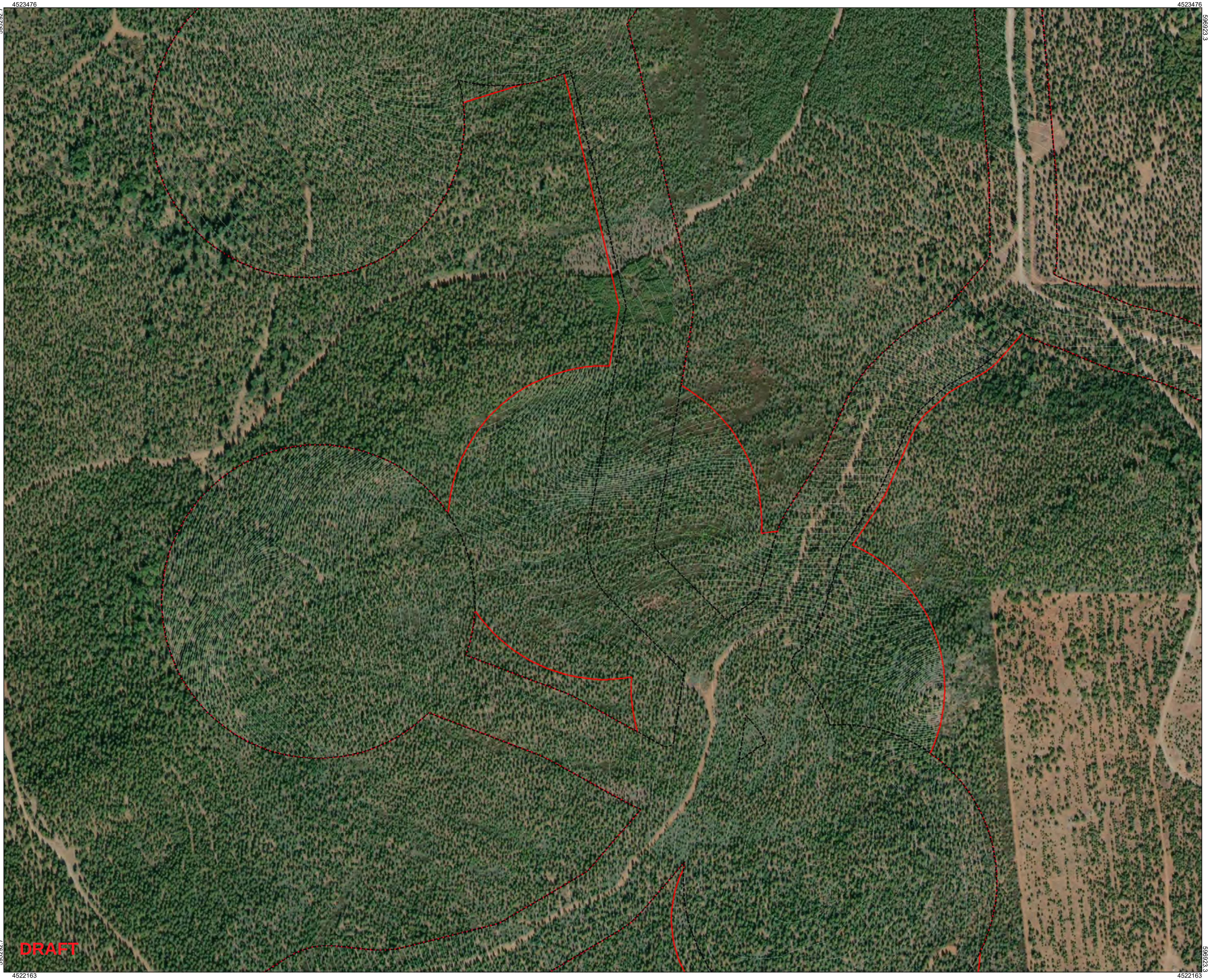

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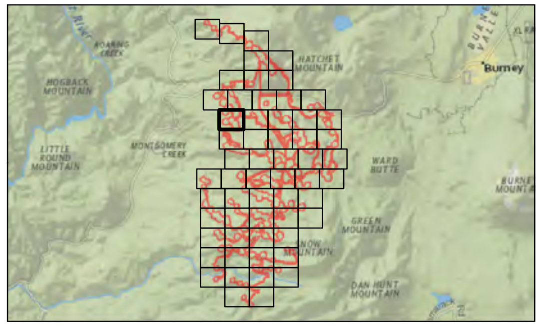

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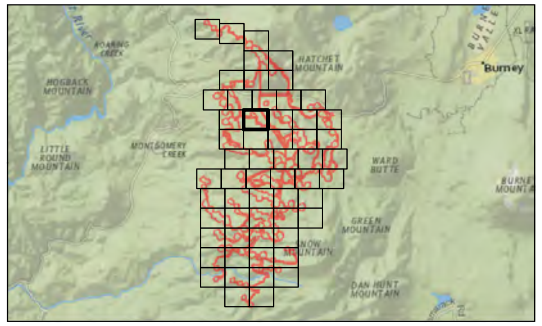

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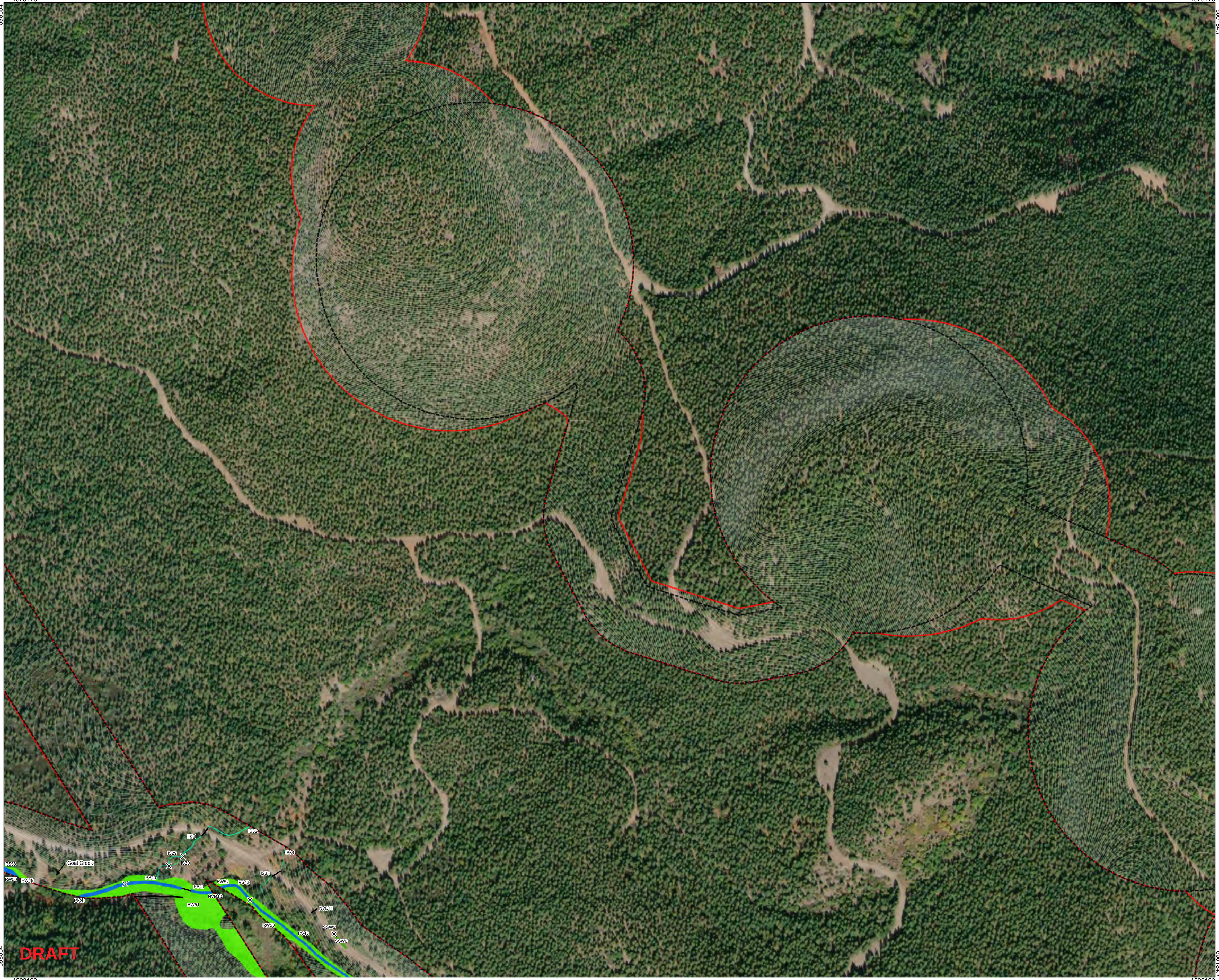

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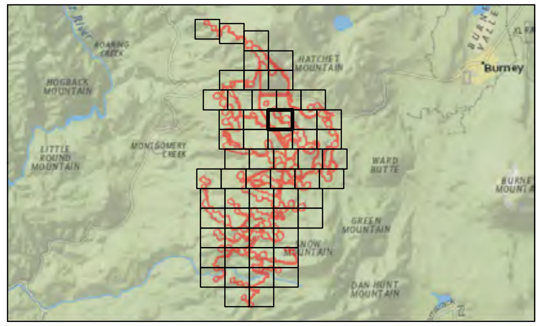

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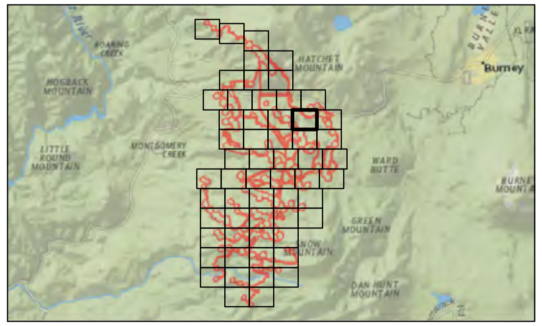

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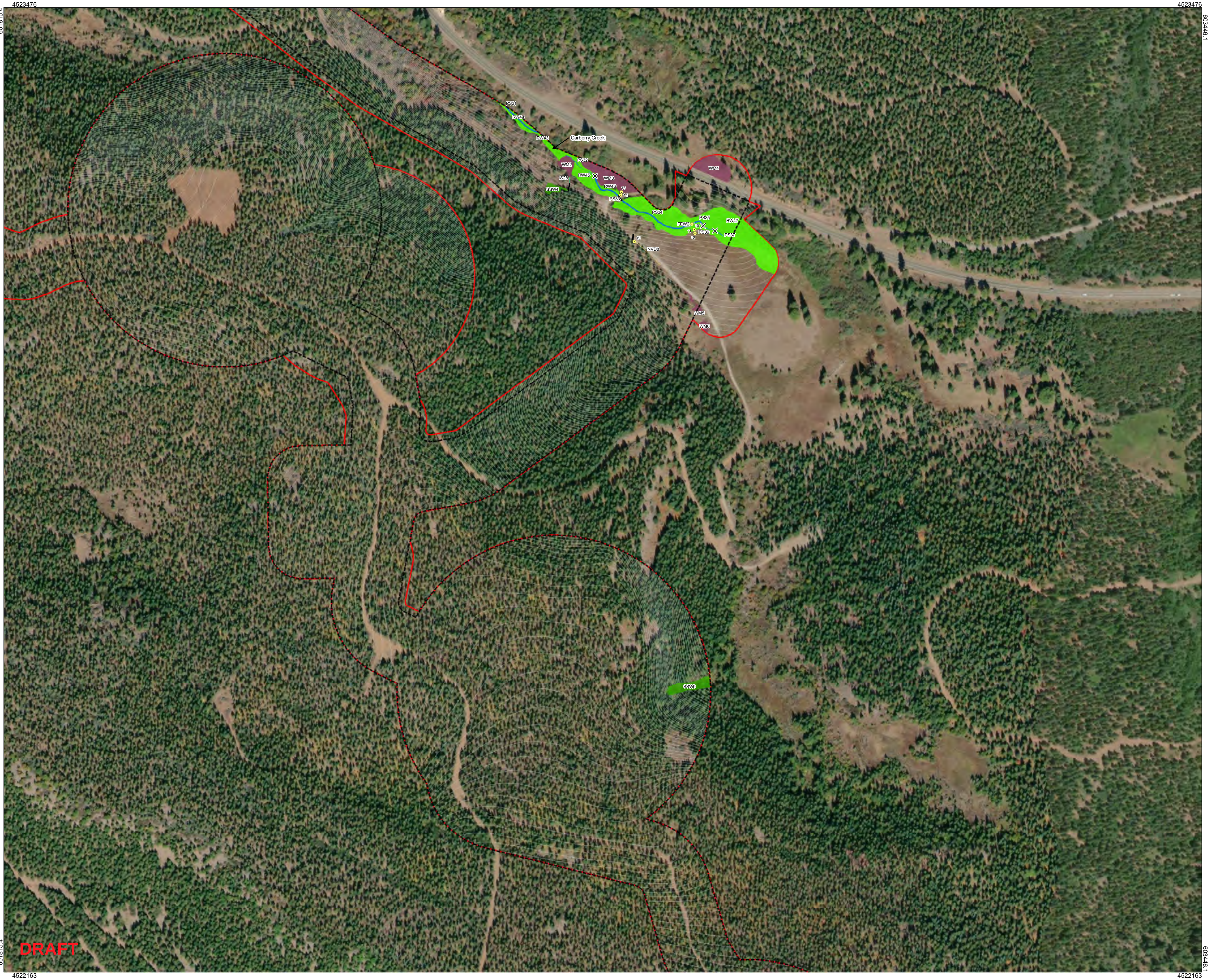

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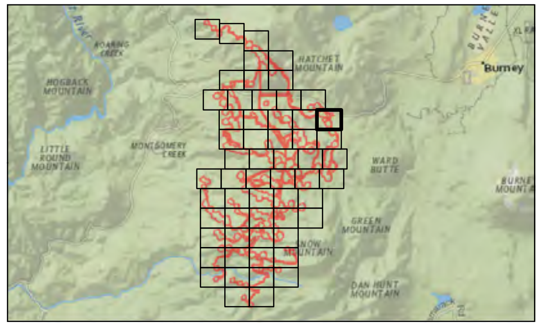

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Potential Waters of the United States

Client/Project 185804576
ConnectGen Generating LLC
Fountain Wind Project

Project Location
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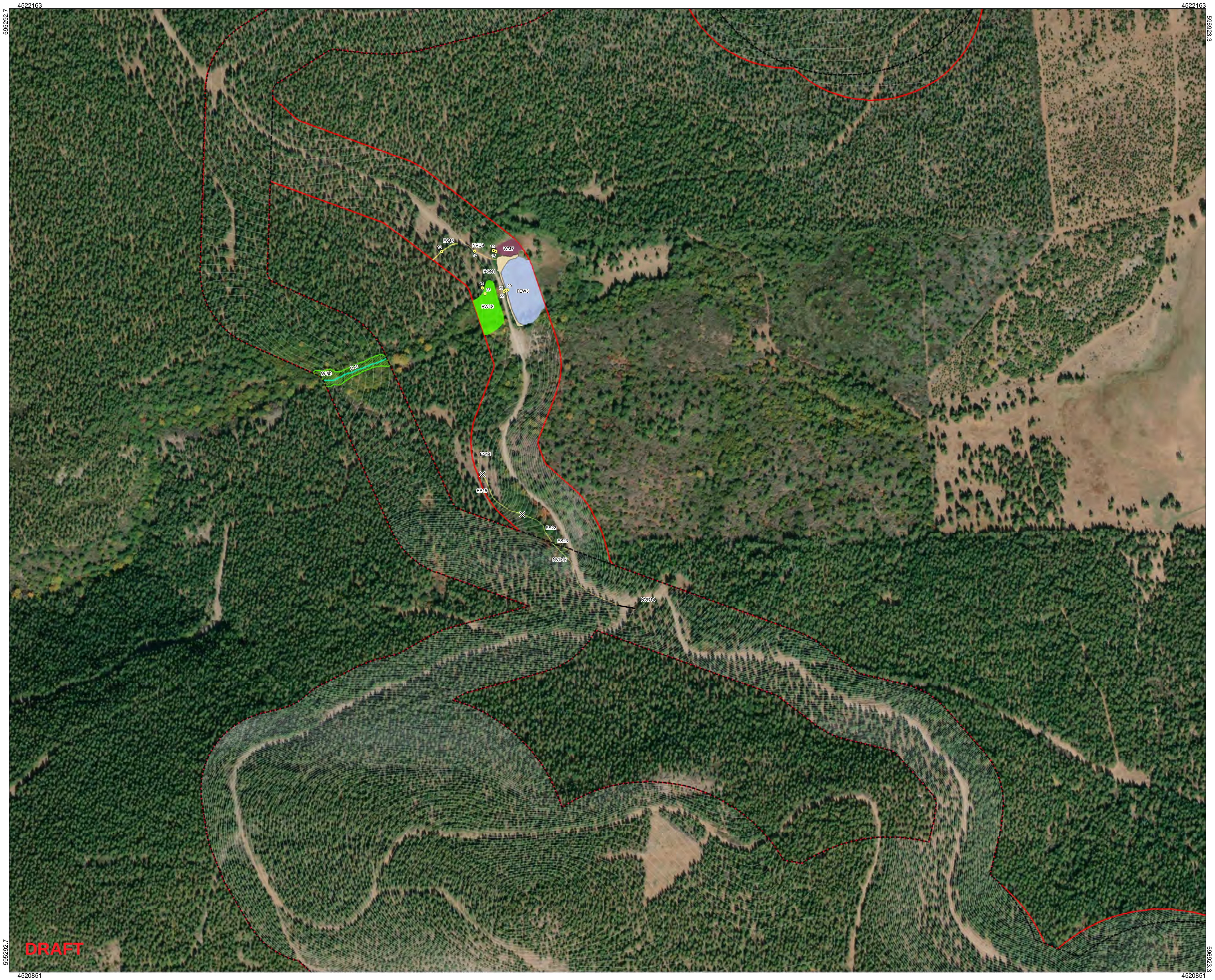

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Survey Area (6,118 acres)
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2 ft Contour
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Wetland Seep/Spring (0.019 acre)

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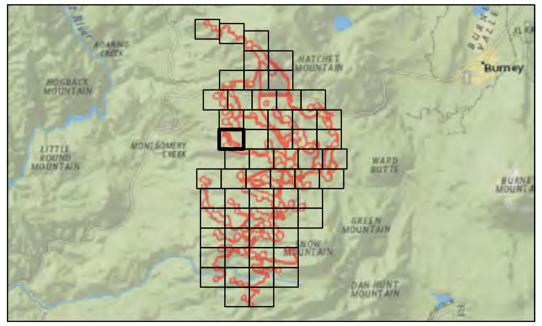

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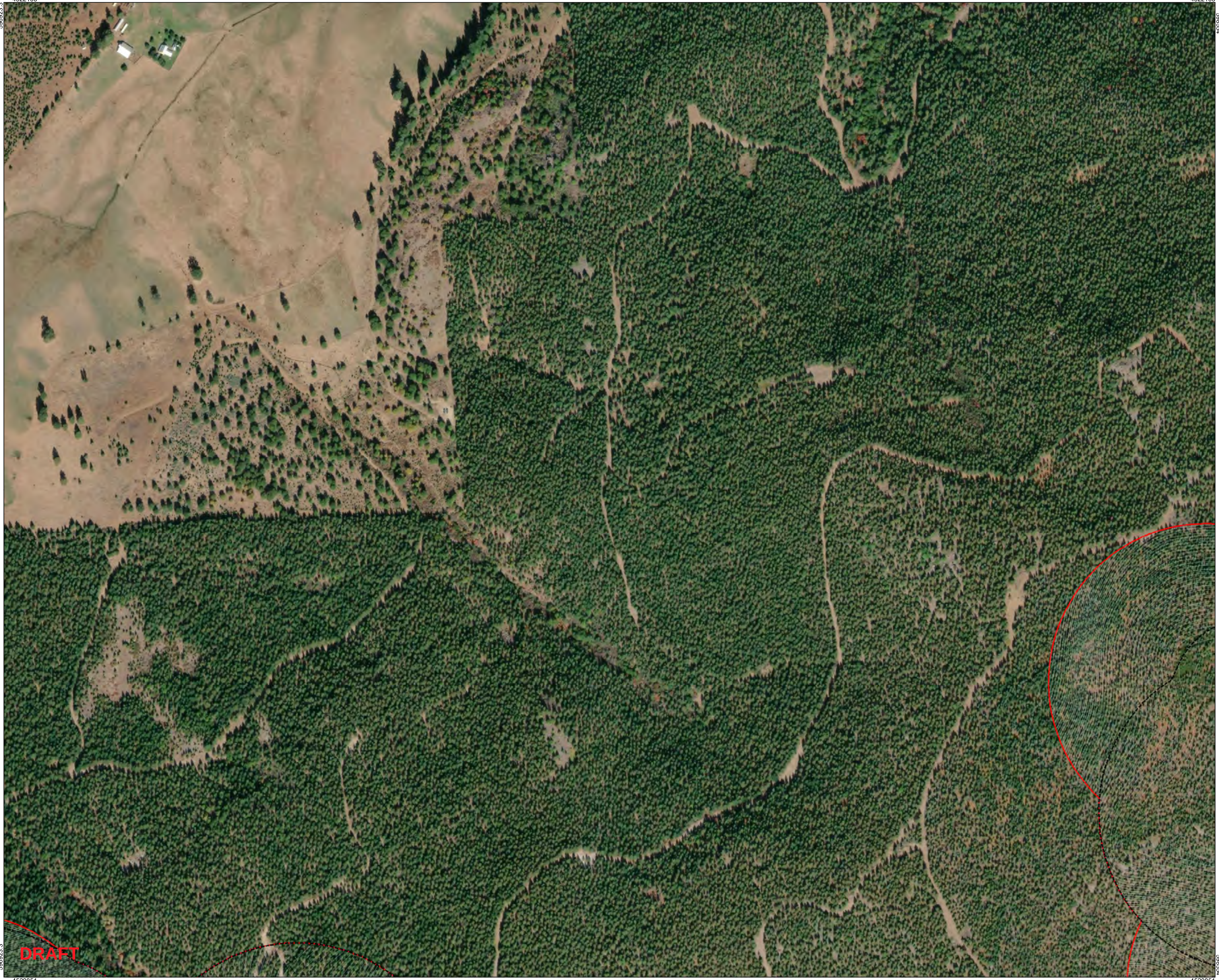

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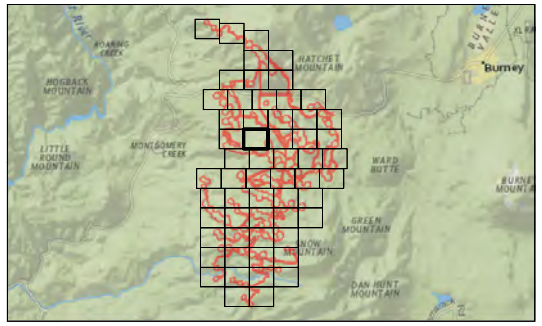

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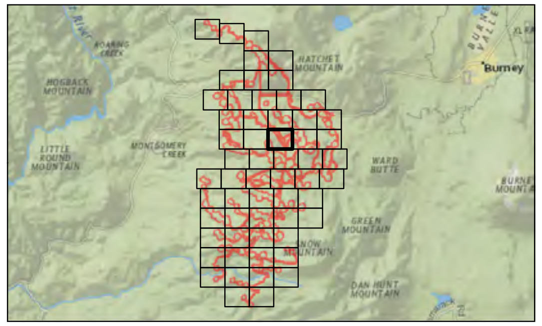

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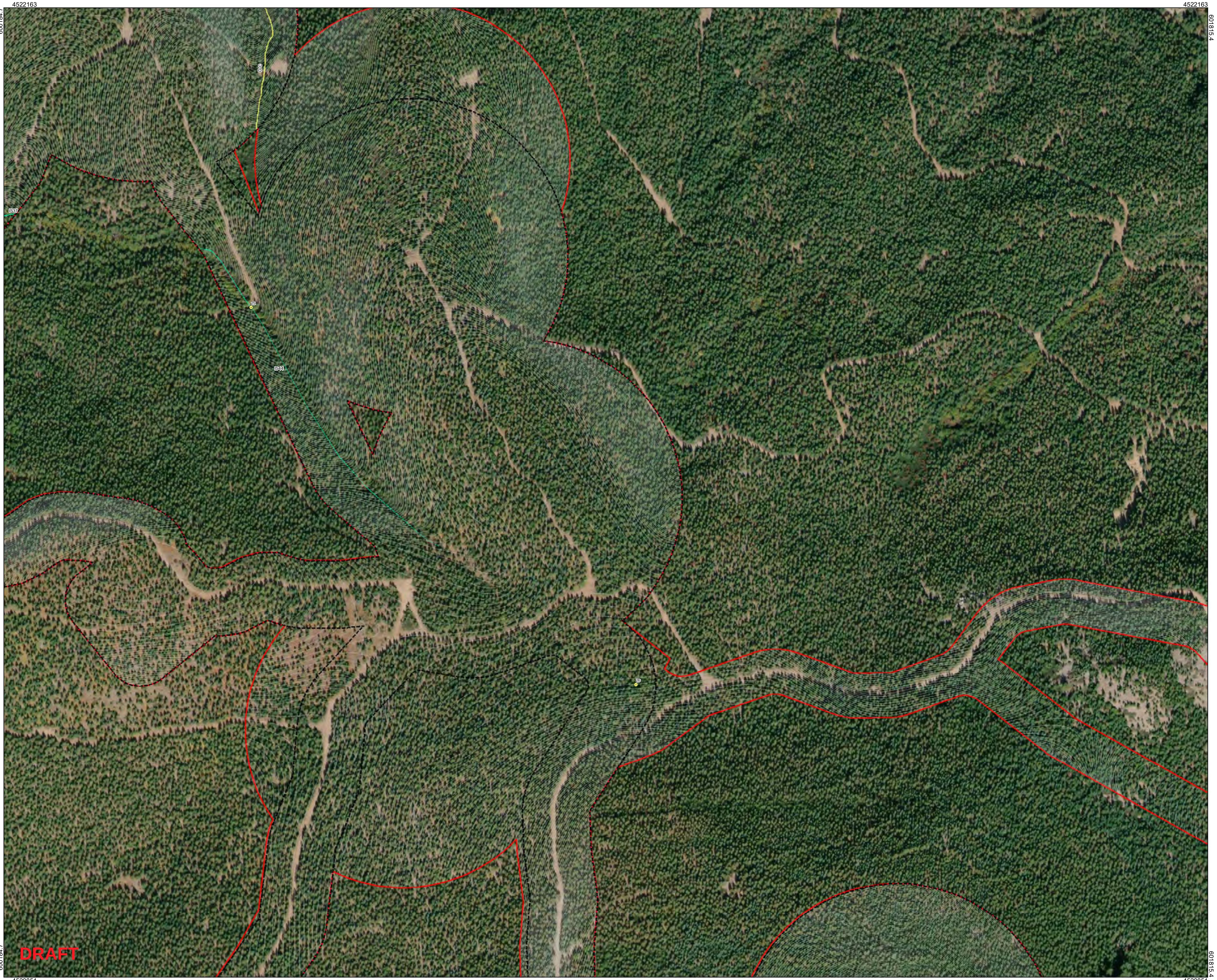

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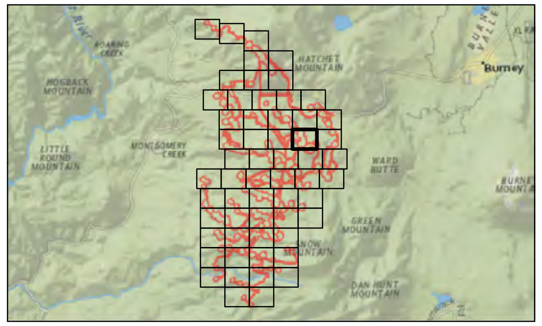

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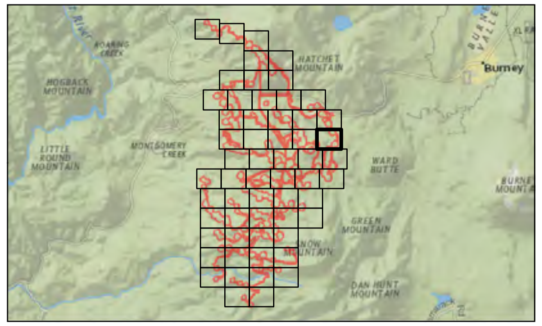

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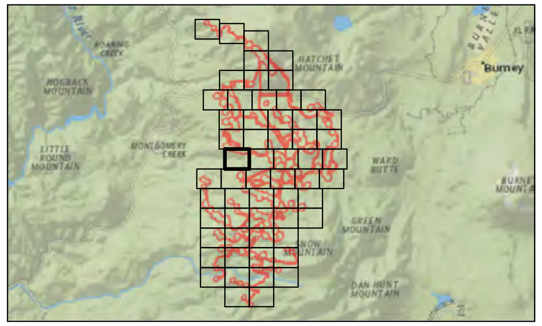

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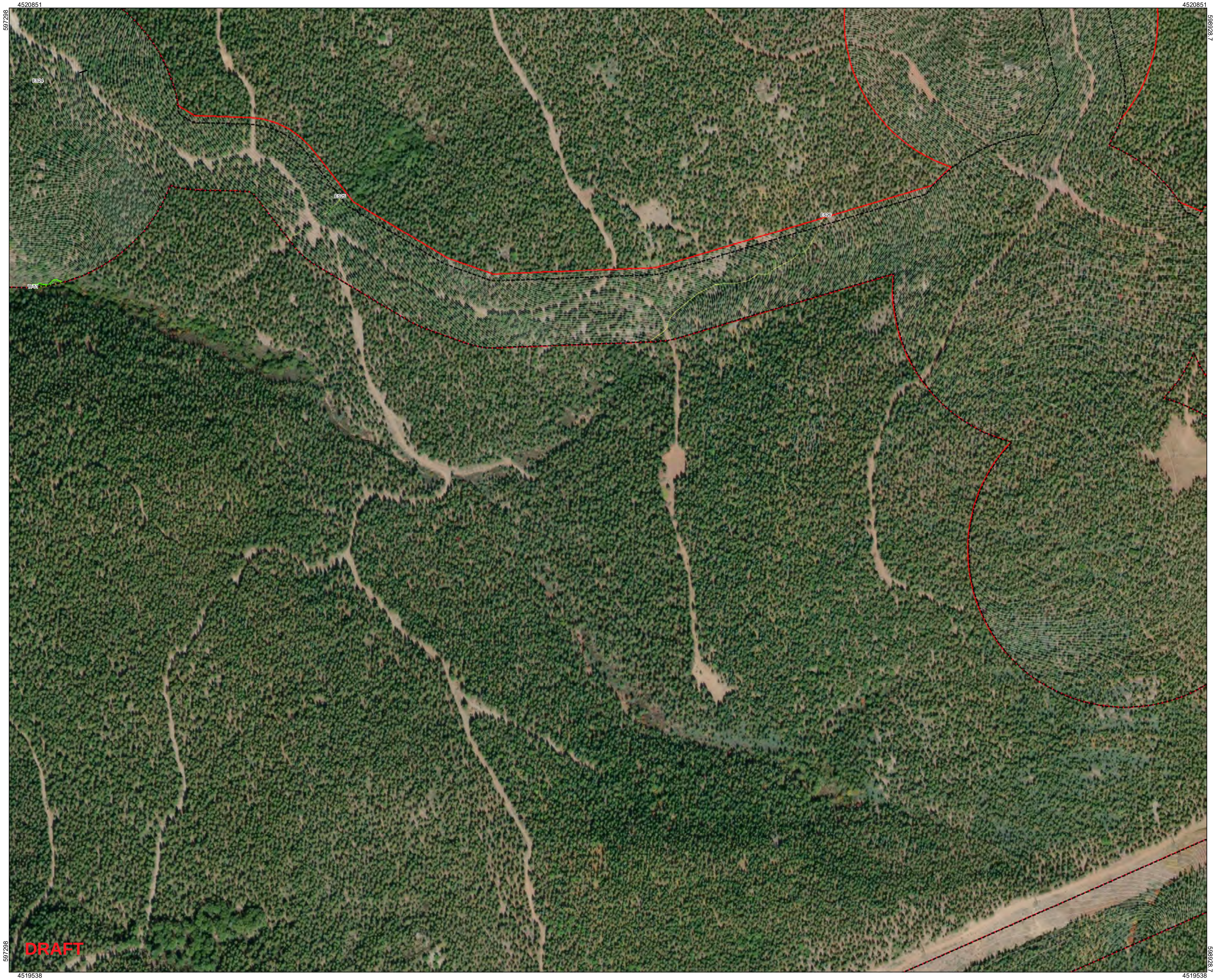

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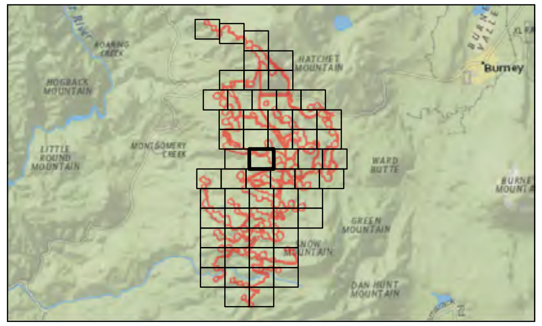

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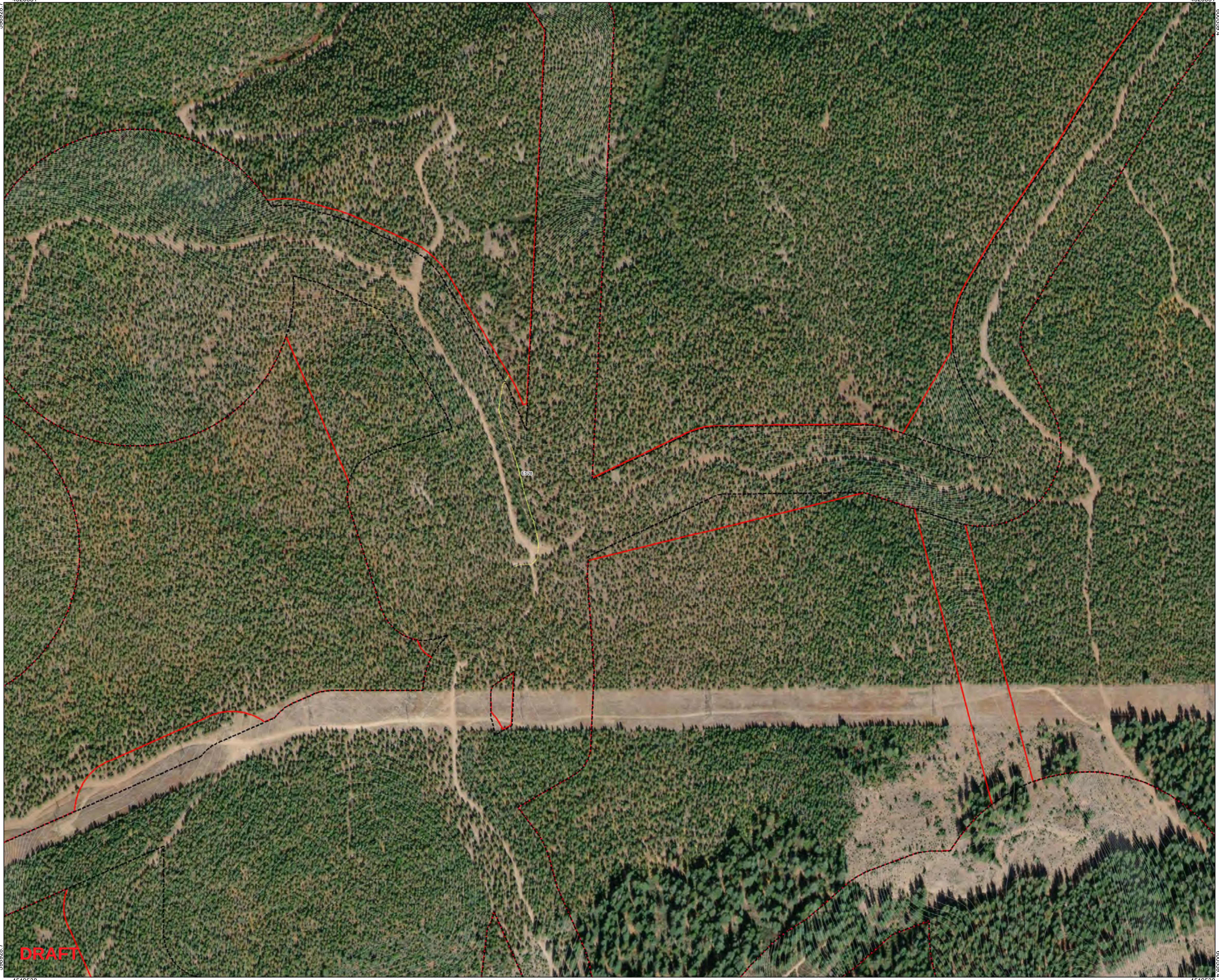

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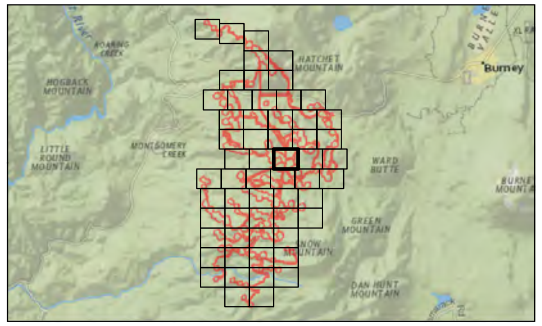

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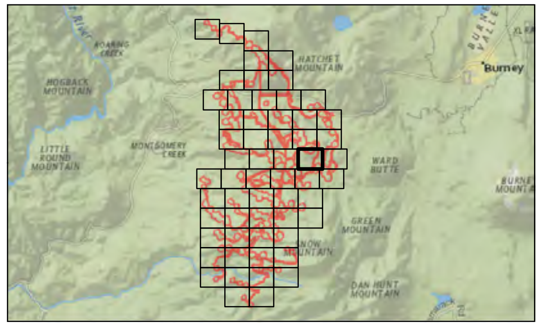

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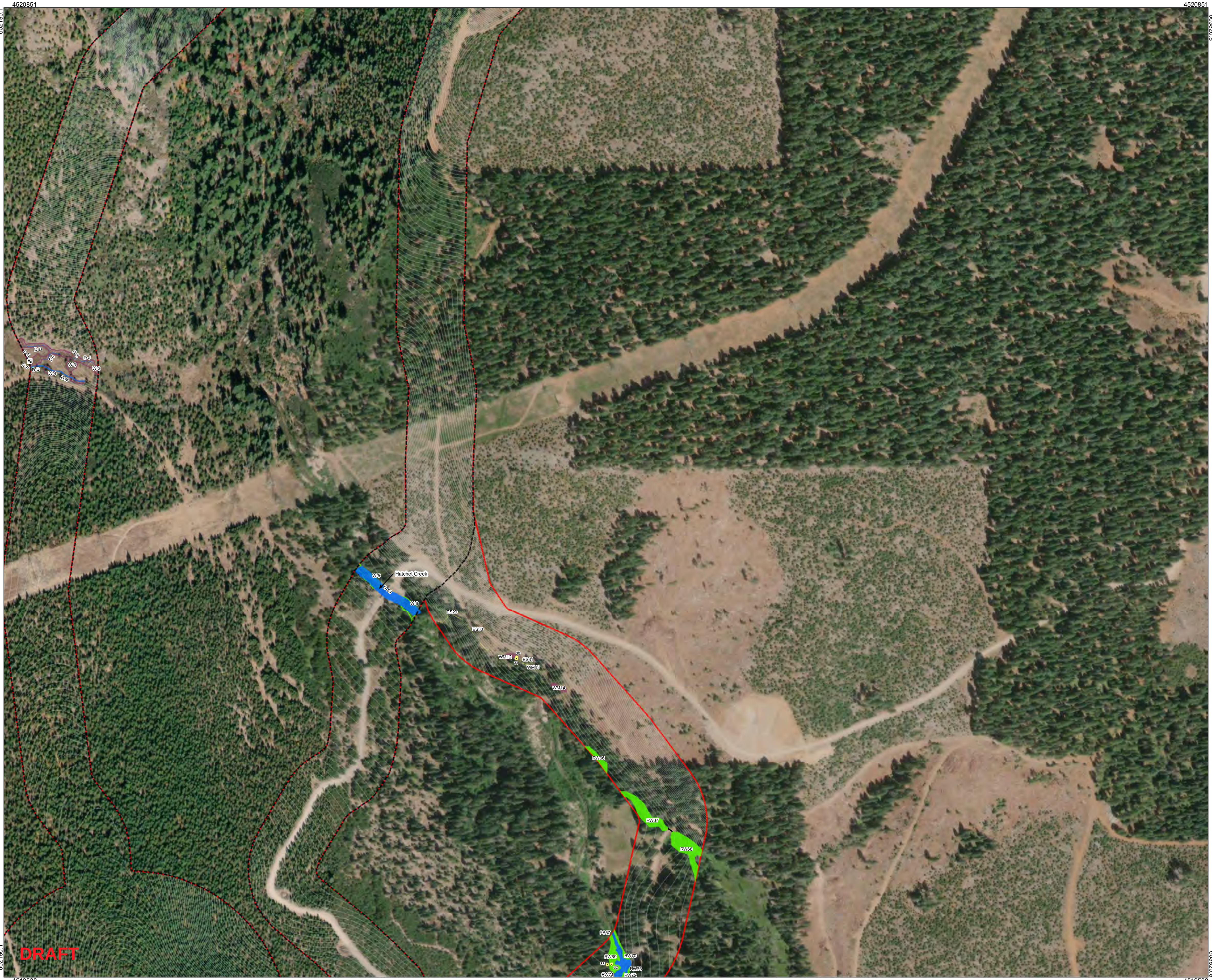

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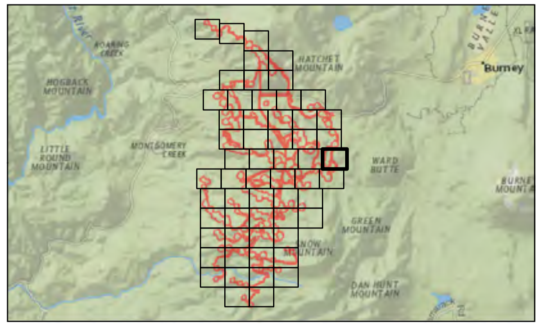

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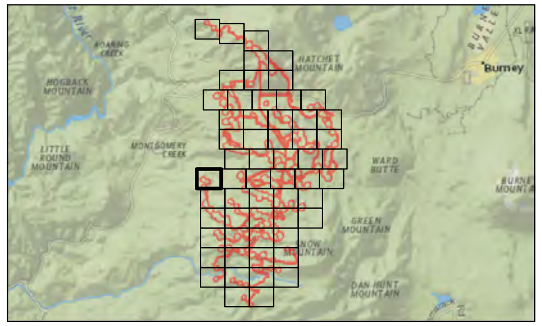

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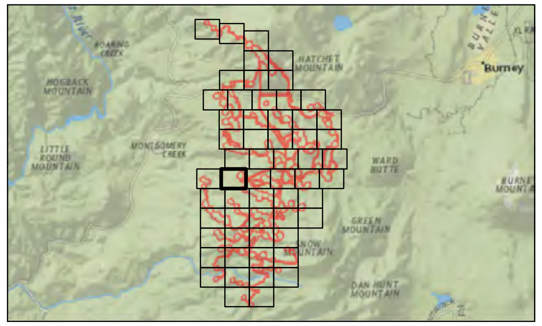

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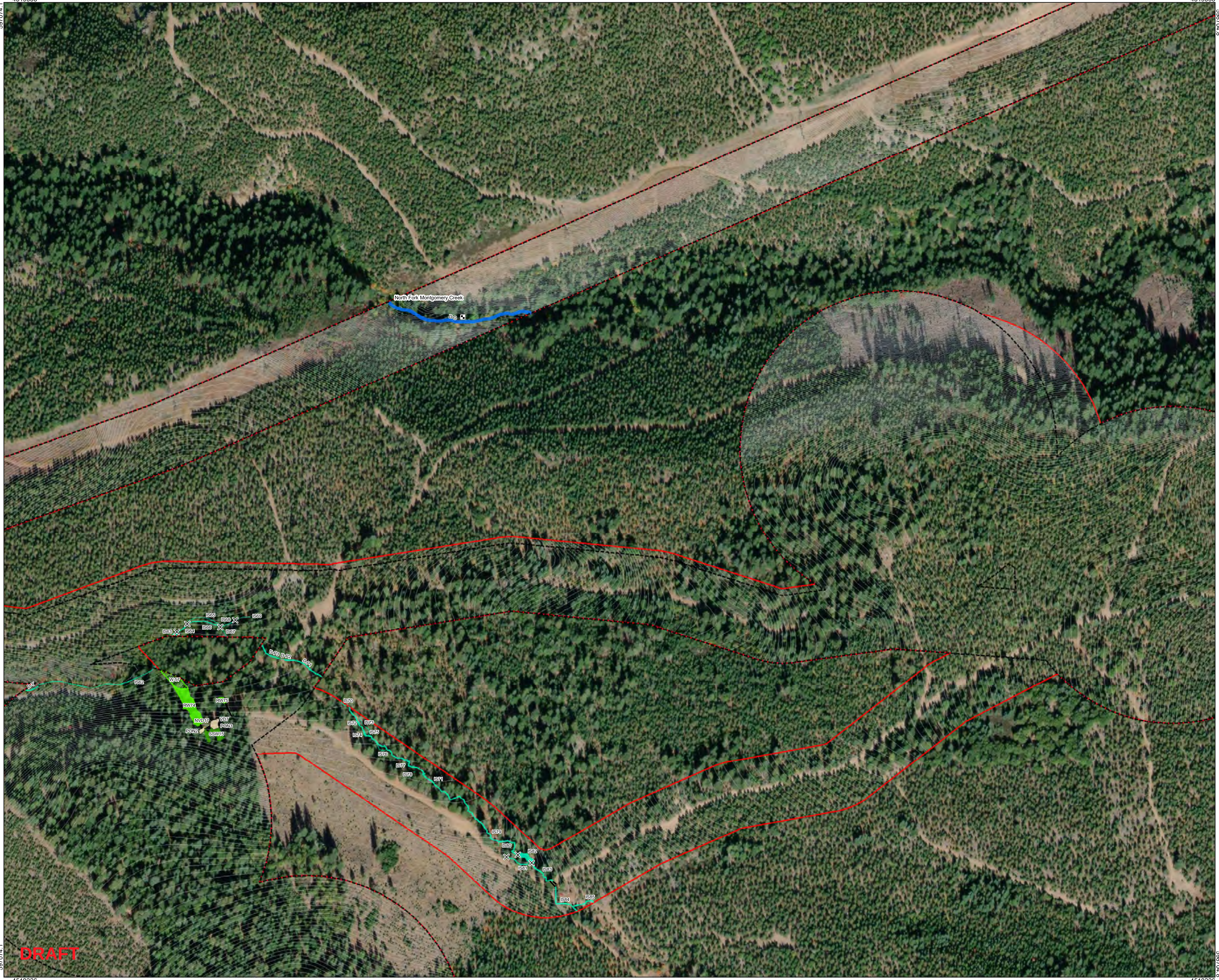

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ConnectGen Generating LLC
Fountain Wind Project

Project Location
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TR by GC on 2019-11-01
IR Review by SC on 2019-11-05

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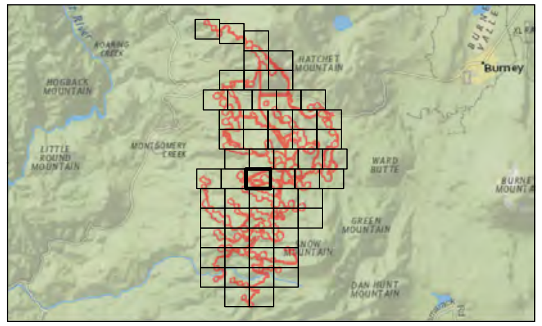

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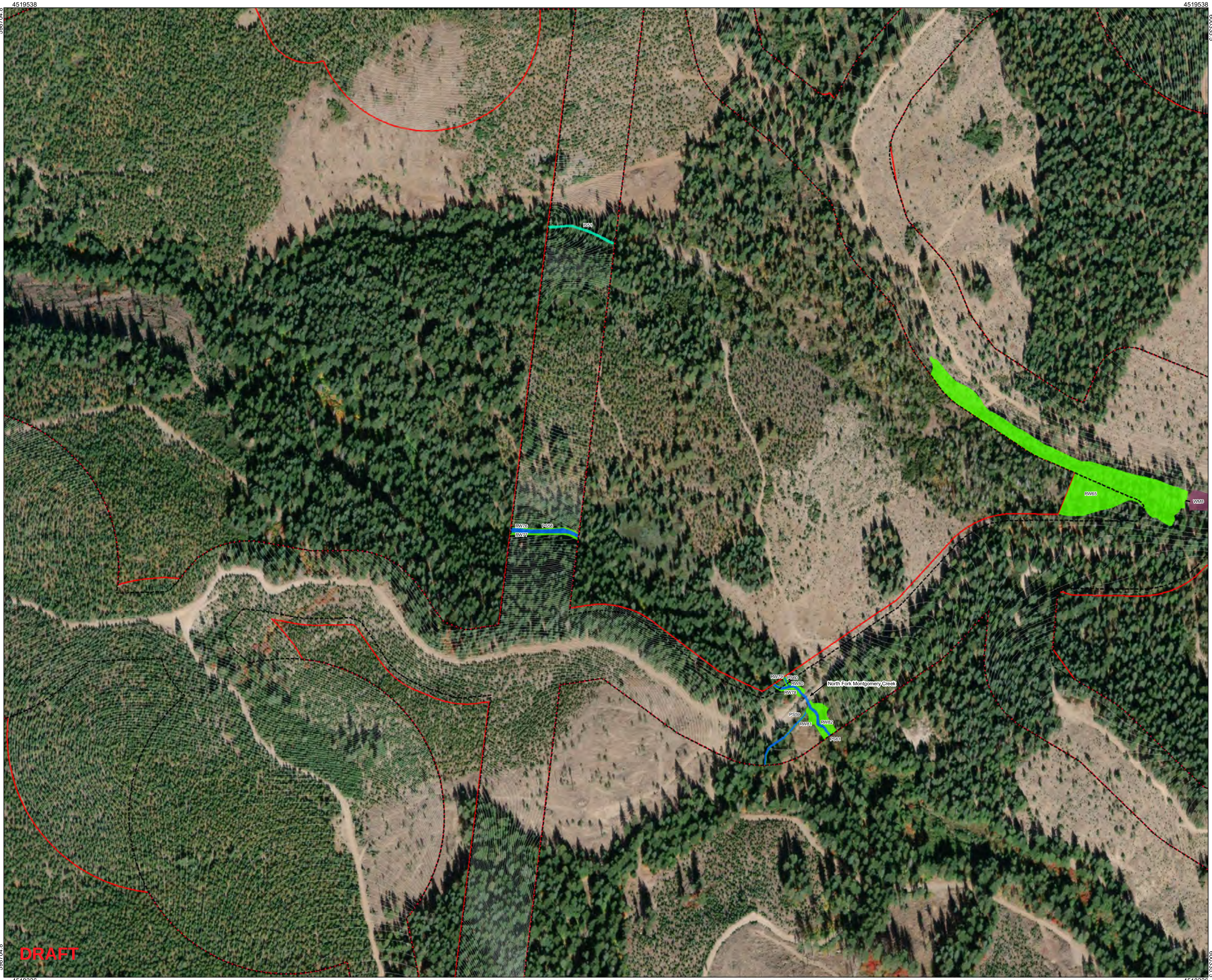

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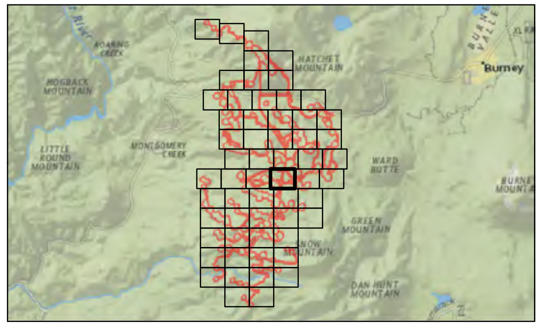

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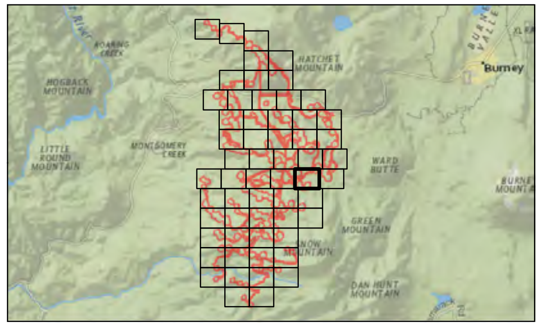

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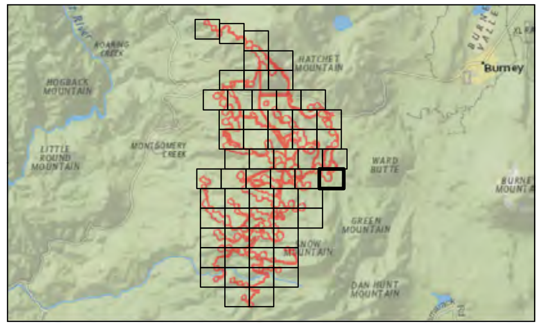

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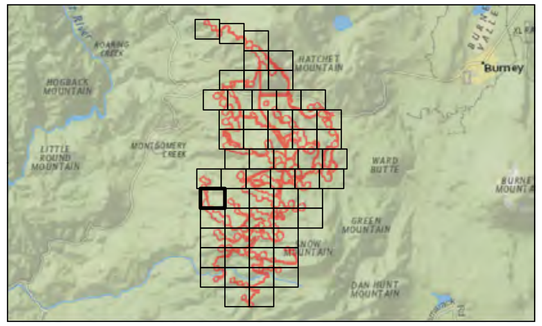

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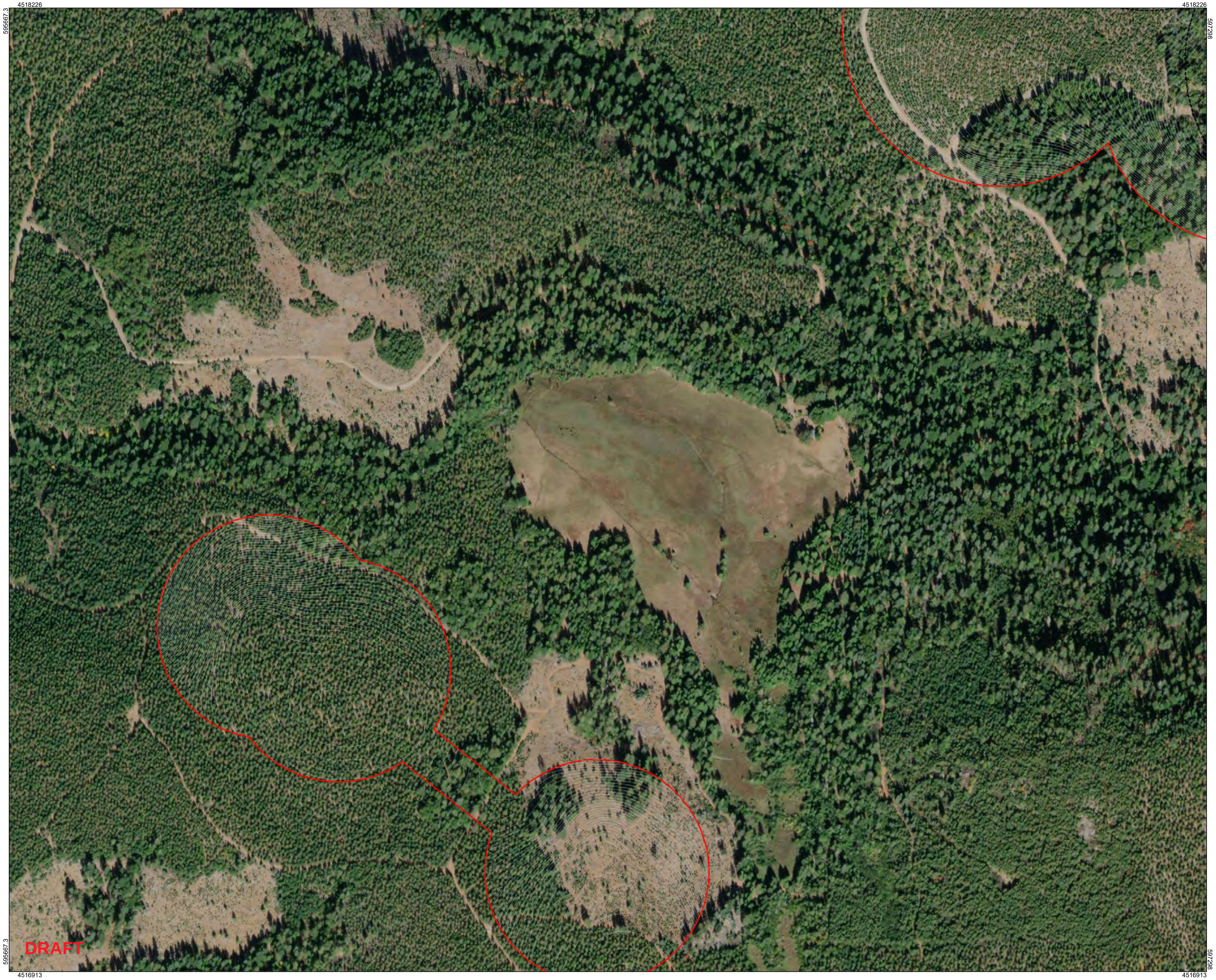

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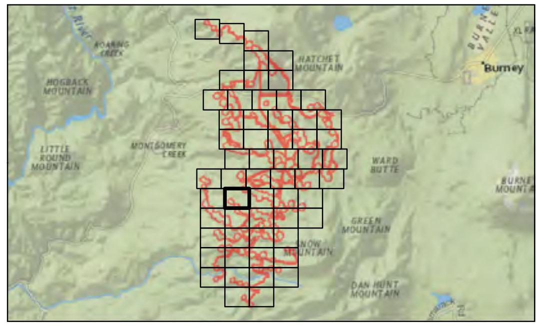

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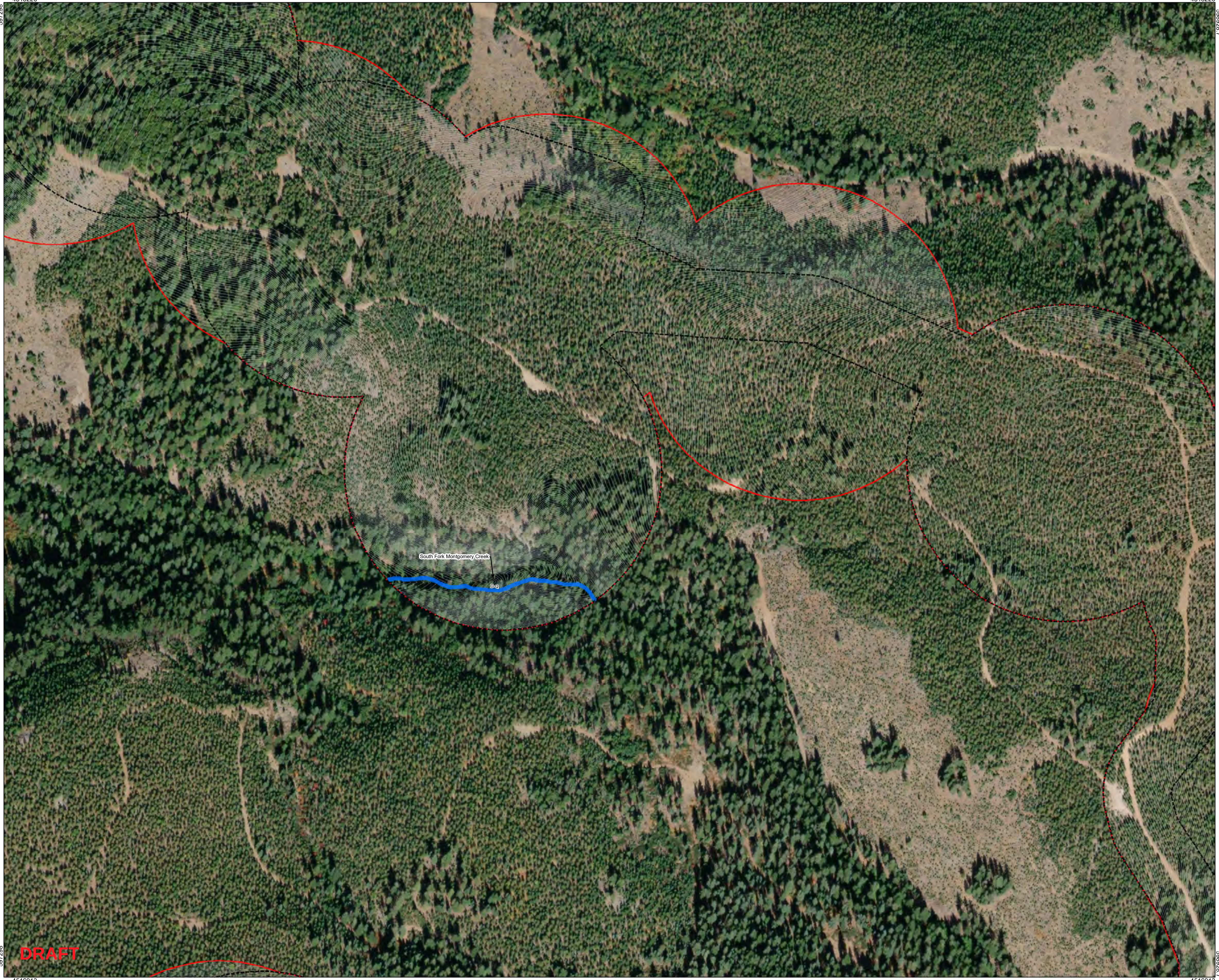

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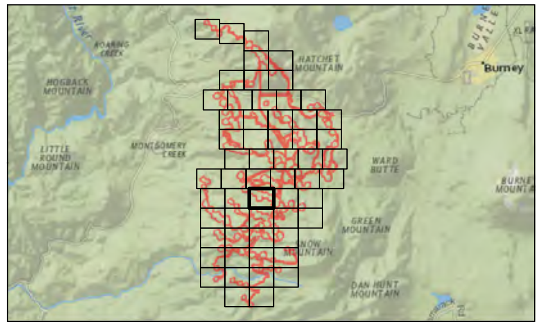

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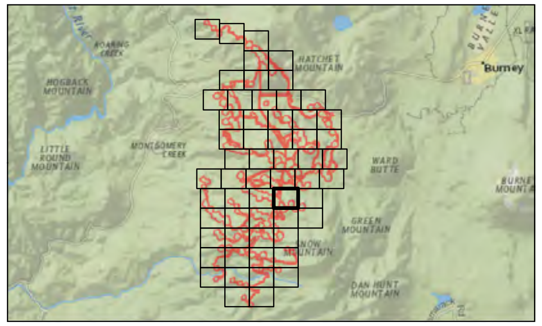

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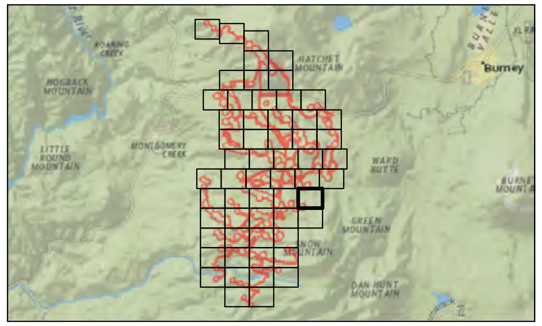

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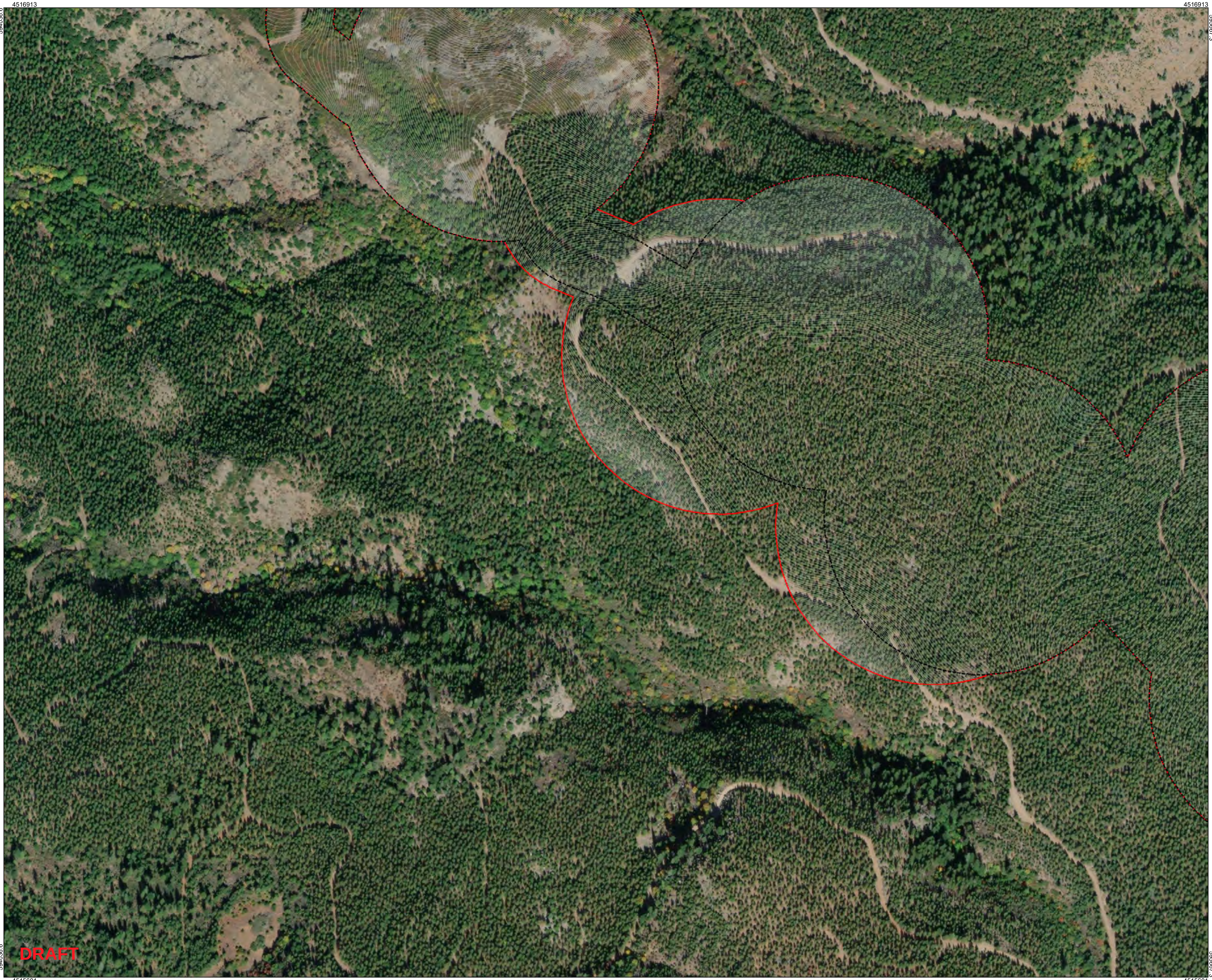

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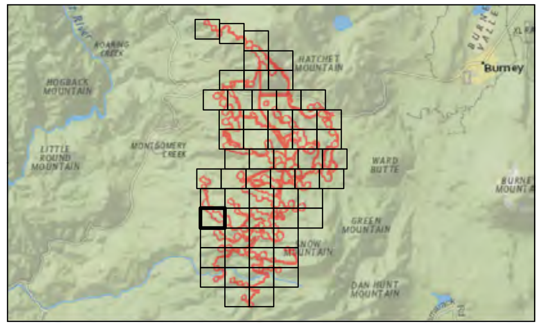

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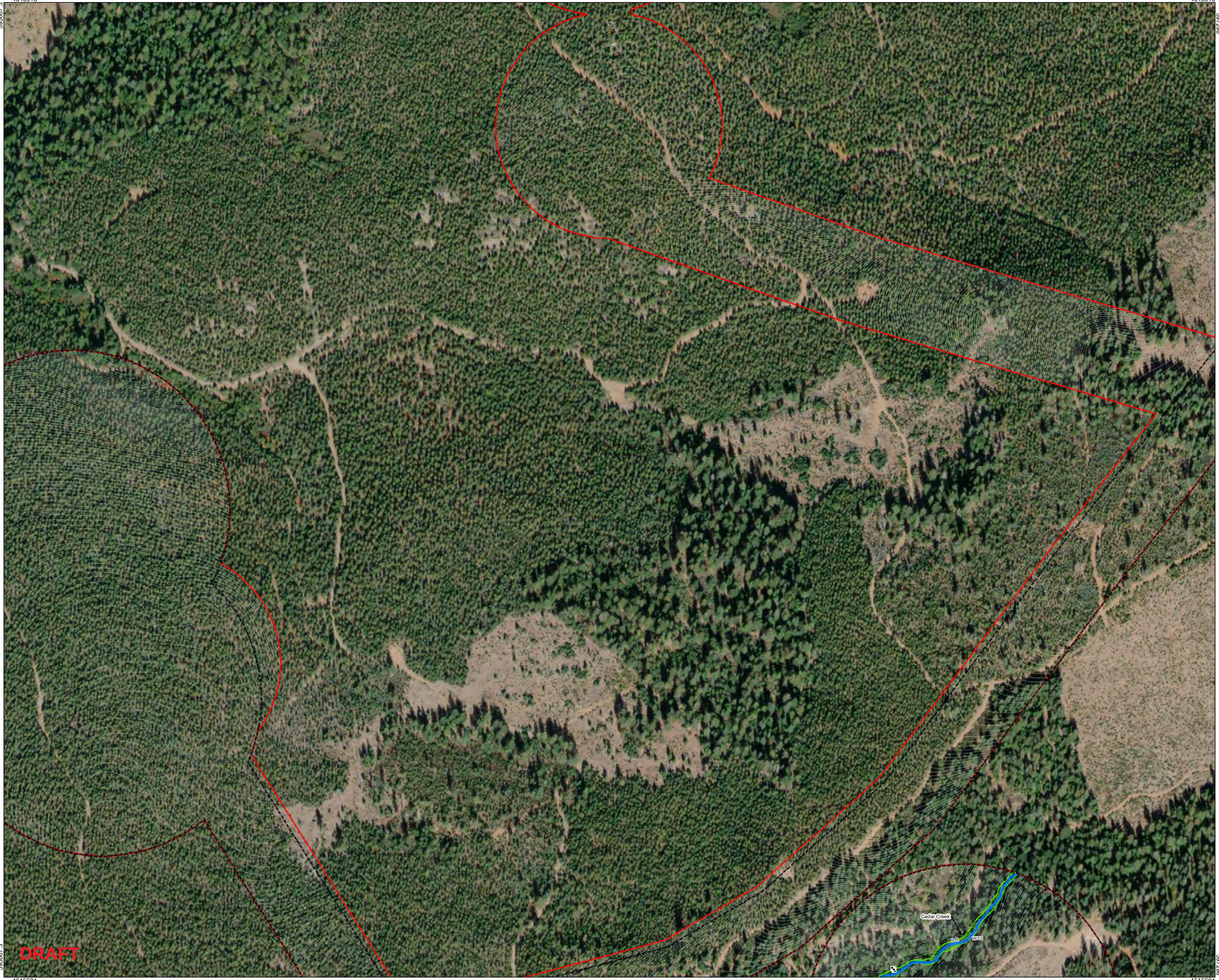

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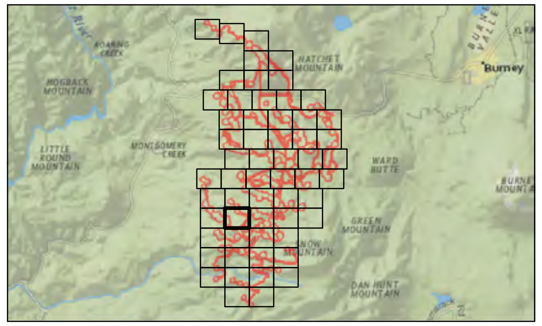

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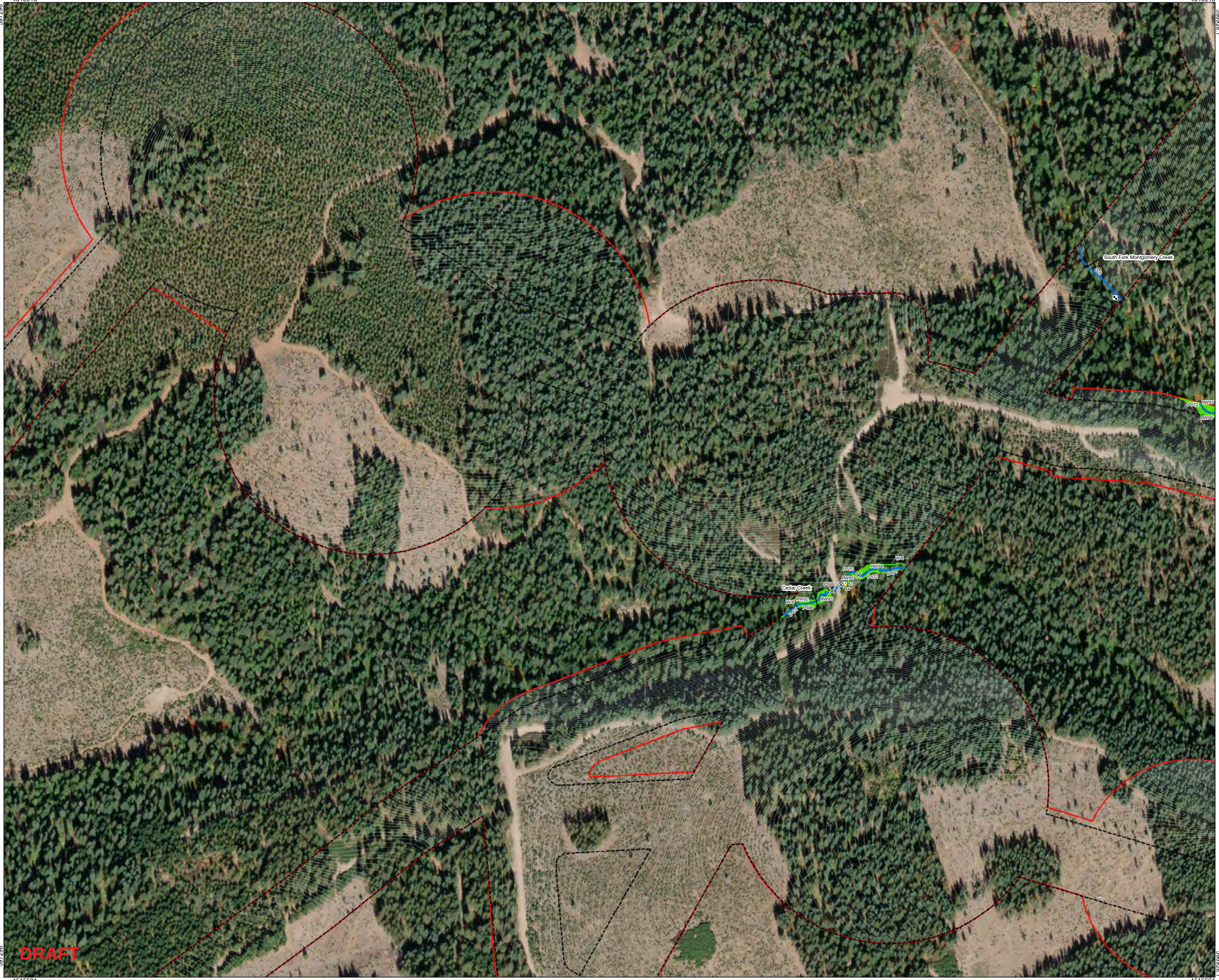

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Figure No.
3

DRAFT

Title
Potential Waters of the United States

Client/Project
185804576
ConnectGen Generating LLC
Fountain Wind Project

Project Location
Shasta County, California

Prepared by REM on 2019-11-01
TR by GC on 2019-11-01
IR Review by SC on 2019-11-05

N

0 200 400
Feet
(At original document size of 24x36)
1:2,400

- Survey Area (6,118 acres)
- Project Site
- 2 ft Contour
- Culvert
- Historic Ditch
- Ordinary High Water Mark
- 3-Parameter Data Point
- Feature Width Change
- Test Pit
- Map Reference Point

Waters of the United States (2019)

Type
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- Wetland Meadow (0.340 acre)
- Wetland Seep/Spring (0.019 acre)

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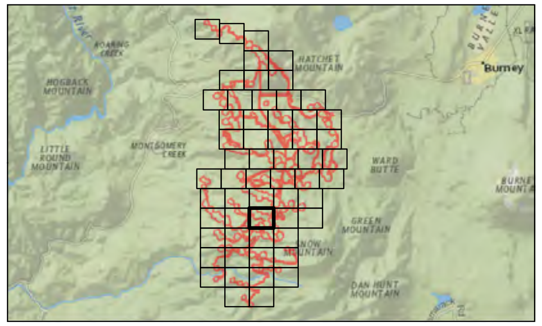

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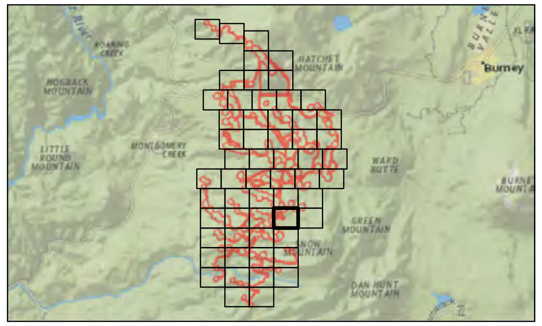

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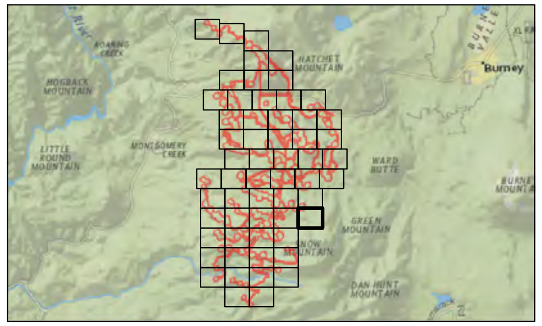

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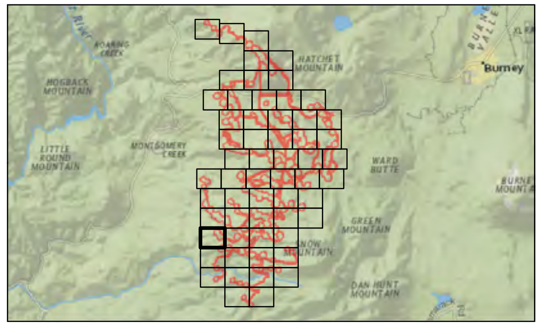

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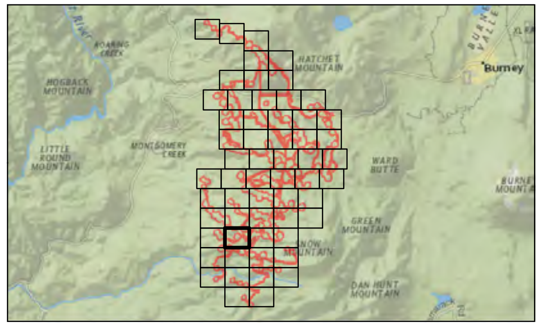

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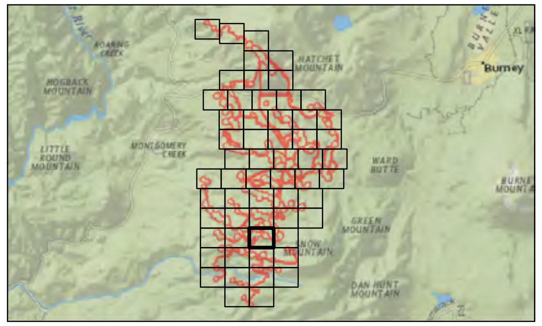

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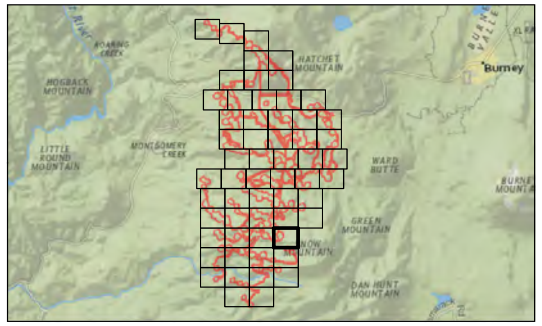

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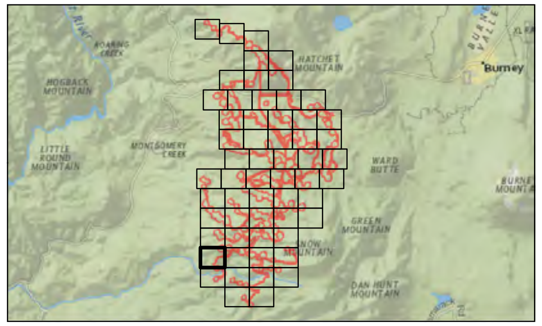

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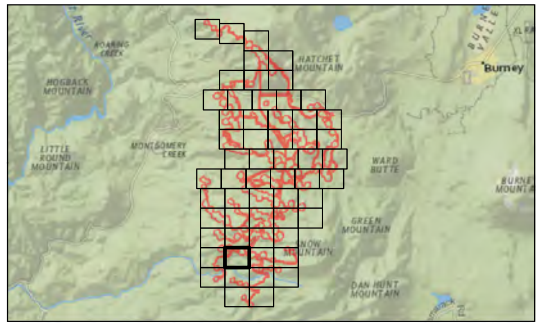

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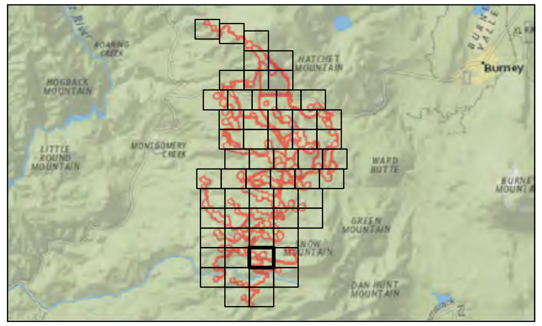

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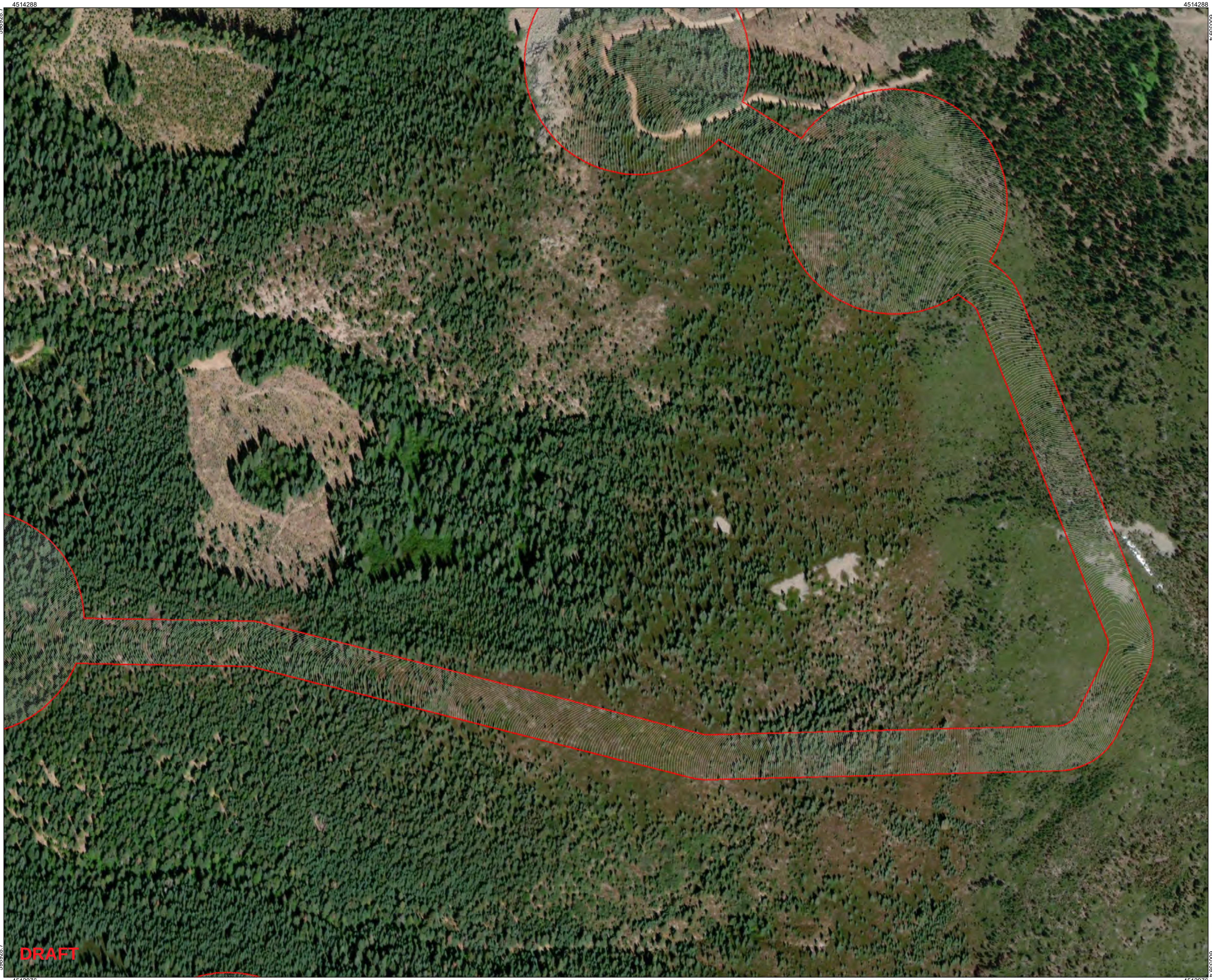

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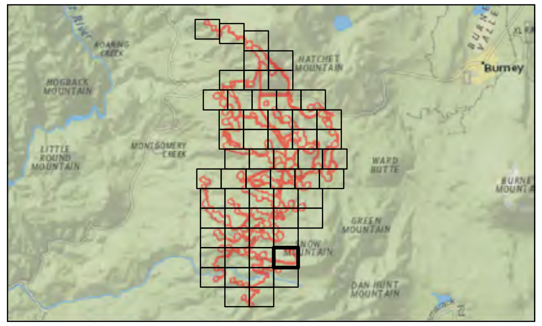

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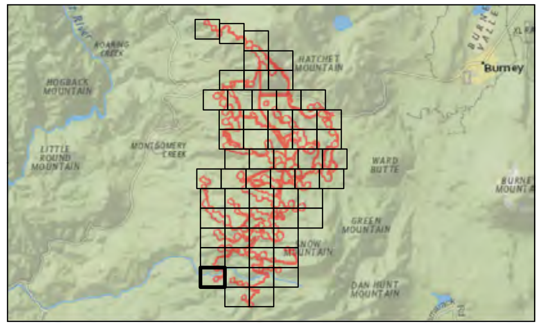

Notes
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3. Coordinate System: NAD 1983 UTM Zone 10N
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Figure No.
3

DRAFT

Title
Potential Waters of the United States

Client/Project
185804576
ConnectGen Generating LLC
Fountain Wind Project

Project Location
Shasta County, California

Prepared by REM on 2019-11-01
TR by GC on 2019-11-01
IR Review by SC on 2019-11-05

N

0 200 400
Feet
(At original document size of 24x36)
1:2,400

- Survey Area (6,118 acres)
- Project Site
- 2 ft Contour
- Culvert
- Historic Ditch
- Ordinary High Water Mark
- 3-Parameter Data Point
- Feature Width Change
- Test Pit
- Map Reference Point

Waters of the United States (2019)

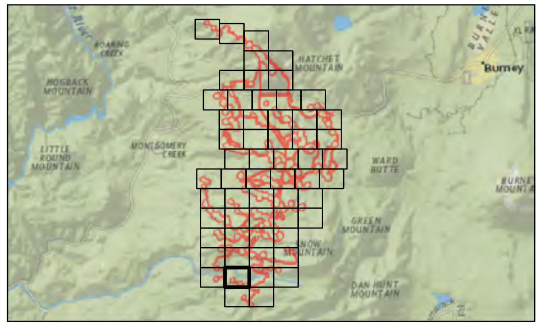
Type
- Riparian Wetland (2.520 acres)
- Wetland Meadow (0.340 acre)
- Wetland Seep/Spring (0.019 acre)

Other Waters
- Ephemeral Stream (0.118 acres)
- Intermittent Stream (0.711 acres)
- Perennial Stream (2.165 acres)

Waters of the United States (2017, 2018)

Type
- Fresh Emergent Wetland (0.967 acre)
- Riparian Wetland (24.288 acres)
- Seasonal Wetland (0.120 acre)
- Vegetated Ditch (0.174 acre)
- Wetland Meadow (8.374 acres)
- Wetland Seep/Spring (1.790 acres)

Other Waters
- Ephemeral Stream (0.441 acre)
- Intermittent Stream (2.150 acres)
- Non-Vegetated Ditch (0.239 acre)
- Perennial Stream (7.300 acres)
- Pond (0.181 acre)



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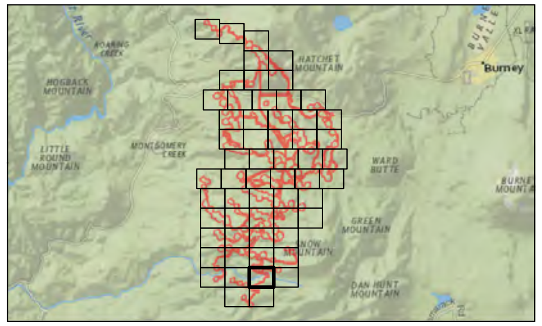

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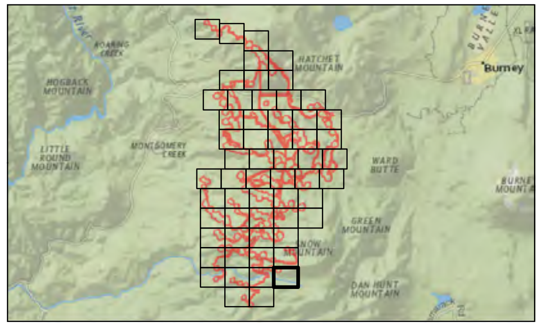

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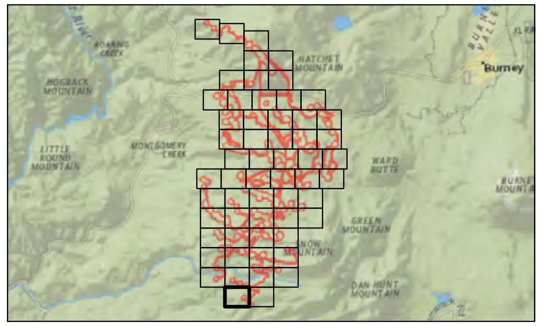

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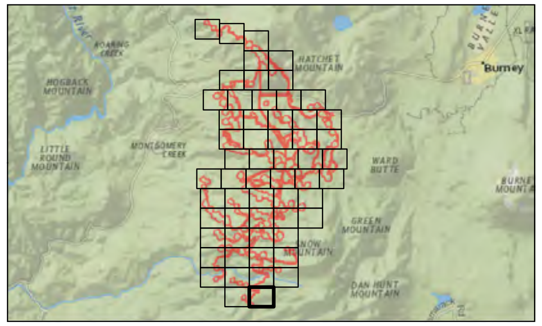

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APPENDICES

Appendix A AQUATIC RESOURCE SURVEY RESULTS

Table A-1. Aquatic Resources

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
Wetlands						
FEW1	fresh emergent	PEM	40.890447	-121.834332	0.017	--
FEW2	fresh emergent	PEM	40.853232	-121.780988	0.007	56
FEW3	fresh emergent	PEM	40.841437	-121.861347	0.882	--
FEW4	fresh emergent	PEM	40.840474	-121.821305	0.042	55
FEW5	fresh emergent	PEM	40.840517	-121.821061	0.019	45
RW1	riparian wetland	PSS	40.891495	-121.835363	0.780	--
RW2	riparian wetland	PSS	40.891599	-121.835343	0.494	--
RW3	riparian wetland	PSS	40.890837	-121.834593	0.166	--
RW4	riparian wetland	PSS	40.890337	-121.834052	0.025	--
RW5	riparian wetland	PSS	40.889439	-121.833081	1.268	--
RW6	riparian wetland	PSS	40.888925	-121.832221	0.447	--
RW7	riparian wetland	PSS	40.887418	-121.830094	0.258	--
RW8	riparian wetland	PSS	40.886252	-121.828624	0.246	--
RW9	riparian wetland	PSS	40.884149	-121.826098	0.268	--
RW10	riparian wetland	PSS	40.883870	-121.825625	0.239	--
RW11	riparian wetland	PFO	40.873218	-121.858120	0.114	--
RW12	riparian wetland	PFO	40.873100	-121.857852	0.060	--
RW13	riparian wetland	PFO	40.873292	-121.857597	0.703	--
RW14	riparian wetland	PFO	40.873670	-121.836937	0.050	--
RW15	riparian wetland	PFO	40.873635	-121.836923	0.051	--
RW16	riparian wetland	PSS	40.880939	-121.821330	0.291	--
RW17	riparian wetland	PSS	40.881021	-121.821352	0.131	--
RW18	riparian wetland	PSS	40.878541	-121.818671	0.481	--
RW19	riparian wetland	PSS	40.877669	-121.818184	0.549	--
RW20	riparian wetland	PSS	40.877059	-121.818055	0.114	--
RW21	riparian wetland	PSS	40.876417	-121.817259	0.057	--
RW22	riparian wetland	PSS	40.875833	-121.816962	0.099	--
RW23	riparian wetland	PSS	40.875776	-121.816837	0.082	--
RW24	riparian wetland	PSS	40.873509	-121.815448	0.290	--
RW25	riparian wetland	PSS	40.873640	-121.815454	0.136	--
RW26	riparian wetland	PSS	40.872656	-121.813937	0.067	--
RW27	riparian wetland	PSS	40.872654	-121.813875	0.090	--
RW28	riparian wetland	PFO	40.860975	-121.837816	0.500	--

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
RW29	riparian wetland	PFO	40.860524	-121.837613	1.235	--
RW30	riparian wetland	PSS	40.871419	-121.814428	0.191	--
RW31	riparian wetland	PSS	40.871190	-121.814446	0.225	--
RW32	riparian wetland	PSS	40.868878	-121.814728	0.126	--
RW33	riparian wetland	PSS	40.868779	-121.814774	0.115	--
RW34	riparian wetland	PSS	40.865209	-121.818110	0.010	--
RW35	riparian wetland	PSS	40.864723	-121.818203	0.039	--
RW36	riparian wetland	PSS	40.865208	-121.818005	0.006	--
RW37	riparian wetland	PSS	40.864720	-121.818083	0.012	--
RW38	riparian wetland	PSS	40.863026	-121.814215	0.114	--
RW39	riparian wetland	PSS	40.862944	-121.814297	0.102	--
RW40	riparian wetland	PSS	40.852568	-121.844232	0.062	--
RW41	riparian wetland	PSS	40.851808	-121.844058	0.154	--
RW42	riparian wetland	PSS	40.851444	-121.844056	0.077	--
RW43	riparian wetland	PSS	40.854344	-121.783416	0.144	--
RW44	riparian wetland	PSS	40.854555	-121.783674	0.028	--
RW45	riparian wetland	PSS	40.853794	-121.782600	0.207	--
RW46	riparian wetland	PSS	40.853914	-121.782609	0.076	--
RW47	riparian wetland	PSS	40.853190	-121.780694	1.690	--
RW48	riparian wetland	PFO	40.841212	-121.861894	0.471	--
RW49	riparian wetland	PSS	40.845914	-121.831109	0.071	--
RW50	riparian wetland	PSS	40.845931	-121.831647	0.037	--
RW51	riparian wetland	PSS	40.845351	-121.827945	1.649	--
RW52	riparian wetland	PSS	40.844681	-121.825535	0.451	--
RW53	riparian wetland	PSS	40.844679	-121.825674	0.479	--
RW54	riparian wetland	PSS	40.842373	-121.822825	0.338	--
RW55	riparian wetland	PSS	40.841967	-121.822511	0.456	--
RW56	riparian wetland	PSS	40.840733	-121.821993	0.208	--
RW57	riparian wetland	PSS	40.840582	-121.820956	0.065	--
RW58	riparian wetland	PSS	40.840503	-121.820908	0.042	--
RW59	riparian wetland	PSS	40.840597	-121.816460	0.008	--
RW60	riparian wetland	PSS	40.840642	-121.816399	0.016	--
RW61	riparian wetland	PSS	40.834212	-121.817283	0.014	--
RW62	riparian wetland	PSS	40.834188	-121.817289	0.013	--
RW63	riparian wetland	PSS	40.833724	-121.816664	0.015	--
RW64	riparian wetland	PSS	40.833732	-121.816641	0.015	--

Appendix A Aquatic Resource Survey Results

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
RW65	riparian wetland	PFO	40.815172	-121.812451	3.298	--
RW66	riparian wetland	PSS	40.823068	-121.778623	0.071	--
RW67	riparian wetland	PSS	40.822403	-121.777886	0.226	--
RW68	riparian wetland	PSS	40.821951	-121.777227	0.269	--
RW69	riparian wetland	PFO	40.820653	-121.778426	0.119	--
RW70	riparian wetland	PFO	40.820769	-121.778299	0.034	--
RW71	riparian wetland	PFO	40.820366	-121.778372	0.006	--
RW72	riparian wetland	PFO	40.820404	-121.778264	0.015	--
RW73	riparian wetland	PFO	40.820227	-121.778185	0.081	--
RW74	riparian wetland	PFO	40.812569	-121.846053	0.201	--
RW75	riparian wetland	PFO	40.812629	-121.845533	0.014	--
RW76	riparian wetland	PSS	40.814488	-121.820920	0.034	--
RW77	riparian wetland	PSS	40.814419	-121.820983	0.066	--
RW78	riparian wetland	PSS	40.812468	-121.817060	0.027	--
RW79	riparian wetland	PSS	40.812562	-121.817172	0.009	--
RW80	riparian wetland	PSS	40.812526	-121.816962	0.025	--
RW81	riparian wetland	PSS	40.812052	-121.816732	0.105	--
RW82	riparian wetland	PSS	40.812152	-121.816532	0.146	--
RW83	riparian wetland	PFO	40.814566	-121.810205	0.003	--
RW84	riparian wetland	PFO	40.801414	-121.879709	0.287	--
RW85	riparian wetland	PSS	40.796313	-121.810630	0.209	--
RW86	riparian wetland	PSS	40.796408	-121.810553	0.136	--
RW87	riparian wetland	PSS	40.795604	-121.810194	0.072	--
RW88	riparian wetland	PSS	40.795361	-121.810729	0.029	--
RW89	riparian wetland	PSS	40.795248	-121.810832	0.005	--
RW90	riparian wetland	PSS	40.795221	-121.810645	0.033	--
RW91	riparian wetland	PSS	40.795062	-121.810106	0.374	--
RW92	riparian wetland	PSS	40.790117	-121.833817	0.045	--
RW93	riparian wetland	PSS	40.790047	-121.833793	0.069	--
RW94	riparian wetland	PSS	40.790446	-121.832991	0.051	--
RW95	riparian wetland	PSS	40.790362	-121.833069	0.038	--
RW96	riparian wetland	PSS	40.792191	-121.826971	0.301	--
RW97	riparian wetland	PSS	40.792341	-121.827458	0.041	--
RW98	riparian wetland	PSS	40.792227	-121.826803	0.049	--
RW99	riparian wetland	PSS	40.792068	-121.826113	0.008	--
RW100	riparian wetland	PSS	40.791793	-121.825514	0.069	--

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
RW101	riparian wetland	PSS	40.791591	-121.825292	0.052	--
RW102	riparian wetland	PSS	40.791175	-121.824461	0.149	--
RW103	riparian wetland	PSS	40.791207	-121.824287	0.080	--
RW104	riparian wetland	PSS	40.791193	-121.822844	0.014	--
RW105	riparian wetland	PSS	40.773617	-121.852219	0.011	--
RW106	riparian wetland	PSS	40.773563	-121.852166	0.013	--
RW107	riparian wetland	PSS	40.773601	-121.850887	0.008	--
RW108	riparian wetland	PSS	40.773663	-121.850833	0.011	--
RW109	riparian wetland	PSS	40.773549	-121.850483	0.012	--
RW110	riparian wetland	PSS	40.773623	-121.850581	0.002	--
RW111	riparian wetland	PSS	40.773621	-121.850358	0.008	--
RW112	riparian wetland	PSS	40.773944	-121.849629	0.004	--
RW113	riparian wetland	PSS	40.773861	-121.849497	0.009	--
RW114	riparian wetland	PSS	40.773926	-121.849114	0.008	--
RW115	riparian wetland	PSS	40.773981	-121.848678	0.011	--
RW116	riparian wetland	PSS	40.774095	-121.848464	0.005	--
RW117	riparian wetland	PSS	40.774359	-121.847838	0.008	--
RW118	riparian wetland	PSS	40.774336	-121.847781	0.008	--
RW119	riparian wetland	PSS	40.774418	-121.847670	0.008	--
RW120	riparian	PFO	40.759667	-121.867426	0.045	--
RW121	riparian	PFO	40.759582	-121.867279	0.146	--
RW122	riparian	PFO	40.761524	-121.871080	0.028	--
RW123	riparian	PSS	40.757966	-121.833940	0.033	--
RW124	riparian	PSS	40.757819	-121.834125	0.039	--
SW1	seasonal	PEM	40.855418	-121.796332	0.087	--
SW2	seasonal	PEM	40.830941	-121.848041	0.006	--
SW3	seasonal	PEM	40.830981	-121.847850	0.019	--
SW4	seasonal	PEM	40.832394	-121.847031	0.003	--
SW5	seasonal	PEM	40.815233	-121.804631	0.005	--
VD1	vegetated ditch	PEM	40.864946	-121.821408	0.005	114
VD2	vegetated ditch	PEM	40.864915	-121.821259	0.003	73
VD3	vegetated ditch	PEM	40.864944	-121.821061	0.006	146
VD4	vegetated ditch	PEM	40.865218	-121.820776	0.014	739
VD5	vegetated ditch	PEM	40.836493	-121.820790	0.001	52
VD6	vegetated ditch	PEM	40.816789	-121.789207	0.003	54
VD7	vegetated ditch	PEM	40.812409	-121.845484	0.003	59

Appendix A Aquatic Resource Survey Results

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		Cowardin	Location			
			Latitude	Longitude		
VD8	vegetated ditch	PEM	40.806278	-121.880500	0.003	152
VD9	vegetated ditch	PEM	40.805908	-121.880505	0.027	235
VD10	vegetated ditch	PEM	40.803975	-121.879762	0.020	219
VD11	vegetated ditch	PEM	40.802449	-121.879872	0.057	415
VD12	vegetated ditch	PEM	40.801865	-121.879357	0.032	174
WM1	meadow	PEM	40.864720	-121.822380	2.578	--
WM2	meadow	PEM	40.853997	-121.782958	0.095	--
WM3	meadow	PEM	40.853828	-121.782279	0.327	--
WM4	meadow	PEM	40.853931	-121.780587	0.266	--
WM5	meadow	PEM	40.852239	-121.780911	0.046	--
WM6	meadow	PEM	40.851990	-121.780767	0.038	--
WM7	meadow	PEM	40.841956	-121.861564	0.147	--
WM8	meadow	PFO	40.814975	-121.805890	4.614	--
WM9	meadow	PEM	40.818286	-121.794219	0.039	--
WM10	meadow	PEM	40.818246	-121.793875	0.030	--
WM11	meadow	PEM	40.818302	-121.793441	0.133	--
WM12	meadow	PEM	40.824337	-121.780008	0.028	--
WM13	meadow	PEM	40.824205	-121.779653	0.005	--
WM14	meadow	PEM	40.823941	-121.779240	0.028	--
SSW1	seep/spring	PEM	40.880767	-121.821626	0.011	--
SSW2	seep/spring	PEM	40.877874	-121.818932	0.002	--
SSW3	seep/spring	PSS	40.865232	-121.819485	0.414	--
SSW4	seep/spring	PSS	40.853703	-121.783179	0.062	--
SSW5	seep/spring	PEM	40.845116	-121.825675	0.001	--
SSW6	seep/spring	PEM	40.844968	-121.825528	0.023	--
SSW7	seep/spring	PSS	40.843166	-121.822585	0.066	--
SSW8	seep/spring	PEM	40.840315	-121.815487	0.002	--
SSW9	seep/spring	PSS	40.847580	-121.781099	0.185	--
SSW10	seep/spring	PSS	40.836221	-121.820897	0.172	--
SSW11	seep/spring	PSS	40.836672	-121.820496	0.057	--
SSW12	seep/spring	PEM	40.837776	-121.818593	0.114	--
SSW13	seep/spring	PEM	40.834990	-121.816054	0.004	--
SSW14	seep/spring	PEM	40.838192	-121.815089	0.003	--
SSW15	seep/spring	PSS	40.812212	-121.845667	0.067	--
SSW16	seep/spring	PEM	40.791346	-121.825301	0.012	--
SSW17	seep/spring	PEM	40.790844	-121.820400	0.007	--

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
SSW18	seep/spring	PEM	40.791067	-121.820056	0.003	--
SSW19	seep/spring	PEM	40.791744	-121.819765	0.005	--
SSW20	seep/spring	PEM	40.791531	-121.819862	0.004	--
SSW21	seep/spring	PEM	40.791221	-121.819697	0.005	--
SSW22	seep/spring	PEM	40.791351	-121.819529	0.002	--
SSW23	seep/spring	PEM	40.791289	-121.819441	0.004	--
SSW24	seep/spring	PEM	40.773057	-121.857046	0.010	--
SSW25	seep/spring	PEM	40.773023	-121.856441	0.011	--
SSW26	seep/spring	PSS	40.774072	-121.849235	0.153	--
SSW27	seep/spring	PSS	40.774109	-121.848712	0.051	--
SSW28	seep/spring	PSS	40.775018	-121.847328	0.100	--
SSW29	seep/spring	PEM	40.769698	-121.835837	0.005	--
SSW30	seep/spring	PSS	40.759478	-121.867748	0.004	--
SSW31	seep/spring	PFO	40.758601	-121.867078	0.230	--
1	riparian	PSS	40.83385673	-121.78377	1.020	--
2	meadow	PEM	40.82826307	-121.787843	0.244	--
3	meadow	PSS	40.82781361	-121.787015	0.072	--
4	meadow	PSS	40.82791797	-121.787333	0.024	--
5	riparian	PSS	40.82542795	-121.782464	0.083	--
6	riparian	PSS	40.82508067	-121.781715	0.093	--
8	riparian	PFO	40.790353	-121.832811	0.087	--
9	riparian	PFO	40.79003735	-121.83405	0.067	--
10	seep/spring	PEM	40.7750096	-121.847283	0.002	--
11	seep/spring	PEM	40.77491331	-121.847382	0.016	--
50	riparian	PSS	40.84053307	-121.863502	0.373	--
51	riparian	PSS	40.82953048	-121.845301	0.032	--
53	riparian	PFO	40.78585444	-121.851623	0.634	--
56	riparian	PFO	40.79689706	-121.810473	0.048	--
57	riparian	PFO	40.81279719	-121.846088	0.084	--
Other Waters						
ES1	ephemeral stream	R4SB	40.906356	-121.871535	0.004	160
ES2	ephemeral stream	R4SB	40.895389	-121.847652	0.015	323
ES3	ephemeral stream	R4SB	40.873249	-121.848448	0.027	395
ES4	ephemeral stream	R4SB	40.873446	-121.846996	0.020	428
ES5	ephemeral stream	R4SB	40.877326	-121.819019	0.022	153
ES6	ephemeral stream	R4SB	40.877415	-121.818606	0.005	42

Appendix A Aquatic Resource Survey Results

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
ES7	ephemeral stream	R4SB	40.865603	-121.834594	0.001	54
ES8	ephemeral stream	R4SB	40.864961	-121.832654	0.007	153
ES9	ephemeral stream	R4SB	40.865410	-121.829715	0.001	48
ES10	ephemeral stream	R4SB	40.865286	-121.829737	0.005	43
ES11	ephemeral stream	R4SB	40.864870	-121.829891	0.004	156
ES12	ephemeral stream	R4SB	40.851954	-121.846311	0.003	112
ES13	ephemeral stream	R4SB	40.841939	-121.862610	0.017	139
ES14	ephemeral stream	R4SB	40.839359	-121.862111	0.003	137
ES15	ephemeral stream	R4SB	40.838893	-121.861779	0.019	272
ES16	ephemeral stream	R4SB	40.842927	-121.826460	0.005	114
ES17	ephemeral stream	R4SB	40.843052	-121.826202	0.008	329
ES18	ephemeral stream	R4SB	40.840847	-121.824265	0.006	237
ES19	ephemeral stream	R4SB	40.839643	-121.823468	0.006	262
ES20	ephemeral stream	R4SB	40.839820	-121.822907	0.0003	14
ES21	ephemeral stream	R4SB	40.838333	-121.819333	0.003	112
ES22	ephemeral stream	R4SB	40.838442	-121.861017	0.014	294
ES23	ephemeral stream	R4SB	40.838295	-121.860787	0.004	78
ES24	ephemeral stream	R4SB	40.832081	-121.846274	0.016	686
ES25	ephemeral stream	R4SB	40.830269	-121.841112	0.007	303
ES26	ephemeral stream	R4SB	40.829453	-121.834288	0.047	1,025
ES27	ephemeral stream	R4SB	40.838263	-121.819891	0.009	202
ES28	ephemeral stream	R4SB	40.826878	-121.818557	0.066	956
ES29	ephemeral stream	R4SB	40.824791	-121.781061	0.002	111
ES30	ephemeral stream	R4SB	40.824625	-121.780605	0.008	369
ES31	ephemeral stream	R4SB	40.824258	-121.779830	0.002	78
ES32	ephemeral stream	R4SB	40.791800	-121.822685	0.008	111
ES33	ephemeral stream	R4SB	40.791404	-121.822874	0.017	148
ES34	ephemeral stream	R4SB	40.778938	-121.841781	0.010	109
ES35	ephemeral stream	R4SB	40.778336	-121.842372	0.001	19
ES36	ephemeral stream	R4SB	40.778746	-121.841329	0.049	713
ES37	ephemeral stream	R4SB	40.759364	-121.825149	0.003	145
IS1	intermittent stream	R4SB	40.902292	-121.857570	0.033	173
IS2	intermittent stream	R4SB	40.902230	-121.856919	0.027	147
IS3	intermittent stream	R4SB	40.891986	-121.835677	0.020	285
IS4	intermittent stream	R4SB	40.891287	-121.835221	0.040	292
IS5	intermittent stream	R4SB	40.888301	-121.831137	0.006	62

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
IS6	intermittent stream	R4SB	40.885150	-121.836824	0.007	148
IS7	intermittent stream	R4SB	40.873832	-121.856003	0.021	154
IS8	intermittent stream	R4SB	40.873543	-121.855497	0.018	152
IS9	intermittent stream	R4SB	40.882989	-121.837240	0.027	592
IS10	intermittent stream	R4SB	40.882074	-121.836977	0.007	97
IS11	intermittent stream	R4SB	40.881399	-121.836616	0.026	374
IS12	intermittent stream	R4SB	40.880431	-121.836389	0.034	365
IS13	intermittent stream	R4SB	40.879618	-121.836687	0.017	88
IS14	intermittent stream	R4SB	40.877990	-121.836783	0.153	1,112
IS15	intermittent stream	R4SB	40.876214	-121.836658	0.039	214
IS16	intermittent stream	R4SB	40.875449	-121.836446	0.051	277
IS17	intermittent stream	R4SB	40.872689	-121.813895	0.049	357
IS18	intermittent stream	R4SB	40.865501	-121.834510	0.005	100
IS19	intermittent stream	R4SB	40.865383	-121.834581	0.001	38
IS20	intermittent stream	R4SB	40.865005	-121.834400	0.008	179
IS21	intermittent stream	R4SB	40.871875	-121.814210	0.034	185
IS22	intermittent stream	R4SB	40.871195	-121.814471	0.096	332
IS23	intermittent stream	R4SB	40.868844	-121.814664	0.084	309
IS24	intermittent stream	R4SB	40.865301	-121.824299	0.002	101
IS25	intermittent stream	R4SB	40.864913	-121.824317	0.002	70
IS26	intermittent stream	R4SB	40.856538	-121.836553	0.020	431
IS27	intermittent stream	R4SB	40.855561	-121.835742	0.012	256
IS28	intermittent stream	R4SB	40.853804	-121.782916	0.001	29
IS29	intermittent stream	R4SB	40.845932	-121.828274	0.013	191
IS30	intermittent stream	R4SB	40.845955	-121.828123	0.004	77
IS31	intermittent stream	R4SB	40.846156	-121.827878	0.011	123
IS32	intermittent stream	R4SB	40.846328	-121.827286	0.019	211
IS33	intermittent stream	R4SB	40.845678	-121.826722	0.005	111
IS34	intermittent stream	R4SB	40.845972	-121.826426	0.002	105
IS35	intermittent stream	R4SB	40.840640	-121.815959	0.113	355
IS36	intermittent stream	R4SB	40.840927	-121.815144	0.031	166
IS37	intermittent stream	R4SB	40.841785	-121.812045	0.032	344
IS38	intermittent stream	R4SB	40.841435	-121.813888	0.023	253
IS39	intermittent stream	R4SB	40.841661	-121.813144	0.029	211
IS40	intermittent stream	R4SB	40.841169	-121.814585	0.026	1,840
IS41	intermittent stream	R4SB	40.841230	-121.814087	0.008	178

Appendix A Aquatic Resource Survey Results

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
IS42	intermittent stream	R4SB	40.841105	-121.813507	0.006	127
IS43	intermittent stream	R4SB	40.841216	-121.813413	0.012	236
IS44	intermittent stream	R4SB	40.839558	-121.806713	0.080	1726
IS45	intermittent stream	R4SB	40.832597	-121.847999	0.017	240
IS46	intermittent stream	R4SB	40.832019	-121.847418	0.005	235
IS47	intermittent stream	R4SB	40.831425	-121.847554	0.009	187
IS48	intermittent stream	R4SB	40.837736	-121.819629	0.011	232
IS49	intermittent stream	R4SB	40.837735	-121.819103	0.005	112
IS50	intermittent stream	R4SB	40.834977	-121.820063	0.007	106
IS51	intermittent stream	R4SB	40.818108	-121.820309	0.085	31
IS52	intermittent stream	R4SB	40.818174	-121.797261	0.011	93
IS53	intermittent stream	R4SB	40.818237	-121.796939	0.032	136
IS54	intermittent stream	R4SB	40.818502	-121.796227	0.115	331
IS55	intermittent stream	R4SB	40.818492	-121.794751	0.022	52
IS56	intermittent stream	R4SB	40.818431	-121.794486	0.026	64
IS57	intermittent stream	R4SB	40.816631	-121.789141	0.011	45
IS58	intermittent stream	R4SB	40.816557	-121.789016	0.006	54
IS59	intermittent stream	R4SB	40.816286	-121.788860	0.012	174
IS60	intermittent stream	R4SB	40.816586	-121.788614	0.012	254
IS61	intermittent stream	R4SB	40.816687	-121.788219	0.003	17
IS62	intermittent stream	R4SB	40.812871	-121.847505	0.038	552
IS63	intermittent stream	R4SB	40.813439	-121.846288	0.002	26
IS64	intermittent stream	R4SB	40.813487	-121.846167	0.009	810
IS65	intermittent stream	R4SB	40.813601	-121.845811	0.008	171
IS66	intermittent stream	R4SB	40.813566	-121.845797	0.014	152
IS67	intermittent stream	R4SB	40.813453	-121.845488	0.003	53
IS68	intermittent stream	R4SB	40.813548	-121.845423	0.005	74
IS69	intermittent stream	R4SB	40.813555	-121.845068	0.004	164
IS70	intermittent stream	R4SB	40.812561	-121.843594	0.002	30
IS71	intermittent stream	R4SB	40.811568	-121.842162	0.160	1,102
IS72	intermittent stream	R4SB	40.812329	-121.843345	0.001	19
IS73	intermittent stream	R4SB	40.812293	-121.843261	0.004	91
IS74	intermittent stream	R4SB	40.812184	-121.843268	0.001	23
IS75	intermittent stream	R4SB	40.812181	-121.843193	0.001	18
IS76	intermittent stream	R4SB	40.812020	-121.843019	0.003	65
IS77	intermittent stream	R4SB	40.811839	-121.842595	0.000	17

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
IS78	intermittent stream	R4SB	40.811714	-121.842425	0.002	81
IS79	intermittent stream	R4SB	40.810935	-121.841241	0.001	31
IS80	intermittent stream	R4SB	40.810775	-121.841096	0.002	77
IS81	intermittent stream	R4SB	40.810621	-121.840841	0.011	123
IS82	intermittent stream	R4SB	40.810671	-121.840711	0.038	84
IS83	intermittent stream	R4SB	40.810468	-121.840460	0.020	146
IS84	intermittent stream	R4SB	40.810142	-121.840144	0.026	181
IS85	intermittent stream	R4SB	40.810108	-121.839803	0.014	98
IS86	intermittent stream	R4SB	40.783412	-121.837431	0.014	103
IS87	intermittent stream	R4SB	40.783452	-121.837191	0.012	40
IS88	intermittent stream	R4SB	40.783465	-121.836918	0.025	180
IS89	intermittent stream	R4SB	40.783254	-121.836246	0.035	128
IS90	intermittent stream	R4SB	40.783318	-121.836240	0.003	79
IS91	intermittent stream	R4SB	40.778848	-121.842346	0.003	52
IS92	intermittent stream	R4SB	40.778335	-121.842501	0.044	321
NVD1	ditch	R4	40.876514	-121.817529	0.013	175
NVD2	ditch	R4	40.876009	-121.817651	0.009	69
NVD3	ditch	R4	40.865345	-121.832613	0.008	49
NVD4	ditch	R4	40.864771	-121.824826	0.002	90
NVD5	ditch	R4	40.865351	-121.822307	0.028	611
NVD6	ditch	R4	40.871062	-121.814232	0.005	55
NVD7	ditch	R4	40.871095	-121.814017	0.004	438
NVD8	ditch	R4	40.852910	-121.781686	0.008	165
NVD9	ditch	R4	40.841927	-121.862077	0.013	188
NVD10	ditch	R4	40.845502	-121.827824	0.003	109
NVD11	ditch	R4	40.845267	-121.825812	0.002	87
NVD12	ditch	R4	40.839173	-121.822651	0.002	61
NVD13	ditch	R4	40.837795	-121.860348	0.015	327
NVD14	ditch	R4	40.837425	-121.859655	0.004	190
NVD15	ditch	R4	40.832313	-121.847360	0.012	170
NVD16	ditch	R4	40.834850	-121.816129	0.002	80
NVD17	ditch	R4	40.812320	-121.845772	0.003	38
NVD18	ditch	R4	40.806514	-121.880685	0.017	189
NVD19	ditch	R4	40.791069	-121.821182	0.022	477
NVD20	ditch	R4	40.773181	-121.854917	0.058	1,259
NVD21	ditch	R4	40.778783	-121.842090	0.010	148

Appendix A Aquatic Resource Survey Results

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
PS1	perennial stream	R3UB	40.891052	-121.834861	0.004	47
PS2	perennial stream	R3UB	40.890757	-121.834580	0.022	234
PS3	perennial stream	R3UB	40.890288	-121.834029	0.018	162
PS4	perennial stream	R3UB	40.889536	-121.833095	0.027	292
PS5	perennial stream	R3UB	40.888392	-121.831478	0.132	161
PS6	perennial stream	R3UB	40.886975	-121.829703	0.116	515
PS7	perennial stream	R3UB	40.886555	-121.829011	0.004	38
PS8	perennial stream	R3UB	40.884426	-121.826436	0.709	2,570
PS9	perennial stream	R3UB	40.873235	-121.857989	0.101	209
PS10	perennial stream	R3UB	40.873519	-121.857510	0.035	301
PS11	perennial stream	R3UB	40.873715	-121.856838	0.002	19
PS12	perennial stream	R3UB	40.875151	-121.836440	0.002	34
PS13	perennial stream	R3UB	40.873657	-121.836928	0.150	950
PS14	perennial stream	R3UB	40.880994	-121.821371	0.410	1173
PS15	perennial stream	R3UB	40.880154	-121.819299	0.012	33
PS16	perennial stream	R3UB	40.877758	-121.818181	0.663	1608
PS17	perennial stream	R3UB	40.876049	-121.816853	0.019	36
PS18	perennial stream	R3UB	40.875770	-121.816901	0.055	170
PS19	perennial stream	R3UB	40.873544	-121.815365	0.082	299
PS20	perennial stream	R3UB	40.860908	-121.837674	0.408	558
PS21	perennial stream	R3UB	40.865306	-121.821159	0.007	79
PS22	perennial stream	R3UB	40.865207	-121.818055	0.050	306
PS23	perennial stream	R3UB	40.864722	-121.818136	0.097	306
PS24	perennial stream	R3UB	40.862986	-121.814253	0.218	474
PS25	perennial stream	R3UB	40.859710	-121.837571	0.058	313
PS26	perennial stream	R3UB	40.852640	-121.844214	0.026	113
PS27	perennial stream	R3UB	40.852397	-121.844109	0.028	77
PS28	perennial stream	R3UB	40.852198	-121.844210	0.052	88
PS29	perennial stream	R3UB	40.851947	-121.844247	0.036	99
PS30	perennial stream	R3UB	40.851470	-121.844024	0.063	269
PS31	perennial stream	R3UB	40.854543	-121.783690	0.025	184
PS32	perennial stream	R3UB	40.854006	-121.782781	0.009	189
PS33	perennial stream	R3UB	40.853705	-121.782355	0.021	155
PS34	perennial stream	R3UB	40.853338	-121.781588	0.043	312
PS35	perennial stream	R3UB	40.853261	-121.780828	0.007	50
PS36	perennial stream	R3UB	40.853187	-121.780676	0.004	55

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
PS37	perennial stream	R3UB	40.853129	-121.780515	0.002	47
PS38	perennial stream	R3UB	40.845952	-121.831505	0.221	487
PS39	perennial stream	R3UB	40.845625	-121.829304	0.076	207
PS40	perennial stream	R3UB	40.845697	-121.828495	0.081	251
PS41	perennial stream	R3UB	40.845591	-121.827736	0.026	98
PS42	perennial stream	R3UB	40.845616	-121.827171	0.043	159
PS43	perennial stream	R3UB	40.844984	-121.826160	0.132	582
PS44	perennial stream	R3UB	40.844033	-121.824461	0.111	605
PS45	perennial stream	R3UB	40.843496	-121.823571	0.013	31
PS46	perennial stream	R3UB	40.842321	-121.822743	0.151	812
PS47	perennial stream	R3UB	40.843215	-121.822945	0.003	61
PS48	perennial stream	R3UB	40.841208	-121.822502	0.004	33
PS49	perennial stream	R3UB	40.840861	-121.822138	0.031	342
PS50	perennial stream	R3UB	40.840545	-121.821538	0.011	82
PS51	perennial stream	R3UB	40.840550	-121.820834	0.015	81
PS52	perennial stream	R3UB	40.835693	-121.820022	0.060	435
PS53	perennial stream	R3UB	40.834810	-121.819333	0.040	431
PS54	perennial stream	R3UB	40.834230	-121.817335	0.015	161
PS55	perennial stream	R3UB	40.834062	-121.817060	0.008	35
PS56	perennial stream	R3UB	40.833728	-121.816652	0.020	218
PS57	perennial stream	R3UB	40.820369	-121.778294	0.278	366
PS58	perennial stream	R3UB	40.814458	-121.820970	0.127	301
PS59	perennial stream	R3UB	40.811899	-121.817195	0.058	253
PS60	perennial stream	R3UB	40.812587	-121.817122	0.006	44
PS61	perennial stream	R3UB	40.812299	-121.816822	0.105	396
PS62	perennial stream	R3UB	40.796770	-121.810586	0.024	102
PS63	perennial stream	R3UB	40.796583	-121.810632	0.006	43
PS64	perennial stream	R3UB	40.796577	-121.810592	0.003	42
PS65	perennial stream	R3UB	40.796208	-121.810647	0.071	249
PS66	perennial stream	R3UB	40.795745	-121.810385	0.036	78
PS67	perennial stream	R3UB	40.795237	-121.810537	0.050	89
PS68	perennial stream	R3UB	40.790099	-121.833763	0.033	183
PS69	perennial stream	R3UB	40.790225	-121.833462	0.013	47
PS70	perennial stream	R3UB	40.790348	-121.833266	0.023	122
PS71	perennial stream	R3UB	40.790409	-121.832957	0.021	95
PS72	perennial stream	R3UB	40.792315	-121.827468	0.023	117

Appendix A Aquatic Resource Survey Results

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
PS73	perennial stream	R3UB	40.792203	-121.826799	0.038	201
PS74	perennial stream	R3UB	40.791810	-121.825631	0.113	407
PS75	perennial stream	R3UB	40.791473	-121.824980	0.014	33
PS76	perennial stream	R3UB	40.791205	-121.824384	0.053	288
PS77	perennial stream	R3UB	40.773590	-121.852192	0.123	268
PS78	perennial stream	R3UB	40.773831	-121.849568	0.419	925
PS79	perennial stream	R3UB	40.774359	-121.847796	0.070	152
PS80	perennial stream	R3UB	40.774332	-121.847733	0.005	40
PS81	perennial stream	R3UB	40.775636	-121.846020	0.039	86
PS82	perennial stream	R3UB	40.759626	-121.867440	0.196	426
PS83	perennial stream	R3UB	40.765307	-121.837121	0.090	489
PS84	perennial stream	R3UB	40.758198	-121.867570	0.031	222
PS85	perennial stream	R3UB	40.757982	-121.833624	0.418	338
PS86	perennial stream	R3UB	40.747830	-121.840312	0.039	214
PON1	perennial stream	PUB	40.841583	-121.861610	0.137	--
PON2	perennial stream	PUB	40.812260	-121.845864	0.011	--
PON3	perennial stream	PUB	40.812339	-121.845654	0.033	--
A (Hatchet Creek)	perennial stream	R3UB	40.83388153	-121.783671	0.313	446
A1 (Hatchet Creek)	perennial stream	R3UB	40.82543492	-121.782441	0.314	341
B	intermittent stream	R4SB	40.83330343	-121.782393	0.001	60
C	ephemeral stream	R4SB	40.84286023	-121.807543	0.108	937
C1 (North Fork Cedar Creek)	perennial stream	R3UB	40.79003107	-121.834076	0.022	94
D	perennial stream	R3UB	40.82794635	-121.787638	0.003	40
D1 (North Fork Cedar Creek)	perennial stream	R3UB	40.79027933	-121.832742	0.028	121
E	perennial stream	R3UB	40.82803867	-121.787679	0.001	17
E1	intermittent stream	R4SB	40.78345333	-121.837588	0.008	61
E2	intermittent stream	R4SB	40.78344026	-121.838067	0.017	120
F	perennial stream	R3UB	40.82795794	-121.787653	0.0002	7
F1	intermittent stream	R4SB	40.78337647	-121.838211	0.011	78
G1	intermittent stream	R4SB	40.78341698	-121.83845	0.091	399
G2	intermittent stream	R4SB	40.78322327	-121.841412	0.223	970
H	perennial stream	R3UB	40.8281905	-121.787786	0.004	154
H1	intermittent stream	R4SB	40.78303504	-121.838906	0.003	75
I	perennial stream	R3UB	40.82809804	-121.787192	0.004	93

Aquatic Resource Name	Type	Aquatic Resource Classification			Acres	Linear Feet
		Cowardin	Location			
			Latitude	Longitude		
I1	intermittent stream	R4SB	40.78300564	-121.838841	0.001	46
J	perennial stream	R3UB	40.82804317	-121.786973	0.002	106
J1	intermittent stream	R3UB	40.78125253	-121.831685	0.095	1,037
K	perennial stream	R3UB	40.82803623	-121.786933	0.001	32
K1 (North Fork Little Cow Creek)	perennial stream	R3UB	40.77584467	-121.844045	0.143	519
L	intermittent stream	R4SB	40.82794342	-121.787615	0.001	14
L1	perennial stream	R3UB	40.77483319	-121.844982	0.102	372
M	perennial stream	R4SB	40.82776879	-121.786829	0.020	217
M1 (North Fork Little Cow Creek)	perennial stream	R3UB	40.77455022	-121.847517	0.031	114
N	intermittent stream	R4SB	40.84062839	-121.863574	0.042	307
O (North Fork Montgomery Creek)	perennial stream	R3UB	40.81742637	-121.842789	0.229	664
P1	intermittent stream	R4SB	40.81290446	-121.843947	0.026	192
P2	intermittent stream/culvert	R4SB	40.81312891	-121.844621	0.001	22
P3	intermittent stream	R4SB	40.81313024	-121.844629	0.014	104
Q (South Fork Montgomery Creek)	perennial stream	R3UB	40.80222033	-121.84041	0.405	980
R	perennial stream	R3UB	40.78735153	-121.848454	0.357	2,242
S	perennial stream	R3UB	40.79433757	-121.82953	0.059	321
T1	intermittent stream	R4SB	40.79775118	-121.875107	0.137	597
T2	intermittent stream	R4SB	40.8014536	-121.879136	0.017	75
U	ephemeral stream	R4SB	40.83708622	-121.778328	0.005	105
V	ephemeral stream/culvert	R4SB	40.83708226	-121.778127	0.002	50
W	ephemeral stream	R4SB	40.837079	-121.778076	0.004	102
W1	intermittent stream	R4SB	40.79694424	-121.8105455	0.013	56
X	perennial stream	R3UB	40.77361381	-121.8527186	0.085	309
Y	intermittent stream	R4SB	40.81281922	-121.8484931	0.009	63
Total		--	--	--	**51.900**	**73,183**

Appendix B WETLAND DETERMINATION DATA FORMS

North State Resources, Inc.

Data Point: 1
Feature Type: Intermittent Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/10/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, John Holford Section, Township, Range: Sec. 10, T35N, R1E
Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope %: 5
Subregion (LRR): MLRA 22B Lat: 40.902296° Long: -121.857121° Datum: NAD 83
Soil Map Unit Name: Goulder gravelly sandy loam, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 8'
Feature Designation: Perennial ___ Intermittent ✓ Ephemeral ___ Blue-line on USGS Quad ___ Substrate Rock
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks

DP documents OHWM of an intermittent stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ___ 20%= ___ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust ___

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ___ (A)
Total number of dominant species across all strata: ___ (B)
Percent of dominant species that are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks

No vegetation scoured channel.

Data Point 1

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soil pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
✓ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Sediment and drift deposits indicate frequent flooding.

North State Resources, Inc.

Data Point: 2
Feature Type: Fresh Emergent Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/11/17
Applicant/Owner: Avangrid State: CA
Investigator(s): John Holford Section, Township, Range: Sec. 14, T35N, R1E
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope %: 0
Subregion (LRR): MLRA 22B Lat: 40.890468° Long: -121.834325° Datum: NAD 83
Soil Map Unit Name: Obie-Mounthat complex, 5 to 15 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width _____
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate _____
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

DP documents a fresh emergent wetland within riparian habitat associated with Little Hatchet Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	20	Y	FACW
2. Alnus incana	5	N	FACW
3. Acer circinatum	5	N	FAC
4.			
50%= 15 20%= 6 Total Cover:	30		

Sapling/Shrub Stratum (Plot Size: 15)	% Cover	Species?	Status
1. Salix lasiolepis	5	Y	FACW
2.			
3.			
4.			
50%= 2.5 20%= 1 Total Cover:	5		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Ludwigia palustris	75	Y	OBL
2. Unkown grass	5	N	Unk
3. Scirpus microcarpus	5	N	OBL
4. Epilobium ciliatum	1	N	FACW
5.			
6.			
7.			
8.			
50%= 43 20%= 17.2 Total Cover:	86		

Woody/Vine Stratum (Plot Size: 30)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 3 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominant hydrophytic vegetation is present.

Data Point 2

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR 2.5/3	100					SL	mucky

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ✓ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ____________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

High organic matter, decomposing smell (not hydrogen sulfide). Soils meet the definition of indicator F1.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No ____ Depth (inches) 1 Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ____ Depth (inches) Surface

Saturation Present? Yes ✓ No ____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Approximately 1 inch of standing water provides wetland hydrology.

North State Resources, Inc.

Data Point: 3
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/11/17

Applicant/Owner: Avangrid State: CA

Investigator(s): John Holford Section, Township, Range: Sec. 14, T35N, R1E

Landform (hillslope, terrace, etc.): Toe of hillslope Local relief (concave, convex, none): convex Slope %: 1

Subregion (LRR): MLRA 22B Lat: 40.890502° Long: -121.834364° Datum: NAD83

Soil Map Unit Name: Obie-Mounthat complex, 5 to 15 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to DP2 fresh emergent wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer circinatum	15	Y	FAC
2. Calocedrus decurrens	10	Y	UPL
3. Pseudotsuga menziesii	10	Y	FACU
4.			
50%= 35 20%= 7 Total Cover:	35		

Sapling/Shrub Stratum (Plot Size: 15)	% Cover	Species?	Status
1. Ceanothus integerrimus	10	Y	UPL
2. Cornus nuttallii	1	N	FACU
3.			
4.			
50%= 6 20%= 3 Total Cover:	11		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Pteridium aquilinum	10	Y	FACU
2. Carex sp.	3	N	FACU
3. Symphoricarpos albus	1	N	FACU
4.			
5.			
6.			
7.			
8.			
50%= 7 20%= 2 Total Cover:	14		

Woody/Vine Stratum (Plot Size: 30)	% Cover	Species?	Status
1. Rubus parvifloras	3	Y	FACU
2.			
50%= 20%= Total Cover:	3		

% Bare Ground in Herb Stratum 86 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 6 (B)

Percent of dominant species that are OBL, FACW, or FAC: 17 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] *Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

Carex sp. assumed to be FACU or drier. Dominant hydrophytic vegetation is not present.

Data Point 3

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					SL	charred bio material from fire
4-18	7.5YR 3/4	100					SL	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soil.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology.

North State Resources, Inc.

Data Point: 4
Feature Type: Riparian Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/11/17

Applicant/Owner: Avangrid State: CA

Investigator(s): John Holford Section, Township, Range: Sec. 14, T35N, R1E

Landform (hillslope, terrace, etc.): Toe of hillslope Local relief (concave, convex, none): concave Slope %: 1

Subregion (LRR): MLRA 22B Lat: 40.890069° Long: -121.834209° Datum: NAD83

Soil Map Unit Name: Obie-Mounthat complex, 5 to 15 percent slopes NWI Classification: PSSC

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents riparian wetland adjacent to Little Hatchet Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	15	Y	FACW
2. Salix lasiolepis	15	Y	FACW
3. Acer circinatum	5	N	FAC
4.			
50%= 17.5 20%= 7 Total Cover:	35		
Sapling/Shrub Stratum (Plot Size: 15)	**% Cover**	**Species?**	**Status**
1. Salix lasiolepis	5	Y	FACW
2. Acer circinatum	5	Y	FACW
3. Cornus nuttallii	1	N	FACU
4.			
50%= 6.5 20%= 2.2 Total Cover:	11		
Herb Stratum (Plot Size: 5)	**% Cover**	**Species?**	**Status**
1. Carex sp.	65	Y	FAC
2. Platanthera dilatata	1	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
50%= 66 20%= 13.2 Total Cover:	66		
Woody/Vine Stratum (Plot Size:)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 34 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 5 (A)

Total number of dominant species across all strata: 5 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

- ____ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Carex sp. assumed to be FAC or wetter. Dominant hydrophytic vegetation is present.

Data Point 4

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 2/2	100					SL	mucky

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
✓ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

High in organic matter. Soil meets the requirements of indicator F1 Loamy Mucky Mineral.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
✓ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation present throughout entire depth of soil sample. The water table was not observed.

North State Resources, Inc.

Data Point 5
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/11/17
Applicant/Owner: Avangrid State: CA
Investigator(s): John Holford Section, Township, Range Sec. 14, T35N, R1E
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Convex Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.890079° Long: -121.834289° Datum: NAD83
Soil Map Unit Name: Obie-Mounthat complex, 5 to 15 percent slopes NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings
(Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Upland pair to DP4 riparian wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	25	Y	FACU
2. Calocedrus decurrens	25	Y	UPL
3. Alnus incana	5	N	FACW
4.			
50%= 27.5 20%= 11 Total Cover:	55		
Sapling/Shrub Stratum (Plot Size: 15)	**% Cover**	**Species?**	**Status**
1. Acer circinatum	10	Y	FAC
2. Cornus nuttallii	3	N	FACU
3.			
4.			
50%= 6.5 20%= 2.6 Total Cover:	13		
Herb Stratum (Plot Size: 5)	**% Cover**	**Species?**	**Status**
1. Pteridium aquilinum	5	Y	FACU
2. Trillium albidum	1	N	FACU
3. Elymus glacus	1	N	FACU
4.			
5.			
6.			
7.			
8.			
50%= 3.5 20%= 1.4 Total Cover:	7		
Woody/Vine Stratum (Plot Size: 30)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 93 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 4 (B)
Percent of dominant species that are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks Dominant hydrophytic vegetation is not present.

Data Point 5

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/4	100					SL	
12-18	7.5YR 5/6	100					SL	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / ~~N~~

Remarks

No indicators of hydric soils.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / ~~N~~
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology.

North State Resources, Inc.

Data Point: 6
Feature Type: Perennial Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/11/17
Applicant/Owner: Avangrid State: CA
Investigator(s): John Holford Section, Township, Range: Sec. 14, T35N, R1E
Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope %: 10
Subregion (LRR): MLRA 22B Lat: 40.888505° Long: -121.831906° Datum: NAD83
Soil Map Unit Name: Obie-Mounthat complex, 5 to 15 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 6'
Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ✓ Substrate Cobble
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks DP documents OHWM of Little Hatchet Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ___ 20%= ___ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks No veg scoured channel.

Data Point 6

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✗

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No _____ Depth (inches) 1 Wetland Hydrology? ✓ / N
Water Table Present? Yes ✓ No _____ Depth (inches) Surface
Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water provides hydrology.

North State Resources, Inc.

Data Point: DP7
Feature Type: Wetland Seep/Spring

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/11/17
Applicant/Owner: Avangrid State: CA
Investigator(s): John Holford Section, Township, Range: Sec. 24, T35N, R1E
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 5
Subregion (LRR): MLRA 22B Lat: 40.880789° Long: -121.821713° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy very stony sandy loams, 30 to 50 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☑/☐ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☐/☒
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑ ☐ Is sampled area a wetland? ☑ ☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Normal circumstances not present- seep located on gravel logging road. Significant grading and compaction.

Vegetation (Use Scientific Names)

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: ____)			
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Mimulus guttatus	20	Y	OBL
2. Juncus xiphioides	10	Y	OBL
3. Trifolium repens	10	Y	FAC
4. Juncus bufonius	10	Y	FACW
5. Hypericum perforatum	3	N	FACU
6. Elymus glaucus	1	N	FACU
7. Castilleja campestris	1	N	FACW
8.			
50%= 28 20%= 11 Total Cover:	55		
Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 4 (A)
Total number of dominant species across all strata: 4 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Data Point DP7

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					SL	
3-6	10GY 5/1	95	7.5YR 5/8	5	C	M	SL	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ✓ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: gravel (road bed) Depth (Inches) 6 Hydric Soil Present? ✓ /

Remarks

Soils meet the requirements of indicator F2 loamy gleyed matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____

Water Table Present? Yes ____ No X Depth (inches) ____

Saturation Present? Yes ✓ No ____ Depth (inches) 0-6 *(includes capillary fringe)*

Wetland Hydrology? ✓ / N

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation at the soil surface provides wetland hydrology.

North State Resources, Inc.

Data Point: 8
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/11/17
Applicant/Owner: Avangrid State: CA
Investigator(s): John Holford Section, Township, Range: Sec. 24, T35N, R1E
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope %: 50
Subregion (LRR): MLRA 22B Lat: 40.880774° Long: -121.821738° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy very stony sandy loams, 30 to 50 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to DP7 wetland seep/spring.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	30	Y	FACU
2.			
3.			
4.			
50%= 15 20%= 6 Total Cover:	30		

Sapling/Shrub Stratum (Plot Size: 15)	% Cover	Species?	Status
1. Paxistima myrsinites	20	Y	FACU
2. Notholithocarpus densiflorus	5	N	UPL
3. Calocedrus decurrens	5	N	UPL
4.			
50%= 15 20%= 6 Total Cover:	30		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Epilobium sp.	5	Y	FACU
2. Trillium sp.	1	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
50%= 3 20%= 1.2 Total Cover:	6		

Woody/Vine Stratum (Plot Size: 30)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

Epilobium sp. assumed FACU or drier due to presence of other hydrophytic vegetation. All species of Trillium are FACU. Dominant hydrophytic vegetation is not present.

Data Point 8

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	5YR 5/3	100					SL	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ________________ Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soils.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X

Water Table Present? Yes _____ No X Depth (inches) __________

Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology.

North State Resources, Inc.

Data Point 9
Feature Type Ephemeral Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/10/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, John Holford Section, Township, Range Sec. 22, T35N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Convex Slope % 5
Subregion (LRR): MLRA 22B Lat: 40.873445° Long: -121.846261° Datum: NAD 83
Soil Map Unit Name: Goulder gravelly sandy loam, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ____ Stream Width 2'
Feature Designation: Perennial ____ Intermittent ____ Ephemeral ✓ Blue-line on USGS Quad ____ Substrate Rock
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks DP documents the headwaters of an ephemeral stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ____ 20%= ____ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks No vegetation scoured channel.

Data Point 9

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✗

Remarks

Scoured channel no soil pit.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
__✓__ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No ✗ Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No ✗ Depth (inches) __________
Saturation Present? Yes _____ No ✗ Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding.

North State Resources, Inc.

Data Point: 10
Feature Type: Fresh Emergent Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/24/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range: Sec. 32, T35N, R3E
Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope %: 1
Subregion (LRR): MLRA 22B Lat: 40.853245° Long: -121.780950° Datum: NAD83
Soil Map Unit Name: Gardens-Jacksback complex, 0 to 2 percent slopes NWI Classification: PEMC1

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 6'
Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ✓ Substrate Soil & Vegetated
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks DP documents OHWM of a perennial stream with emergent vegetation.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Glyceria striata	80	Y	OBL
2. Unknown herb	5	N	UNK
3. Ludwigia palustris	1	N	OBL
4.			
5.			
6.			
7.			
8.			
50%= 43 20%= 17.2 Total Cover:	86		

Woody/Vine Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 14 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 1 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominate hydrophytic vegetation is present.

Data Point 10

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR3/1	90	10YR 4/6	10	C	PL	Loam	Gravelly Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ____________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F6 Redox Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No ____ Depth (inches) 6 Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ____ Depth (inches) Surface

Saturation Present? Yes ✓ No ____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water provides wetland hydrology.

North State Resources, Inc.

Data Point: 11
Feature Type: Riparian Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind   City/County: Shasta County   Date: 10/24/17
Applicant/Owner: Avangrid   State: CA
Investigator(s): John Holson   Section, Township, Range: Sec. 32, T35N, R3E
Landform (hillslope, terrace, etc.): Stream terrace   Local relief (concave, convex, none): None   Slope %: 0
Subregion (LRR): MLRA 22B   Lat: 40.853179°   Long: -121.780916°   Datum: NAD83
Soil Map Unit Name: Gardens-Jacksback complex, 0 to 2 percent slopes   NWI Classification: PEMC1

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

DP documents riparian wetland associated with Carberry Creek where it flows through a meadow.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1. Salix lasiolepis	40	Y	FACW
2. Alnus Incanca	20	Y	FACW
3.			
4.			
50%= 30 20%= 12 Total Cover:	60		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Juncus effusus	35	Y	FACW
2. Carex sp.	15	Y	FAC
3. Epilobium ciliatum	10	N	FACW
4. Drymocallis glandulosa	2	N	FAC
5. Alopecurus pratensis	2	N	FAC
6. Poa pratensis	1	N	FAC
7.			
8.			
50%= 32.5 20%= 13 Total Cover:	65		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 4 (A)
Total number of dominant species across all strata: 4 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominant hydrophytic vegetation present. Carex sp. assumed FAC or wetter.

Data Point 11

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5YR 2.5/1	100					Loam	Clay + roots/organic matter
3-10	2.5YR 2.5/1	90	5YR 4/4	10	C	M	Loam	Clay, some cobble
10-16	7.5YR 2.5/1	100					Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ____________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F6 Redox Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? Yes ✓ No ____ Depth (inches) 10 *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation at 10 inches provides wetland hydrology.

North State Resources, Inc.

Data Point: 12
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/24/17
Applicant/Owner: Avangrid State: CA
Investigator(s): John Holson Section, Township, Range: Sec. 32, T35N, R3E
Landform (hillslope, terrace, etc.): Stream terrace Local relief (concave, convex, none): None Slope %: 0
Subregion (LRR): MLRA 22B Lat: 40.853133° Long: -121.780904° Datum: NAD83
Soil Map Unit Name: Gardens-Jacksback complex, 0 to 2 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks: Upland pair to DP 10 fresh emergent wetland/perennial stream and DP 11 riparian wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ______)

	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: 5')

	% Cover	Species?	Status
1. Juncus balticus	40	Y	FACW
2. Carex sp.	40	Y	FAC--
3. Poa pratensis	10	N	FAC
4. Alopecurus pratensis	5	N	FAC
5. Holcus lanatus	5	N	FAC
6. Phalaris sp.	5	N	UNK
7.			
8.			
50%= 52.5 20%= 21 Total Cover:	105		

Woody/Vine Stratum (Plot Size: ______)

	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 2 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks: Dominant hydrophytic vegetation present. Carex sp. assumed FAC or wetter due to presence of other hydrophytic species.

Data Point 12

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					Loam	Roots/organic matter
2-6	7.5YR 2.5/1	100					Loam	
6-16	7.5YR 2.5/1	100					Loam	Clay

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / ~~N~~

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / ~~N~~
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point: 13
Feature Type: Wetland Meadow

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/24/17

Applicant/Owner: Avangrid State: CA

Investigator(s): John Holson Section, Township, Range: Sec. 29, T35N, R3E

Landform (hillslope, terrace, etc.): Stream terrace Local relief (concave, convex, none): None Slope %: 0

Subregion (LRR): MLRA 22B Lat: 40.853651° Long: -121.782083° Datum: NAD83

Soil Map Unit Name: Gardens-Jacksback complex, 0 to 2 percent slopes NWI Classification: PEMC1

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents wetland meadow adjacent to Carberry Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15')	**% Cover**	**Species?**	**Status**
1. Salix lasiolepis	10	Y	FACW
2.			
3.			
4.			
50%= 5 20%= 2 Total Cover:	10		
Herb Stratum (Plot Size: 5')	**% Cover**	**Species?**	**Status**
1. Juncus effusus	75	Y	FACW
2. Mentha spicata	15	Y	FACW
3. Carex sp.	10	N	FAC
4. Holcus lanatus	3	N	FAC
5. Drymocallis glandulosa	2	N	FAC
6. Veronica americana	1	N	OBL
7.			
8.			
50%= 53 20%= 13.2 Total Cover:	106		
Woody/Vine Stratum (Plot Size:)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 3 (A)

Total number of dominant species across all strata: 3 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation present. Carex sp. assumed FAC or wetter.

Data Point 13

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100					Loam	Clay, some cobble
6-10	7.5YR 2.5/1	100	5YR 4/4	10	C	M	Clay	some cobble

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ✓ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ________ Depth (Inches) ____ Hydric Soil Present? ✓ /

Remarks

Soils had a hydrogen sulfide odor and meet the requirements for indicator A4 Hydrogen Sulfide.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ✓ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) **(LRR A)**
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) **(LRR A)**
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____ Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ____ Depth (inches) 4

Saturation Present? Yes ✓ No ____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Water table at 4 inches provides wetland hydrology.

North State Resources, Inc.

Data Point 14
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/24/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 29, T35N, R3E
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Convex Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.853612° Long: -121.782094° Datum: NAD83
Soil Map Unit Name: Gardens-Jacksback complex, 0 to 2 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents uplands in previously placed fill associated with a road adjacent to a wet meadow.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ______)	**% Cover**	**Species?**	**Status**
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Herb Stratum (Plot Size: 5')	**% Cover**	**Species?**	**Status**
1. Holcus lanatus	30	Y	FAC
2. Acmispon americanus	20	Y	FACU
3. Achillea millefolium	20	Y	FACU
4. Alopecurus pratensis	10	N	FAC
5. Poa pratensis	10	N	FAC
6. Rumex acetosella	5	N	FACU
7. Plantago lanceolata	5	N	FACU
8.			
50%= ____ 20%= ____ Total Cover:	100		
Woody/Vine Stratum (Plot Size: ______)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks Dominant hydrophytic vegetation is not present.

Data Point 14

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5YR 3/4	100					Loam	Gravelly

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
✓ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) _________ Wetland Hydrology? ✓ / N
Water Table Present? Yes ✓ No _____ Depth (inches) 14
Saturation Present? Yes ✓ No _____ Depth (inches) 6 *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation at 6 inches provides wetland hydrology.

North State Resources, Inc.

Data Point 15

Feature Type Non-vegetated Ditch

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/24/17

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood Section, Township, Range Sec. 32, T35N, R3E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 2

Subregion (LRR): MLRA 22B Lat: 40.853041° Long: -121.781886° Datum: NAD83

Soil Map Unit Name: Gardens-Jacksback complex, 0 to 2 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 1'

Feature Designation: Perennial ____ Intermittent ____ Ephemeral ✓ Blue-line on USGS Quad ____ Substrate Rock

Natural Drainage ____ Artificial Drainage ✓ Navigable Water ____

Remarks DP documents OHWM of a non-vegetated ditch on the uphill side of a dirt road.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ____ 20%= ____ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 14 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)

Total number of dominant species across all strata: ____ (B)

Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks Veg not evaluated other waters feature.

Data Point 15

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

Soils not evaluated other waters feature.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
✓ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 16
Feature Type: Ephemeral Stream

Project/Site: Fountain Wind | City/County: Shasta County | Date: 10/16/17
Applicant/Owner: Avangrid | State: CA
Investigator(s): Gabe Youngblood | Section, Township, Range: Sec. 33, T35N, R1E
Landform (hillslope, terrace, etc.): Drainage | Local relief (concave, convex, none): Concave | Slope %: 2
Subregion (LRR): MLRA 22B | Lat: 40.841929° | Long: -121.862647° | Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes | NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 5'
Feature Designation: Perennial ____ Intermittent ____ Ephemeral ✓ Blue-line on USGS Quad ____ Substrate Soil & Rock
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks
DP documents OHWM of an ephemeral stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks
No veg scoured channel.

Data Point 16

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding.

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 17
Feature Type: Non-vegetated ditch

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood Section, Township, Range Sec. 34, T35N, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 2

Subregion (LRR): MLRA 22B Lat: 40.841929° Long: -121.862114° Datum: NAD83

Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 3'

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ✓ Blue-line on USGS Quad ___ Substrate Rock

Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks: DP documents OHWM of a NVD.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ___ 20%= ___ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ___ (A)

Total number of dominant species across all strata: ___ (B)

Percent of dominant species that are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks: No veg scoured channel.

Data Point 17

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / ~~N~~

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
__✓__ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No __X__ Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No __X__ Depth (inches) __________
Saturation Present? Yes _____ No __X__ Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Sediment deposits indicate frequent flooding.

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 18
Feature Type: Wetland meadow

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range: Sec. 34, T35N, R1E
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope %: 1
Subregion (LRR): MLRA 22B Lat: 40.841924° Long: -121.861772° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: PEM1Ch

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? Y ☑/N ☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks: DP documents wetland meadow.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Juncus balticus	45	Y	FACW
2. Carex sp. (NIF)	40	Y	FAC-
3. Deschampsia danthonioides	3	N	FACW
4. Unkown grass	2	N	UNK
5.			
6.			
7.			
8.			
50%= 45 20%= 18 Total Cover:	90		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust 10

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 2 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks: Dominant hydrophytic vegetation present. Carex sp. assumed FAC or wetter.

Data Point 18

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					Loam	Sandy
6-12	10YR 2/2	80	5YR 3/4	20	C	PL	Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? ✓

Remarks

Soils meet the requirement for indicator F6 Redox Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? Yes ____ No X Depth (inches) ________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Algal crust indicates long duration saturation. Saturation is visible on Google Earth imagery from 7/8/12.

North State Resources, Inc.

Data Point 19
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood Section, Township, Range Sec. 34, T35N, R1E

Landform (hillslope, terrace, etc.) Hillslope (Nearly Level) Local relief (concave, convex, none) Convex Slope % 0

Subregion (LRR): MLRA 22B Lat: 40.841931° Long: -121.861811° Datum: NAD83

Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to Data Point 18 wetland meadow.

Vegetation (Use Scientific Names)

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: 30')			
1. Quercus kelloggii	40	Y	UPL
2.			
3.			
4.			
50%= 20 20%= 8 Total Cover:	40		
Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Rubus armeniacus	80	Y	FAC
2. Salix scouleriana	5	N	FAC
3.			
4.			
50%= 42.5 20%= 17 Total Cover:	85		
Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Hypericum perforatum	1	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= .5 20%= .2 Total Cover:	1		
Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 3 (B)

Percent of dominant species that are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

Dominate hydrophytic vegetation is not present.

Data Point 19

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/3	100					Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? Y / X

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point: 20
Feature Type: Fresh Emergent Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range: Sec. 34, T35N, R1E
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 1
Subregion (LRR): MLRA 22B Lat: 40.841448° Long: -121.861591° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: PABFh

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width _____
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate _____
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks: DP documents fresh emergent wetland in a seasonal pond.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Glyceria striata	40	Y	OBL
2. Nuphar polysepala	40	Y	OBL
3. Schoenoplectus acutus	5	N	OBL
4. Muhlenbergia filiformis	5	N	FACW
5.			
6.			
7.			
8.			
50%= 45 20%= 18 Total Cover:	90		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust 10

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 2 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks: Dominate hydrophytic vegetation present.

Data Point 20

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	100					Muck	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ___ 2 cm Muck (A10)
- ___ Red Parent Materials (TF21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Vegetated Sand/Gravel Bars
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? ✓

Remarks

Soils meet the requirement for indicator A1 Histosol.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___ Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ___ Depth (inches) 6

Saturation Present? Yes ✓ No ___ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation and high water table provide wetland hydrology.

North State Resources, Inc.

Data Point 21
Feature Type Pond

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 34, T35N, R1E
Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none) Concave Slope % 1
Subregion (LRR): MLRA 22B Lat: 40.841443° Long: -121.861622° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: PABFh

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents unvegetated portion of a seasonal pond.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ________)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ________)	**% Cover**	**Species?**	**Status**
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Herb Stratum (Plot Size: ________)	**% Cover**	**Species?**	**Status**
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ____ 20%= ____ Total Cover:	0		
Woody/Vine Stratum (Plot Size: ________)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ________ (A)
Total number of dominant species across all strata: ________ (B)
Percent of dominant species that are OBL, FACW, or FAC: ________ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks Portion of seasonal pond with no vegetation.

Data Point 21

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/3	100					Loam	Sandy, very rocky
6-12	10YR 2/1	80	7.5YR 3/4	10	C	PL	Loam	Clay
			10YR 6/1	10	D	M	Loam	Clay

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ✓ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? ✓

Remarks

Soils meet the requirement for indicator F6 Redox Dark Surface and indicator F7 Depleted Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? Yes ✓ No ____ Depth (inches) 6 inches *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation provides wetland hydrology. Inundation visible on Google Earth imagery from 7/8/12

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 22
Feature Type: Upland

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range: Sec. 34, T35N, R1E
Landform (hillslope, terrace, etc.): roadbank Local relief (concave, convex, none): Convex Slope %: 20
Subregion (LRR): MLRA 22B Lat: 40.841428° Long: -121.861648° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width _____
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate _____
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Upland pair to Data Point 20 and 21. Data point is located on the road shoulder. The road acts as a dam causing water to pond seasonally.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20 20%= 8 Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Rubus armeniacus	80	Y	FAC
2. Quercus Kelloggii	10	N	UPL
3. Calocedrus decurrens	10	N	UPL
4.			
50%= 42.5 20%= 17 Total Cover:	100		

Herb Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 1 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominate facultative vegetation is present.

Data Point 22

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/3	100					Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? Y / N X

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / N X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point 23
Feature Type Riparian Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood Section, Township, Range Sec. 34, T35N, R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none) Concave Slope % 1

Subregion (LRR): MLRA 22B Lat: 40.841404° Long: -121.861956° Datum: NAD83

Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: PEM1C

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

DP documents a riparian wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus ponderosa	3	Y	FACU
2.			
3.			
4.			
50%= 1.5 20%= 0.6 Total Cover:	3		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Rubus armeniacus	70	Y	FAC
2. Salix scouleriana	20	Y	FAC
3. Rosa californica	4	N	FAC
4.			
50%= 47 20%= 18.8 Total Cover:	94		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 3 (B)

Percent of dominant species that are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominate hydrophytic vegetation present.

Data Point 23

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-21	7.5YR 3/1	95	7.5YR3/4	5	C	PL	Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
__✓__ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F6 Redox Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
__✓__ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Oxidized rhizospheres indicate long duration saturation.

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 24
Feature Type: Upland

Project/Site: Fountain Wind City/County: Shasta County Date: 10/16/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range: Sec. 34, T35N, R1E
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope %: 10
Subregion (LRR): MLRA 22B Lat: 40.841477° Long: -121.861999° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width _____
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate _____
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to Data Point 23 Riparian Wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus ponderosa	10	Y	FACU
2. Salix scouleriana	10	Y	FAC
3. Cornus nuttallii	5	N	FACU
4. Quercus Kelloggii	2	N	UPL
50%= 13.5 20%= 5.4 Total Cover:	27		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Rubus armeniacus	70	Y	FAC
2. Ceanothus integerrimus	5	N	UPL
3.			
4.			
50%= 37.5 20%= 15 Total Cover:	75		

Herb Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominate facultative vegetation is present.

Data Point 24

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 3/1	100					Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? / X

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) _____ Wetland Hydrology? Y / X

Water Table Present? Yes _____ No X Depth (inches) _____

Saturation Present? Yes _____ No X Depth (inches) _____ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point 25
Feature Type Intermittent Stream

Project/Site: Fountain Wind City/County: Shasta County Date: 10/23/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 36, T35N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.840698° Long: -121.807661° Datum: NAD83
Soil Map Unit Name: Gasper-Scarface complex, moist, 15 to 30 percent slopes NWI Classification: R4SBC

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 2'
Feature Designation: Perennial ___ Intermittent ✓ Ephemeral ___ Blue-line on USGS Quad ✓ Substrate Soil & Gravel
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks

DP documents OHWM of an intermittent stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ___ (A)
Total number of dominant species across all strata: ___ (B)
Percent of dominant species that are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

No veg scoured channel.

Data Point 25

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (except MLRA 1) (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

____ 2 cm Muck (A10)
____ Red Parent Materials (TF21)
____ Very Shallow Dark Surface (TF12)
____ Vegetated Sand/Gravel Bars
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)
____ Water Stained Leaves (B9) except MLRA 1,2,4A, and 4B)
____ Salt Crust (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Stunted or Stressed Plants (D1) (LRR A)
____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

____ Water Stained Leaves (B9) except MLRA 1,2,4A, and 4B)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Saturation Visible on Aerial Imagery (C9)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)
____ Raised Ant Mounds (D6) (LRR A)
____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________ Wetland Hydrology? ✓ / N
Water Table Present? Yes ____ No X Depth (inches) ________
Saturation Present? Yes ____ No X Depth (inches) ________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding.

North State Resources, Inc.

Data Point 26
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/23/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 1, T34N, R1E
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Convex Slope % 1
Subregion (LRR): MLRA 22B Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: Gasper-Scarface complex, moist, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ______
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ______
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

DP documents an upland area dominated by Carex sp.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: ______)	% Cover	Species?	Status
1. Carex sp. (NIF)	60	Y	FAC
2. Carex sp. (NIF)	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
50%= 40 20%= 16 Total Cover:	80		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 2 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks

Carex sp. assumed FAC. Dominant facultative vegetation present.

Data Point 26

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR 2.5/2	100					Loam	Gravely

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point 27
Feature Type Sesonal Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/17/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 3, T34N, R1E
Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none) Concave Slope % 1
Subregion (LRR): MLRA 22B Lat: 40.831029° Long: -121.847797° Datum: NAD83
Soil Map Unit Name: Toomes very rocky loam, 0 to 50 percent slopes NWI Classification: N/A
Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? Y ☑/N ☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width _____
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate _____
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents a seasonal wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Eleocharis acicularis	50	Y	OBL
2. Deschampsia danthonioides	20	Y	FACW
3. Juncus balticus	7	N	FAC
4. Bromus hordeaceus	2	N	FACU
5. Navarretia sp.	1	N	FAC--
6.			
7.			
8.			
50%= 40 20%= 16 Total Cover:	80		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust 20

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 2 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks
Dominant hydrophytic vegetation is present. Navarretia sp. assumed FAC due to presence of dominant hydrophytic species.

Data Point 27

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 5/1	80	5YR 3/4	20	C	PL	Loam	Clay
8-12	10YR 3/1	100					Loam	Clay

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ___ 2 cm Muck (A10)
- ___ Red Parent Materials (TF21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Vegetated Sand/Gravel Bars
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: N/A Depth (Inches) N/A Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F3 Depleted Matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present?	Yes ___	No X	Depth (inches) ___	Wetland Hydrology? ✓ / N
Water Table Present?	Yes ___	No X	Depth (inches) ___	
Saturation Present?	Yes ___	No X	Depth (inches) ___ *(includes capillary fringe)*	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Algal crust indicates long duration inundation and oxidized rhizospheres indicate long duration saturation.

North State Resources, Inc.

Data Point 28
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/17/17

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood Section, Township, Range Sec. 3, T34N, R1E

Landform (hillslope, terrace, etc.) Road cut Local relief (concave, convex, none) Convex Slope % 5

Subregion (LRR): MLRA 22B Lat: 40.831032° Long: -121.847810° Datum: NAD83

Soil Map Unit Name: Toomes very rocky loam, 0 to 50 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to DP27 seasonal wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus ponderosa	5	Y	UPL
2.			
3.			
4.			
50%= 2.5 20%= 1 Total Cover:	5		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Arctostaphylos patula	25	Y	UPL
2. Quercus garryana	10	Y	FACU
3.			
4.			
50%= 17.5 20%= 7 Total Cover:	35		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Elymus caput-medusae	35	Y	UPL
2. Bromus tectorum	5	N	UPL
3. Epilobium sp.	5	N	UNK
4. Unk sp.	5	N	UNK
5.			
6.			
7.			
8.			
50%= 45 20%= 18 Total Cover:	50		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 4 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

Dominate hydrophytic vegetation is not present.

Data Point 28

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					Loam	Clay

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: bedrock Depth (Inches) 8 Hydric Soil Present? Y / N X

Remarks

No indicators of hydric soils were observed. Paralithic bedrock encountered at 8 inches.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / N X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point 29
Feature Type Intermittent Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/17/17
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 3, T34N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 5
Subregion (LRR): MLRA 22B Lat: 40.831304° Long: -121.847573° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 2'
Feature Designation: Perennial ____ Intermittent ✓ Ephemeral ____ Blue-line on USGS Quad ____ Substrate Soil & Rock
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks

DP documents OHWM of an intermittent stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		
Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ___ 20%= ___ Total Cover:	0		
Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks

No veg scoured channel.

Data Point 29

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding.

North State Resources, Inc. now Stantec

Data Point: 30
Feature Type: Wetland Meadow

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind   City/County: Shasta County   Date: 10/24/17
Applicant/Owner: Avangrid   State: California
Investigator(s): Gabe Youngblood   Section, Township, Range: Sec. 8, T34N, R2E
Landform (hillslope, terrace, etc.): Shallow depression on terrace   Local relief (concave, convex, none): Concave   Slope %: 0
Subregion (LRR): MLRA 22B   Lat: 40.824316°   Long: -121.779911°   Datum: NAD83
Soil Map Unit Name: Gasper-Scarface complex, moist, 30 to 50 percent slopes   NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ (If no, explain in Remarks.)
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? (If needed, explain in Remarks.)

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? Y ☑/N ☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks: DP documents a wetland meadow in a shallow depression along the stream terrace for Hatchet Creek.

Vegetation (Use Scientific Names)

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: ____)			
1.			
2.			
3.			
4.			
50%=____ 20%=____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)			
1.			
2.			
3.			
4.			
50%=____ 20%=____ Total Cover:	0		
Herb Stratum (Plot Size: 5')			
1. Carex utriculata	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%=____ 20%=____ Total Cover:	100		
Woody/Vine Stratum (Plot Size: ____)			
1.			
2.			
50%=____ 20%=____ Total Cover:	0		

% Bare Ground in Herb Stratum: 0   % Cover of Biotic Crust: 50

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 1 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks: Dominant hydrophytic vegetation is present. Biotic crust present in sparsely vegetated portions of feature.

Data Point 30

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 2.5/2	100					Loam	Sandy
6-12	10YR 4/2	80	5YR4/6	20	C	PL	Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

Soils meet the requirements for indicator F3 Depleted Matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
✓ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
✓ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Algal crust indicates long duration inundation. Oxidized rhizospheres indicate long duration saturation.

North State Resources, Inc. now Stantec

Data Point: 31
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/24/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range: Sec. 8, T34N, R2E
Landform (hillslope, terrace, etc.): Stream terrace Local relief (concave, convex, none): Concave Slope %: 0
Subregion (LRR): MLRA 22B Lat: 40.824304° Long: -121.779913° Datum: NAD83
Soil Map Unit Name: Gasper-Scarface complex, moist, 30 to 50 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to Data Point 30 wet meadow.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Juncus sp.	60	Y	FAC*
2. Achillea millefolium	10	N	FACU
3. Drymocallis glandulosa	10	N	FAC
4. Unk grass	10	N	?
5.			
6.			
7.			
8.			
50%= 45 20%= 18 Total Cover:	90		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust ____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 1 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks

Juncus sp. assumed FAC or wetter due to species that are documented within the project as being FACW or OBL.

Data Point 31

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/2	100					Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / ~~N~~

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / ~~N~~
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 32
Feature Type Riparian Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/25/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 8, T34N, R2E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 3
Subregion (LRR): MLRA 22B Lat: 40.820561° Long: -121.778456° Datum: NAD83
Soil Map Unit Name: Jacksback loam, 2 to 9 percent slopes NWI Classification: R3USC

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width Variable
Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ✓ Substrate Bolder, cobbel, gravel, and sand
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks DP documents riparian wetlands along Hatchet Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus contorta	10	Y	FAC
2.			
3.			
4.			
50%= 5 20%= 2 Total Cover:	10		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Alnus incana	60	Y	FACW
2. Abies concolor	10	N	UPL
3. Spiraea douglasii	2	N	FACW
4. Acer circinatum (2%)/Populus tremuloides (2%)	4	N	FAC/FACU
50%= 38 20%= 15.2 Total Cover:	76		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Glyceria striata	10	Y	OBL
2. Stachys ajugoides	2	N	OBL
3. Heracleum maximum	2	N	FAC
4. Galium aparine	2	N	FACU
5. Scirpus microcarpus	2	N	OBL
6.			
7.			
8.			
50%= 9 20%= 3.6 Total Cover:	18		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 82 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 3 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by
OBL Species		x 1 = 0
FACW Species		x 2 = 0
FAC Species		x 3 = 0
FACU Species		x 4 = 0
UPL Species		x 5 = 0
Column Totals	0 (A)	0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] *Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Data Point 32

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	100					Sand	Silty
6-12	10YR 4/2	60	7.5YR4/6	40	C	PL	Sand	Silty

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ✓ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✗

Remarks

Soils meet the requirements for indicator S5 Sandy Redox.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ✓ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No ✗ Depth (inches) ________ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No ✗ Depth (inches) ________

Saturation Present? Yes ____ No ✗ Depth (inches) ________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding. Oxidized rhizospheres indicates long duration saturation.

North State Resources, Inc. now Stantec

Data Point 33
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/25/17
Applicant/Owner: Avangrid State: California
Investigator(s): John Holson Section, Township, Range Sec. 8, T34N, R2E
Landform (hillslope, terrace, etc.) Shallow Depression Local relief (concave, convex, none) Concave Slope % 0
Subregion (LRR): MLRA 22B Lat: 40.820556° Long: -121.778522° Datum: NAD83
Soil Map Unit Name: Jacksback loam, 2 to 9 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? Y ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Upland pair to DP32 riparian wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	30	Y	FACU
2. Abies concolor	20	Y	UPL
3. Pseudotsuga menziesii	20	Y	FACU
4.			
50%= 35 20%= 14 Total Cover:	70		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Abies concolor	15	Y	UPL
2. Alnus incana	3	N	FACW
3. Acer circinatum	2	N	FACU
4.			
50%= 10 20%= 4 Total Cover:	20		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Elymus glaucus	1	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= .5 20%= .2 Total Cover:	1		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)
Total number of dominant species across all strata: 5 (B)
Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks Hydrophytic vegetation in not dominant.

Data Point 33

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/3	100					Loam	Sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 34
Feature Type Seasonal wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 10/25/17
Applicant/Owner: Avangrid State: California
Investigator(s): John Holson Section, Township, Range Sec. 12, T34N, R1E
Landform (hillslope, terrace, etc.) Depresion Local relief (concave, convex, none) Concave Slope % 0
Subregion (LRR): MLRA 22B Lat: 40.815248° Long: -121.804622° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: PEM1C

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents an area in a wet meadow that appears to pond seasonally.

Vegetation (Use Scientific Names)

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ______ 20%= ______ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ______ 20%= ______ Total Cover:	0		
Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Eleocharis bella	40	Y	FACW
2. Eleocharis acicularis	35	Y	OBL
3. Carex utriculata	2	N	OBL
4. Ranunculus flammula	2	N	FACW
5. Rumex crispus	1	N	FAC
6. Uknown grass sp.	1	N	?
7.			
8.			
50%= 40.5 20%= 16.2 Total Cover:	81		
Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ______ 20%= ______ Total Cover:	0		

% Bare Ground in Herb Stratum 19 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 2 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Data Point 34

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	5YR 2/1	100					Loam	Clay
6-16	10YR 4/2	60	7.5YR4/6	40	C	PL	Clay	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F3 Depleted Matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ✓ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? Yes ____ No X Depth (inches) ________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding. Oxidized rhizospheres indicates long duration saturation.

North State Resources, Inc.

Data Point 35
Feature Type Wetland Meadow

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/29/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range Sec. 12, T34N, R1E
Landform (hillslope, terrace, etc.) Valley Local relief (concave, convex, none) None Slope % 0
Subregion (LRR): MLRA 22B Lat: 40.815335° Long: -121.804718° Datum: NAD 83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☐/☒
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

DP documents large wetland meadow at the headwaters of a tributary to the North Fork of Montgomery Creek.

Vegetation (Use Scientific Names)

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: ______)			
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Herb Stratum (Plot Size: 10 ft)	% Cover	Species?	Status
1. Helenium bigelovii	17	Y	FACW
2. Muhlenbergia filiformis	15	Y	FACW
3. Platanthera dilatata (10)/Phleum pratense (10)	20	Y	FACW/FAC
4. Prunella vulgaris	10	Y	FACU
5. Poa palustris	8	N	FAC
6. Symphyotrichum spathulatum (5)/Trifolium pratense (5)	10	N/N	FAC/FACU
7. Epilobium ciliatum (3)/Stachys ajugoides (2)	5	N/N	FACW/OBL
8. Danthonia californica (1)/Carex sp. (1)	2	N/N	FAC/FAC
50%= 43.5 20%= 17.4 Total Cover:	87		
Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 96 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 4 (A)
Total number of dominant species across all strata: 5 (B)
Percent of dominant species that are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominant hydrophytic vegetation is present. Carex assumed FAC.

Data Point 35

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/2	90	7.5YR 3/6	10	C	PL	SL	Sandy loam
10-16	10YR 2/1	10		2	C	PL	LC	Loamy clay

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (except MLRA 1) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Rock Depth (Inches) 10 Hydric Soil Present? ✓

Remarks

Soil meets the requirements for indicator F3 Depleted Matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) except MLRA 1,2,4A, and 4B)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (LRR A)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) except MLRA 1,2,4A, and 4B)
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (LRR A)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ______ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ______

Saturation Present? Yes ____ No X Depth (inches) ______ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Oxidized rhizosphers indicate long duration saturation.

North State Resources, Inc.

Data Point: 36
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind   City/County: Shasta County   Date: 8/29/18
Applicant/Owner: Avangrid   State: CA
Investigator(s): Gabe Youngblood, Alison Loveless   Section, Township, Range: Sec. 12, T34N, R1E
Landform (hillslope, terrace, etc.): Valley   Local relief (concave, convex, none): None   Slope %: 0
Subregion (LRR): MLRA 22B   Lat: 40.815378°   Long: -121.804743°   Datum: NAD 83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes   NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☐/☒
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ____ Scour ____ Ordinary High Water Mark Mapped ____ Stream Width ____
Feature Designation: Perennial ____ Intermittent ____ Ephemeral ____ Blue-line on USGS Quad ____ Substrate ____
Natural Drainage ____ Artificial Drainage ____ Navigable Water ____

Remarks Upland pair to Data Point 35 wet meadow.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: 10 ft)	% Cover	Species?	Status
1. Plantago lanceolata	10	Y	FACU
2. Cynosurus echinatus	5	Y	UPL
3. Acmispon americanus	5	Y	FACU
4. Trifolium pratense	5	Y	FACU
5. Carex sp.	5	Y	FAC--
6. Symphyotrichum spathulatum	2	N	FAC
7. Poa palustris	1	N	FAC
8. Phleum pratense	1	N	FAC
50%= 17 20%= 6.8 Total Cover:	34		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 96 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 5 (B)
Percent of dominant species that are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is not present. Carex assumed FAC.

Data Point 36

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / N X

Remarks

No soil pit edge of compacted dirt road.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) ________ Wetland Hydrology? Y / N X
Water Table Present? Yes _____ No X Depth (inches) ________
Saturation Present? Yes _____ No X Depth (inches) ________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 37
Feature Type Non-vegetated ditch

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/14/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 17, T34N, R1E
Landform (hillslope, terrace, etc.) Ditch Local relief (concave, convex, none) Convex Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.806354° Long: -121.880599° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 0 to 30 percent slopes NWI Classification: R5UBFx

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? Y ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 4'
Feature Designation: Perennial ✓ Intermittent ✓ Ephemeral _____ Blue-line on USGS Quad _____ Substrate Rock and soil
Natural Drainage _____ Artificial Drainage ✓ Navigable Water _____

Remarks DP documents an irrigation ditch that does not support hydrophytic vegetation.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: _____ (A)
Total number of dominant species across all strata: _____ (B)
Percent of dominant species that are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks No veg scoured channel.

Data Point 37

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- _____ Histosol (A1)
- _____ Histic Epipedon (A2)
- _____ Black Histic (A3)
- _____ Hydrogen Sulfide (A4)
- _____ Depleted Below Dark Surface (A11)
- _____ Thick Dark Surface (A12)
- _____ Sandy Mucky Mineral (S1)
- _____ Sandy Gleyed Matrix (S4)
- _____ Sandy Redox (S5)
- _____ Stripped Matrix (S6)
- _____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- _____ Loamy Gleyed Matrix (F2)
- _____ Depleted Matrix (F3)
- _____ Redox Dark Surface (F6)
- _____ Depleted Dark Surface (F7)
- _____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- _____ 2 cm Muck (A10)
- _____ Red Parent Materials (TF21)
- _____ Very Shallow Dark Surface (TF12)
- _____ Vegetated Sand/Gravel Bars
- _____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- _____ Surface Water (A1)
- _____ High Water Table (A2)
- _____ Saturation (A3)
- _____ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- _____ Algal Mat or Crust (B4)
- _____ Iron Deposits (B5)
- _____ Surface Soil Cracks (B6)
- _____ Inundation Visible on Aerial Imagery (B7)
- _____ Sparsely Vegetated Concave Surface (B8)
- _____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- _____ Salt Crust (B11)
- _____ Aquatic Invertebrates (B13)
- _____ Hydrogen Sulfide Odor (C1)
- _____ Oxidized Rhizospheres (C3)
- _____ Presence of Reduced Iron (C4)
- _____ Recent Iron Reduction in Tilled Soils (C6)
- _____ Stunted or Stressed Plants (D1) (**LRR A**)
- _____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Geomorphic Position (D2)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)
- _____ Raised Ant Mounds (D6) (**LRR A**)
- _____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) _____ Wetland Hydrology? ✓ / N

Water Table Present? Yes _____ No X Depth (inches) _____

Saturation Present? Yes _____ No X Depth (inches) _____ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Sediment and drift deposits indicate frequent flooding.

North State Resources, Inc. now Stantec

Data Point: 38
Feature Type: Vegetated ditch

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/14/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 17, T34N, R1E
Landform (hillslope, terrace, etc.) Ditch Local relief (concave, convex, none) Convex Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.806106° Long: -121.880605° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 0 to 30 percent slopes NWI Classification: R5UBFx

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 5'
Feature Designation: Perennial ___ Intermittent ✓ Ephemeral ___ Blue-line on USGS Quad ✓ Substrate soil and gravel
Natural Drainage ___ Artificial Drainage ✓ Navigable Water ___

Remarks DP documents an irrigation ditch that supports hydrophytic vegetation.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Scirpus microcarpus	40	Y	OBL
2. Symphyotrichum spathulatum	10	N	FAC
3. Epilobium ciliatum	5	N	FACW
4. Prunella vulgaris	2	N	FACU
5. Heracleum maximum	2	N	FAC
6. Ludwigia palustris	1	N	OBL
7.			
8.			
50%= 30 20%= 12 Total Cover:	60		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 1 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Data Point 38

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/2	98	5YR 3/4	2	C	PL	Loam	gravelly

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
✓ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: bedrock Depth (Inches) 10 Hydric Soil Present? ✓

Remarks

Soil meets the requirements for indicator F6 Redox Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No _____ Depth (inches) 2 Wetland Hydrology? ✓ / N
Water Table Present? Yes ✓ No _____ Depth (inches) Surface
Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water provides wetland hydrology.

North State Resources, Inc. now Stantec

Data Point 39
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/14/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 17, T34N, R1E
Landform (hillslope, terrace, etc.) Ditch Local relief (concave, convex, none) Convex Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.806105° Long: -121.880566° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 0 to 30 percent slopes NWI Classification: R5UBFx

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ___________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ___________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Upland pair to DP38 vegetated ditch.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus ponderosa	20	Y	FACU
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	20		

Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1. Salix lasiolepis	5	Y	FACW
2. Ceanothus integerrimus	2	Y	UPL
3.			
4.			
50%= 3.5 20%= 1.4 Total Cover:	7		

Herb Stratum (Plot Size: ______)	% Cover	Species?	Status
1. Pteridium aquilinum	5	Y	FACU
2. Elymus glaucus	3	Y	FACU
3. Hypericum perforatum	1	N	FACU
4. Acmispon americanus	1	N	FACU
5.			
6.			
7.			
8.			
50%= 5 20%= 2 Total Cover:	10		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 5 (B)
Percent of dominant species that are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks Dominant hydrophytic vegetation is not present.

Data Point 39

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 3/2	100					Loam	sandy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 40
Feature Type Riparian Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/6/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 13, T34N, R1E
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Convex Slope % 5
Subregion (LRR): MLRA 22B Lat: 40.795593° Long: -121.810125° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: PSSC

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

DP documents a riparian wetland on a slope adjacent to the North Fork of Montgomery Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15')	**% Cover**	**Species?**	**Status**
1. Alnus incana	40	Y	FACW
2. Spiraea douglasii	5	N	FACW
3. Acer circinatum	5	N	FAC
4. Calocedrus decurrens	5	N	UPL
50%= 22.5 20%= 11 Total Cover:	55		
Herb Stratum (Plot Size: 5')	**% Cover**	**Species?**	**Status**
1. Athyrium filix-femina	8	Y	FAC
2. Carex sp.	5	Y	FAC
3. Senecio triangularis	2	N	FACW
4.			
5.			
6.			
7.			
8.			
50%= 7.5 20%= 3 Total Cover:	15		
Woody/Vine Stratum (Plot Size: ______)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 3 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominant hydrophytic vegetation is present. Carex assumed facultative as it occurs in both wetland and adjacent uplands.

Data Point 40

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/2	100					Loam	Muck
								High organic content with greasy
								feel when rubbed between fingers

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ✓ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ___ 2 cm Muck (A10)
- ___ Red Parent Materials (TF21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Vegetated Sand/Gravel Bars
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Rock Depth (Inches) 12 Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F1 Loamy Mucky Mineral.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___ Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ___ Depth (inches) 8

Saturation Present? Yes ✓ No ___ Depth (inches) 6 *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation and high water table provide wetland hydrology.

North State Resources, Inc. now Stantec

Data Point 41
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/6/17

Applicant/Owner: Avangrid State: California

Investigator(s): Gabe Youngblood Section, Township, Range Sec. 13, T34N, R1E

Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Convex Slope % 5

Subregion (LRR): MLRA 22B Lat: 40.795574° Long: -121.810151° Datum: NAD 83

Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Upland pair to DP40 riparian wetland adjacent to the North Fork of Montgomery Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	40	Y	FACU
2. Abies concolor	30	Y	UPL
3. Calocedrus decurrens	10	N	UPL
4.			
50%= 40 20%= 16 Total Cover:	80		
Sapling/Shrub Stratum (Plot Size: 15')	**% Cover**	**Species?**	**Status**
1. Calocedrus decurrens	10	Y	UPL
2.			
3.			
4.			
50%= 5 20%= 2 Total Cover:	10		
Herb Stratum (Plot Size: 5')	**% Cover**	**Species?**	**Status**
1. Carex sp.	10	Y	FAC
2. Pteridium aquilinum	5	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
50%= 7.5 20%= 3 Total Cover:	15		
Woody/Vine Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 5 (B)

Percent of dominant species that are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks
Dominant hydrophytic vegetation is not present. Carex assumed facultative as it occurs in both wetland and adjacent uplands.

Data Point 41

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	2.5YR 3/4	100					Loam	Gravelly

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 42
Feature Type Perennial Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/7/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 23, T34N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Convex Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.790275° Long: -121.833337° Datum: NAD83
Soil Map Unit Name: Lyonsville-Jiggs complex, deep, 10 to 50 percent slopes NWI Classification: R5UB

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 8'
Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ✓ Substrate Cobble, gravel, sand
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks

DP documents ordinary high water mark of Cedar Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ___ 20%= ___ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ___ (A)
Total number of dominant species across all strata: ___ (B)
Percent of dominant species that are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is $\leq$ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks

No veg scoured channel.

Data Point 42

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No _____ Depth (inches) 2 Wetland Hydrology? ✓ / N
Water Table Present? Yes ✓ No _____ Depth (inches) Surface
Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water provides wetland hydrology.

North State Resources, Inc.

Data Point: 43
Feature Type: Riparian wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/28/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 23, T34N, R1E
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope %: 3
Subregion (LRR): MLRA 22B Lat: 40.790273° Long: -121.833322° Datum: NAD 83
Soil Map Unit Name: Lyonsville-Jiggs complex, deep, 10 to 50 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☑/☐, soil ☑/☐, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ___ Ordinary High Water Mark Mapped ✓ Stream Width: Variable
Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ___ Substrate: Vegetated
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks: DP documents riparian wetland associated with Cedar Creek. Vegetation and soils were disturbed from the recent replacement of the culvert with a bridge.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Juncus sp. (NIF)	2	Y	FAC+
2. Grass NIF (Glyceria?)	2	Y	FAC+
3.			
4.			
5.			
6.			
7.			
8.			
50%= 2 20%= .8 Total Cover:	4		

Woody/Vine Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 96 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 1 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by
OBL Species		x 1 = 0
FACW Species		x 2 = 0
FAC Species		x 3 = 0
FACU Species		x 4 = 0
UPL Species		x 5 = 0
Column Totals	0 (A)	0 (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks: Vegetation was disturbed during recent bridge installation. Sparse re-sprouting species appear to be hydrophytic vegetation.

Data Point 43

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 4/1	90	5YR 3/6	10	C	M	LS	Loamy sand
10+	Rock							

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Rock Depth (Inches) 10 Hydric Soil Present? ✓

Remarks

Soils disturbed during bridge installation, but meet requirements for indicator F3 Depleted Matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ______ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ______

Saturation Present? Yes ✓ No ____ Depth (inches) 4 *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation at 4 inches provides wetland hydrology.

North State Resources, Inc.

Data Point 44
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/28/18

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range Sec. 23, T34N, R1E

Landform (hillslope, terrace, etc.) Floodplain Local relief (concave, convex, none) Concave Slope % 3

Subregion (LRR): MLRA 22B Lat: 40.790260° Long: -121.833322° Datum: NAD 83

Soil Map Unit Name: Lyonsville-Jiggs complex, deep, 10 to 50 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☑/☐, soil ☑/☐, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☐/☒

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ____ Scour ____ Ordinary High Water Mark Mapped ____ Stream Width ____

Feature Designation: Perennial ____ Intermittent ____ Ephemeral ____ Blue-line on USGS Quad ____ Substrate ____

Natural Drainage ____ Artificial Drainage ____ Navigable Water ____

Remarks Upland pair to DP43 riparian wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Herb Stratum (Plot Size: 5)	**% Cover**	**Species?**	**Status**
1. Pteridium aquilinum	1	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= .5 20%= .2 Total Cover:	1		
Woody/Vine Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 96 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks Vegetation was disturbed during recent bridge installation. Upland point is on a newly installed gravel pad.

Data Point 44

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soil pit. Upland point is on a newly installed gravel pad.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / N X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 45
Feature Type Wetland Seep/Spring

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/7/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 23, T34N, R1E
Landform (hillslope, terrace, etc.) depresion Local relief (concave, convex, none) Concave Slope % 2
Subregion (LRR): MLRA 22B Lat: 40.791752° Long: -121.819750° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 0 to 30 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ____________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ____________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

DP documents a wetland seep/spring in a shallow depression along a road cut.

Vegetation (Use Scientific Names)

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: ________)			
1.			
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ________)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		
Herb Stratum (Plot Size: ________)	% Cover	Species?	Status
1. Juncus balticus	30	Y	FACW
2. Carex sp.	20	Y	FAC
3. Prunella vulgaris	20	Y	FACU
4. Epilobium ciliatum	10	N	FACW
5. Stachys ajugoides	5	N	OBL
6. Galium triflorum	5	N	FACU
7. Trifolium repens	5	N	FAC
8. Juncus nevadensis(3%)/Sceptridium multifidum(2%)	5	N	FACW/FAC
50%= 50 20%= 20 Total Cover:	100		
Woody/Vine Stratum (Plot Size: ________)	% Cover	Species?	Status
1.			
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominant hydrophytic vegetation is present. Carex sp. assumed facultative.

Data Point 45

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 5/2	78	10YR 6/1	20	D	M	Loam	Gravelly
			10YR 3/4	2	C	PL		
5-8	10YR 4/2	98	10 YR 5/6	2	C	PL	Loam	Gravelly

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Rock Depth (Inches) 8 Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F3 Depleted Matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ✓ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ____

Saturation Present? Yes ____ No X Depth (inches) ____ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Hydrology is indicated by geomorphic position, drainage patterns, and veg meeting the FAC-neutral test.

North State Resources, Inc. now Stantec

Data Point: 46
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/7/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range: Sec. 23, T34N, R1E
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope %: 5
Subregion (LRR): MLRA 22B Lat: 40.791769° Long: -121.819793° Datum: NAD 83
Soil Map Unit Name: Cohasset stony loam, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑ Y / ☐ N *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to DP45 wetland seep/spring along a road cut.

Vegetation (Use Scientific Names)

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: ____)			
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)			
1. Calocedrus decurrens	5	Y	UPL
2. Abies concolor	5	Y	UPL
3.			
4.			
50%= 5 20%= 2 Total Cover:	10		
Herb Stratum (Plot Size: ____)			
1. Pteridium aquilinum	5	Y	FACU
2. Lotus sp.	5	Y	FACU
3. Elymus glaucus	2	N	FACU
4.			
5.			
6.			
7.			
8.			
50%= 6 20%= 2.4 Total Cover:	12		
Woody/Vine Stratum (Plot Size: ____)			
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)
Total number of dominant species across all strata: 4 (B)
Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks

Dominant hydrophytic vegetation is not present. Lotus assumed facultative upland due to presence of other upland species.

Data Point 46

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/3	100					Loam	Gravelly

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / ~~N~~

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) _____ Wetland Hydrology? Y / ~~N~~
Water Table Present? Yes _____ No X Depth (inches) _____
Saturation Present? Yes _____ No X Depth (inches) _____ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 47
Feature Type Ephemeral stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/7/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 23, T34N, R1E
Landform (hillslope, terrace, etc.) Draianage Local relief (concave, convex, none) Concave Slope % 10
Subregion (LRR): MLRA 22B Lat: 40.791707° Long: -121.822774° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 0 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 3-5'
Feature Designation: Perennial ____ Intermittent ____ Ephemeral ✓ Blue-line on USGS Quad ____ Substrate Rock and Soil
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks DP document OHWM of an ephemeral stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ____ 20%= ____ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks No Veg scoured channel.

Data Point 47

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? X

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding.

North State Resources, Inc. now Stantec

Data Point 48
Feature Type Intermittent Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/17/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe youngblood Section, Township, Range Sec. 27, T34N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 3
Subregion (LRR): MLRA 22B Lat: 40.778821° Long: -121.842353° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 2'
Feature Designation: Perennial _____ Intermittent ✓ Ephemeral _____ Blue-line on USGS Quad _____ Substrate Gravel & Rock
Natural Drainage ✓ Artificial Drainage _____ Navigable Water _____

Remarks
DP Documents the OHWM of an intermittent stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test Worksheet
Number of dominant species that are OBL, FACW, or FAC: ________ (A)
Total number of dominant species across all strata: ________ (B)
Percent of dominant species that are OBL, FACW, or FAC: ________ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators
_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks
No vegetation present scoured channel.

Data Point 48

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✗

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No _____ Depth (inches) 2 Wetland Hydrology? ✓ / N
Water Table Present? Yes ✓ No _____ Depth (inches) Surface
Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water from snow melt and ground water provides wetland hydrology.

North State Resources, Inc. now Stantec

Data Point 49
Feature Type Ephemeral Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/17/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe youngblood Section, Township, Range Sec. 27, T34N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 3
Subregion (LRR): MLRA 22B Lat: 40.778837° Long: -121.841812° Datum: NAD83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ____ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 4'
Feature Designation: Perennial ____ Intermittent ____ Ephemeral ✓ Blue-line on USGS Quad ____ Substrate Gravel
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks

DP documents the OHWM of an ephemeral stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☒

Remarks

No vegetation present scoured channel.

Data Point 49

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✗

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
✓ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No _____ Depth (inches) 1 Wetland Hydrology? ✓ / N
Water Table Present? Yes ✓ No _____ Depth (inches) Surface
Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water from snow melt provides wetland hydrology.

North State Resources, Inc. now Stantec

Data Point: 50
Feature Type: Non-Vegetated Ditch

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/17/17

Applicant/Owner: Avangrid State: California

Investigator(s): Gabe youngblood Section, Township, Range Sec. 27, T34N, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 2

Subregion (LRR): MLRA 22B Lat: 40.778781° Long: -121.841876° Datum: NAD83

Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 3'

Feature Designation: Perennial _____ Intermittent _____ Ephemeral ✓ Blue-line on USGS Quad _____ Substrate Soil and gravel

Natural Drainage _____ Artificial Drainage ✓ Navigable Water _____

Remarks

DP Documents the a non-vegetated ditch which conveys water along the side of a road from the ephemeral stream documented by DP49 to the intermittent stream documented by DP48.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ________ (A)

Total number of dominant species across all strata: ________ (B)

Percent of dominant species that are OBL, FACW, or FAC: ________ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

No vegetation present scoured channel.

Data Point 50

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- _____ Histosol (A1)
- _____ Histic Epipedon (A2)
- _____ Black Histic (A3)
- _____ Hydrogen Sulfide (A4)
- _____ Depleted Below Dark Surface (A11)
- _____ Thick Dark Surface (A12)
- _____ Sandy Mucky Mineral (S1)
- _____ Sandy Gleyed Matrix (S4)
- _____ Sandy Redox (S5)
- _____ Stripped Matrix (S6)
- _____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- _____ Loamy Gleyed Matrix (F2)
- _____ Depleted Matrix (F3)
- _____ Redox Dark Surface (F6)
- _____ Depleted Dark Surface (F7)
- _____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- _____ 2 cm Muck (A10)
- _____ Red Parent Materials (TF21)
- _____ Very Shallow Dark Surface (TF12)
- _____ Vegetated Sand/Gravel Bars
- _____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ________ Depth (Inches) ______ Hydric Soil Present? /X

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- _____ Water Marks (B1)
- _____ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- _____ Algal Mat or Crust (B4)
- _____ Iron Deposits (B5)
- _____ Surface Soil Cracks (B6)
- _____ Inundation Visible on Aerial Imagery (B7)
- _____ Sparsely Vegetated Concave Surface (B8)
- _____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
- _____ Salt Crust (B11)
- _____ Aquatic Invertebrates (B13)
- _____ Hydrogen Sulfide Odor (C1)
- _____ Oxidized Rhizospheres (C3)
- _____ Presence of Reduced Iron (C4)
- _____ Recent Iron Reduction in Tilled Soils (C6)
- _____ Stunted or Stressed Plants (D1) (**LRR A**)
- _____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B**)
- _____ Drainage Patterns (B10)
- _____ Dry-Season Water Table (C2)
- _____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)
- _____ Raised Ant Mounds (D6) (**LRR A**)
- _____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No _____ Depth (inches) 1

Water Table Present? Yes ✓ No _____ Depth (inches) Surface

Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Wetland Hydrology? ✓ / N

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water from snow melt provides wetland hydrology.

North State Resources, Inc. now Stantec

Data Point 51
Feature Type Riparian wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/28/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 33, T34N, R1E
Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none) Concave Slope % 1
Subregion (LRR): MLRA 22B Lat: 40.761519° Long: -121.870985° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 30 to 50 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ______
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ______
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents a riparian wetland in a slight depression.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	40	Y	FACW
2.			
3.			
4.			
50%= 20 20%= 8 Total Cover:	40		

Sapling/Shrub Stratum (Plot Size: 15' radius)	% Cover	Species?	Status
1. Abies concolor	3	Y	UPL
2. Rubus leucodermis	3	Y	FACU
3.			
4.			
50%= 3 20%= 1.2 Total Cover:	6		

Herb Stratum (Plot Size: 5' Radius)	% Cover	Species?	Status
1. Panicum acuminatum	3	Y	FAC
2. Sceptridium multifidum	2	Y	FAC
3. Smilax californica	2	Y	UPL
4.			
5.			
6.			
7.			
8.			
50%= 3.5 20%= 1.4 Total Cover:	7		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 93 % Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 3 (A)
Total number of dominant species across all strata: 6 (B)
Percent of dominant species that are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species	40	x 2 =	80
FAC Species	6	x 3 =	18
FACU Species	3	x 4 =	12
UPL Species	5	x 5 =	25
Column Totals	54	(A)	135 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
✓ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks Hydrophytic vegetation is present within the feature.

Data Point 51

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 4/2	80	7.5YR 4/6	20	C	PL	Loam	Clay

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: None Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F3 Depleted Matrix.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ________

Saturation Present? Yes ____ No X Depth (inches) ________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Oxidized rhizospheres indicate long duration saturation.

North State Resources, Inc. now Stantec

Data Point: 52
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind   City/County: Shasta County   Date: 11/28/17

Applicant/Owner: Avangrid   State: California

Investigator(s): Gabe Youngblood   Section, Township, Range: Sec. 33, T34N, R1E

Landform (hillslope, terrace, etc.): Hillslope   Local relief (concave, convex, none): convex   Slope %: 1

Subregion (LRR): MLRA 22B   Lat: 40.761554°   Long: -121.870946°   Datum: NAD83

Soil Map Unit Name: Cohasset stony loam, 30 to 50 percent slopes   NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width _____

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate _____

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to DP 51 riparian wetland.

Vegetation (Use Scientific Names)

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: 30')			
1. Calocedrus decurrens	30	Y	UPL
2. Pinus ponderosa	5	N	FACU
3. Acer macrophyllum	5	N	FACU
4.			
50%= 20 20%= 8 Total Cover:	40		
Sapling/Shrub Stratum (Plot Size: 15')			
1. Acer macrophyllum	40	Y	UPL
2. Abies concolor	15	Y	FACU
3. Rubus leucodermis	10	N	FACU
4. Calocedrus decurrens	2	N	UPL
50%= 33.5 20%= 13.4 Total Cover:	67		
Herb Stratum (Plot Size: 5')			
1. Sceptridium multifidum	5	Y	FAC
2. Smilax californica	3	Y	UPL
3. Carex brainerdii	2	Y	UPL
4.			
5.			
6.			
7.			
8.			
50%= 5 20%= 2 Total Cover:	10		
Woody/Vine Stratum (Plot Size: ____)			
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 90 %   Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 6 (B)

Percent of dominant species that are OBL, FACW, or FAC: 17 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation

_____ Dominance Test is >50%

_____ Prevalence Index is ≤ 3.0[1]

_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

_____ Wetland Non-Vascular Plants[1]

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

Dominate hydrophytic vegetation is not present.

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 2.5/2	100					Loam	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: None Depth (Inches) ______ Hydric Soil Present? X

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / X
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 53
Feature Type Wetland Seep/Spring

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/28/17

Applicant/Owner: Avangrid State: California

Investigator(s): Gabe Youngblood Section, Township, Range Sec. 33, T34N, R1E

Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Convex Slope % 30

Subregion (LRR): MLRA 22B Lat: 40.758415° Long: -121.867163° Datum: NAD83

Soil Map Unit Name: Lyonsville-Jiggs soils, 50 to 70 percent slopes NWI Classification: PSSC

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width _____

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate _____

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents a wetland seep spring near the toe of a hillslope.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rhombifolia	35	Y	FACW
2. Taxus brevifolia	20	Y	FACU
3.			
4.			
50%= 22.5 20%= 11 Total Cover:	55		
Sapling/Shrub Stratum (Plot Size: 15' radius)	**% Cover**	**Species?**	**Status**
1. Acer circinatum	30	Y	FAC
2.			
3.			
4.			
50%= 15 20%= 6 Total Cover:	30		
Herb Stratum (Plot Size: 5' Radius)	**% Cover**	**Species?**	**Status**
1. Maianthemum racemosum	30	Y	FAC
2. Athyrium filix-femina	5	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
50%= 17.5 20%= 7 Total Cover:	35		
Woody/Vine Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 3 (A)

Total number of dominant species across all strata: 4 (B)

Percent of dominant species that are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Muck	Loamy

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ✓ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ___ 2 cm Muck (A10)
- ___ Red Parent Materials (TF21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Vegetated Sand/Gravel Bars
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: 8 Depth (Inches) rock Hydric Soil Present? ✓

Remarks

Soils meet the requirements for indicator F1 Loamy Mucky Mineral.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) ___ Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ___ Depth (inches) 8

Saturation Present? Yes ✓ No ___ Depth (inches) 4 *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturation at 4 inches and a water table at 8 inches provides hydrology.

North State Resources, Inc. now Stantec

Data Point 54
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/28/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 33, T34N, R1E
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) convex Slope % 1
Subregion (LRR): MLRA 22B Lat: 40.758391° Long: -121.867118° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 30 to 50 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to DP 53 wetland seep/spring.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rhombifolia	15	Y	FACW
2. Calocedrus decurrens	15	Y	UPL
3. Taxus brevifolia	5	N	FACU
4.			
50%= 17.5 20%= 7 Total Cover:	35		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 33.5 20%= 13.4 Total Cover:	0		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Maianthemum racemosum	30	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 15 20%= 6 Total Cover:	30		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust _____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominate hydrophytic vegetation is present.

Data Point 54

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Peat	Corse organic
6-16	10 YR 2/2	100					Loam	Sandy gravely

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: None Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 55
Feature Type Riparian wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/28/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 33, T34N, R1E
Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none) Concave Slope % 1
Subregion (LRR): MLRA 22B Lat: 40.759497° Long: 40.759497° Datum: NAD83
Soil Map Unit Name: Cohasset stony loam, 30 to 50 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width ____
Feature Designation: Perennial ✓ Intermittent ____ Ephemeral ____ Blue-line on USGS Quad ✓ Substrate cobble, gravel, sand
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks DP documents a riparian wetland within the OHWM of Little Cow Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer macrophyllum	20	Y	FACU
2. Alnus rhombifolia	5	Y	FACW
3.			
4.			
50%= 12.5 20%= 5 Total Cover:	25		

Sapling/Shrub Stratum (Plot Size: 15')	% Cover	Species?	Status
1. Acer macrophyllum	25	Y	FACU
2. Alnus rhombifolia	10	Y	FACW
3. Acer circinatum	10	Y	FAC
4. Abies concolor (3)/Pseudotsuga menziesii (2)	5	N	UPL/FACU
50%= 25 20%= 10 Total Cover:	50		

Herb Stratum (Plot Size: 5')	% Cover	Species?	Status
1. Heracleum maximum	1	Y	FAC
2. UNK grass	1	Y	?
3.			
4.			
5.			
6.			
7.			
8.			
50%= 1 20%= .4 Total Cover:	2		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 98 % Cover of Biotic Crust ____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 4 (A)
Total number of dominant species across all strata: 7 (B)
Percent of dominant species that are OBL, FACW, or FAC: 57 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present within the floodplain of Little Cow Creek. Main channel is scoured with no vegetation.

Data Point 55

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ___ 2 cm Muck (A10)
- ___ Red Parent Materials (TF21)
- ___ Very Shallow Dark Surface (TF12)
- ✓ Vegetated Sand/Gravel Bars
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ___________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

No soil pit vegetated sand/gravel bar.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ________ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No ____ Depth (inches) ________

Saturation Present? Yes ____ No ____ Depth (inches) ________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding. Water was present in the scoured channel but not on the vegetated floodplain.

North State Resources, Inc. now Stantec

Data Point 56
Feature Type Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 11/28/17
Applicant/Owner: Avangrid State: California
Investigator(s): Gabe Youngblood Section, Township, Range Sec. 33, T34N, R1E
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) convex Slope % 20
Subregion (LRR): MLRA 22B Lat: 40.759456° Long: -121.867278° Datum: NAD83
Soil Map Unit Name: Lyonsville-Jiggs soils, 50 to 70 percent slopes NWI Classification: None

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width ______
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate ______
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks

Upland pair to DP 55 wetland seep/spring.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15')	**% Cover**	**Species?**	**Status**
1. Corylus cornuta	15	Y	FACU
2. Acer macrophyllum	5	N	FACU
3. Acer circinatum	5	N	FAC
4. Pseudotsuga menziesii (3)/Abies concolor (2)	5	N	FACU/FAC
50%= 15 20%= 6 Total Cover:	30		
Herb Stratum (Plot Size: 5')	**% Cover**	**Species?**	**Status**
1. Rubus parviflorus	20	Y	FACU
2. Agrostis pallens	10	Y	UPL
3. Galium triflorum	1	N	FACU
4.			
5.			
6.			
7.			
8.			
50%= 15.5 20%= 6.2 Total Cover:	31		
Woody/Vine Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 69 % Cover of Biotic Crust ____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks

Dominate hydrophytic vegetation is not present.

Data Point 56

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loam	Gravelly

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: None Depth (Inches) ______ Hydric Soil Present? Y / X

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? Y / ~~N~~
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 57
Feature Type: Riparian Wetland

Project/Site: Fountain Wind City/County: Shasta County Date: 8/13/18

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 1, T34N, R1E

Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Convex Slope %: 5

Subregion (LRR): MLRA 22B Lat: -121.816888° Long: 40.833953° Datum: NAD 83

Soil Map Unit Name: Gasper-Scarface complex, moist, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☑/☐ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 10'

Feature Designation: Perennial ✓ Intermittent ____ Ephemeral ____ Blue-line on USGS Quad ____ Substrate Vegetated

Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks

DP documents riparian wetlands within a perennial stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15)	**% Cover**	**Species?**	**Status**
1. Salix scouleriana	40	Y	FAC
2. Salix lasiandra	40	Y	FACW
3. Alnus incana	10	N	FACW
4. Cornus sericea	5	N	FACW
50%= 47.5 20%= 19 Total Cover:	95		
Herb Stratum (Plot Size: 5)	**% Cover**	**Species?**	**Status**
1. Glyceria striata	3	Y	OBL
2. Viola glabella	2	Y	FACW
3. Symphyotrichum spathulatum	2	Y	FAC
4. Lilium pardalinum	2	Y	FACW
5. Galium aparine	1	N	FACU
6.			
7.			
8.			
50%= 5 20%= 2 Total Cover:	10		
Woody/Vine Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 6 (A)

Total number of dominant species across all strata: 6 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

- ____ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominant hydrophytic vegetation is present.

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
__✓__ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

Scoured channel no soil pit, vegetated sand gravel bar.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

__✓__ Surface Water (A1)
__✓__ High Water Table (A2)
__✓__ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
__✓__ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
__✓__ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
__✓__ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No _____ Depth (inches) 1 Wetland Hydrology? ✓ / N
Water Table Present? Yes ✓ No _____ Depth (inches) Surface
Saturation Present? Yes ✓ No _____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Water present in channel. Drift deposits at data point indicate frequent flooding.

North State Resources, Inc.

Data Point	58
Feature Type	Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/13/18

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range Sec. 1, T34N, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Convex Slope % 5

Subregion (LRR): MLRA 22B Lat: 40.833976° Long: -121.816855° Datum: NAD 83

Soil Map Unit Name: Gasper-Scarface complex, moist, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☑/☐ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑ ☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? Y☑N☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 10'

Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ___ Substrate Vegetated

Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks

Upland pair point.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Calocedrus decurrens	30	Y	UPL
2. Salix scouleriana	30	Y	FAC
3. Salix lasiandra	10	N	FACW
4.			
50%= 35 20%= 14 Total Cover:	70		

Sapling/Shrub Stratum (Plot Size:)	% Cover	Species?	Status
1. Ribes roezlii	5	Y	UPL
2.			
3.			
4.			
50%= 2.5 20%= 1 Total Cover:	5		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Pteridium aquilinum	15	Y	FACU
2. Lysimachia latifolia	10	Y	FACU
3. Galium aparine	2	N	FACU
4.			
5.			
6.			
7.			
8.			
50%= 13.5 20%= 5.4 Total Cover:	27		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 73 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 5 (B)

Percent of dominant species that are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks

Dominant hydrophytic vegetation is not present.

Data Point 58

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2							O	Leaf litter/roots
7-12	7.5YR 2.5/3	100					SL	Sandy loam

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
__✓__ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: n/a Depth (Inches) ______ Hydric Soil Present? ✓ /

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No __X__ Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No __X__ Depth (inches) __________
Saturation Present? Yes _____ No __X__ Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point: 59
Feature Type: Wetland Seep/Spring

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/13/18

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 1, T34N, R1E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope %: 5

Subregion (LRR): MLRA 22B Lat: 40.837787° Long: -121.818807° Datum: NAD 83

Soil Map Unit Name: Gasper-Scarface complex, moist, 30 to 50 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks DP documents riparian wetlands within a perennial stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Muhlenbergia filiformis	20	Y	FACW
2. Carex sp.	10	Y	FAC
3. Leucanthemum vulgare	2	N	FACU
4. Holcus lanatus	2	N	FAC
5. Equisetum arvense	2	N	FAC
6. Prunella vulgaris	2	N	FACU
7. Epilobium sp.	1	N	FAC
8. Verbena lasiostachys	1	N	FAC
50%= 20 20%= 8 Total Cover:	40		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤ 3.0[1]
- ___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present. Carex sp. and Epilobium sp. are assumed FAC due to presence of other hydrophytic vegetation..

Data Point 59

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 2.5/2	100					SL	Sandy Loam high organic
2-8	10YR 2/1	80	7.5YR 3/3	20	C	M	C	Clay
8-12	10YR 3/1	70	10YR 5/4	30	C	M	C	Clay

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)

_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
✓ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✓

Remarks

Soils meet the requirements of indicator F6 Redox Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
✓ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No X Depth (inches) __________
Saturation Present? Yes _____ No X Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Oxidized rhizospheres indicate long duration saturation.

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 60
Feature Type: Upland

Project/Site: Fountain Wind   City/County: Shasta County   Date: 8/13/18

Applicant/Owner: Avangrid   State: CA

Investigator(s): Gabe Youngblood, Alison Loveless   Section, Township, Range: Sec. 1, T34N, R1E

Landform (hillslope, terrace, etc.): Hillslope   Local relief (concave, convex, none): Convex   Slope %: 5

Subregion (LRR): MLRA 22B   Lat: 40.837806°   Long: -121.818803°   Datum: NAD 83

Soil Map Unit Name: Gasper-Scarface complex, moist, 30 to 50 percent slopes   NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks: Data point documents upland condition on the edge of a meadow.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	5	Y	FACU
2. Pinus ponderosa	5	Y	FACU
3.			
4.			
50%= 5 20%= 2 Total Cover:	10		

Sapling/Shrub Stratum (Plot Size: 15)	% Cover	Species?	Status
1. Arctostaphylos patula	5	Y	UPL
2. Salix scouleriana	2	Y	FAC
3. Ceanothus integerrimus	2	Y	UPL
4. Rubus armeniacus	1	N	FAC
50%= 5 20%= 2 Total Cover:	10		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Leucanthemum vulgare	15	Y	FACU
2. Symphyotrichum spathulatum	5	Y	FAC
3. Sidalcea gigantea	5	Y	UPL
4. Prunella vulgaris	4	N	FACU
5. Holcus lanatus	2	N	FAC
6. Hypericum perforatum	2	N	FACU
7. Carex sp.	1	N	FAC
8. Elymus glaucus	1	N	FACU
50%= 17.5 20%= 7 Total Cover:	35		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 8 (B)

Percent of dominant species that are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks: Dominant hydrophytic vegetation is not present. Carex sp. assumed to be FAC due to presence of other FAC species.

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					SL	Sandy loam
4-6	7.5YR 3/2	80	10YR 3/4	20	C	PL	SL	Sandy loam
6-7	10YR 2/1	100					L	Loam
7-12	7.5YR 3/1	95	10YR 3/4	5	C	PL	CL	Clay loam

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ✓ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: n/a Depth (Inches) ____ Hydric Soil Present? ✓

Remarks

Soils meet the requirements of indicator F6 Redox Dark Surface.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) ____ Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) ____

Saturation Present? Yes ____ No X Depth (inches) ____ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Oxidized rhizospheres begin at 4 inches and indicate long duration saturation.

North State Resources, Inc.

Data Point: 61
Feature Type: Fresh emergent wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/15/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 36, T35N, R1E
Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope %: 1
Subregion (LRR): MLRA 22B Lat: 40.840497° Long: -121.821042° Datum: NAD 83
Soil Map Unit Name: Gasper-Scarface complex, moist, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour _____ Ordinary High Water Mark Mapped ✓ Stream Width: Variable
Feature Designation: Perennial ✓ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate: Vegetated
Natural Drainage ✓ Artificial Drainage _____ Navigable Water _____

Remarks Data point documents a perennial stream with wetland vegetation throughout the channel.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		
Herb Stratum (Plot Size: 5)	**% Cover**	**Species?**	**Status**
1. Veronica americana	20	Y	OBL
2. Equisetum arvense	5	N	FAC
3. Scirpus microcarpus	5	N	OBL
4.			
5.			
6.			
7.			
8.			
50%= 15 20%= 6 Total Cover:	30		
Woody/Vine Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)
Total number of dominant species across all strata: 1 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

- ____ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Data Point 61

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					MS	Mucky sand

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ✓ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ✓ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Rock Depth (Inches) 2 Hydric Soil Present? ✓

Remarks

Soil consists of root mat with fine organic (muck) and sand. Meets indicator S1 Sandy Mucky Mineral.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ✓ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No ____ Depth (inches) 1 Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ____ Depth (inches) Surface

Saturation Present? Yes ✓ No ____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water provides wetland hydrology.

North State Resources, Inc.

Data Point: 62
Feature Type: Riparian Wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/15/18

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 36, T35N, R1E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope %: 3

Subregion (LRR): MLRA 22B Lat: 40.840466° Long: -121.821029° Datum: NAD 83

Soil Map Unit Name: Gasper-Scarface complex, moist, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Data point documents riparian wetland adjacent to a perennial stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: 15 ft)	% Cover	Species?	Status
1. Salix lasiandra	20	Y	FACW
2. Salix scouleriana	20	Y	FAC
3. Alnus incana	15	Y	FACW
4.			
50%= 27.5 20%= 11 Total Cover:	55		

Herb Stratum (Plot Size: 5 ft)	% Cover	Species?	Status
1. Viola glabella	10	Y	FACW
2. Stachys ajugoides	10	Y	OBL
3. Equisetum arvense	5	N	FAC
4. Achillea millefolium	5	N	FACU
5. Scirpus microcarpus	2	N	OBL
6.			
7.			
8.			
50%= 15.5 20%= 6.4 Total Cover:	32		

Woody/Vine Stratum (Plot Size: ______)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 68 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 5 (A)

Total number of dominant species across all strata: 5 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
__✓__ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-4	10YR 2/1	100					P	Peat
4-12	7.5YR 2.5/3	58	7.5YR 3/4	30	C	M	SL	Sandy loam
			7.5YR 5/8	10	C	PL		
			10YR 6/2	2	D	M		

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ___ Histosol (A1)
- ✓ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ___ 2 cm Muck (A10)
- ___ Red Parent Materials (TF21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Vegetated Sand/Gravel Bars
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Rock Depth (Inches) 2 Hydric Soil Present? ✓

Remarks

Four inch layer of coarsely decomposed organic layer over mineral soil. Oxidized rhizoshpheres indicate aquic conditions

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ___ No X Depth (inches) n/a Wetland Hydrology? ✓ / N
Water Table Present? Yes ___ No X Depth (inches) n/a
Saturation Present? Yes ___ No X Depth (inches) n/a *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Oxidized rhizospheres indicate long duration saturation.

North State Resources, Inc.

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Data Point: 63
Feature Type: Upland

Project/Site: Fountain Wind   City/County: Shasta County   Date: 8/15/18

Applicant/Owner: Avangrid   State: CA

Investigator(s): Gabe Youngblood, Alison Loveless   Section, Township, Range: Sec. 36, T35N, R1E

Landform (hillslope, terrace, etc.): Hillslope   Local relief (concave, convex, none): Convex   Slope %: 5

Subregion (LRR): MLRA 22B   Lat: 40.840437°   Long: -121.821010°   Datum: NAD 83

Soil Map Unit Name: Gasper-Scarface complex, moist, 15 to 30 percent slopes   NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________

Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________

Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks Data point documents uplands adjacent to riparian wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix scouleriana	10	Y	FAC
2. Pinus ponderosa	10	Y	FACU
3.			
4.			
50%=_____ 20%=_____ Total Cover:	20		

Sapling/Shrub Stratum (Plot Size: 15)	% Cover	Species?	Status
1. Salix scouleriana	40	Y	FAC
2. Alnus incana	10	N	FACW
3. Ribes roezlii (2)/ Ribes nevadense (2)	4	N	UPL/FAC
4. Ceanothus integerrimus (2)/ Pseudotsuga menziesii(2)	4	N	UPL/FACU
50%= 27 20%= 11.6 Total Cover:	58		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Lysimachia latifolia	8	Y	FACW
2. Equisetum arvense	5	Y	FAC
3. Juncus balticus	2	N	FACW
4. Cynoglossum occidentale	2	N	UPL
5. Stachys ajugoides	1	N	OBL
6. Achillea millefolium	1	N	FACU
7. Leucanthemum vulgare	1	N	FACU
8.			
50%= 10 20%= 4 Total Cover:	20		

Woody/Vine Stratum (Plot Size: _____)	% Cover	Species?	Status
1.			
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 80   % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 4 (A)

Total number of dominant species across all strata: 5 (B)

Percent of dominant species that are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

- ____ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Data Point 63

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/1	100					P	Peat
1-12	7.5YR 3/4	100					GL	Gravelly loam
12-16	7.5YR 3/3	70	7.5YR 4/6	30	C	M	GCL	Gravelly clay loam

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? Y / ~~N~~

Remarks

No indicators of hydric soils were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) n/a Wetland Hydrology? Y / ~~N~~
Water Table Present? Yes _____ No X Depth (inches) n/a
Saturation Present? Yes _____ No X Depth (inches) n/a *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point: 64
Feature Type: Vegetated ditch

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/30/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 25, T35N, R1E
Landform (hillslope, terrace, etc.): Drainage ditch Local relief (concave, convex, none): Concave Slope %: 2
Subregion (LRR): MLRA 22B Lat: 40.865026° Long: -121.821162° Datum: NAD 83
Soil Map Unit Name: Goulder gravelly sandy loam, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☑/☐ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ___ Ordinary High Water Mark Mapped ✓ Stream Width 2
Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ___ Substrate vegetated
Natural Drainage ___ Artificial Drainage ✓ Navigable Water ___

Remarks: Data point documents a vegetated ditch.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)	% Cover	Species?	Status
1. Carex amplifolia	60	Y	OBL
2. Carex sp.	5	N	FAC--
3. Holcus lanatus	5	N	FAC
4. Deschampsia cespitosa	5	N	FACW
5. Rumex occidentalis	3	N	OBL
6. Galium trifidum	1	N	FACW
7. Veronica americana	1	N	OBL
8.			
50%= 40 20%= 16 Total Cover:	80		

Woody/Vine Stratum (Plot Size: ___)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 5 (A)
Total number of dominant species across all strata: 5 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks: Dominant hydrophytic vegetation is present. Carex sp. assumed to be FAC due to presence of other hydrophytic vegetation.

Data Point 64

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/2	100					GCL	Gravely clay loam

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ____ Depth (Inches) ____ Hydric Soil Present? /

Remarks

Soils were inundated during survey. Considered Hydric as they support dominate obligate plants and wetland hydrology.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No ____ Depth (inches) 1

Water Table Present? Yes ✓ No ____ Depth (inches) Surface

Saturation Present? Yes ✓ No ____ Depth (inches) Surface *(includes capillary fringe)*

Wetland Hydrology? ✓ / N

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water provides wetland hydrology.

North State Resources, Inc.

Data Point: 65

Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/30/18

Applicant/Owner: Avangrid State: CA

Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 25, T35N, R1E

Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Convex Slope %: 5

Subregion (LRR): MLRA 22B Lat: 40.865027° Long: -121.821220° Datum: NAD 83

Soil Map Unit Name: Goulder gravelly sandy loam, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*

Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐

Are vegetation ☐/☒ soil ☑/☐ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☑/☐ Hydric soil? ☑/☐ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☑/☐ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width ____

Feature Designation: Perennial ____ Intermittent ✓ Ephemeral ____ Blue-line on USGS Quad ____ Substrate Vegetated

Natural Drainage ____ Artificial Drainage ✓ Navigable Water ____

Remarks: Upland pair to DP64 which documents a vegetated ditch.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ____ 20%= ____ Total Cover:	0		

Herb Stratum (Plot Size: 5)	% Cover	Species?	Status
1. Festuca arundinacea	60	Y	FAC
2. Poa pratensis	5	N	FAC
3. Juncus sp.	5	N	FAC--
4.		N	
5.		N	
6.		N	
7.		N	
8.			
50%= 40 20%= 16 Total Cover:	70		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ____ 20%= ____ Total Cover:	0		

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

- ____ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ____ Prevalence Index is ≤ 3.0[1]
- ____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☑/☐

Remarks: Dominant hydrophytic vegetation is present. Juncus sp. assumed FAC or wetter due to species that are documented within the project as being FACW or OBL.

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/3	100					GCL	Gravelly clay loam

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? ✓ /

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) n/a Wetland Hydrology? Y / ~~N~~
Water Table Present? Yes _____ No X Depth (inches) n/a
Saturation Present? Yes _____ No X Depth (inches) n/a *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc.

Data Point 66
Feature Type Seasonal wetland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/30/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range Sec. 30, T35N, R2E
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Convex Slope % 15
Subregion (LRR): MLRA 22B Lat: 40.855492° Long: -121.796321° Datum: NAD 83
Soil Map Unit Name: Stukel complex, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ____ Ordinary High Water Mark Mapped ✓ Stream Width Variable
Feature Designation: Perennial ✓ Intermittent ____ Ephemeral ____ Blue-line on USGS Quad ____ Substrate Vegetated
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks Data point documents a seasonal wetland on a hillslope with shallow soils over bedrock.

Vegetation (Use Scientific Names)

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot Size: ____)			
1.			
2.			
3.			
4.			
50%=____ 20%=____ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)			
1.			
2.			
3.			
4.			
50%=____ 20%=____ Total Cover:	0		
Herb Stratum (Plot Size: 5)			
1. Triteleia hyacinthina	20	Y	FAC
2. Navarretia intertexta	18	Y	FACW
3. Mimulus guttatus	5	N	OBL
4. Perideridia sp.	3	N	UNK
5. Brodiaea sp.	2	N	UNK
6. Juncus sp. (dwarf sp.)	2	N	UNK
7. Epilobium campestre	1	N	OBL
8.			
50%= 15 20%= 6 Total Cover:	51		
Woody/Vine Stratum (Plot Size: ____)			
1.			
2.			
50%=____ 20%=____ Total Cover:	0		

% Bare Ground in Herb Stratum 49 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 2 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☑/☐

Remarks Dominant hydrophytic vegetation is present.

Data Point 66

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					MS	Mucky sand

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Bedrock Depth (Inches) 4 Hydric Soil Present? ✓

Remarks

Problematic shallow soil over bedrock is seasonally saturated and supports hydrophytic plants.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ✓ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ✓ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ____ No X Depth (inches) n/a Wetland Hydrology? ✓ / N

Water Table Present? Yes ____ No X Depth (inches) n/a

Saturation Present? Yes ____ No X Depth (inches) n/a *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Saturation visible on some Google Earth imagery.

Remarks

Salt (white) staining on rocks and soil surface indicate saturation and seepage.

North State Resources, Inc.

Data Point: 67
Feature Type: Upland

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/30/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range: Sec. 30, T35N, R2E
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope %: 15
Subregion (LRR): MLRA 22B Lat: 40.855504° Long: -121.796347° Datum: NAD 83
Soil Map Unit Name: Stukel complex, 15 to 30 percent slopes NWI Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒, soil ☐/☒, or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒, soil ☑/☐ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☐/☒ Is sampled area a wetland? ☐/☒ Other waters? ☐/☒

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank _____ Scour _____ Ordinary High Water Mark Mapped _____ Stream Width __________
Feature Designation: Perennial _____ Intermittent _____ Ephemeral _____ Blue-line on USGS Quad _____ Substrate __________
Natural Drainage _____ Artificial Drainage _____ Navigable Water _____

Remarks: Upland pair to DP66 which documents a seasonal wetland.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1. Arctostaphylos patula	45	Y	UPL
2. Quercus garryana	40	Y	FACU
3. Ceanothus integarmus	5	N	UPL
4.			
50%= 45 20%= 18 Total Cover:	90		
Herb Stratum (Plot Size: 5)	**% Cover**	**Species?**	**Status**
1. Galium aparine	2	2	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 1 20%= .4 Total Cover:	2		
Woody/Vine Stratum (Plot Size: ____)	**% Cover**	**Species?**	**Status**
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum 98 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

_____ Rapid Test for Hydrophytic Vegetation
_____ Dominance Test is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] *Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☒

Remarks: Dominant hydrophytic vegetation is not present.

Data Point 67

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/2	100					L	Loam

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: Bedrock Depth (Inches) 8 Hydric Soil Present? Y / ~~N~~ X

Remarks

No indicators of hydric soil were observed.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No X Depth (inches) n/a Wetland Hydrology? Y / ~~N~~ X
Water Table Present? Yes _____ No X Depth (inches) n/a
Saturation Present? Yes _____ No X Depth (inches) n/a *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

No indicators of wetland hydrology were observed.

North State Resources, Inc. now Stantec

Data Point 68
Feature Type Intermittent Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/15/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range Sec. 26, T35N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 5
Subregion (LRR): MLRA 22B Lat: 40.856761° Long: -121.836736° Datum: NAD 83
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI Classification: R4SBC

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width 2
Feature Designation: Perennial ____ Intermittent ✓ Ephemeral ____ Blue-line on USGS Quad ____ Substrate soil
Natural Drainage ✓ Artificial Drainage ____ Navigable Water ____

Remarks

DP documents a small intermittent stream.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (Plot Size:)	% Cover	Species?	Status
1.			
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Rapid Test for Hydrophytic Vegetation
____ Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
____ Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]*Indicators of hydric soil and wetland hydrology must be present.*

Hydrophytic Vegetation Present? ☐/☐

Remarks

No veg scoured channel

Data Point 68

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

_____ 2 cm Muck (A10)
_____ Red Parent Materials (TF21)
_____ Very Shallow Dark Surface (TF12)
_____ Vegetated Sand/Gravel Bars
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: __________ Depth (Inches) ______ Hydric Soil Present? /

Remarks

No soils pit scoured channel

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
__✓__ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Surface Soil Cracks (B6)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Sparsely Vegetated Concave Surface (B8)
_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Salt Crust (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Odor (C1)
_____ Oxidized Rhizospheres (C3)
_____ Presence of Reduced Iron (C4)
_____ Recent Iron Reduction in Tilled Soils (C6)
_____ Stunted or Stressed Plants (D1) (**LRR A**)
_____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
_____ Drainage Patterns (B10)
_____ Dry-Season Water Table (C2)
_____ Saturation Visible on Aerial Imagery (C9)
__✓__ Geomorphic Position (D2)
_____ Shallow Aquitard (D3)
_____ FAC-Neutral Test (D5)
_____ Raised Ant Mounds (D6) (**LRR A**)
_____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes _____ No __X__ Depth (inches) __________ Wetland Hydrology? ✓ / N
Water Table Present? Yes _____ No __X__ Depth (inches) __________
Saturation Present? Yes _____ No __X__ Depth (inches) __________ *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Drift deposits indicate frequent flooding.

North State Resources, Inc. now Stantec

Data Point 69
Feature Type Perennial Stream

Wetland Determination Data Form–Western Mountains, Valleys, & Coast Region

Project/Site: Fountain Wind City/County: Shasta County Date: 8/30/18
Applicant/Owner: Avangrid State: CA
Investigator(s): Gabe Youngblood, Alison Loveless Section, Township, Range Sec. 26, T35N, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) Concave Slope % 5
Subregion (LRR): MLRA 22B Lat: 40.861379° Long: -121.837220° Datum: NAD 83
Soil Map Unit Name: Nanny gravelly sandy loam, 0 to 8 percent slopes NWI Classification: R3UBH

Are climatic/hydrologic conditions on the site typical for this time of year? ☑/☐ *(If no, explain in Remarks.)*
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ significantly disturbed? Are normal circumstances present? ☑/☐
Are vegetation ☐/☒ soil ☐/☒ or hydrology ☐/☒ naturally problematic? *(If needed, explain in Remarks.)*

Note: On this e-form, the checkmark (left choice) means yes, the X (right choice) means no.

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? ☐/☒ Hydric soil? ☐/☒ Wetland hydrology? ☑/☐ Is sampled area a wetland? ☐/☒ Other waters? ☑/☐

Evaluation of features designated "Other Waters of the United States"

Indicators: Defined bed and bank ✓ Scour ✓ Ordinary High Water Mark Mapped ✓ Stream Width Variable
Feature Designation: Perennial ✓ Intermittent ___ Ephemeral ___ Blue-line on USGS Quad ___ Substrate Cobble
Natural Drainage ✓ Artificial Drainage ___ Navigable Water ___

Remarks
DP documents Hatchet Creek.

Vegetation (Use Scientific Names)

Tree Stratum (Plot Size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Sapling/Shrub Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
50%= ___ 20%= ___ Total Cover:	0		

Herb Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= ___ 20%= ___ Total Cover:	0		

Woody/Vine Stratum (Plot Size: ____)	% Cover	Species?	Status
1.			
2.			
50%= ___ 20%= ___ Total Cover:	0		

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust ___

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: ____ (A)
Total number of dominant species across all strata: ____ (B)
Percent of dominant species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	0
FACW Species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0	(A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

___ Rapid Test for Hydrophytic Vegetation
___ Dominance Test is >50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐/☐

Remarks
No veg scoured channel

Data Point 69

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (**except MLRA 1**) (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ____ 2 cm Muck (A10)
- ____ Red Parent Materials (TF21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Vegetated Sand/Gravel Bars
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: ____________ Depth (Inches) ______ Hydric Soil Present?

Remarks

No soils pit scoured channel.

Hydrology

Wetland Indicators

Primary Indicators (Minimum of one is required. Check all that apply.)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) **except MLRA 1,2,4A, and 4B)**
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations

Surface Water Present? Yes ✓ No ____ Depth (inches) 12 Wetland Hydrology? ✓ / N

Water Table Present? Yes ✓ No ____ Depth (inches) Surface

Saturation Present? Yes ✓ No ____ Depth (inches) Surface *(includes capillary fringe)*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Surface water provides wetland hydrology.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project City/County: Burney/Shasta Sampling Date: 10/14/2019
Applicant/Owner: Fountain Wind, LLC State: California Sampling Point: 001 up
Investigator(s): S. Creer|&|S. Cortez|&|B. Cohen Section, Township, Range: CA21 T34N R2E SN5
Landform (hillslope, terrace, etc): Terrace Local relief (concave, convex, none): concave Slope (%): 3
Subregion (LRR): MLRA 22B Lat: 40.83333943 Long: 121.782373 Datum: WGS84
Soil Map Unit Name: Gasper-Scarface complex, moist, 30 to 50 percent slopes NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus ponderosa* / Yellow pine, Ponderosa pine, Western yel	10	Yes	FACU
2. *Pseudotsuga menziesii* / Douglas fir	10	Yes	FACU
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15ft)			
1. *Alnus incana* / Gray alder	40	Yes	FACW
2. *Salix scouleriana* / Scouler willow, Scouler's willow	35	Yes	FAC
3. *Acer macrophyllum* / Bigleaf maple, Big-leaf maple	30	Yes	FACU
4. *Symphoricarpos albus* / Common snowberry	15	No	FACU
5.			
	120	= Total Cover	
Herb Stratum (Plot size: 6 foot radius)			
1. *Elymus glaucus* / Blue wildrye, Blue or western wild-rye	65	Yes	FACU
2. *Equisetum hyemale* / Scouringrush horsetail	13	No	FACW
3. *Woodwardia fimbriata* / Western chain fern, Giant chain fern	7	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	35	x 3 =	105
FACU species	130	x 4 =	520
UPL species	0	x 5 =	0
Column Totals:	225 (A)		745 (B)

Prevalence Index = B/A = 3.31

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point: 001 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	5 YR 3/2	100					Sandy loam	Shovel refusal rocks at 8

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:
Large rocks present throughout

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project City/County: Burney/Shasta Sampling Date: 10/14/2019
Applicant/Owner: Fountain Wind, LLC State: California Sampling Point: 001 wet
Investigator(s): S. Cortez|&|B. Cohen Section, Township, Range: CA21 T34N R2E SN5
Landform (hillslope, terrace, etc): terrace Local relief (concave, convex, none): concave Slope (%): 3
Subregion (LRR): MLRA 22B Lat: 40.83333298 Long: -121.782401 Datum: WGS84
Soil Map Unit Name: Gasper-Scarface complex, moist, 30 to 50 percent slopes NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___	
Hydric Soil Present? Yes X No ___	**Is the Sampled Area**
Wetland Hydrology Present? Yes X No ___	**within a Wetland?** Yes X No ___

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 foot radius)			
1. *Acer circinatum* / Vine maple	30	Yes	FAC
2. *Salix scouleriana* / Scouler willow, Scouler's willow	20	Yes	FAC
3. *Alnus incana* / Gray alder	20	Yes	FACW
4.			
5.			
	70	= Total Cover	
Herb Stratum (Plot size: 6 foot radius)			
1. *Carex utriculata* / Beaked sedge, Southern beaked sedge	70	Yes	OBL
2. *Elymus glaucus* / Blue wildrye, Blue or western wild-rye	20	Yes	FACU
3. *Scirpus microcarpus* / Mountain bog bulrush	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species	20	x 2 =	40
FAC species	50	x 3 =	150
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	165 (A)		345 (B)

Prevalence Index = B/A = 2.09

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: 001 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-12	7.5 YR 4/1	90	5 YR 4/6	10	C	M	sandy loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): .5
Water Table Present? Yes ___ No ___ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project   City/County: Burney/Shasta   Sampling Date: 10/15/2019
Applicant/Owner: Fountain Wind, LLC   State: California   Sampling Point: 002 up
Investigator(s): S. Creer|&|S. Cortez   Section, Township, Range: CA21 T34N R2E SN6
Landform (hillslope, terrace, etc): Flattened area on hill slope   Local relief (concave, convex, none): concave   Slope (%): 3
Subregion (LRR): MLRA 22B   Lat: 40.828088   Long: -121.787942   Datum: WGS84
Soil Map Unit Name: Nanny stony sandy loam, 0 to 8 percent slopes (NbB)   NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed?   Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: N/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: N/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 6 feet radius)			
1. *Hypericum perforatum* / Klamathweed	25	Yes	FACU
2. *Plantago lanceolata* / Ribwort, English plantain	15	Yes	FACU
3. *Achillea millefolium* / Yarrow	10	No	FACU
4. *Anthoxanthum odoratum* / Sweet vernal grass	10	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: N/a)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 45

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	60 (A)		240 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide supporting
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 002 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-6	10 YR 3/2	100					loam	
6-12	10 YR 5/2	70					Loam	
6-12	10 YR 4/2	30					Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	.1
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	12

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project City/County: Burney/Shasta Sampling Date: 10/15/2019
Applicant/Owner: Fountain Wind, LLC State: California Sampling Point: 002 wet
Investigator(s): S. Creer|&|S. Cortez Section, Township, Range: CA21 T34N R2E SN6
Landform (hillslope, terrace, etc): Flattened area on hill slope Local relief (concave, convex, none): concave Slope (%): 3
Subregion (LRR): MLRA 22B Lat: 40.8280169 Long: -121.787656 Datum: WGS84
Soil Map Unit Name: Nanny stony sandy loam, 0 to 8 percent slopes (NbB) NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil X, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: N/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: N/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 6 feet radius)			
1. *Carex utriculata* / Beaked sedge, Southern beaked sedge	80	Yes	OBL
2. *Juncus effusus* / Common bog rush, Soft or lamp rush	15	No	FACW
3. *Anthoxanthum odoratum* / Sweet vernal grass	10	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: N/a)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	105 (A)		150 (B)

Prevalence Index = B/A = 1.43

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 002 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5 YR 3/3	100					Silty clay loam	
5-12	10 YR 4/1	58	5 YR 5/8	2	C	M	Silty clay loam	
5-12	10 YR 5/2	40					Silty clay loam	Soft manganese masses at 3%

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:

Problematic soil; as per chapter 5 of supplement: item #6 seasonally ponded soils. Positive for alpha-alpha Dipyridyl test. Assume Hydric soils due to presence of hydrology and hydrophytic veg.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): .1
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 12

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project City/County: Burney/Shasta Sampling Date: 10/15/2019
Applicant/Owner: Fountain Wind, LLC State: California Sampling Point: 052 up
Investigator(s): JI Holson|&|B. Cohen Section, Township, Range: CA21 T34N R1E SN10
Landform (hillslope, terrace, etc): Floodplain Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): MLRA 22B Lat: 40.817215 Long: -121.841597 Datum: WGS84
Soil Map Unit Name: Windy and McCarthy very stony sandy loams, 30 to 50 percent slopes NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pseudotsuga menziesii* / Douglas fir	50	Yes	FACU
2. *Populus tremuloides* / Quaking aspen	40	Yes	FACU
3.			
4.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 foot radius)			
1. *Cornus nuttallii* / Mountain dogwood	25	Yes	FACU
2. *Acer circinatum* / Vine maple	15	Yes	FAC
3. *Rubus parviflorus* / Thimbleberry	10	Yes	FACU
4.			
5.			
	50	= Total Cover	
Herb Stratum (Plot size: 6 foot radius)			
1. *Lathyrus latifolius* / Sweet pea, Perennial sweet pea	2	Yes	
2. *Bromus carinatus* / California bromegrass	1	Yes	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	3	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 95

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 14.3 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	125	x 4 =	500
UPL species	0	x 5 =	0
Column Totals:	140 (A)		545 (B)

Prevalence Index = B/A = 3.89

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 052 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-4	5 YR 3/1	100					Loamy sand	
4-16	5 YR 3/3	100					Sand	Small gravel throughout.

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project City/County: Burney/Shasta Sampling Date: 10/16/2019
Applicant/Owner: Fountain Wind, LLC State: California Sampling Point: 053 up
Investigator(s): JI Holson|&|B. Cohen Section, Township, Range: CA21 T34N R1E SN22
Landform (hillslope, terrace, etc): Hillslope Local relief (concave, convex, none): convex Slope (%): 30
Subregion (LRR): MLRA 22B Lat: 40.78578697 Long: -121.851966 Datum: WGS84
Soil Map Unit Name: Windy and McCarthy very stony sandy loams, 30 to 50 percent slopes NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pseudotsuga menziesii* / Douglas fir	45	Yes	FACU
2. *Calocedrus decurrens* / Incense cedar	15	Yes	
3. *Cornus nuttallii* / Mountain dogwood	5	No	FACU
4.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 foot radius)			
1. *Acer circinatum* / Vine maple	20	Yes	FAC
2. *Cornus nuttallii* / Mountain dogwood	20	Yes	FACU
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0	= Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 100

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	90 (A)		340 (B)

Prevalence Index = B/A = 3.78

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point: 053 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-16	7.5 YR 3/3	100					Loam	Cobbles present

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project City/County: Burney/Shasta Sampling Date: 10/16/2019
Applicant/Owner: Fountain Wind, LLC State: California Sampling Point: 053 wet
Investigator(s): JI Holson|&|B. Cohen Section, Township, Range: CA21 T34N R1E SN22
Landform (hillslope, terrace, etc): Floodplain Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): MLRA 22B Lat: 40.785926 Long: -121.851976 Datum: WGS84
Soil Map Unit Name: Windy and McCarthy very stony sandy loams, 30 to 50 percent slopes NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil X, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 foot radius)			
1. *Alnus rhombifolia* / White alder	40	Yes	FACW
2. *Acer circinatum* / Vine maple	20	Yes	FAC
3. *Salix scouleriana* / Scouler willow, Scouler's willow	10	No	FAC
4.			
5.			
	70	= Total Cover	
Herb Stratum (Plot size: 6 foot radius)			
1. *Carex* / Sedge	75	Yes	FAC
2. *Stachys ajugoides* / Hedge nettle	8	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	83	= Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	8	x 1 =	8
FACW species	40	x 2 =	80
FAC species	105	x 3 =	315
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	153 (A)		403 (B)

Prevalence Index = B/A = 2.63

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Carex is not identifiable to species at this time but is assumed to be FAC due to presence of other hydrophytic species.

SOIL

Sampling Point: 053 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					Loamy sand	Higher levels of loam in upper layers above

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:
Soils are problematic and assumed hydric. Sampled area is in vegetated sand and gravel bar within top of bank and redox features may be washed out by Drainage patterns and are oxygenated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)	X		11

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Area is adjacent to ohwm or drainage and within top of bank. Drainage patterns and saturation present.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project City/County: Burney/Shasta Sampling Date: 10/16/2019
Applicant/Owner: Fountain Wind, LLC State: California Sampling Point: 054 up
Investigator(s): C. Singer|&|B. Cohen Section, Township, Range: CA21 T34N R1E SN23
Landform (hillslope, terrace, etc): Terrace Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): MLRA 22B Lat: 40.792924 Long: -121.828157 Datum: WGS84
Soil Map Unit Name: Windy and McCarthy stony sandy loams, 0 to 30 percent slopes NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Calocedrus decurrens* / Incense cedar	15	Yes	UPL
2. *Abies* / Fir	5	Yes	UPL
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 foot radius)			
1. *Alnus rhombifolia* / White alder	30	Yes	FACW
2. *Acer circinatum* / Vine maple	30	Yes	FAC
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 6 foot radius)			
1. *Maianthemum racemosum* / Feathery false lily of the valley	2	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	2	= Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 98

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	32	x 3 =	96
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	82 (A)		256 (B)

Prevalence Index = B/A = 3.12

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Abies concolor

SOIL

Sampling Point: 054 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	7.5 YR 2.5/3	100					Silty loam	Gravel present, more as you go deeper

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, & Coast

Project/Site: Fountain Wind Project | City/County: Burney/Shasta | Sampling Date: 10/17/2019
Applicant/Owner: Fountain Wind, LLC | State: California | Sampling Point: 055 up
Investigator(s): C. Singer|&|B. Cohen | Section, Township, Range: CA21 T34N R1E SN17
Landform (hillslope, terrace, etc): Terrace | Local relief (concave, convex, none): none | Slope (%): 1
Subregion (LRR): MLRA 22B | Lat: 40.79850965 | Long: -121.876521 | Datum: WGS84
Soil Map Unit Name: Cohasset stony loam, 0 to 30 percent slopes | NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer macrophyllum* / Bigleaf maple, Big-leaf maple	65	Yes	FACU
2. *Salix scouleriana* / Scouler willow, Scouler's willow	15	No	FAC
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 foot radius)			
1. *Rubus armeniacus* / Himalayan blackberry	15	Yes	FAC
2. *Rubus parviflorus* / Thimbleberry	10	Yes	FACU
3. *Ribes malvaceum* / Chaparral currant	10	Yes	UPL
4.			
5.			
	35	= Total Cover	
Herb Stratum (Plot size: 6 foot radius)			
1. *Pteridium aquilinum* / Western brackenfern	7	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	7	= Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Statum 90

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	82	x 4 =	328
UPL species	10	x 5 =	50
Column Totals:	122 (A)		468 (B)

Prevalence Index = B/A = 3.84

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 055 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-16	7.5 YR 2.5/2	100					Silty loam	Small gravel present

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ______
Water Table Present?	Yes ____	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ______

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C PLANT SPECIES OBSERVED

Table C-1. Plant Species Observed

Scientific Name[1]	Common Name	Wetland Indicator Status[2]	Origin
Adoxaceae (Muskroot Family)			
Sambucus nigra ssp. *caerulea*	blue elderberry	FAC	Native
Apiaceae (Umbelliferae) (Carrot Family)			
Angelica californica	California angelica	-	Native
Angelica capitellata	grayswamp whiteheads	FACW	Native
Heracleum maximum	common cow parsnip	FAC	Native
Apocynaceae (Dogbane Family)			
Apocynum androsaemifolium	bitter dogbane	FACU	Native
Aristolochiaceae (Pipevine Family)			
Asarum caudatum	long-tail wild ginger	FACU	Native
Asarum hartwegii	Hartweg's wild ginger	-	Native
Asteraceae (Compositae) (Sunflower Family)			
Achillea millefolium	yarrow	FACU	Native
Artemisia douglasiana	California mugwort	FACW	Native
Cirsium vulgare	bullthistle	FACU	non-native (invasive)
Ericameria nauseosa	rubber rabbitbrush	-	Native
Erigeron annus	annual fleabane	FACU	non-native
Helenium bigelovii	Bigelow's sneezeweed	FACW	Native
Leucanthemum vulgare	ox-eye daisy	FACU	non-native (invasive)
Oreostemma alpigenum	tundra aster	FAC	Native
Senecio triangularis	arrowleaf ragwort	FACW	Native
Sonchus oleraceus	sow thistle	UPL	non-native
Symphyotrichum spathulatum	western mountain aster	FAC	Native
Taraxacum officinale	common dandelion	FACU	Non-native
Uropappus lindleyi	silver puffs	UPL	Native
Athyriaceae (Lady Fern Family)			
Athyrium filix-femina var. cyclosorum	western lady fern	FAC	Native
Berberidaceae (Barberry Family)			
Berberis aquifolium	mountain grape	FACU	Native
Betulaceae (Birch Family)			
Alnus incana ssp. *tenuifolia*	creek alder	FACW	Native
Alnus rhombifolia	white alder	FACW	Native
Corylus cornuta ssp. *californica*	beaked hazelnut	FACU	Native
Blechnaceae (Deer Fern Family)			
Woodwardia fimbriata	western chain fern	-	Native
Boraginaceae (Borage Family)			
Cynoglossum grande	grand hound's tongue	UPL	Native
Cynoglossum occidentale	hound's tongue	-	Native
Eriodictyon californicum	California yerba santa	UPL	Native
Caprifoliaceae (Honeysuckle Family)			
Lonicera conjugialis	purpleflower honeysuckle	FAC	Native
Lonicera hispidula	pink honeysuckle	FACU	Native
Symphoricarpos albus var. laevigatus	snowberry	FACU	Native

Scientific Name[1]	Common Name	Wetland Indicator Status[2]	Origin
Celastraceae (Staff-Tree Family)			
Paxistima myrsinites	Oregon boxwood	FACU	Native
Cornaceae (Dogwood Family)			
Cornus nuttallii	mountain dogwood	FACU	Native
Cornus sericea	American dogwood	FACW	Native
Cupressaceae (Cypress Family)			
Calocedrus decurrens	incense cedar	-	Native
Cyperaceae (Sedge Family)			
Carex amplifolia	ample leaved sedge	OBL	Native
Carex brainerdii	Brainerd's sedge	UPL	Native
Carex utriculata	beaked sedge	OBL	Native
Schoenoplectus acutus	common tule	OBL	Native
Scirpus microcarpus	mountain bog bulrush	OBL	Native
Dennstaedtiaceae (Bracken Family)			
Pteridium aquilinum var. pubescens	western bracken fern	FACU	Native
Equisetaceae (Horsetail Family)			
Equisetum hyemale	common scouring rush	FACW	Native
Ericaceae (Heath Family)			
Arctostaphylos nevadensis	pine mat manzanita	-	Native
Arctostaphylos patula	green leaf manzanita	-	Native
Arctostaphylos viscida	whiteleaf manzanita	-	Native
Rhododendron occidentale	western azalea	FAC	Native
Vaccinium uliginosum ssp. *occidentale*	western blueberry	FACW	Native
Fabaceae (Leguminosae) (Legume Family)			
Acmispon wrangelianus	Chilean trefoil	UPL	Native
Cercis occidentalis	western redbud	UPL	Native
Genista monspessulana	French broom	UPL	non-native (invasive)
Hosackia oblongifolia	narrow leaved lotus	OBL	Native
Lathyrus latifolius	sweet pea	-	non-native
Trifolium dubium	little hop clover	FACU	non-native
Trifolium longipes	long-stalked clover	FAC	Native
Trifolium pratense	red clover	FACU	non-native
Trifolium repens	white clover	FAC	non-native
Fagaceae (Oak Family)			
Chrysolepis sempervirens	Sierra chinquapin	-	Native
Notholithocarpus densiflorus var. echinoides	tanoak shrub	-	Native
Quercus garryana	Oregon oak	FACU	Native
Quercus vacciniifolia	huckleberry oak	UPL	Native
Garryaceae (Silk Tassel Family)			
Garrya fremontii	Fremont's silk tassel	UPL	Native
Grossulariaceae (Goosefoot Family)			
Ribes malvaceum	chaparral currant	-	Native
Ribes nevadense	mountain pink currant	FAC	Native
Ribes roezlii	Sierra gooseberry	-	Native
Ribes sanguineum	flowering currant	FACU	Native

Appendix C Plant Species Observed

Scientific Name[1]	Common Name	Wetland Indicator Status[2]	Origin
Hypericaceae (St. John's Wort Family)			
Hypericum anagalloides	Tinker's penny	OBL	Native
Hypericum perforatum ssp. *perforatum*	Klamathweed	FACU	non-native
Iridaceae (Iris Family)			
Iris macrosiphon	ground iris	UPL	Native
Iris tenuissima	slender iris	UPL	Native
Juncaceae (Rush Family)			
Eleocharis acicularis	needle spikerush	OBL	Native
Eleocharis bella	beautiful spikerush	FACW	Native
Eleocharis macrostachya (*Eleocharis palustrus*)	common spikerush	OBL	Native
Juncus balticus ssp. *ater*	Baltic rush	FACW	Native
Juncus bufonius	toad rush	FACW	Native
Juncus effusus	common bog rush	FACW	Native
Juncus nevadensis	Sierran rush	FACW	Native
Juncus occidentalis	western rush	FACW	Native
Juncus xiphioides	iris-leaved rush	OBL	Native
Lamiaceae (Labiateae) (Mint Family)			
Mentha pulegium	pennyroyal	OBL	non-native (invasive)
Mentha spicata	spearmint	FACW	non-native
Stachys ajugoides	hedge nettle	OBL	Native
Trichostema lanceolatum	vinegar weed	FACU	Native
Liliaceae (Lily Family)			
Lilium pardalinum	California tiger lily	FACW	Native
Malvaceae (Mallow Family)			
Sidalcea gigantea	giant checkerbloom	UPL	Native
Melanthiaceae (False-hellebore Family)			
Veratrum californicum var. californicum	California corn lily	FAC	Native
Trillium albidum	giant white trillium	FACU	Native
Montiaceae (Miner's Lettuce Family)			
Calyptridium umbellatum	pussy toes	-	Native
Myrsinaceae (Myrsine Family)			
Lysimachia latifolia	Pacific starflower	FACW	Native
Nymphaeaceae (Waterlily Family)			
Nuphar polysepala	Rocky Mountain pond-lily	OBL	Native
Oleaceae (Olive Family)			
Fraxinus latifolia	Oregon ash	FACW	Native
Onagraceae (Evening-Primrose Family)			
Chamerion angustifolium	fireweed	UPL	Native
Ludwigia palustris	marsh purslane	OBL	Native
Ophioglossaceae (Adder's-tongue Family)			
Sceptridium multifidum	leather grape-fern	FAC	Native
Orchidaceae (Orchid Family)			
Goodyera oblongifolia	rattlesnake-plantain	FACU	Native
Platanthera dilatata	white-flowered bog-orchid	FACW	Native

Scientific Name[1]	Common Name	Wetland Indicator Status[2]	Origin
Orobanchaceae (Broomrape Family)			
Castilleja campestris	vernal pool paintbrush	FACW	Native
Castilleja lacera	cut leaved owl's clover	UPL	Native
Epilobium brachycarpum	tall annual willowherb	UPL	Native
Epilobium campestre	smooth willowherb	OBL	Native
Epilobium ciliatum	fringed willowherb	FACW	Native
Phrymaceae (Lopseed Family)			
Mimulus guttatus	seep monkey flower	OBL	Native
Pinaceae (Pine Family)			
Abies concolor	white silver fir	-	Native
Pinus contorta	lodgepole pine	FAC	Native
Pinus lambertiana	sugar pine	-	Native
Pinus ponderosa	yellow pine	FACU	Native
Pseudotsuga menziesii var. menziesii	Douglas fir	FACU	Native
Plantaginaceae (Plantain Family)			
Keckiella breviflora	bush beardtongue	UPL	Native
Plantago lanceolata	ribwort	FACU	non-native (invasive)
Veronica americana	American brooklime	OBL	native
Veronica anagallis-aquatica	water speedwell	OBL	non-native (invasive)
Veronica peregrina	purslane speedwell	FACW	native
Polemoniaceae (Phlox Family)			
Navarretia intertexta	needleleaf navarretia	FACW	native
Polygonaceae (Buckwheat Family)			
Rumex acetosella	sheep sorrel	FACU	non-native (invasive)
Rumex crispus	curly dock	FAC	non-native (invasive)
Rumex occidentalis	western dock	FACW	native
Poaceae (Gramineae) (Grass Family)			
Alopecurus pratensis	meadow foxtail	FAC	non-native
Anthoxanthum odoratum	sweet vernal grass	FACU	non-native (invasive)
Bromus carinatus	California bromegrass	-	native
Bromus hordeaceus	soft chess	FACU	non-native (invasive)
Bromus tectorum	downy chess	-	non-native (invasive)
Cynosurus echinatus	dogtail grass	-	non-native (invasive)
Dactylis glomerata	orchardgrass	FACU	non-native (invasive)
Danthonia californica	California oatgrass	FAC	native
Deschampsia cespitosa	tufted hair grass	FACW	native
Elymus caput-medusae	Medusa head	UPL	non-native (invasive)
Elymus glaucus	blue wildrye	FACU	native
Elymus triticoides	beardless wild rye	UPL	native
Festuca arundinacea	tall fescue	FAC	non-native (invasive)
Glyceria striata	ridged manna grass	OBL	native
Holcus lanatus	common velvetgrass	FAC	non-native (invasive)
Panicum acuminatum	western panicgrass	FAC	native
Phalaris aquatica	Harding grass	FACU	non-native (invasive)
Phalaris paradoxa	hood canary grass	FAC	non-native

Appendix C Plant Species Observed

Scientific Name[1]	Common Name	Wetland Indicator Status[2]	Origin
Poa palustris	fowl blue grass	FAC	non-native
Poa pratensis ssp. *pratensis*	Kentucky blue grass	FAC	non-native (invasive)
Poa secunda	nevada blue grass	FACU	native
Stipa miliacea	smilo grass	UPL	non-native
Ranunculaceae (Buttercup Family)			
Aconitum columbianum	Columbian monkshood	FACW	native
Aquilegia formosa	crimson columbine	FAC	native
Ranunculus californicus	California buttercup	FAC	native
Ranunculus flammula	water buttercup	FACW	native
Ranunculus orthorhynchus	straight beaked buttercup	FACW	native
Rhamnaceae (Buckthorn Family)			
Ceanothus cordulatus	mountain whitethorn	UPL	native
Ceanothus integerrimus	deer brush	UPL	native
Ceanothus velutinus	tobacco brush	-	native
Frangula californica	California coffeeberry	-	native
Frangula purshiana	cascara sagrada	FAC	native
Rosaceae (RoseFamily)			
Drymocallis glandulosa	sticky cinquefoil	FAC	native
Heteromeles arbutifolia	toyon	-	native
Holodiscus discolor	oceanspray	FACU	native
Prunus emarginata	bitter cherry	FACU	native
Rosa californica	California wild rose	FAC	native
Rosa gymnocarpa	wood rose	FACU	native
Rubus armeniacus	Himalayan blackberry	FAC	non-native (invasive)
Rubus leucodermis	white bark raspberry	FACU	native
Rubus parviflorus	thimbleberry	FACU	native
Rubus ursinus	California blackberry	FACU	native
Sorbus scopulina	Cascade mountain ash	FACU	native
Spiraea douglasii	Douglas spiraea	FACW	native
Rubiaceae (Bedstraw Family)			
Galium trifidum	three petaled bedstraw	FACW	native
Galium triflorum	sweet scented bedstraw	FACU	native
Ruscaceae (Butcher's-Broom Family)			
Maianthemum racemosum	feathery false lily of the valley	FAC	native
Salicaceae (Willow Family)			
Populus tremuloides	quaking aspen	FACU	native
Salix exigua	narrowleaf willow	FACW	native
Salix lasiandra	Pacific willow	FACW	native
Salix lasiolepis	arroyo willow	FACW	native
Salix scouleriana	Scouler willow	FAC	native
Sapindaceae (Soapberry Family)			
Acer circinatum	vine maple	FAC	native
Acer macrophyllum	bigleaf maple	FACU	native
Saxifragaceae (Saxifrage Family)			
Darmera peltata	Indian rhubarb	OBL	native

Scientific Name[1]	Common Name	Wetland Indicator Status[2]	Origin
Scrophulariaceae (Figwort Family)			
Verbascum blattaria	moth mullein	UPL	non-native
Verbascum thapsus	woolly mullein	FACU	non-native (invasive)
Smilacaceae (Smilax Family)			
Smilax californica	California greenbriar	UPL	native
Taxaceae (Yez Family)			
Taxus brevifolia	Pacific yew	FACU	native
Themidaceae (Brodiaea Family)			
Triteleia hyacinthina	white brodiaea	FAC	native
Urticaceae (Nettle Family)			
Urtica dioica	stinging nettle	FAC	native
Verbenaceae (Verbena Family)			
Verbena lasiostachys	western vervain	FAC	native
Violaceae (Violet Family)			
Viola glabella	stream violet	FACW	native

[1] Taxonomic nomenclature for plant species follows the Jepson eFlora (2019).
[2] Wetland indicator status for plant species followed Lichvar, R. W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. *Phytoneuron* 2016-30: 1-17.

Appendix D PHOTO LOG

Photo 1. Intermittent stream documented by data point

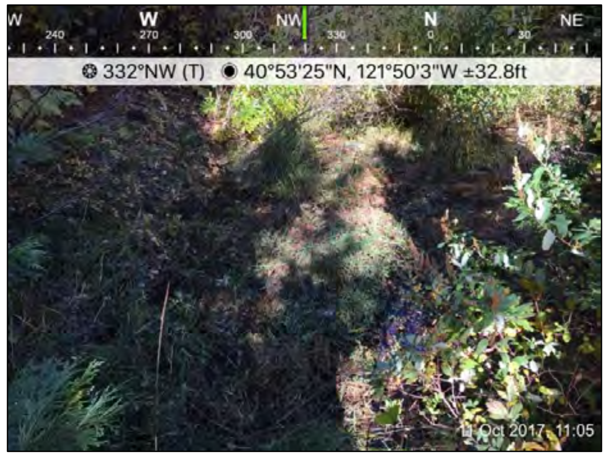

Photo 2. Fresh emergent wetland adjacent to Little Hatchet Creek.

Photo 3. Little Hatchet Creek, a perennial stream documented by data point 8.

Photo 4. Wetland seep spring along an access road.

Photo 5. Ephemeral stream documented by data point 9.

Photo 6. Fresh emergent wetland within Carberry Creek (data points 10 and 12).

Photo 7. Riparian wetland adjacent to Carberry Creek (data points 11 and 12).

Photo 8. Wetland meadow adjacent to Carberry Creek (data points 13 and 14).

Photo 9. Non-vegetated ditch (data point 15). Orientation: northwest.

Photo 10. Ephemeral stream documented (data point 16). Orientation: east.

Photo 11. Non-vegetated ditch (data point 17). Orientation: southeast

Photo 12. Wetland meadow (data points 18 and 19). Orientation: west.

Photo 13. Fresh emergent wetland in a seasonally inundated pond (data points 20, 21 and 22). Orientation: southwest.

Photo 14. Riparian wetland (data points 23 and 24). Orientation: south

Photo 15. Intermittent stream (data point 25). Orientation: south.

Photo 16. Suspect area documented as an upland (data point 26). Orientation: southwest

Photo 17. Seasonal wetland adjacent to a road (data points 27 and 28). Orientation: southwest.

Photo 18. Intermittent stream (data point 29). Orientation: southwest.

Photo 19. Wetland meadow (data points 30 and 31). Orientation: west.

Photo 20. Riparian wetland within Hatchet Creek (data points 32 and 33).

Photo 21. Seasonal wetland within a wetland meadow (data point 34).

Photo 22. Wetland meadow (data points 35 and 36). Orientation: west.

Photo 23. Non-vegetated ditch (data point 37). Orientation: noth

Photo 24. Vegetated ditch (data points 38 and 39). Orientation: east

Photo 25. Riparian wetlands adjacent to North Fork of Montgomery Creek (data points 40 and 41). Orientation: northwest.

Photo 26. Cedar Creek, a perennial stream (data points 42-44). Adjacent riparian wetlands are recovering from a recent bridge installation. Orientation: southwest.

Photo 27. Wetland seep spring adjacent to a road (data points 45 and 46). Orientation: northwest.

Photo 28. Ephemeral stream (data point 47). Orientation: north.

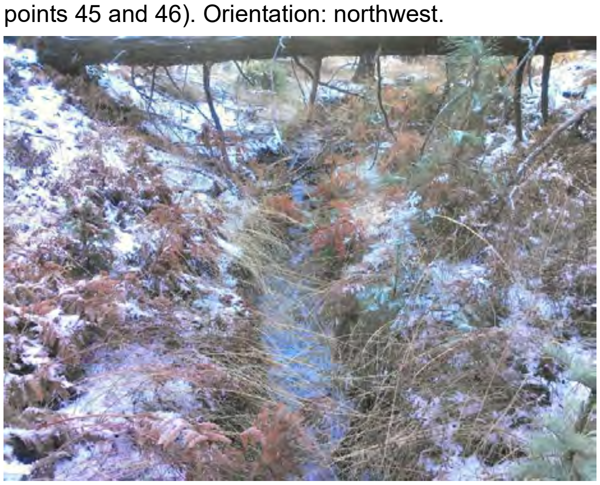

Photo 29. Intermittent stream (data point 48). Orientation: north.

Photo 30. W-10, W-11. Ephemeral stream (data point 49). Orientation: north.

Photo 31. Non-vegetated ditch (data point 50). Orientation: west.

Photo 32. Riparian wetland (data points 51 and 52). Orientation: northwest.

Photo 33. Wetland seep spring (data points 53 and 54). Orientation: north.

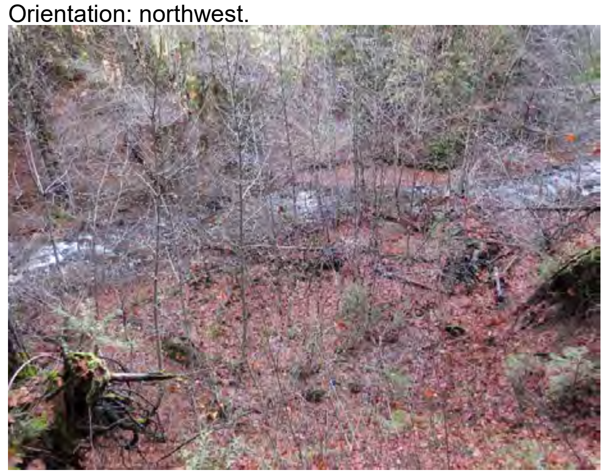

Photo 34. Little Cow Creek and riparian wetlands (data points 55 and 56). Orientation: north.

Photo 35. Riparian wetland (data points 57 and 58). Orientation: west.

Photo 36. Wetland seep spring (data points 59 and 60). Orientation: east.

Photo 37. Fresh emergent wetland in a perennial stream (behind shovel) and riparian wetland (in front of shovel) (data points 61-63). Orientation: north.

Photo 38. Vegetated ditch (data points 64 and 65). Orientation: east.

Photo 39. Water marks on a rock in a seasonal wetland (data points 66 and 67).

Photo 40. Intermittent stream (data point 68). Orientation: southeast.

Photo 41. Hatchet Creek a perennial stream documented (data point 69). Orientation: southwest.

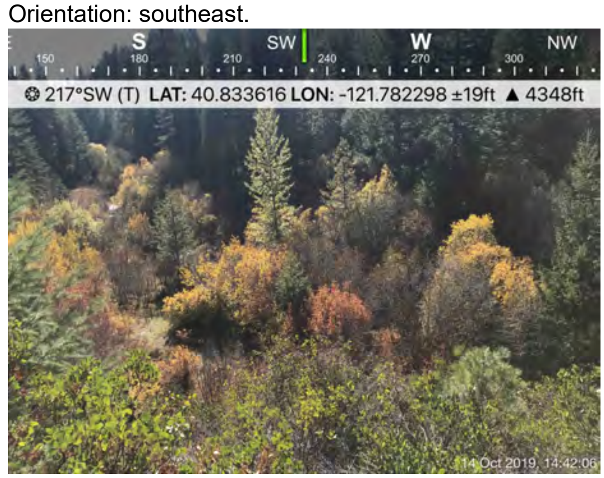

Photo 42. Riparian wetland (wetland [W-] 1).

Photo 43. Wetland meadow (W-2).

Photo 44. Wetland meadow (W-3).

Photo 45. Riparian wetland (W-5 and W-6), and perennial drainage (D-) A1, Hatchet Creek.

Photo 46. Riparian wetland (W-8, W-9), perennial drainage D-1, North Fork of Cedar Creek. Orientation: west

Photo 47. Wetland seep (W-10, W-11).

Photo 48. Riparian wetland (W-50).

Photo 49. Intermittent drainage (D-B).

Photo 50. Ephemeral drainage (D-C).

Photo 51. Intermittent drainage (D-D).

Photo 52. Intermittent drainage (D-G1).

Photo 53. Perennial drainage (D-H) in a wetland meadow (W-2).

Photo 54. Perennial drainage (D-J).

Photo 55. Perennial drainage (D-K).

Photo 56. Perennial drainage (D-K1), North Fork Little Cow Creek.

Photo 57. Intermittent drainage (D-L).

Photo 58. Perennial drainage (D-L1).

Photo 59. Perennial drainage (D-O), North Fork of Montgomery Creek.

Photo 60. Intermittent drainage (D-P1).

Photo 61. Perennial drainage (D-Q), South Fork of Montgomery Creek.

Photo 62. Perennial drainage (D-R).

Photo 63. Perennial drainage (D-S). Orientation: north

Appendix E BIOLOGIST RESUMES

John Holson

Project Biologist

For 10 years, John has managed and assisted in the field data collection for a variety of assessments and surveys, including special-status plant surveys, vegetation mapping, wetland delineations, special-status bird surveys, nesting bird surveys, and mitigation monitoring. He has written and managed special-status plant survey reports, wetland delineation reports, special-status bird survey reports, numerous environmental impact reports (EIR) in accordance to CEQA, environmental impact statements (EIS) in accordance to NEPA, biological assessments (BAs), and natural environment studies (NES) in accordance to Caltrans projects.

John has extensive botanical experience throughout California, conducting spring floristic surveys and wetland delineations for the past ten field seasons. He has also done botanical work in several other states in the US West, including Montana, Washington, Nevada, Arizona, and Utah. His experiences with wildlife biology, specifically with birds, also make him a versatile employee. He has been working with birds for the past eight years, including activities such as surveying, banding, and monitoring.

John's project management experience includes overseeing budgets, personnel, coordinating schedules, and communicating with resource agencies, California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), Regional Water Quality Control Board (RWQCB), and Army Corp of Engineers (Corps).

EDUCATION

BS, Ecology, University of California, Santa Barbara, California, 2004

CERTIFICATIONS & TRAINING

Raptor Handling and Banding Permit, Golden Gate Raptor Observatory, San Francisco, California, 2017

Bald and Golden Eagle Workshop, San Francisco, California, 2015

California Rapid Assessment Method (CRAM) Training, California Wetlands Monitoring Workgroup, Willits, California, 2010

Basic Wetland Delineation, Wetland Training Institute, Sacramento, California, 2009

California Native Plant Society Vegetation Rapid Assessment Workshop, Sierra Nevada Aquatic Research Laboratory, Mammoth Lakes, California, 2007

Jepson Manual Workshop, Santa Barbara Botanical Garden, Santa Barbara, California, 2005

PROJECT EXPERIENCE

HIGH SPEED RAIL

DesertXpress Environmental Services EIR/EIS * | Barstow to Prim, California and Nevada | Lead Botanist/Wetland Ecologist

John conducted botanical surveys in addition to a wetland delineation in and around Las Vegas and Prim, Nevada, as well as Baker and Barstow, California. His duties included identifying local vegetation, assessing soils, and identifying hydrologic indicators. Wetland delineation information compiled was used by the Corps to verify potentially jurisdictional waters of the United States in that region.

Pacheco Pass Corridor EIR/EIS* | San Jose, California, United States | 2009-2017 | Lead Botanist/Wetland Ecologist

John managed and participated in botanical and wetland delineation surveys in support of an EIR/EIS for a new high speed rail proposed from San Jose to Merced, California. His duties included managing a crew of five botanists, plotting daily routes, conducting botanical surveys, as well as every day logistics for the project. John conducted vegetation classification, a botanical inventory, identification of special-status plant species, as well as plant identification and classification based on the wetland indicator status of the plant species. Wetland delineation information compiled was put into a wetland delineation report and used by the Corps to verify potentially jurisdictional waters of the United States in that region. Role: Lead Botanist/Wetland Ecologist | Dates involved: 2009-2017

California High Speed Rail Project Wetland Delineation* | Chowchilla, California, United States | 2013-2017 | Wetland Ecologist

John collected extensive wetland delineation field surveys in support of a delineation of waters of the United States and State for the Central Valley Wye segment of the project, in Merced and Madera Counties. These delineations encompassed a variety of habitats including riparian forest, freshwater marsh, seasonal wetland, and extensive agricultural land. Data collected also involved mapping wetland features using ArcGIS and GPS units, vegetation classification, a botanical inventory, as well as identification and classification based on the wetland indicator status of the plant species. Wetland delineation information compiled was put into a wetland delineation report and used by the Corps to verify potentially jurisdictional waters of the United States in that region. Role: Wetland Ecologist | Dates involved: 2013-2017

RENEWABLE ENERGY

Tehachapi Renewable Transmission Project Biological Consulting Services* | Southern California | Wildlife Biologist

John conducted monitoring and surveys in support of a large-scale transmission line project through several areas of Southern California, specifically Segments 7 and 8. This involved appropriate project training, using the FRED and Sugarsync programs, and becoming familiar with SCE protocols. His duties include construction monitoring for wetlands, nesting birds, and other biological resources.

Tehachapi Renewable Transmission Project (TRTP) Wetland Delineation* | Greater Los Angeles Area and Angeles National Forest, Los Angeles County, California | Wetland Ecologist

John conducted surveys in support of large-scale wetland delineation report for a proposed transmission line through several areas of Southern California, including in the Angeles National Forest. His duties included collecting data to characterize waters of the United States, including wetlands, and adjacent vegetation types per guidance from the Corps. Data was collected and mapped using Tremble Yuma GPS units and plotted on aerial photo-based maps utilizing ARCPAD software.

BOTANICAL SURVEYS

Mokelumne River Plant Surveys* | El Dorado National Forest, California | Lead Botanist

John conducted large-scale vegetation mapping in addition to special-status plant surveys along PG&E roads near the Mokelumne River in El Dorado National Forest. His duties included mapping and reporting any special-status/forest service sensitive species or communities located and led to the observation of several protected species in the area. A subsequent report was prepared using the results of the survey.

North County Corridor EIR/EIS* | Modesto, California, United States | 2011-2017 | Lead Botanist/Wetland Ecologist

John conducted large-scale botanical surveys and wetland delineation in and around Oakhurst, Riverside, and Salida, California. John conducted vegetation classification, a botanical inventory, identification of special-status plant species, as well as plant identification and classification based on the wetland indicator status of the plant species. Wetland delineation information compiled was used by the U.S. Army Corps of Engineers to verify potential jurisdictional waters of the United States. Role: Lead Botanist/Wetland Ecologist | Dates involved: 2011-2017

BIOLOGICAL MONITORING

CP Biological Effectiveness Monitoring* | Sacramento, California | Lead Botanist

John conducted several types of vegetation mapping surveys for the Natomas Basin Conservancy, a primarily agricultural area north of Sacramento. This includes mapping land cover types, surveying for special-status plant species, surveying for noxious weed populations in the area, as well as assessing the change in land cover types over the last five years. Data was used to determine habitat for special-status species including the giant garter snake and Swainson's hawk.

Caltrans Restoration Project - Service-Approved Biological Monitoring for Red-Legged Frog and California Tiger Salamander* | Livermore, California, United States | 2017 | Wildlife Biologist

John monitored mitigation and restoration efforts near Livermore, California, which included monitoring for disturbance near bodies of water that had known occurrences for California tiger salamander and red-legged frog. This included pre-construction surveys, monitoring all ground disturbance activities, and environmental education concerning the California tiger salamander and red-Legged Frog. Role: Wildlife Biologist | Dates involved: 2017

Palermo Transmission Line Project Habitat Monitoring For Giant Garter Snake* | Marysville, California | Wildlife Biologist

John monitored mitigation and restoration efforts near Marysville, California, which include surveying wetland habitat suitability for Giant Garter Snake. His duties included mapping, sampling, and assessing wetland vegetation in areas restored as giant garter snake habitat.

STUDIES AND EVALUATIONS

Rosamond PV Solar Technical Studies* | Rosamond, California | Lead Botanist/Wetland Ecologist

John conducted botanical surveys in addition to a wetland delineation on the Rosamond PV project site in Kern County, California. John conducted vegetation classification, a botanical inventory, identification of special-status plant species, as well as plan identification and classification based on the wetland indicator status of the plant species. Wetland delineation information compiled was used by the Corps to verify potentially jurisdictional waters of the United States.

APPROVALS AND PERMITTING

Carrizo to Midway Permitting Augmentation* | San Luis Obispo and Kern Counties, California | Wetland Ecologist

John conducted a wetland delineation along a transmission line from the Carrizo Plain to Buttonwillow, California. His duties included identifying local vegetation types, assessing soils, and identifying hydrologic indicators. Wetland delineation information compiled was used by the Corps to verify potentially jurisdictional waters of the United States in that region.

WILDLIFE SURVEYS AND STUDIES

Swainson's Hawk Surveys and Monitoring - West Feather River Levee Project,* | Feather River, California | Lead

Wildlife Biologist

John conducted protocol level Swainson's Hawk surveys for four year concurrently in support of a large-scale levee improvement project along the Feather River. His duties included construction surveying for Swainson's hawks, monitoring for nesting birds and other biological resources.

Crane Valley Dam, Stockpile Expansion Bio Surveys* | Sierra National Forest, California | Lead Botanist/Wildlife Biologist

John was tasked with providing environmental surveys and documentation to support the additional quarry stockpile areas needed for the Crane Valley Dam Seismic Retrofit Project. Surveys conducted include wetland resources, special-status/forest service sensitive plant species, California spotted owl surveys, and Northern goshawk surveys. This included duties, such as mapping wetlands using Tremble GPS units, walking transects for plant species, and conducting playback surveys for the aforementioned bird species. A subsequent report was prepared using the results of the survey.

CONSTRUCTION MONITORING

Shiloh III Wind Farm Construction Monitoring for Wetlands, California Tiger Salamander* | Solano County, California, United States | 2010-2012 | Wildlife Biologist

John monitored the construction of a wind farm in Solano County, which included monitoring for disturbance near wetlands that had known occurrences for California tiger salamander. This included ensuring that wetlands and their associated buffers were not disturbed, mapping potential wetlands/habitat, and environmental education concerning the salamander. Role: Wildlife Biologist | Dates involved: 2010-2012

ENVIRONMENTAL CONSULTING

Raptor and Songbird Banding* | Northern California | 2008-2015 | Wildlife Biologist

John participated in local bird banding efforts near the Bay Area and Sacramento, California. Birds were trapped using a variety of techniques involving mist nets, dho-gaza nets, and bow nets. Bird bands, both lock and butt varieties, were placed on the bird's leg, after which data was collected and the birds released. Species include numerous songbirds in addition to raptor specific banding which involves bird of prey species.

Gabe Youngblood

Project Biologist

Gabe has 15 years of experience as a professional biologist working throughout northern California. He has conducted protocol-level and targeted surveys, biotic assessments, and construction site monitoring for numerous species of special-status wildlife including benthic invertebrates, fairy shrimp, terrestrial mollusks, valley elderberry longhorn beetle, Shasta salamander, California red -legged frog, giant garter snake, northern goshawk, spotted owl, willow flycatcher, pileated woodpecker, white-headed woodpecker, and forest carnivores. He also has significant experience in conducting botanical surveys, wetland delineations, Forest Inventory Analysis, and fish population surveys. In addition to biological field surveys and monitoring, Gabe has experience with the regulatory requirements of the California Environmental Quality Act, National Environmental Policy Act, and Endangered Species Act; and he has participated in the preparation of natural environment study reports, biological assessments, environmental assessments, initial studies, and environmental impact reports.

EDUCATION

Bachelor of Science, Wildlife Management, Humboldt State University, Arcata, California, 2006

PROJECT EXPERIENCE

ENVIRONMENTAL

Big Hill Carnivore Survey* | California | 2011 | Biologist

Conducted a sensitive forest carnivore survey within Plumas National Forest. Methods involved the use of photographic bait stations to detect sensitive species.

Forest Inventory Analysis* | California | 2008-2011 | Forestry Technician

Conducted sampling of permanent vegetation plots throughout multiple National Forests in California as part of USDA Forest Service Forest Inventory Analysis.

Coleman-South Guy and Anchor Project* | California | 2009 | Biologist

Conducted a delineation of waters of the United States within a 50-foot radius around each of 40 wood poles located along an 8-mile stretch of the Coleman-South 60 kV Line.

Cottonwood–Roseville Optical Ground Wire Project Wetland Delineation* | California | 2012 | Biologist

Performed an assessment of biological and wetland resources for a large transmission line upgrade project extending from Shasta to Placer counties, California. The assessment included a wetland delineation to U.S. Army Corps of Engineers standards in the entire study area, which encompassed 2,700+ acres, extended 140+ miles through 7 counties, and involved hundreds of private landowners.

L402 ILI Upgrade Project | Redding, California | 2015-2016 | Biologist

Evaluated habitat to support special-status species and defined boundaries of waters of the United States. Developed avoidance and minimization measures to avoid impacts on sensitive resources. Conducted pre-construction nesting bird surveys.

L402 Strength Test * | Redding, California | 2016 | Biologist

Performed pre-construction nesting bird surveys and biological constraints assessments. Conducted a delineation of waters of the United States at project locations where wetlands were identified during biological constraints assessments.

Logan Creek Pole Replacement Project* | California | 2012 | Biologist

Conducted a delineation of waters of the United States in a 25-foot radius around 20 wooden utility poles along one-and-a-half miles of 12 kV Line located adjacent to County Road 39.

Mokelumne River Re-Licensing Support, Fishery Surveys * | 2009 | Biologist

Collected aquatic habitat (SWAMP) data and conducted snorkel and backpack electrofishing surveys to assess fish species composition and fish abundance on several tributaries to the Mokelumne River.

Northern Spotted Owl and Barred Owl Surveys* | California | 2010 | Biologist

Conducted protocol-level northern spotted owl surveys and experimental barred owl surveys for seven vegetation management projects located in the Mendocino National Forest.

Region 5 Sensitive Mammals Evaluation* | California | 2007 | Biologist

Prepared an ecological assessment for over 100 rare mammals within National Forest lands throughout California. The assessment included a comprehensive

** denotes projects completed with other firms*

literature review and preparation of a summary of the biology and ecology of each species; culminating in a determination of whether each species should be considered "Sensitive" to National Forest System management actions.

Roseville–Elverta Optical Ground Wire Project* | Roseville, California | 2013 | Biologist

Performed biological surveys, worker awareness training, and environmental monitoring for Western's Roseville-Elverta Optical Ground Wire project. Environmental issues included vernal pools and other wetlands, nesting raptors, and other nesting birds.

Klamath Northern Spotted Owl Surveys* | California | 2010 | Biologist

Conducted northern spotted owl surveys supporting management activities on the Klamath National Forest. Northern spotted owl surveys were conducted following the protocol-level "nighttime surveys using roads" technique. Follow-up surveys and nest searches were also conducted following the survey protocol.

L-121 Strength Test * | Yuba City, California | 2016 | Biologist

Performed construction monitoring for giant garter snake during gas pipeline inspection and replacement.

Deschutes Road Widening Project – Phase 1* | California | 2016-2017 | Biologist

Conducted a wetland delineation survey, biological reconnaissance survey, and protocol-level valley elderberry longhorn beetle survey. Prepared wetland delineation and natural environmental study reports, and a technical memo explaining why project would have no impacts on valley elderberry longhorn beetle.

Parkville Road at Ash Creek Bridge (06C-0220) Replacement Project* | California | 2015

Conducted a wetland delineation survey and biological reconnaissance survey. Prepared a wetland delineation report and a technical memo explaining why the project would have no impacts on California red-legged frog.

Shasta Dam and Reservoir Enlargement NEPA Documentation and Technical Studies* | California | 2009-2015 | Biologist

Conducted surveys for a variety of technical studies related to the proposed enlargement of Shasta Lake. These studies include survey and manage terrestrial mollusks, amphibians, forest carnivores, botanical resources, wetland resources, and avian species.

Pileated Woodpecker and White-Headed Woodpecker Surveys* | Oregon | 2007 | Biologist

Conducted surveys for pileated woodpecker and white-headed woodpecker as part of the biological resource monitoring of 24,000 acres in the Sun Pass State Forest. The surveys included determination of presence/absence of these species and follow-up surveys to locate nest stands or trees.

PG&E McCloud/Pit Re-Licensing Support* | California | 2007 | Biologist

Conducted protocol surveys for northern spotted owl and Shasta salamander at McCloud Reservoir, Hawkins Bar, Iron Canyon Reservoir, Pit 5, Pit 6, and Pit 7.

Pipeline Pathways Program* | California | 2013-2015 | Biologist

Conducted environmental constraints analyses, San Joaquin Valley Habitat Conservation Plan (SJVHCP) pre-activity surveys, CDFW Master Stream Alteration Agreement Verification Request Forms, preconstruction nesting bird surveys, worker environmental training, and monitoring. Work was conducted in Glenn, Yolo, Stanislaus, San Joaquin, Sutter, Colusa, Shasta, Tehama, Trinity, Fresno, and Amador counties.

Quartz Hill Road Improvement Project* | Redding, California | 2016-2017 | Biologist

Preformed reconnaissance-level biological survey, vegetation and habitat mapping, and a delineation of waters of the United States. Prepared Natural Environmental Study and wetland delineation reports.

Eastside Road at Onley Creek Bridge Replacement Project* | Redding, California | 2016 | Biologist

Preformed reconnaissance-level biological survey, vegetation and habitat mapping, and a delineation of waters of the United States.

On-Call Biological Services Western Area Power Administration | California | 2011-Present | Biologist

Currently conducting biological surveys, preparing impact assessments, and developing biological conservation measures for Western's Integrated Vegetation Management Program. Tasks also include Migratory Bird Treaty Act compliance surveys for avian species and biological monitoring for giant garter snake, California red-legged frog, and nesting birds.

Orland Sand and Gravel Delineation of Stony Creek Ordinary High Water Mark* | California | 2017

Preformed delineation of the ordinary high water mark of Stony Creek on four privately owned parcels. Prepared ordinary high water mark delineation report.

** denotes projects completed with other firms*

Sheryl Creer M.S.

Biologist, Botanist

Sheryl has over 10 years of experience as a field biologist and botanist in California and specializes in large-scale infrastructure and utilities projects such as electric transmission lines, gas pipelines, wind energy, and groundwater storage and recovery. She conducts rare plant surveys, wetland and drainage delineations, impacts analyses, habitat assessments, maps vegetation, and prepares habitat restoration and mitigation and monitoring plans. Sheryl also has extensive experience in environmental inspection and construction monitoring. She also prepares technical documents and permit applications for various regulatory agencies including the U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and the United States Fish and Wildlife Service (USFWS).

EDUCATION

B.S., Biology, concentration in Botany, San Francisco State University, San Francisco, California, 2010

M.S., Biology, concentration in Ecology, Evolution, and Conservation, San Francisco State University, San Francisco, California, 2013

MEMBERSHIPS

Member, former Board Member, California Botanical Society

Member, California Native Plant Society, 2009-Present

AWARDS

2013 Department of Biology Distinguished Graduate Student Award, San Francisco State University

PROJECT EXPERIENCE

BOTANICAL SURVEYS

Eldorado-Lugo-Mohave Transmission Line Upgrade Project* | Mojave Desert and Other Locations in California and Nevada, California and Nevada, United States | 2014-2016 | Field Lead

Sheryl coordinated a team of eight botanists for protocol-level rare plant surveys and vegetation mapping along a transmission line corridor spanning 245 miles from Hesperia, California, east to Laughlin, Nevada, and north to Boulder City, Nevada. She coordinated and conducted wetland and drainage delineations along the same corridor. Special-status species mapped during plant surveys included short-joint beavertail cactus (Opuntia basilaris var. brachyclada), spiny-hair blazing star (Mentzelia tricuspis), and Mojave menodora (Menodora spinescens var. mohavensis), among others. Role: Field Lead | Dates involved: 06/2014–06/2016

650 Line Rebuild Project* | Tahoe National Forest and Placer County, California, United States | 2014-2016 | Botanist/Wetland Specialist

Sheryl conducted biological surveys—including wetland delineations, vegetation mapping, and rare plant and noxious weed surveys—for the wood to steel rebuild of approximately 9 miles of electric transmission line in Tahoe National Forest and adjacent areas in Placer County. She prepared the Botanical Resources Survey Report and Preliminary Wetland Delineation Report as well as the drainage delineation and permit application package for a CDFW Lake or Streambed Alteration Agreement (LSAA). Sheryl also developed a post-construction Habitat Restoration Plan that included the restoration of wetlands and riparian zones and monitoring of a population of a special-status plant species, Plumas ivesia (Ivesia sericoleuca). She assisted with pre-construction special-status wildlife species surveys, including pedestrian night surveys for bats, burrow mapping, and pedestrian amphibian surveys. Role: Botanist/Wetland Specialist | Dates involved: 05/2014–08/2016

Pipeline Safety & Reliability Project* | San Diego County, California, United States | 2015 | Botanist

Sheryl conducted protocol-level rare plant surveys, field confirmation of vegetation mapping, and a wetland delineation for the construction of an approximately 50-mile natural gas transmission pipeline in San Diego County. She assisted in identifying and mapping host plants for Quino checkerspot butterfly (Plantago erecta and Castilleja exserta) and Hermes copper butterfly (Rhamnus crocea). Sheryl also authored the Special-Status Plant Species Report and co-authored the Biological Technical Report, the Jurisdictional Delineation Report, and the Biological Resources section of a Proponent's Environmental Assessment (PEA) for the project. Role: Botanist | Cost: unknown | Dates involved: 02/2015–06/2015

ENVIRONMENTAL INSPECTION

Groundwater Storage and Recovery Project* | San Mateo County, California | 2015-2016 | environmental inspector

Sheryl served as an environmental inspector and monitor for the construction and operation of 13 new groundwater well facilities in San Mateo County. The project involved environmental inspection, specialty monitoring, and interpretation of agency-imposed mitigation measures associated with sensitive species and water quality.

** denotes projects completed with other firms*

BIOLOGICAL MONITORING

Line 109 Hydrostatic Testing* | Woodside, California, United States | 2015 | Lead Biological Monitor

Sheryl conducted biological monitoring for the excavation and hydrostatic testing of a natural gas transmission pipeline located within critical habitat for Bay checkerspot butterfly. She prepared environmental compliance training materials and provided training to crew members and supervisors. Sheryl also prepared daily environmental inspection reports. Upon project completion, she assisted with habitat restoration and prepared a post-construction report for the USFWS. Role: Lead Biological Monitor | Dates involved: 07/2015-11/2015

ECOSYSTEM RESTORATION

City of Sunnyvale Primary Water Treatment Facility Upgrade* | Sunnyvale, California | 2017-2018

Sheryl managed the development of a restoration plan for a wetland and riparian mitigation site. She also implemented and monitored compliance with project permit requirements including coordinating nesting bird and burrowing owl surveys and developing and providing worker environmental awareness training.

VEGETATION ASSESSMENTS

Hollister 115 Kilovolt Power Line Reconductoring Project* | San Benito County, California, United States | 2014-2016 | Bontanist

Sheryl conducted 3 years of annual vegetation restoration monitoring and reporting for the reconductoring and replacement of structures along approximately 16 miles of 115 kilovolt power lines. Vegetation monitoring included sampling vegetation within rangeland, chaparral planting monitoring, and wetland monitoring including soils, hydrology, and vegetation. She also prepared annual reports for agency submittal. Role: Botanist | Dates involved: 04/2014-04/2016

North-South Interconnect Project* | San Bernardino and Riverside Counties, California | 2014-2016

Sheryl complied and analyzed revegetation monitoring data collected during post-construction monitoring for the conversion of approximately 76 miles of petroleum pipeline to natural gas, as well as the construction of approximately 1.2 miles of new pipeline in San Bernardino and Riverside counties. She also authored the Year 3 Restoration and Revegetation Annual Report.

PUBLICATIONS

Creer, S. and R. Patterson. Book Review: The Drunken Botanist, by Amy Stewart.. *Madroño*, 2014, pp. 61(1):144-145.

PRESENTATIONS

Sub-Family Reunion: Will the North American Arbutoids be Invited?. *California Botanical Society Symposium*, 2013.

Addressing Paraphyly in Arbutus (Ericaceae). *Northern California Botanists Symposium*, 2014.

** denotes projects completed with other firms*

Brendan Cohen

Biologist/Environmental Scientist

Brendan is a professional biologist and associate environmental planner with experience evaluating biological and environmental impacts in California. He has conducted special-status species surveys, habitat site assessments, wetland delineations, and prepared biological sections for CEQA/NEPA environmental documents. He routinely implements Worker Environmental Awareness Programs (WEAP), conducts preconstruction surveys, and performs biological construction monitoring. He has experience drafting Biological Resource Assessments, Biological Assessments, Jurisdictional Determinations/Wetland Delineations, and Caltrans Natural Environment Studies. Brendan has experience with GPS equipment for arborist surveys, wetland delineations, and other natural resource analyses.

Brendan also drafts CEQA/NEPA environmental documents which includes analyzing impacts to various environmental resources and reviewing and preparing technical studies. Brendan has assisted in the preparation of environmental documents including Initial Studies/Mitigated Negative Declarations (IS/MND) and Environmental Impact Reports/Environmental Assessments (EIR/EA). He has also assisted with preliminary documents and technical studies for Caltrans-funded projects. These include Preliminary Environmental Awareness Reports, Preliminary Environmental Study forms, Section 4(f) analyses, Community Impact Assessments, and Visual Impact Assessments. He has also prepared public noticing documents, responded to public comments, drafted Mitigation Monitoring Programs (MMP), and prepared final document packages.

EDUCATION

Bachelor of Science, Ecology and Evolutionary Biology, University of California, Santa Cruz, California, 2013

CERTIFICATIONS & TRAINING

CPR/First Aid Certification, Sacramento, California, 2017

Rare Pond Species Survey Techniques Workshop. California tiger salamander (CTS), Western Pond Turtle, and California red-legged frog (CRLF). Workshop allowed for the handling of larval CTS and adult CRLF in the presence of a permitted biologist, Santa Rosa, California, 2017

Ringtail Workshop, Yuba City, California, 2017

Amphibian of the Bay Area Workshop, Santa Rosa, California, 2016

CEQA Essentials Workshop, West Sacramento, California, 2016

CEQA Training for Biologists, Rancho Cordova, California, 2016

CNDDB/BIOS/RareFind5 Training, Sacramento, California, 2015

Western Pond Turtle Workshop, Petaluma, California, 2015

Habitat Conservation Planning Workshop, Vacaville, California, 2015

MEMBERSHIPS

Member, Superior California Chapter, California Association of Environmental Professionals

PROJECT EXPERIENCE

ASSESSMENT, PERMITTING AND COMPLIANCE

APHIS-WS Integrated Wildlife Damage Management (IWDM) Program and Agreement Renewal* | Monterey County, California | 2017

The USDA Animal Plant and Health Inspection Service (APHIS) – Wildlife Services (WS) division implements a program in Monterey County to protect human health, agricultural resources, and infrastructure from predators and nuisance wildlife. Analyzed the biological impacts associated with renewal of the cooperative agreement for the IWDM program. Drafted the Initial Study biological resources section.

BNSF Le Grand to Merced Double Track Project* | Merced County, California | 2015 | Biological Monitor

Conducted daily biological construction monitoring for the construction of a new railroad track. Species of concern included San Joaquin kit fox, western pond turtle, giant garter snake (GGS), CTS, burrowing owl, Swainson's hawk and other nesting birds. Implemented buffers for active nests, trained workers using a WEAP and presented daily morning updates to the work crew.

California State Prison, Los Angeles County Wind Energy Generation Project* | Los Angeles County, California | 2016-2017 | Environmental Planner

Drafted an IS/MND evaluating impacts from the development of a wind turbine within the California State

** denotes projects completed with other firms*

Prison, Los Angeles County. Responded to public comments, filed the Notice of Intent and IS/MND with the State Clearing House and Los Angeles County Clerk, and prepared the final document package.

Camanche Tank 9 Replacement* | Ione, California | 2017 | Biologist/Biological Monitor

Conducted a preconstruction sensitive area demarcation, nesting bird survey, WEAT, and compliance monitoring. Duties included demarcating an area for exclusionary fencing to be placed around an elderberry shrub, placing pin flags at potential CTS burrows, and identifying active bird nests prior to construction. Conducted a WEAP for new workers as well as daily monitoring of ground disturbing activities.

Chappell Road Annexation Project* | Hollister, California | 2016 | Biologist

This project included the preparation of an EIR for a Sphere of Influence Annexation on a property in the City of Hollister. Conducted a biological site visit and evaluated the potential for special-status species to occur including burrowing owl, San Joaquin kit fox, San Joaquin whipsnake, and nesting birds. Drafted the biological section of the EIR and prescribed minimization measures for the above species.

City of Elk Grove Routine Channel Maintenance* | Elk Grove, California | 2015-2016 | Biologist and Monitor

Monitored maintenance activities within the City's drainages and creeks under City's Routine Maintenance Agreement and Routine General Permit. Performed daily WEAPs and preconstruction surveys for GGS, Valley Elderberry Longhorn Beetle (VELB), western pond turtle, and nesting migratory birds and raptors.

Community Pipeline Safety Initiative Program* | Multiple Locations, California | 2017-Present | Biologist

Performed preconstruction nesting bird surveys at multiple locations throughout California's Central Valley. Duties included performing reconnaissance level bird surveys following established protocols, and documenting active bird nests.

Corral Bottom Road at Trinity River Bridge Replacement Project* | Trinity County, California | 2017-Present | Environmental Planner

Drafted the Drafted the Visual Impact Assessment (VIA) for a bridge replacement project. Conducted the fieldwork for the VIA which included photographing the project from key viewpoints.

Humboldt Bay Trail South* | Humboldt County, California | 2017 | Environmental Planner

Drafted the VIA for a Class I multi-use trail project. Conducted the fieldwork for the VIA which included photographing the project from key viewpoints.

Old Town Elk Grove Streetscape Project, Phase II* | Elk Grove, California | 2016 | Environmental Planner and Biologist

Drafted an IS/MND evaluating impacts from implementation of a streetscape improvement project in the Old Town Elk Grove Historic District. Prepared the IS/MND, created the MMP and handled public noticing requirements. Responded to public comments and drafted the City's Staff Report and Resolution to present to the City Council for project adoption.

Pacific Connector Gas Pipeline Project* | Environmental Analyst

Assisted in the preparation of technical studies for the creation of a 232-mile long pipeline project. Revised technical studies that support the project's compliance with the Northwest Forest Plan.

Soledad Wind Energy Generation Project 2* | Soledad, California | 2016 | Environmental Planner

The City of Soledad proposed to install a second wind turbine within the City's wastewater treatment plant to provide 100% renewable energy. Drafted an IS/MND, responded to public comments, prepared the MMP, and filed the Notice of Completion.

Swainson's Hawk Conservation Easement Monitoring* | Elk Grove, California | 2015-2016 | Biologist

Visited sites under annual conservation easements for Swainson's hawk foraging habitat with the City of Elk Grove. Verified crop types, biological conditions, and the presence of nearby raptor nests. Drafted annual status reports documenting condition changes and compliance with the easement.

Taylor Boulevard Development* | Pleasant Hill, California | 2016 | Biologist

Conducted a peer review of biological studies and performed a site visit documenting habitat for a residential subdivision project. Evaluated the site for potential occurrences of VELB, burrowing owl, and Alameda whipsnake. Drafted a peer review memo and biological section for the IS/MND.

Eastside Road at Olney Creek Bridge Replacement Project* | Redding, California | 2017 | Environmental Planner

Drafted the IS, MND, and MMP. Resources analyzed in the environmental document include aesthetics, agricultural resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazardous materials, hydrology, land use, mineral resources, noise, population, public services, recreation, transportation, tribal cultural resources, and utilities.

Hawkins Station Generator Project* | Santa Rosa, California | 2016 | Monitor

Conducted biological monitoring for the placement of a new generator pad at a Cal Water station within Santa Rosa. The project site contained adjacent vernal pools; monitored for potential CTS activity and habitat destruction.

Honeydew Bridge Replacement Project* | Humboldt County, California | 2017-Present | Environmental Planner

Drafted the VIA. Conducted the fieldwork for the VIA which included photographing the project from key viewpoints. Drafted the EIR/EA. Resources analyzed included land use, community impacts, utilities, traffic,

** denotes projects completed with other firms*

visual/aesthetics, paleontology, hazardous waste, air quality, noise, energy, biological resources, greenhouse gases, and cumulative impacts.

Horseshoe Bend Levee Improvement Project* | Bethel Island, California | 2016 | Biologist and Environmental Planner

Assisted with a habitat site assessment and wetland delineation. Assisted in drafting the Jurisdictional Determination and Biological Assessment. Special-status species evaluated included vernal pool crustaceans, anadromous fish. Assisted BIMID in circulating the IS/MND for public review and responding to public comment.

Live Oak WWTP Plant Solar Project* | Live Oak, California | 2016 | Biologist

Conducted a site visit and evaluated biological impacts for the Live oak wastewater treatment plant to install solar panels on their property. Analyzed potential habitat and impacts to burrowing owl, VELB, GGS, CTS, and nesting birds. Drafted the IS/MND biology section and prescribed minimization measures for the above species.

McKean Road Tank and Pipeline Project* | Santa Clara County, California | 2017 | Biological Monitor

Conducted biological construction monitoring for the construction of a new water tank and pipeline. Species of concern included CTS, CRLF, Least Bell's vireo, western pond turtle, Bay checkerspot butterfly, burrowing owl, Blainville's horned lizard, white-tailed kite, golden-eagle, pallid bat, San Francisco dusky-footed woodrat, Chinook salmon, Steelhead, and special-status plants. Performed daily pre-activity clearance surveys; trained workers using a WEAP; and monitored project's compliance to 1602 Streambed Alteration Agreement, USFWS Biological Opinion, and Santa Clara Valley Habitat Conservation Plan permit.

SPMUD Trunk Sewer Relocation Project* | Rocklin, California | 2017 | Biological Monitor

Performed daily pre-activity surveys, WEAP trained new workers, and monitored the status of birds nesting near the project area.

** denotes projects completed with other firms*

Sara Cortez

Senior Biologist

As a senior biologist with over 13 years of experience, Sara has been involved in a variety of project including collaborating with the U.S. Army Corps of Engineers (Corps) and Regional Water Quality Control Board (RWQCB) CWA Sections 401 and 404, California Department of Fish and Wildlife (CDFW) California Fish and Game Codes (CFGC) Sections 1600 and 2081, and with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) for projects requiring federal Endangered Species Act (ESA) authorization.

Sara has acquired experience on a wide variety of projects throughout California. She has a diverse skillset in wetland ecology, botany, aquatic invertebrate biology and water quality analysis. She has experience surveying and monitoring special-status species including; California red-legged frog (Rana draytonii), burrowing owl (Athene cunicularia), California tiger salamander (Ambystoma californiense) and federally listed vernal pool crustaceans.

Sara routinely prepares wetland delineations, habitat suitability assessments, and special-status species investigations and has prepared numerous permit applications. She has also prepared reports and assessments to document compliance with California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), Migratory Bird Treaty Act, federal and state Endangered Species Acts (ESA), Clean Water Act (CWA), and California Fish and Game Codes (CFGC).

EDUCATION

Bachelor of Science, Environmental and Resource Sciences, Hydrobiology Emphasis, University of California, Davis, California, 2002

CERTIFICATIONS & TRAINING

California Rapid Assessment Method (CRAM) Practitioner Riparian Systems–Riverine Module, San Francisco Estuary Institute, Moss Landing, California, 2012

California Rapid Assessment Method (CRAM)-Estuarine Module, San Francisco Estuary Institute, Costa Mesa, California, 2012

Wetlands Restoration Ecology, Tiburon Romberg Center for Environmental Studies, San Francisco State University, Tiburon, California, 2011

Biology Sacramento Valley and Lower Foothill Region, Auburn and Walnut Grove, California, 2008

Biology and Management of the California Red-legged Frog (Rana draytonii) Workshop, Livermore, California, 2008

Basic Wetland Delineation Training, U.S. Army Corps of Engineers (Corps), San Diego, California, 2007

Biology and Management of the California Tiger Salamander (Ambystoma californiense) Workshop, Livermore, California, 2007

California Fairy Shrimp (Linderiella occidentalis) Class, Davis, California, 2006

Aquatic Bioassessment Survey Training, Roseville, California, 2006

Aquatic Weed School, Davis, California, 2004

Field Botany Course, Sacramanto, California, 2005

Tricolored Blackbird (Agelaius tricolor) Biology, Conservation, and Survey Techniques Workshop, Folsom, California, 2016

PROJECT EXPERIENCE

WILDLIFE ASSESSMENTS

Vernal Pool Species Study and Analysis* | Sacramento County, California | Deputy Project Manager

As deputy project manager, Sara included the review and compilation of information pertaining to the six listed vernal pool crustaceans in California and southern Oregon. During the course of this project, Sara held position in the USFWS Sacramento Office and given access to USFWS files. She coordinated directly with Holly Herod, the Sacramento Valley Branch Chief, through completion of the project. Following the review and compilation process of the database, the relevant species information was summarized and presented in a report to USFWS for use in their preparation of the five-year status reviews for these six species.

SCAS Terminal B Replacement and Modernization Program "Big Build"* | Sacramento County, California | Senior Biologist

As senior biologist, Sara conducted biological monitoring both during and prior to active construction of this project. Tasks included pre-construction clearance and monitoring of the project site for presence of sensitive resources including burrowing owl (Athene cunicularia) and Swainson's hawk (Buteo swainsoni). Sara acted as field team leader and organized and facilitated the pre-construction clearance of project areas for presence of burrowing owls. Biological monitoring continued during the construction activities at the airport as part of the Terminal Modernization Program, which was finalized in October 2012.

Habitat Conservation Plan (HCP)* | Sacramento County, California | Project Coordinator

Sara was involved in this multi-species HCP is being prepared to cover SMUD's covered activities (primarily operations and maintenance activities) in its Service Area (which encompasses Sacramento County and portions of adjacent counties). Species proposed for inclusion in the HCP would include; vernal pool plants and invertebrates, California tiger salamander (Ambystoma californiense), giant garter snake (Thamnophis gigas), Swainson's hawk (Buteo swainsoni), and burrowing owl (Athene cunicularia). As project coordinator of the SMUD HCP, Sara was responsible for preparing and reviewing the document, staff management, contract/schedule management, and Geographic Information System (GIS) data analysis. She was also responsible for regular collaboration and coordination between regulatory agencies (U.S. Fish and Wildlife Service [USFWS] and California Department of Fish and Wildlife [CDFW]) and the SMUD Environmental Management team to meet both the required biological and statutory requirements of the HCP and the needs of SMUD as a utility provider. Sara also attended monthly meetings with SMUD and the regulatory agencies to discuss and determine various approach strategies, reviewed technical documents, discussed species conservation strategies and determine mutually agreeable approaches to the HCP document sections.

WILDLIFE SURVEYS AND STUDIES

On-Call Services, Burrowing Owl Surveys and Monitoring* | Sacramento, California | Senior Biologist

As senior biologist, Sara assisted biologists at SAFCA in performing protocol-level burrowing owl (Athene cunicularia) surveys and implementing passive relocation methods to exclude burrowing owls from canal system levees set to be retrofitted. She conducted emergency biological monitoring for burrowing owl during construction of local levee protection projects. Sara also presented worker awareness training for the burrowing owl.

Campus Parkway Phase I* | Merced County, California | Senior Biologist

As senior biologist, Sara performed site biological field surveys which included nesting raptor, San Joaquin kit fox (Vulpes macrotis mutica), burrowing owl (Athene cunicularia), and nesting songbird surveys. Subsequent summary documents were also created for the project detailing the survey protocols followed and the findings of the surveys.

SMUD Nature Preserve Mitigation Bank* | Sacramento County, California | Biologist

As biologist, Sara conducted large branchiopod and California tiger salamander (Ambystoma californiense) aquatic surveys. The California tiger salamander aquatic surveys were completed to document overwintering larvae in a managed stock pond and included tissue collection for genetic analysis.

TRANSIT

On-Call Biological Support Services—Caltrans, East Counties of District 4* | Multiple Counties, California, United States | 2018 | Senior Biologist/USFWS Liaison

As part this on-call contract for biological support services, Sara coordinated with Caltrans to avoid listed species and their habitats, prepared effects determinations, coordinated technical assistance, reviewed Biological Assessments, prepared Biological Opinions per Section 7 of the Endangered Species Act, and coordinated with Caltrans during the construction phase to confirm regulatory compliance of permitted activities as related to Bay Area federally-threatened and endangered species. Role: Senior Biologist/USFWS Liaison | Dates involved: 01/2017–07/2018

California High Speed Rail, CP4—California High-Speed Rail Authority* | Central Valley, California, United States | 2018-Ongoing | Senior Biologist

Sara is working on various Incidental Take Permit (ITP) Amendments for the CDFW to address changes in the alignment footprint and/or covered activities of the permit and address any potential changes to the associated effects to Covered Species under the take permit. Role: Senior Biologist | Dates involved: 08/2018–present

BRIDGES

San Joaquin River Bridge on Italian Bar Road Replacement Project* | Fresno County, California | Biologist

Sara was involved in a project to replace the Italian Bar Road Bridge crossing the San Joaquin River at the Fresno-Madera county line in the Sierra National Forest. This is a federally funded California Department of Transportation (Caltrans) Local Assistance project. She completed a biological resources site assessment and prepared the U.S. Forest Service (USFS) Special Use Permit Application for the project.

OIL AND GAS PIPELINES

PG&E Line 406/407 Natural gas Pipeline* | Yolo County, Sutter County, Placer County, California | Senior Biologist

As senior biologist, Sara acted as third-party lead field monitor for the California State Lands Commission during construction activities. She managed biological monitoring staff and helped ensure project compliance per the project permits and the Mitigation Monitoring and Reporting Requirements during the first phase of project construction activities which involved the construction of a newly established section of natural gas transmission pipeline in Yolo County.

Pacific Gas and Electric (PG&E) – Line 108 Natural Gas Pipeline Environmental Impact Report (EIR)* | Sacramento County, California | Senior Biologist

As senior biologist, Sara prepared the Draft EIR (DEIR) with respect to plant and wildlife resources potentially affected by the project and acted as lead third party Field Monitor for the California State Lands Commission during construction activities. She managed biological monitoring staff and helped ensure project compliance per the project permits and the Mitigation Monitoring and Reporting Requirements during project construction activities which included the replacement of 11 miles of natural gas transmission pipeline.

TRANSPORTATION

California High Speed Train System -Merced to Fresno Section Construction Package 1* | Fresno County and Madera County, California | Deputy Project Manager

As deputy project manager, Sara coordinating closely with the client to prepare all pre-construction reports, surveys, and actions to be consistent and in compliance with the environmental permits and the Mitigation Monitoring and Reporting Requirements.

STORMWATER

Constra Costa Clean Water Program* | Constra Costa, California | Senior Biologist

As senior biologist, Sara assisted in the implementation of a 2-year evaluation of organic-based fertilizer technologies as a best management practice to reduce the nutrient and pesticide pollutant load entering surface waters within Contra Costa County. Project work activities included use of aquatic toxicity testing and chemical water quality analysis to evaluate up and downstream water quality in waterways flowing adjacent or through golf courses. She was responsible for performing regular on-site stormwater event sampling and subsequent evaluation of water quality parameters including; dissolved oxygen, nitrogen, phosphorus, and electrical conductivity. The data collected was then analyzed to compare water quality in courses using traditional synthetic fertilizers versus newer organic-based products.

WATER AND SEWER

Linda Creek Sewer Crossing Rehabilitation Project* | Placer County, California | Wildlife Biologist

Sara conducted a biological field survey and wetland delineation for a small sewer replacement project in close proximity to active stream and riparian habitats within in the City of Roseville. She was also responsible for the preparation and coordination of various permit applications including, federal Section 404, 401, and California Department of Fish and Wildlife (CDFW) Sections 1600-1616 permits for sanitary sewer improvement activities. During the construction phase of the project, acted as Project Manager and Lead Monitor. Managed a biological monitoring staff, ensured project compliance per the project permits and the Mitigation Monitoring and Reporting Requirements during project construction activities, and communicated with client to manage the project timeline and construction scheduling changes.

WATER DAMS & RESERVOIRS

Los Vaqueros Reservoir Expansion Project Environmental Impact Statement/Environment Impact Report* | Sacramento, California | Senior Biologist

Sara performed field surveys to quantify the oak tree species within portions of the project area. This survey was conducted in an effort to calculate estimated habitat loss data following the expansion of Los Vaqueros Reservoir. She performed field surveys and assessments of potential habitat mitigation lands considered for the project.

WATER OPEN CHANNELS & AQUEDUCTS

South Bay Aqueduct Maintenance and Rehabilitation Project* | Alameda and Santa Clara Counties, California | Senior Biologist

Sara conducted biological monitoring both during and prior to active construction of this project. She monitored vegetation restoration sites, pre-construction clearance, and monitored the project site for presence of sensitive resources. She also acted as field team lead in organizing and facilitating the multi-year pre-construction clearance effort to passively exclude burrowing owls (Athene cunicularia) from large portions of the project area.

WETLANDS

Broderick Boat Launch Facility Improvements* | Yolo County, California | Senior Biologist

As senior biologist, Sara conducted the biological field survey and wetland delineation and prepared the Biological Assessment (BA) and the biological resources section of the Initial Study/Mitigated Negative Declaration (IS/MND) document. Sara coordinated with resource agencies and prepared the permit applications for federal Section 404, 401, and California Department of Fish and Wildlife (CDFW) Sections 1600-1616 permits for park expansion and improvement activities.

Hot Springs Road Improvement Project* | Alpine County, California | Wildlife Biologist and Project Coordinator

As wildlife biologist and project coordinator, Sara is coordinating in the preparation of technical reports for a Caltrans Department of Transportation (Caltrans) District 10 Local Assistance road widening project in Markleeville. Technical reports include a Natural Environment Study (NES), wetland deliniation, Historic Property Survey Report (HPSR), and Archeological Survey Report (ASR).

Delta Wetlands Project* | Contra Costa and San Joaquin Counties, California | Project Manager and Senior Biologist

Sara conducted extensive field surveys of the approximate 20,000-acre project area to complete biological resource assessments and update the wetland delineation. She coordinated with state and federal agencies to complete updates to the U.S. Fish and Wildlife Service (USFWS) Biological Assessment (BA), National Marine Fisheries Services (NMFS) Biological Assessment (BA), and the Incidental Take Permit Application.

Jackson Valley Quarry Expansion and Reclamation Environmental Impact Report (EIR) and Mitigation Monitoring Program* | Amador County | Senior Biologist

As senior biologist, Sara conducted biological field assessments (including a wetland delineation) and prepared the Wetland Delineation Report and the biological resources section of the EIR. This EIR analyzed potential impacts that would result from the proposed project activities, which involved the expansion of the existing Jackson Valley Quarry operation to an adjacent parcel.

Payran to Southpoint Multi-Use Pathway Project—GHD, Inc.* | Sonoma County, California, United States | 2017-2018 | Senior Biologist

For this Caltrans District 4 Local Assistance project, Sara conducted field work and prepared a biological resources technological memorandum to document biological constraints and re-verify the extent of previously delineated wetlands for a portion of the SMART Non-motorized Pathways in Petaluma, California. Role: Senior Biologist | Dates involved: 08/2017–07/2018

CONSERVATION AND RESOURCE MANAGEMENT

Initial Study/Mitigated Negative Declaration (IS/MND) Document* | Alameda County, California | Senior Biologist

As senior biologist, Sara helped prepare an IS/MND document for projects in Alameda County for the use of aquatic herbicides in stormwater conveyances to control aquatic weeds. This document was produced to comply with National Pollutant Discharge Elimination System Aquatic Pesticide Permit requirements. She performed regular on-site biological surveys and evaluated potential risk of herbicide exposure to federally and state-listed species in estuarine and wetland habitats. Sara also conducted regular water sampling and analysis as part of on-going monitoring and reporting plans.

SOURCE WATER ASSESSMENT

Laguna de Santa Rosa Ludwigia Control Project* | Sonoma County, California | Senior Biologist

As senior biologist, Sara assisted in the preparation of an Aquatic Pesticide Application Plan to the North Coast Regional Water Quality Control Board (RWQCB) on behalf of California Department of Fish and Wildlife (CDFW) and the Sonoma County Water Agency. Following the issuance of National Pollutant Discharge Elimination System permits, she worked with RWQCB staff to develop a Monitoring and Reporting Plan to be carried out during the first phase of the project. Sara also made bi-weekly field visits to the site to monitor water quality, maintain field equipment (including continuous water quality monitoring instruments), monitor field crew progress, and evaluate the effectiveness of the best management practices. At the end of phase I, she compiled all collected data for summary and inclusion in the Annual Report that was submitted to RWQCB.

ENVIRONMENTAL ASSESSMENT

Payette National Forest: Disease Transmission of Bighorn Sheep Supplemental Draft Environmental Impact Statement (DEIS)* | Washington County, Idaho | Senior Biologist

As senior biologist, Sara assisted in comment review and categorization process of a large Content Analysis Team (CAT) project for the USFS, Payette National Forest. The CAT project catalogued and summarized public comment on the Draft Supplemental Environmental Impact Statement for Bighorn Sheep Viability Analysis and Forest Plan Amendment.

BRIDGES, ROAD

Atlantic/Eureka I-80 Westbound On-ramp Widening Project* | Placer County, California, United States | 2018 | Senior Biologist/Project Coordinator

Sara provided oversight for the preparation of the technical reports, as well as an IS/MND (IS/MND) for CEQA compliance for the project. Technical reports included a Natural Environment Study, wetland delineation, National Marine Fisheries Service (NMFS) Biological Assessment, Historic Property Survey Report, Archaeological Survey Report, and extended phase I archaeological investigation. She also coordinated agency consultation with NMFS to address potential effects to listed fish species. 06/2017–07/2018

BIOLOGICAL MONITORING

Initial Study/Migigated Negative Declaration (IS/MND) Document* | Alameda County, California | Senior Biologist

Sara assisted in the preparation of an IS/MND document for projects in Alameda County for the use of aquatic herbicides in stormwater conveyances to control aquatic weeds. This document was produced to comply with National Pollutant Discharge Elimination System Aquatic Pesticide Permit requirements. Sara performed regular on-site biological surveys and evaluated potential risk of herbicide exposure to federally and state-listed species in estuarine and wetland habitats. Additionally, Sara conducted regular water sampling and analysis as part of on-going monitoring and reporting plans. Bureau of Land Management–Reach 4B San Joaquin River Restoration Project, Merced County, California: Field Team Lead. Sara performed surveys of habitats that would be flooded along Reach 4B of the San Joaquin River if restoration activities proceed as proposed. Biological surveys included; general habitat assessment, preliminary wetland delineation, sensitive vegetation community assessment (including vernal pools), and nesting bird surveys.

Hirschdale Transmission Line Project Initial Study/Mitigated Negative Declaration* | Nevada County, California | Senior Biologist

As senior biologist, Sara conducted biological monitoring during active construction of this project. She coordinated with the daily monitor and site foreman to help ensure that the project and all related activities remained in compliance with project permits. As a third-party monitor, weekly site visits were performed of the project site to monitor for presence of sensitive resources and project compliance with all applicant proposed mitigation measures including Stormwater Pollution Prevention Plan (SWPPP) measures and produced weekly reports summarizing field findings.

VERNAL POOL STUDIES/DESIGN

Yolo Grasslands Park Project* | Yolo County, California | Field Biologist and Project Manager

As field biologist and project manager, Sara initially performed regular collections of hydrology data within vernal pools and conducted California Burrowing Owl Consortium protocol-level surveys for burrowing owls (Athene cunicularia). During subsequent years, she performed annual plant population assessments (utilizing transect survey methods) to determine distributional data for the two special-status plant species, Solano grass (Tuctoria mucronata) and Colusa grass (Neostapfia colusana), that occur within the vernal pools on the site. She performed quarterly site visits to monitor site progress or potential problems, submitting quarterly and annual reports and maintaining communication with the project client, sub-consultant, and regulatory agencies.

STREAM/RIVER RESTORATION

Reach 4B San Joaquin River Restoration Project* | Merced County, California | Field Team Lead

As field team lead, Sara performed surveys of habitats that would be flooded along Reach 4B of the San Joaquin River if restoration activities proceed as proposed. Biological surveys included; general habitat assessment, preliminary wetland delineation, sensitive vegetation community assessment (including vernal pools), and nesting bird surveys.

CONVEYANCE - OPEN CHANNELS & AQUEDUCTS

North Bay Aqeduct Alternate Intake Project Environemntal Impact Report (EIR)* | Alameda and Santa Clara counties, California | Senior Biologist

Sara prepared the Draft EIR (DEIR) with respect to aquatic resources as well as the terrestrial plant and wildlife resources that could be potentially affected by the project. She also assisted in the habitat impact analysis in ArcGIS as part of the document preparation.

HABITAT EVALUATIONS

San Joaquin Habitat Conservation Plan (HCP) On Call Biological Services* | San Joaquin County, California | Senior Biologist

As senior biologist, Sara conducted preconstruction surveys for a proposed Home Depot in Lathrop. She coordinated with SJCOG staff and project proponents to schedule field visit and verify compliance with San Joaquin Multi-Species HCP measures.

ENVIRONMENTAL IMPACT ASSESSMENTS

Aquatic Permitting for Herbicide Use* | Solano County, California | Senior Biologist

As senior biologist, Sara assisted in the implementation of a Monitoring and Reporting Plan for SCWA to assess environmental impacts of the use of aquatic pesticides for weed control. Work involved a collection of water quality parameters and herbicide levels during active in-water applications of herbicide. She analyzed all collected data and prepared annual reports for SCWA to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) permitting process.

AIRPORTS

Rancho Murieta Airport Resource Study* | Sacramento County, California | Senior Biologist

As senior biologist, Sara conducted biological field surveys including an arborist survey, Valley elderberry longhorn beetle survey (Desmocerus californicus dimorphus), and habitat assessment.She prepared the Resource Management Report and biological section for the Environmental Impact Report (EIR) for the County of Sacramento. These reports evaluated the natural resources within the Rancho Murieta Recreation Area that had the potential to interfere with flight operations at the adjacent Rancho Murieta Airport.

** denotes projects completed with other firms*

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QUALIFICATIONS

- Experience performing vegetation and wildlife surveys, and familiar with species-specific protocols and USACE wetland delineation process.
- Practiced CEQA author with experience writing the Biological Resources and Hydrology and Water Quality Resources sections of several CEQA documents including several EIRs for transmission projects at the direction of the CPUC.
- Experience in managing and performing construction monitoring on commercial solar and wind development projects, including managing budgets and field staff.
- Familiar with permit conditions associated with CWA Section 401 and 404, Biological Opinions, Incidental Take Permits, and well-versed in ensuring those conditions are met.
- Proficient with handheld GPS, ArcGIS, and Google Earth.

EXPERIENCE

Ecology and Environment, Inc., San Francisco, CA (January 2015 – Present)
Environmental Scientist. Contributed to all phases of environmental review document preparation, including drafting biological resource sections and responding to public comment for CEQA documents. Surveyed existing and prospective solar, wind, and transmission projects for threatened and endangered wildlife species. Managed the biological monitoring for the decommissioning of a wind energy project in the Altamont Pass.

Great Basin Institute, Reno, NV (May 2014 - July 2014)
Vegetation/Habitat Assessment Crew Member. Performed habitat assessment activities, including vegetation sampling and inventories, soil testing, and logging photo points, while working with the Nevada Dept. of Wildlife sage grouse habitat-monitoring project.

Great Basin Institute, US Forest Service, Carson City, NV (May 2013 – November 2013)
Invasive Species Technician. Surveyed US Forest Service lands for invasive species and mapped new infestations. Eradicated invasive plant infestations with chemical, biological, and mechanical methods.

National Audubon Society, Trabuco Canyon, CA (November 2012 – May 2013)
Invasive Species Crew Member. Eradicated invasive plant infestations by mechanical means, performed invasive plant surveys, conducted experimental treatments and collected data.

EDUCATION

SUNY College of Environmental Science and Forestry, Syracuse, NY
Master of Professional Studies, Environmental Science (December 2014)

SUNY College of Environmental Science and Forestry, Syracuse, NY
Bachelor of Science, Natural Resources Management (May 2011)

TRAINING

HAZWOPER 40-Hr Training (April 2015), 8-Hr Refresher (January 2017)
Introduction to Desert Tortoises and Field Techniques, Desert Tortoise Council (November 2015)
FERC Environmental Review and Compliance for Natural Gas Facilities (April 2016)

REFERENCES Available Upon Request

FOOTHILL ASSOCIATES

ENVIRONMENTAL CONSULTING ● PLANNING ● LANDSCAPE ARCHITECTURE

Cristian Singer

Senior Botanist

Education

Bachelor of Science, Environmental Biology, Humboldt State University, 1996

Certifications

CDFW Scientific Collecting Permit for State Designated Endangered, Threatened, and Rare Plants, No. 07003

California Endangered Species Act, Native Plant Protection Act, Plant Voucher Collecting Permit No. 2081(a)-18-139-V

Experience

Foothill Associates, Botanist

ICF International, Botanist

U.S. Forest Service, Botanist, Susanville, California.

U.S. Forest Service, Botanist, Nevada City, California

U.S. Forest Service, Botanist, Nevada City, California

The Nature Conservancy, Botanist, San Francisco, California

Bureau of Land Management, Botanist, Bakersfield, California

U.S. Geological Survey, Botanist, Barstow, California

Cristian Singer has twenty-three years of experience conducting large-scale vegetation mapping projects, floristic inventories, rare plant surveys and wetland delineations throughout the State of California, southern Oregon, and southern Nevada. Cristian utilizes dichotomous keys to facilitate accurate and timely identification of plant specimens (including grasses, sedges and rushes) in the course of botanical surveys, vegetation community sampling and wetland delineations. He specializes in conducting floristic surveys for special-status plant species in accordance with federal, state and local agency guidelines. He has surveyed hundreds of vegetation community plots in the course of developing base-line data for the development of large-scale vegetation maps. Cristian is a strong project manager and regularly communicates and coordinates with multidisciplinary professionals to complete project goals in a timely manner; effectively manages project timelines and produces accurate cost estimates; prepares and reviews technical reports and documents; maintains a safe and productive working environment; and supervises and trains junior personnel.

Representative Experience

Floristic Surveys— Butte County Meadowfoam. Conducted surveys for and extensive mapping of Butte County Meadowfoam, a state and federally listed endangered plant species, in Butte County, California.

District 1 Biologist—Caltrans; Humboldt, Mendocino, Sierra and Sonoma counties, California. Conducted special-status plant surveys and wetland delineations at various existing bridge locations and proposed culvert improvement sites.

1-80/1-680 Interchange Project PA/ED—Solano County Transportation Authority/Mark Thomas and Company, Solano County, California. Conducted special-status plant surveys within a proposed improvement footprint at the Interstate 80 and Interstate 680 interchange. The work will form the environmental baseline and obtain environmental permits for project planning and implementation.

SR-299 Blue Lake Slide Wetland Delineation and Permitting—Caltrans, Humboldt County, California. Conducted a wetland delineation and functional assessment to meet both Caltrans and the Corps standards. The work will form the environmental baseline and obtain environmental permits for project planning and implementation.

SR 197/US 199 Safe STAA Access Project—Caltrans District 1, Del Norte County, California. Field delineated wetlands and other waters using the routine on-site determination methods detailed in the Corps Wetlands Delineation Manual and the Corps Draft Interim Regional Supplement to the Corps 1987 Manual: Western Mountains, Valleys and Coast Region at the Narrows location on US 199 in the Middle Fork Smith River canyon, one of seven isolated locations where Caltrans is proposing improvements on SR 197 and US 199 to be able to classify the routes as part of the Surface Transportation Assistance Act truck route network. The wetland delineation report was one of several reports prepared to support the environmental impact analysis for the project.

Environmental Support Services for Transportation Improvement (Contract 03A1317)—Caltrans Districts 1, 2, and 3 (Various Locations in Northern California). Conducted wetland delineations for an additional 10 task orders under this contract.

U.S. 101 Willits Bypass Project Mitigation Planning and Design and Permitting—Caltrans District 1, Mendocino County, California. The Willits Bypass Project is a 5.9-mile long roadway bypass of U.S. Highway 101 (Hwy 101) to the east of the City of Willits, in Mendocino County, California. The complex project realigns Hwy 101 with a four-lane highway around the City of Willits through the Little Lake Valley and reconnects with the existing Hwy 101. The project improves traffic access by relieving traffic congestion associated with the Hwy 101 and State Route 20 (SR-20) interchange, constructing a new 4-lane roadway segment, and making other improvements along the alignment, including new and improved bridges, interchanges, viaducts, retaining walls, and fish passage improvements. The new roadway segment includes twenty-two bridges over existing waterways, riparian corridor, streets, and railroad right-of-ways. The new roadway affects endangered species, waters of the State and United States, requiring a complex suite of permits and onsite mitigation plan.

North County Corridor EIR/EIS for New SR-108—North County Corridor Joint Powers Authority, Stanislaus County and San Joaquin County, California. Conducted a wetland delineation for the proposed SR-108 in San Joaquin and Stanislaus County. Caltrans, as the CEQA/NEPA lead agency, in cooperation with the North County Corridor Transportation Expressway Authority, propose to construct an expressway that would extend approximately 25 miles from SR-99 in the vicinity of Kiernan Avenue/the Salida community, to SR-120 approximately 6 miles east of the City of Oakdale.

Delta Wind Technical Studies—enXco, Solano County, California. Conducted an initial mapping project on a proposed 12,000-acre wind farm in order to facilitate planning efforts to minimize or eliminate potential project-related impacts to special-status plant species and wetlands.

Central California Clean Energy 500 kV Transmission Line Project Proponents Environmental Assessment (PEA)—Pacific Gas & Electric Company (PG&E), Fresno County, Kings County, and Madera County, California. Conducted special-status plant surveys throughout the proposed transmission alignment.

Sunrise Powerlink 2008 Rare Plant Surveys—San Diego Gas & Electric Company (SDG&E)/Arcadis, San Diego County, California. Conducted special-status plant surveys throughout the existing transmission alignment and within the proposed, expanded transmission alignment.

Carrizo to Midway Transmission Line—Pacific Gas & Electric Company (PG&E), Carrizo Plain National Monument, San Luis Obispo County and Kern County, California. Conducted special-status plant surveys and delineated wetlands and other waters of the U.S. within the proposed alignment using the routine on-site determination methods detailed in the U.S. Army Corps of Engineers Wetlands Delineation Manual and the U.S. Army Corps of Engineers Draft Interim Regional Supplement to the Corps of Engineers 1987 Manual: Arid West Region.

Rosamond PV Solar Technical Studies—Sempra Energy Utilities, Kern County, California. Conducted special-status plant surveys and delineated wetlands and other waters of the U.S. within a proposed wind farm using the routine on-site determination methods detailed in the U.S. Army Corps of Engineers Wetlands Delineation Manual and the U.S. Army Corps of Engineers Draft Interim Regional Supplement to the Corps of Engineers 1987 Manual: Arid West Region.

Shiloh 3 Wind Project Biological and Cultural Impact Studies—enXco, Contra Costa County, California. Conducted special-status plant surveys within proposed expansion area associated with existing wind farm.

Gas Line 177A Botanical Survey—Pacific Gas & Electric Company (PG&E), Shasta County, California. Conducted special-status plant surveys along a proposed PG&E gas line.

Hollister Tap 1 and 2 115 kV Reconductor PEA—Pacific Gas & Electric Company (PG&E), Monterey County, San Benito County, California. Conducted special-status plant surveys along existing transmission line. Delineated wetlands and other waters of the U.S. within portions of the alignment using the routine on-site determination methods detailed in the U.S. Army Corps of Engineers Wetlands Delineation Manual and the U.S. Army Corps of Engineers Draft Interim Regional Supplement to the Corps of Engineers 1987 Manual: Arid West Region.

Crane Valley Dam Seismic Modifications Permitting Assistance—Pacific Gas & Electric Company (PG&E), Fresno County, California. Conducted floristic inventories in several meadow and riparian complexes as part of an assessment for potential suitable mitigation areas.

Shingle Springs Substation Overhead Distribution Project Biological Services—PG&E, El Dorado County, California. Conducted botanical surveys for proposed pole replacement and re-conductoring to support recent substation expansion work.

Emergency Response Environmental-Cultural Support—PG&E, Various Locations, California. Conducted botanical surveys. ICF is under contract to perform emergency response and short-notice work when requested by PG&E. The scope of work includes wildlife biology, aquatic, water quality, cultural resources, and miscellaneous technical support for a variety of PG&E gas, electric transmission/distribution, and hydroelectric projects throughout PG&E's service territory.

Vernal Pool Monitoring at Van Vleck Ranch Mitigation Bank—Westervelt Ecological Services, Sacramento County

and Solano County, California. Conducted floristic surveys to document the presence/absence of plant species in constructed versus natural vernal pools. Additionally, conducted floristic surveys for special-status plant species.

Arcata Wetland Vegetation Surveys—Caltrans, Humboldt County, California. Conducted a comprehensive floristic examination of wetland/upland conditions in a mosaic of pastures in order to provide an ecological evaluation for potential wetland creation or mitigation.

Sensitive Plant Management Program—U.S.D.A. Forest Service, Susanville, California. Lead Botanist for team conducting special-status plant surveys and comprehensive floristic surveys throughout the National Forests of California

Region 5 Meadow and Riparian Study—U.S.D.A. Forest Service, Nevada City, California. Role: Lead Botanist for team conducting frequency and green-line sampling within meadows and riparian areas throughout the National Forests of California.

Furnace Creek Vegetation Mapping Project—U.S. Geological Survey, Flagstaff, Arizona. Lead Botanist conducting the location and assessment of wetlands associated with an extensive system of seeps and springs in preparation for production of a detailed vegetation map of the study area and surrounding environs.

Mojave Vegetation Mapping Project—U.S. Geological Survey, Flagstaff, Arizona. Lead Botanist testing preliminary vegetation map of the Mojave Desert region for accuracy.

Mojave Vegetation Mapping Project—U.S. Geological Survey, Flagstaff, Arizona. Primary duties involved conducting botanical field investigations, studies, and surveys such as vegetation sampling throughout the Mojave Desert and surrounding environs.

Yosemite National Park Vegetation Mapping Project—The Nature Conservancy, San Francisco, California. Title/Role: Lead Botanist for team conducting botanical investigations, studies and surveys such as vegetation sampling throughout Yosemite National Park and surrounding environs.

Sensitive Plant Management Program—U.S. Bureau of Land Management (BLM), Bakersfield, California. Primary duties involved conducting field surveys for populations of sensitive, threatened and endangered plant species throughout Carrizo Plain National Monument.

Botanical Surveys for Low Effect HCP Santa Cruz and Monterey—PG&E, Monterey County and Santa Cruz County, California. Conducted floristic surveys and mapped special-status plant species along existing gas lines in order to prepare a vegetation management plan.

Desert Conservation Program Rare Plant Inventories—Clark County, Nevada. Conducted targeted surveys to determine the presence or absence of special-status plant species in order to obtain new locations and ecological information to further refine predictive ecological models.

San Joaquin Valley HCP Map Book Survey II—Pacific Gas & Electric Company (PG&E), Kern County, California. Conducted surveys for special-status plant species.

East Contra Costa County HCP/NCCP Implementation—East Contra Costa County Habitat Conservancy, Contra Costa County, California. Conducted surveys for special-status plant species.

Pacheco Pass Corridor EIR/EIS—California High Speed Rail Authority/Parsons Transportation Group, Merced County, Santa Clara County, California. Conducted special-status plant surveys along proposed high-speed rail alignment.

Tejon Mountain Village Biological Surveys—Dudek & Associates, Kern County, California. Conducted surveys for special-status plant species.

Lower Kyle Canyon Development Project EA—U.S.D.A. Forest Service, Clark County, Nevada. Conducted surveys for plant species utilized by special-status butterflies.

Allison Loveless

Biologist

Allison has more than 6 years of biological experience. She has served in roles ranging from consulting field biologist to laboratory biodiversity scientist. Allison has performed pre-construction surveys for nesting birds, biological reviews of project sites, and construction monitoring for giant garter snake, nesting birds, and federally listed vernal pool brachiopods. Allison's employment history also displays broad biological skills. Prior to becoming a biologist for NSR, Allison worked as an Assistant Scientist in the Center for Biodiversity at Temple University, Collection Manager at the Oklahoma State Collection of Vertebrates Museum, Forensic Intern with the Wyoming Wildlife Forensic and Fish Health Laboratory, Biology and Human Anatomy Teaching Assistant, Geographic Information Systems (GIS) assistant with Cal Fire, and Botanical Survey Technician in northern and central California for Sierra Pacific Industries. She has also prepared numerous technical reports, including professional, peer-reviewed publications and environmental constraints reports, and has assisted with revisions to environmental impact reports. Her experience ranges from the study of broad population and ecosystem patterns to within-population species assessments, including native and invasive range identifications and predictions, large-scale analyses of population genetic structure and morphology, forensic genetic analyses of wildlife, and conservation of tropical biodiversity. She has also participated in field trips to tropical regions to collect amphibians and reptiles.

Education

M.S., Zoology, Oklahoma State University, Stillwater, 2014

B.S., Geography/Environmental Studies, University of California, Los Angeles, 2009

Relevant Experience*

Vegetation Management Activities—Western Area Power Administration. Biologist. Conducted surveys for sensitive biological resources, including nesting birds, special-status mammals, and waters of the United States, prior to vegetation management activities at Western Area Power Administration rights-of-way. Also performed biological monitoring for vegetation removal activities.

Deschutes Road Widening Technical Memorandum----Shasta County Department of Public Works. Biologist. Reviewed federal, state, and local databases and site lists for known contamination sites, regulated landfill sites, underground tank sites, hazardous waste generators, and other potential sites of concern prior to project initiation. Generated a technical memorandum of hazards at the project location.

Community Pipeline Safety Initiative----Stantec on behalf of PG&E. Biologist. Performed pre-construction surveys for nesting birds and other sensitive resources. Conducted environmental safety training for project workers. Also performed biological monitoring, ensuring that all federal and state environmental regulations were adhered to. Produced daily reports and photographic logs of work activities associated with any potential impacts to natural resources.

Pit 6 Dam Fish Salvage----PG&E. Biologist. Assisted with locating fish in a dewatered stilling basin below Pit 6 Dam prior to construction activities.

Riverland Drive Widening Project Natural Environment Study----Shasta County Department of Public Works. Biologist. Prepared a natural environment study to evaluate the potential effects of the proposed project on special-status plant and animal species, waters of the United States, and other sensitive biological resources. Tasks included identifying the presence of habitat for special-status species, predicting potential impacts to these species and habitats, and proposing mitigation measures to prevent or reduce significant impacts.

Offsite Roadway Improvements for the River Crossing Marketplace Development Project Biological Resource Assessment----Costco Wholesale Corporation. Biologist. Prepared biological resource assessment evaluating the natural environment and potential impacts and mitigation for sensitive biological resources. Also assisted with field wetland delineation and report preparation.

Pacific Connector Gas Pipeline----Administrative Record Maintenance and

**denotes work with another company*

Forest Service Survey and Manage Persistence Evaluations. Biologist. Used GIS species occurrence and land management data to conduct new persistence evaluations for all survey and manage species that may be affected by PCGP activities. Used these species evaluations to revise survey and manage species persistence discussions.

L-402 Strength Test----CH2M Hill on behalf of PG&E. Biologist. Conducted pre-construction surveys for nesting birds and biological reviews of project sites and provided worker environmental safety training. Also performed construction monitoring for excavation and construction activities, including ensuring that state and federal regulations regarding biological and environmental resources were enforced. Produced daily reports and photograph logs for both construction monitoring and nesting bird surveys, showing construction activities and progress and potential environmental impacts.

L-121 Hydrostatic Test—CH2M Hill on behalf of PG&E. Biologist. Performed construction monitoring for giant garter snake and ensured that state and federal regulations regarding biological and environmental resources were enforced. Produced daily reports on construction progress and potential environmental impacts.

Environmental Constraints Reports (various projects)—ICF on behalf of PG&E. Biologist. Prepared environmental constraints reports evaluating potential impacts on biological resources prior to construction activities. Reports included describing habitats and environmental resources in the project area, determining special-status plant and animal species with potential to be present in the project area, and recommending surveys, permits, and avoidance and minimization measures. *

Upper North Fork Feather River Hydroelectric Project, Draft Environmental Impact Report—State Water Resources Control Board. Biologist. Revised and updated Vegetation, Wildlife, and Sensitive Biological Resources section of 2014 Draft EIR in response to comments from PG&E, Forest Service, California Department of Fish and Wildlife, Plumas County, non-governmental organizations, and individuals.*

Oklahoma Wetland Condition Analysis—Oklahoma State University, Departments of Zoology and Natural Resources Ecology and Management (EPA Grant). Research Assistant. Assisted in developing landscape GIS models for the prediction of wetland conditions in Oklahoma.*

Grey Wolf Genetic Database Project----Wildlife Forensic and Fish Health Laboratory, Wyoming Wildlife Game and Fish Department. Forensic Intern. Collected and analyzed microsatellite and DNA sequence data. The genetic data were used to assemble a grey wolf population database for use as a forensic reference to aid in the prosecution of illegal activities involving wolves. *

Viverridae Project----Oklahoma State University. Assisted with ongoing analyses of the native and invasive range identification and prediction for viverrid species based on recent genetic designations.*

Hispaniolan Frogs----Center for Biodiversity, Temple University. Biodiversity Laboratory Specialist. Assisted with the collection and genetic sequence analyses of endemic Hispaniolan frog species. Responsibilities included the discovery and resolution of unique species. Managed project quality and progress, project budgets, and laboratory assistants. *

C3. 2018 Rare Plant Surveys and Natural Vegetation Community Mapping

RARE PLANT SURVEYS AND NATURAL VEGETATION COMMUNITY MAPPING

Fountain Wind Project
Shasta County, California

Prepared for:

Pacific Wind Development, LLC

Prepared by:

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Western EcoSystems Technology, Inc.
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October 17, 2018

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Rande Patterson	Biologist / field surveys

REPORT REFERENCE

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INTRODUCTION

Pacific Wind Development LLC (Pacific Wind) has contracted Western EcoSystems Technology, Inc. (WEST) to provide biological support for the development of the proposed Fountain Wind Project (Project). This memorandum described the methods and results of rare plant surveys conducted at the Project during the 2018 growing season. The primary purpose of these surveys was to determine the presence or absence of rare plant species that may be subject to impacts resulting from Project construction. A description of the natural vegetation communities present within the Project evaluation area and information on invasive plant species are also provided.

SURVEY AREA

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project is early seral mixed coniferous forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*).

The Project is located within the Southern Cascades Ecoregion, near the southern terminus of the Cascade Mountains. A Mediterranean climate dominates the region, characterized by hot, dry summers and cold, wet winters. On average, the area receives about 63 inches (in; 160 centimeters [cm]) of precipitation per year, of which 28 in (71 cm) occur as rainfall and 35 in (89 cm) as snowfall (US Climate Data 2018). A number of perennial and intermittent streams flow primarily west and northwest from the Project into the Pit River and Sacramento River watersheds. Soils range from stony to clay loams that have formed in residuum weathered from volcanic rock (Natural Resources Conservation Service 2018). In August 1992, the Fountain Fire burned approximately 64,000 acres (25,900 hectares) in and around the Project. Post-fire management included salvage logging, site preparation, and planting in the year following the fire. Within five years of the fire, approximately 17 million seedlings were planted in industrial areas previously supporting timber (Zhang et al. 2008). Planted species included ponderosa pine, Douglas fir and white fir at 10-foot (3-m) spacing. Incense cedar (*Calocedrus decurrens*) was planted along stream buffers. In order to reduce competition for (tree) seedling establishment, growth regulator herbicides were applied in many areas where manzanita (*Arctostaphylos* spp.) and California-lilac (*Ceanothus* spp.) had naturally colonized (Zhang et al. 2008). With historic and on-going timber management activities and post-Fountain Fire salvage and reclamation activities, the natural vegetation communities have been periodically altered and/or disturbed, likely having at least some effect on plant species composition, distribution, and diversity in these areas.

For the purpose of conducting rare plant surveys, survey corridors were provided in GIS format by Pacific Wind. The rare plant surveys corridors included areas of potential disturbance during Project construction (Figure 1). The survey corridors varied in size and included buffers of all areas of proposed infrastructure that may be subject to ground disturbance (e.g., newly proposed roads, roads that may be expanded, turbine pads, and underground collection lines). Natural vegetation communities were mapped in a broader evaluation area that encompassed the rare plant survey corridors and additional surrounding lands (Figure 1).

METHODS

Rare Plant Surveys

WEST conducted a query of the California Natural Diversity Database (CNDDB), an inventory of the status and locations of rare plants, rare plant communities, and animals in California managed by the California Department of Fish and Wildlife (CDFW), and searched the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants to compile a targeted list of special status plant species and sensitive natural vegetation communities with potential to occur within the evaluation area. The CNDDB query was limited to an area within a 10-mile radius of the Project and the CNPS search was focused on Shasta County.

A total of 51 rare plants were identified in the CNDDB query and CNPS database review. Based on further review of the habitat requirements of the 51 species and knowledge of the natural vegetation communities known to occur within the evaluation area (based on previous WEST surveys), WEST biologists determined that 36 rare plant species had the highest potential to occur and 15 of the 51 rare plants species were unlikely to occur. Of the 36 species that had the highest potential to occur, only one was federal- or state-listed, the state endangered Boggs Lake hedge-hyssop (*Gratiola heterosepala*). As the reported habitats (e.g., riparian, wet meadow) and flowering/fruiting periods of the 15 species identified as not likely to occur overlapped those of the 36 species with the highest potential to occur, all 51 rare plant species were targeted during the rare plant survey effort (Appendix A). Prior to conducting surveys, WEST reviewed species descriptions, habitat requirements, and photographs of the 51 target species.

Focused surveys to determine presence or absence of target species were conducted during two survey periods: May 21 – 29 and July 30 – August 3, 2018. The two survey periods were selected to capture the range of flowering and fruiting periods for the 51 target species. WEST biologists conducted pedestrian transect surveys within the survey corridors, with special attention given to areas that might provide suitable habitat for rare plant species, in accordance with the 2018 *CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities*. The survey corridors were uploaded to Global Positioning System units with sub-foot accuracy (Trimble Geo 7x). In addition, surveyors used aerial imagery-based field maps depicting the evaluation area to map natural vegetation communities and invasive plant species and for general navigation.

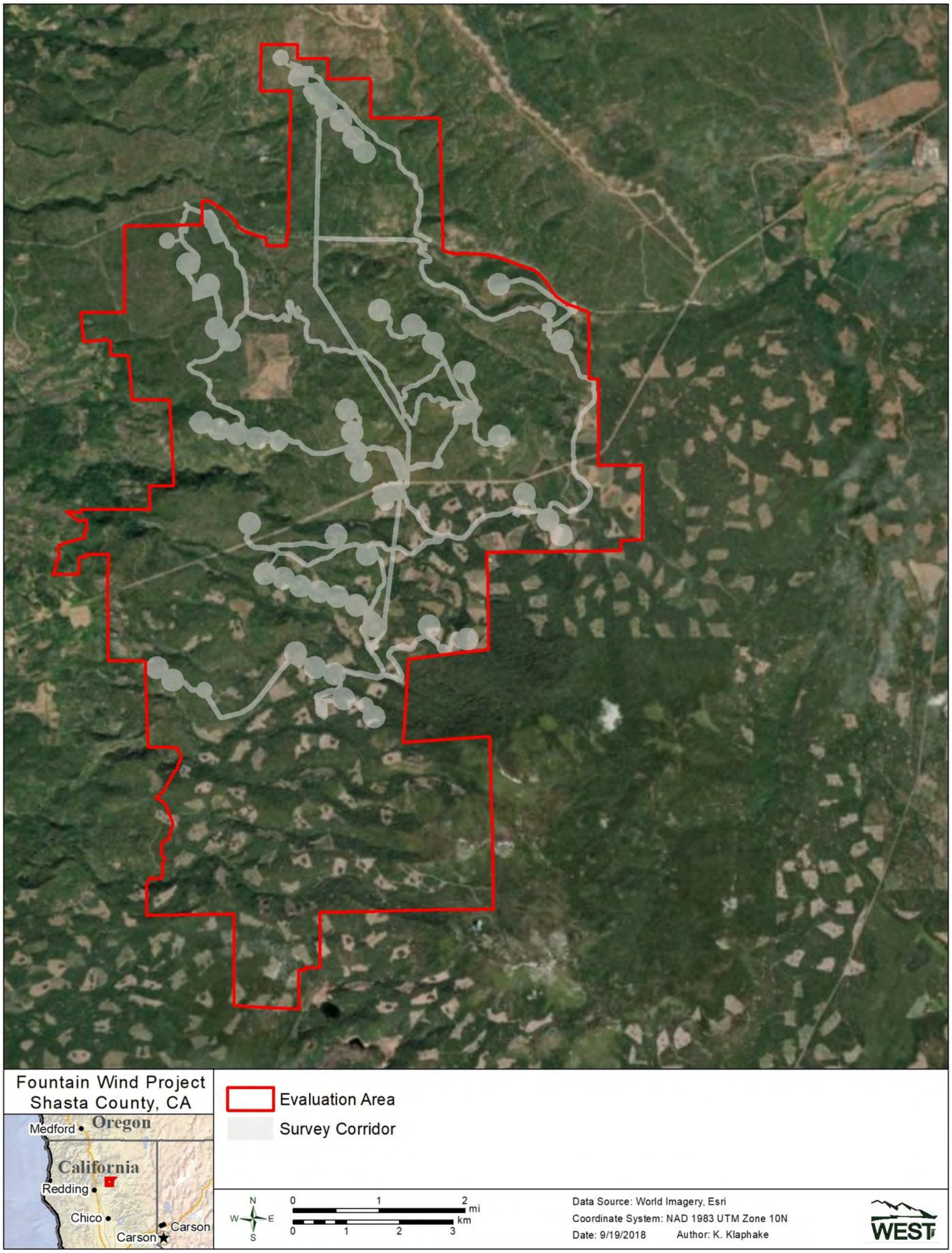

Figure 1. Survey corridors and evaluation area associated with rare plant surveys and natural vegetation community mapping at the Fountain Wind Project, Shasta County, CA.

Natural Vegetation Communities

Mapping of natural vegetation communities within the evaluation area was conducted by WEST during the 2018 rare plant surveys. WEST botanists documented vegetation community types while conducting rare plant surveys and while transiting through the evaluation area en route to survey areas. Dominant plants within each vegetation community were identified to species, and communities were classified in accordance with the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) or *A Manual of California Vegetation* (2^{nd} Edition, Sawyer et al. 2008). Based on the field data collected during rare plant surveys, natural vegetation communities were hand-drawn on aerial imagery-based field maps created at a scale appropriate for broad-scale mapping (i.e., 1 in = 1,000 feet [2.5 cm = 304.8 m]). The field maps were later digitized in a GIS to incorporate into other GIS mapping efforts.

Invasive Plant Species

Non-native invasive plant species encountered were recorded during both rare plant survey periods in 2018. Broad-scale mapping of non-native species was conducted during the second rare plant survey period and primarily focused on roadsides within the rare plant survey corridors. Based on observations during the rare plant surveys, vegetation within turbine pad areas (most of which were away from developed roads) was largely composed of native plant species, with only a few, occasional non-native invasive species observed; no mapping of non-native species was conducted within these locations. Additionally, no mapping was conducted within recently logged (e.g., within the past 10 years) areas because of the abundance of the same three non-native invasive species within all such areas.

Mapping of non-native invasive species along access roads was conducted by walking and slowly driving roads and estimating the number of individuals of non-native invasive species observed. Non-native plant species for which mapping was conducted included all species identified by the California Invasive Plant Council (CAL-IPC) as “high” (i.e., species that have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure), “moderate” (i.e., species that have substantial and apparent, but generally not severe ecological impacts on physical processes, plant and animal communities, and vegetation structure), and “limited” (i.e., species that are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score). Survey corridors were broken into survey segments identified with a unique letter (A-O), with each segment corresponding to a list of non-native invasive species and their relative distribution documented within the segment. Within each survey segment, non-native invasive plant species-level distributions were rated as “Abundant” (A: over one thousand plants), “Common” (C: 200-1,000 individuals), or “Infrequent” (I: less than 200 individuals). Additional non-native invasive plant species mapping included several point locations along roads where invasive plants were concentrated/clustered. These locations were typically located in high-disturbance areas (e.g., near gates).

RESULTS AND DISCUSSION

Rare Plant Surveys

None of the 51 rare plant species identified as possibly occurring were encountered during the two survey periods in 2018. Given the lack of rare plants identified in the survey corridors, no impacts to rare plants are anticipated during Project construction. A comprehensive list of plant species encountered during the 2018 surveys was compiled and is provided in Appendix B.

Natural Vegetation Communities

A total of 11 natural vegetation communities were identified within the Project evaluation area, including: mixed conifer forest-burned; mixed conifer forest-unburned; mixed montane riparian forest; mixed montane riparian scrub; mixed montane chaparral; black oak woodland; wet montane meadow; montane meadow; logged/recently logged; rock outcrop; and, transmission line corridor (Figure 2; Appendix C). None of the mapped natural vegetation communities were considered sensitive (i.e., none had a state rank of S1-S3; CDFW 2018).

Mixed conifer forest is the predominant vegetation community within the evaluation area (see Figure 2) and is a vegetation community that is heavily managed for timber production throughout the region. Other vegetation communities occur in far lesser amounts and are largely outside of areas potentially at risk of disturbance due to Project construction. While the riparian communities cross the survey corridors in many areas, these are largely at existing road crossings or in areas where future roads may be constructed. It is assumed that any future modifications to habitat along streams (e.g., riparian areas) due to added road work will incorporate riparian protections consistent with other ongoing management activities (i.e., timber harvesting) in the region.

Invasive Plant Species

The most common invasive plant species observed within the Project evaluation area included mullein (*Verbascum thapsus*; CAL-IPC ranked “limited”), bull thistle (*Cirsium vulgare*; CAL-IPC ranked “moderate”), Klammathweed (*Hypericum perforatum*; CAL-IPC ranked “limited”), and houndstongue (*Cynoglossum officinale*; CAL-IPC “moderate”). Based on other plant survey work conducted by WEST within the Project vicinity (Young et al. 2007), these four species are ubiquitous in the area. As mentioned above, mullein, bull thistle, and Klammathweed are widespread within all logged and recently logged areas within the evaluation area. A total of three invasive plant species ranked “high” by CAL-IPC were observed within the Project evaluation area, including Himalayan blackberry (*Rubus armeniacus*), yellow starthistle (*Centaurea solstitialis*), and medusahead (*Elymus caput-medusae*; Figure 3). Additional CAL-IPC ranked invasive plant species observed within the evaluation area included annual dogtail grass (*Cynosurus echinatus*; “moderate”), tall fescue (*Festuca arundinacea*; “moderate”), field sorrel (*Rumex acetosella*; “moderate”), orchardgrass (*Dactylis glomerata*; “limited”), and English plantain (*Plantago lanceolata*; “limited”; Figure 3).

Based on the data collected during 2018 surveys, a number of invasive plant species are present within proposed survey corridors. These results are not unexpected given the primary land use (i.e., commercial timber production), which results in recurring disturbance throughout the area and relatively high traffic volumes resulting from timber harvest activities. Many of the invasive species are actively managed by the landowners to minimize competition with conifer seedlings and enhance timber growth. Many disturbances related to Project construction will be similar to those which occur in the Project evaluation area already (e.g., harvest of trees, road construction and widening, seasonal/temporary increases in vehicle traffic) and are unlikely to contribute to any significant changes in invasive species distributions within the evaluation area. While Project construction will create some additional disturbance to the landscape, once construction is complete, the Project will have minimal influence on the future distribution of invasive species relative to the influence of ongoing commercial timber operations.

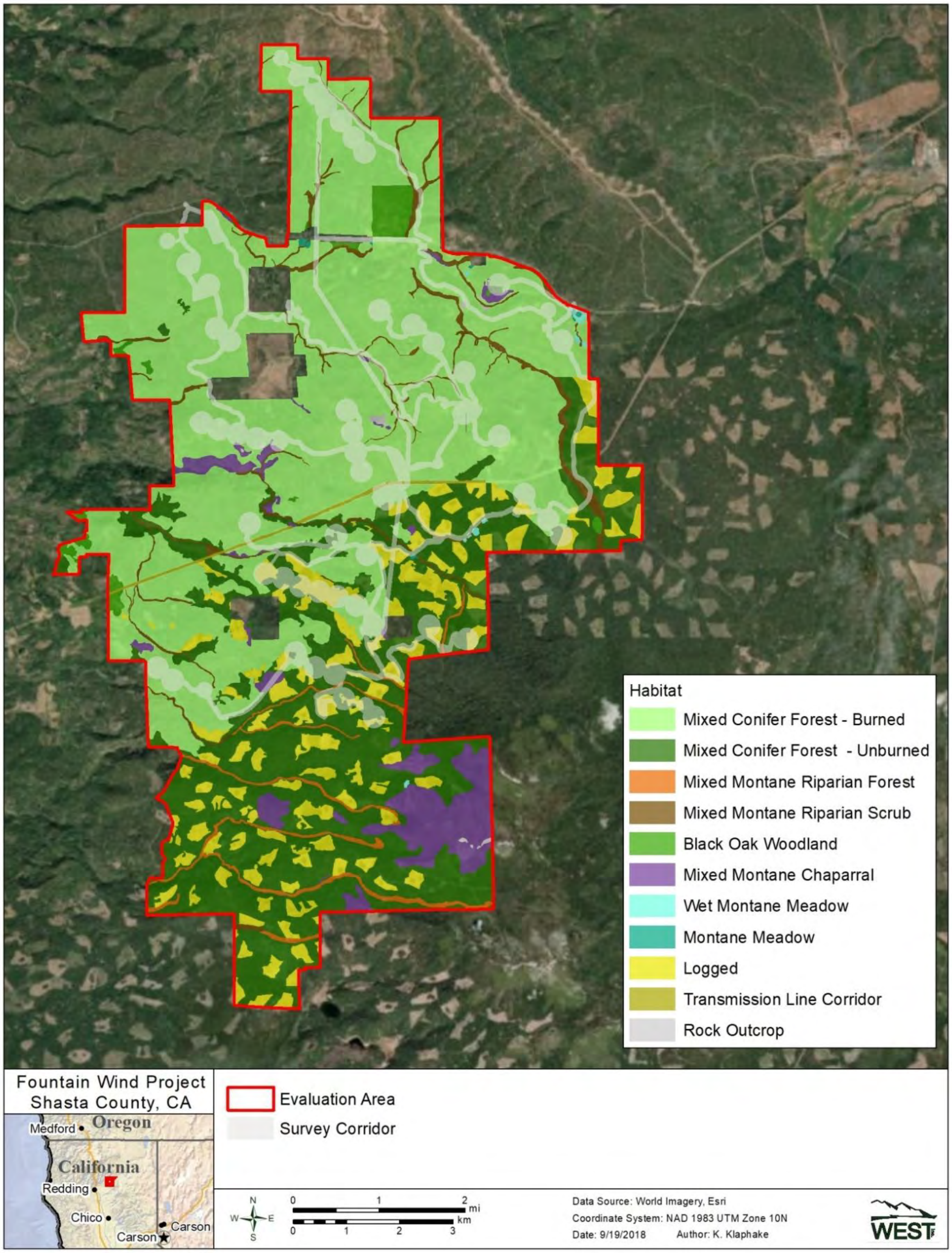

Figure 2. Vegetation communities identified and mapped during plant surveys conducted in 2018 at the Fountain Wind Project, Shasta County, California.

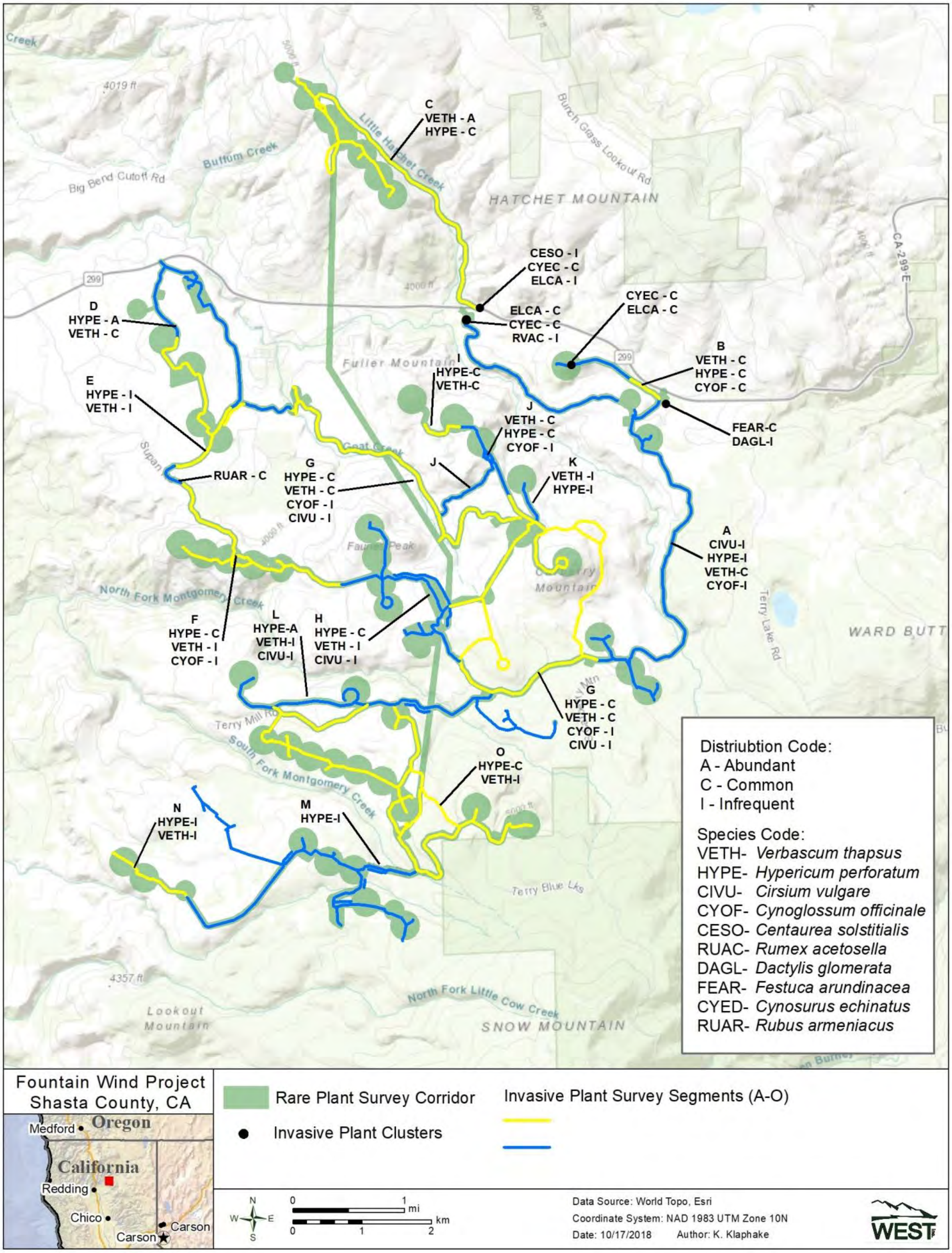

Figure 3. Non-native invasive plant species mapping within the Fountain Wind Project, Shasta County, CA. To differentiate adjacent survey segments (A-O) alternating blue and yellow lines with accompanying notation as to the species present (4-letter species codes) and relative distribution (1-letter distribution code) were used.

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Appendix A. Federally-listed, State-listed, and California Native Plant Society Rare Plant Species and Their Potential for Occurrence within the Fountain Wind Project

Appendix A. Federally-listed, State-listed, and CNPS rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	State Status**	CNPS Status***	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Shasta ageratina *Ageratina shastensis*			1B.2	June-Oct	Rocky, often carbonate sites; lower montane coniferous forest	**Possible.** CNDDB documents species occurrence 10 miles west of site
vanilla-grass *Anthoxanthum nitens* ssp. *nitens*			2B.3	Apr-July	Meadows and seeps	**Possible.** Suitable wetland habitat limited within site
Klamath manzanita *Arctostaphylos klamathensis*			1B.2	May-Aug	Chaparral and upper montane and subalpine coniferous forests; rocky outcrops and slopes	**Possible.** Suitable habitat present within the site; CNDDB documents only 2 occurrences in Shasta County
marbled wild-ginger *Asarum marmoratum*			2B.3	Apr-Aug	Understory of lower montane coniferous forests	**Possible.** Suitable habitat present within the site
northern spleenwort *Asplenium septentrionale*			2B.3	July-Aug	Chaparral and montane coniferous forests; form grass-like tufts in granitic rock crevices	**Possible.** Suitable habitat present within the site
upswept moonwort *Botrychium ascendens*			2B.3	July-Aug	Lower montane coniferous forests; grassy fields and woodlands near springs and creeks	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County
scalloped moonwort *Botrychium crenulatum*			2B.2	June-Sept	Lower montane coniferous forests; moist meadows near creeks; marshes	**Possible.** Suitable habitat may be present within the site; CNDDB documents species occurrence three miles(five km) south of site
mingan moonwort *Botrychium minganense*			2B.2	July-Sept	Creek banks in mixed conifer forests	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County
western goblin *Botrychium montanum*			2B.1	July-Sept	Creek banks in old-growth coniferous forests	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County

Appendix A. Federally-listed, State-listed, and CNPS rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	State Status**	CNPS Status***	Survey period	Habitat Requirements	Potential for Occurrence within the Project
northwestern moonwort *Botrychium pinnatum*			2B.3	July-Oct	Montane coniferous forests; in meadows or along creek banks	**Unlikely.** Suitable habitat may be present within the site but no CNDDB occurrences reported from Shasta County
rattlesnake fern *Botrypus virginianus*			2B.2	June	Streams; bogs and fens; lower montane coniferous forest; meadows and seeps	**Possible.** Suitable habitat may be present; CNDDB documents species occurrence about 3.5 miles west of site
watershield *Brasenia schreberi*			2B.3	Apr-Oct	Freshwater marshes and swamps	**Possible.** Potentially suitable wetland habitat limited within site; CNDDB documents presence seven miles east of site
long-haired star-tulip *Calochortus longebarbatus* var. *longebarbatus*			1B.2	June-Aug	Clay, mesic sites in Great Basin scrub, lower montane coniferous forest openings, meadows and seeps	**Possible.** CNDDB documents species presence 3.5 miles (5.6 km) east of site
Callahan's mariposa lily *Calochortus syntrophus*			1B.1	May-June	Cismontane woodland; vernally mesic valley and foothill grassland	**Possible.** Suitable habitat may be present; CNDDB documents species presence 2.5 miles south of site
Castle Crags harebell *Campanula shetleri*			1B.3	June-Sept	In protected rock crevices in granite; lower montane coniferous forests	**Unlikely.** Granitic rock outcrops absent from site
bristly sedge *Carex comosa*			2B.1	May-Sept	Marshes and swamps (lake margins); valley and foothill grasslands	**Possible.** Suitable wetland habitat may be present within the ; CNDDB documents species occurrence six miles north of site
woolly-fruited sedge *Carex lasiocarpa*			2B.3	June-July	Bogs and fens; freshwater marshes and swamps, lake margins	**Possible.** Potentially suitable wetland habitat limited within site; CNDDB documents presence six miles north of site

Appendix A. Federally-listed, State-listed, and CNPS rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	State Status**	CNPS Status***	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Shasta clarkia *Clarkia borealis* ssp. *arida*			1B.1	June-Aug	Cismontane woodlands	**Possible.** CNDDB documents species presence seven miles to east of site
northern clarkia *Clarkia borealis* ssp. *borealis*			1B.3	June-Sept	Cismontane woodland; lower montane coniferous forest	**Possible.** Suitable habitat may be present within site; CNDDB documents species occurrence approximately 3.5 miles west of site
silky cryptantha *Cryptantha crinita*			1B.2	April-May	Gravelly streambeds of cismontane woodlands, valley foothill grasslands, lower montane coniferous forests, and riparian forests	**Possible.** CNDDB documents occurrence 8.5 miles (13.7 km)south of site
English sundew *Drosera anglica*			2B.3	June-Sept	Bogs and fens; meadows	**Possible.** Suitable wetland habitat limited within site; CNDDB documents species presence seven miles to northeast of site
Oregon fireweed *Epilobium oreganum*			1B.2	June-Sept	Montane coniferous forests; in and near springs and bogs; sometimes on serpentine	**Possible;** but suitable wetland habitat limited within site
blushing wild buckwheat *Eriogonum ursinum var. erubescens*			1B.3	June-Sept	Rocky sites within lower montane coniferous forest and montane chaparral	**Possible.** Suitable rocky habitat may be present within site
Shasta limestone monkeyflower *Erythranthe taylorii*			1B.1	April-May	Openings, carbonate crevices and rocky outcrops of cismontane woodlands and lower montane coniferous forest	**Unlikely.** Suitable carbonate habitat not present within site
Shasta fawn lily *Erythronium shastense*			1B.2	March-April	Usually carbonate, rocky, north-facing or shaded slopes in cismontane woodland and lower montane coniferous forest	**Unlikely.** Suitable habitat not present within site

Appendix A. Federally-listed, State-listed, and CNPS rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	State Status**	CNPS Status***	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Boggs Lake hedge-hyssop *Gratiola heterosepala*		E	1B.2	April-Aug	Freshwater marshes and swamps, vernal pools; clay soils	**Possible.** Suitable wetland habitat may be present within site
Stebbins' harmonia *Harmonia stebbinsii*			1B.2	May-June	Chaparral and lower montane coniferous forests; in ultramafic soils, often along roads	**Unlikely.** Ultramafic soils not present within site
little hulsea *Hulsea nana*			2B.3	July-Aug	Alpine boulder and rock fields, subalpine coniferous forests; volcanic substrates	**Unlikely.** Suitable habitat not present; CNDDB documents species presence nine (15 km) miles to east of site.
Castle Crags ivesia *Ivesia longibracteata*			1B.3	June	Crevices in granitic cliffs; lower montane coniferous forests	**Unlikely**. Granitic cliff habitat not present within site
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*			1B.1	March-May	Vernally mesic meadows and seeps; valley and foothill grassland; vernal pools	**Possible.** Suitable habitat present on site; CNDDB documents species occurrence seven miles to northeast of site
Santa Lucia dwarf rush *Juncus luciensis*			1B.2	April-July	Vernal pools, ephemeral drainages, wet meadows habitats and streamsides	**Possible.** Suitable habitat present on site; CNDDB documents occurrence five miles (eight km) to east of site
Cantelow's lewisia *Lewisia cantelovii*			1B.2		Mesic, granite; lower montane coniferous forest; cismontane woodland	**Unlikely.** Suitable granite habitat not present within site
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*			1B.2	April-June	Mesic; cismontane woodland; meadows and seeps	**Possible.** Suitable wetland habitat limited within site
tufted loosestrife *Lysimachia thyrsiflora*			2B.3	May-Aug	Meadows and seeps; mesic; upper montane coniferous forest	**Possible.** Suitable habitat present within site; CNDDB documents occurrence seven miles east of site

Appendix A. Federally-listed, State-listed, and CNPS rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	State Status**	CNPS Status***	Survey period	Habitat Requirements	Potential for Occurrence within the Project
broad-nerved hump moss *Meesia uliginosa*			2B.2	July,Oct	Moss on damp soil within meadows and seeps, bogs and fens, upper montane coniferous forest, and subalpine coniferous forest	**Possible.** Suitable wetland habitat limited within site
Shasta snow-wreath *Neviusia cliftonii*			1B.2	May-June	Lower montane coniferous forests, riparian woodlands; shady, north-facing or sheltered canyons	**Possible.** Suitable habitat present within site; CNDDB documents occurrence six miles west of site
slender Orcutt grass *Orcuttia tenuis*	T	E	1B.1	May-Oct	Vernal pools	**Unlikely.** Suitable vernal pool habitat absent; CNDDB documents occurrence seven miles to northeast of site
Cascade grass-of-Parnassus *Parnassia cirrata* var. *intermedia*			2B.2	Aug-Sept	Rock serpentine soils; montane coniferous forests, meadows and seeps, bogs and fens; 780 – 1,980 m	**Possible.** Suitable wetland habitat limited within site
thread-leaved beardtongue *Penstemon filiformis*			1B.3	May-July	Cismontane woodlands and lower montane coniferous forests; dry stony sites, grassy openings, and meadows	**Possible.** Potential suitable habitat present within site
Engelmann spruce *Picea engelmannii*			2B.2		Upper montane coniferous forest	**Possible.** Potential suitable habitat on site; nearest CNDDB occurrence approximately 16 miles northeast of site
Sierra blue grass *Poa sierrae*			1B.3	April-June	Lower montane coniferous forests; shady, moist, rock slopes; often in canyons	**Possible.** Potential suitable habitat present within site; CNDDB documents occurrence six miles to west of site
Modoc County knotweed *Polygonum polygaloides* ssp. *esotericum*			1B.1	May-Sept	Mesic; lower montane coniferous forest (vernal pools/wetlands)	**Possible.** Potential suitable habitat within site
marsh sckullcap *Scutellaria galericulata*			2B.2	June-Sept	Marshes and swamps of lower montane coniferous forests	**Possible.** Suitable wetland habitat limited within site

Appendix A. Federally-listed, State-listed, and CNPS rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	State Status**	CNPS Status***	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Canyon Creek stonecrop *Sedum obtusatum* ssp. *paradisum*			1B.3	May-June	In crevices of exposed granite; chaparral and coniferous forests; 1,060 – 1,860 m	**Unlikely.** No exposed granite habitat present within site
long-stiped campion *Silene occidentalis* ssp. *longistipitata*			1B.2	July-Aug	Lower and upper montane coniferous forest	**Possible.** Suitable habitat present within site; CNDDB documents occurrence within five miles to east and northeast of site
Klamath Mountain catchfly *Silene salmonacea*			1B.2	June-July	Openings, usually serpentine, within lower montane coniferous forest	**Possible.** Potential suitable habitat within site
hairy marsh hedge-nettle *Stachys pilosa*			2B.3	June-Aug	Mesic sites in Great Basin scrub	**Unlikely.** Suitable scrub habitat not present; CNDDB documents species presence four miles (six km) east of site
long-leaved starwort *Stellaria longifolia*			2B.2	May-July	Meadows and seeps, riparian woodlands	**Possible.** CNDDB documents species presence seven miles to northeast of site
Greene's tuctoria *Tuctoria greenei*	E	R	1B.1	May-July	Vernal pools	**Unlikely.** Suitable vernal pool habitat absent; CNDDB documents occurrence within approximately 20 miles northeast of site
Shasta huckleberry *Vaccinium shastense* ssp. *shastense*			1B.3	Dec-May (June-Sept uncommon)	Acidic, mesic site; often on streambanks; sometimes on rocky outcrops, seeps, roadsides, and disturbed areas within chaparral, lower montane and subalpine coniferous forest, and riparian forest	**Possible.** Suitable habitat may be present within site

Appendix A. Federally-listed, State-listed, and CNPS rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	State Status**	CNPS Status***	Survey period	Habitat Requirements	Potential for Occurrence within the Project
oval-leaved viburnum *Viburnum ellipticum*			2B.3	May-June	Chaparral, cismontane woodlands, and lower montane coniferous forests	**Possible.** Potential suitable habitat within site; nearest known occurrence approximately 16 miles southwest of site

Information from CNPS 2017, CNDDB 2017, USFWS 2017.

*E: Federally listed endangered species; T: Federally listed threatened species

**E: State-listed endangered species; R: State-listed rare species (CNDDB 2017)

***CNPS: California Native Plant Society rare species categories (CNPS 2001):

CNPS 1B.1: Plants seriously threatened in California and at a minimum rare elsewhere.

CNPS 1B.2: Plants fairly threatened in California and at a minimum rare elsewhere.

CNPS 1B.3: Plants not vey threatened in California and at a minimum rare elsewhere.

CNPS 2B.1: Plants seriously threatened in California but more common elsewhere

CNPS 2B.2: Plants fairly threatened in California but more common elsewhere.

CNPS 2B.3: Plants which are not very threatened in California and are more common elsewhere.

Appendix B. Plant Species Encountered within the Fountain Wind Project

Appendix B. Plant Species Encountered within the Fountain Wind Project.		
Family	**Scientific Name***	**Common Name**
ALLIACEAE	***Allium parvum***	dwarf onion
	***Allium* sp.**	onion
ANACARDIACEAE	***Toxicodendron diversilobum***	poison oak
APIACEAE	***Angelica breweri***	Brewer's angelica
	Heracleum lanatum	cow-parsnip
	Ligusticum californicum	angelica
	***Lomatium* spp.**	lomatium
	Osmorhiza berteroi	sweet cicely
APOCYNACEAE	***Apocynum androsaemifolium***	bitter dogbane
ARISTOLOCHIACEAE	***Asarum hartwegii***	Hartweg's wild ginger
	Asarum caudatum	creeping wild ginger
ASCLEPIADACEAE	***Asclepias speciosa***	showy milkweed
ASTERACEAE	***Achillea millefolium***	common yarrow
	Agoseris grandiflora	giant mountain dandelion
	Arnica cordifolia	heart leaved arnica
	Centaurea solstitialis	yellow starthistle
	Cichorium intybus	chicory
	Cirsium vulgare	bull thistle
	Ericameria nauseosa	gray rabbitbrush
	***Erigeron* sp.**	fleabane
	Eriophyllum lanatum	woolly sunflower
	Grindelia hirsutula	hairy gumweed
	Helenium bigelovii	Bigelow's sneezeweed
	Helianthella californica	California helianthella
	Hieracium nudicaule	naked-stemmed hawkweed
	Hypochaeris sp.	cat's ear
	Lactuca serriola	prickly lettuce
	Madia glomerata	mountain tarweed
	***Senecio* sp.**	groundsel
	***Solidago* sp.**	goldenrod
	Symphyotrichum bracteolatum	Eaton's aster
	Taraxacum officinale	common dandelion
	Wyethia mollis	mountain mule ear
	Tragopogon dubius	yellow salsify
BETULACEAE	***Alnus incana ssp tenuifolia***	creek alder
	Corylus cornuta* var. *californica	beaked hazelnut
BORAGINACEAE	***Cryptantha* spp.**	cryptantha
	Cynoglossum officinale	hound's tongue
	Eriodictyon californicum	California yerba santa
	Eriodictyon lobbii	matted yerba santa
	Plagiobothrys stipitatus* var. *micranthus	stalked popcornflower
BRASSICACEAE	***Erysimum capitatum***	western wallflower
	Lepidium campestre	field peppergrass
	Nasturtium officinale	watercress
	Sisymbrium altissimum	tall tumblemustard
CAMPANULACEAE	***Asyneuma prenanthoides***	California harebell
CAPRIFOLIACEAE	***Lonicera involucrata***	twinberry
	Sambucus mexicana	blue elderberry
	Symphoricarpos mollis	creeping snowberry
CARYOPHYLLACEAE	*Dianthus deltoides*	maiden pink

Appendix B. Plant Species Encountered within the Fountain Wind Project.		
Family	**Scientific Name***	**Common Name**
	***Silene* sp.**	silene
CHENOPODIACEAE	*Chenopodium album*	lamb's quarters
CONVOLVULACEAE	***Calystegia atriplicifolia* ssp. *buttensis***	Butte County morning glory
	Convolvulus sp.	morning glory
CORNACEAE	***Cornus nuttallii***	mountain dogwood
CUPRESSACEAE	***Calocedrus decurrens***	incense cedar
CYPERACEAE	***Carex comosa***	bristly sedge
	Carex densa	dense sedge
	Carex inops* ssp. *inops	long-stoloned sedge
	Carex nebrascensis	Nebraska sedge
	Carex praegracilis	field sedge
	Carex subfusca	brown sedge
	Carex utriculata	beaked sedge
	Carex spp.	sedge
	Eleocharis acicularis	needle spikerush
	Eleocharis macrostachya	common spikerush
	Schoenoplectus acutus	tule
	Scirpus microcarpus	mountain bog bulrush
DENNSTAEDTIACEAE	***Pteridium aquilinum* var. *pubescens***	bracken
EQUISETACEAE	***Equisetum arvense***	common horsetail
	Equisetum hymale	scouringrush horsetail
ERICACEAE	***Arctostaphylos patula***	greenleaf manzanita
	Chimaphila menziesii	pipsissewa
	Pterospora andromedea	pinedrops
	Pyrola picta	white veined shinleaf
	Rhododendron occidentale	western azalea
FABACEAE	***Acmispon americanus***	Spanish clover
	Hosackia crassifolia	broad leaved lotus
	Lathyrus lanszwertii	Nevada pea
	Trifolium pratense	red clover
FAGACEAE	***Chrysolepis sempervirens***	chinquapin
	Quercus kelloggii	California black oak
GROSSULARIACEAE	***Ribes roezlii***	Sierra gooseberry
	Ribes divaricatum	spreading gooseberry
HYDROPHYLLACEAE	***Phacelia* sp.**	phaclia
HYPERICACEAE	*Hypericum perforatum*	Klamathweed
IRIDACEAE	***Iris missouriensis***	western blue flag
	Iris tenuissima	slender iris
	Sisyrinchium bellum	western blue eyed grass
JUNCACEAE	***Juncus balticus***	Baltic rush
	Juncus ensifolius	sword leaved rush
	Juncus tenuis	slender rush
	Juncus xiphiodes	iris leaved rush
LAMIACEAE	***Mentha arvensis***	American wild mint
	Prunella vulgaris	self heal
	Stachys adjugoides* var. *rigida	rigid hedge nettle
	Scutellaria nana	little skullcap
LILIACEAE	***Fritillaria recurva***	scarlet fritillary
	Lilium pardalinum	leopard lily

Appendix B. Plant Species Encountered within the Fountain Wind Project.		
Family	**Scientific Name***	**Common Name**
	Lilium washingtonianum	Washington lily
	Triteleia hyacinthina	wild hyacinth
	Triteleia ixioides	pretty face
	Zigadenus venenosus	death camas
MALVACEAE	***Sidalcea malviflora***	checkermallow
	Sidalcea oregana* ssp. *spicata	checker mallow
MELANTHIACEAE	***Trillium albidum***	giant white wakerobin
	Trillium ovatum	Pacific trillium
	Veratrum californicum	California corn lily
MONTIACEAE	***Claytonia lanceolata***	lanceleaf springbeauty
	Claytonia perfoliata	miner's lettuce
MYRSINACEAE	***Lysimachia latifolia***	Pacific starflower
NYMPHACEAE	***Nuphar polysepala***	Rocky Mountain pond-lily
ONOGRACEAE	***Epilobium angustifolium***	fireweed
	Epilobium brachycarpum	fringed willowherb
	Epilobium ciliatum	California fuchsia
OPHIOGLOSSACEAE	***Botrychium multifidum***	leather grape-fern
ORCHIDACEAE	***Corallorhiza maculata***	spotted coralroot
	Corallorhiza striata	hooded coralroot
	Listera convallarioides	broad lipped twayblade
	Platanthera dilitata* var. *leucostachys	Sierra bog orchid
	Spiranthes romanzoffiana	hooded ladies tresses
OROBANCHACEAE	***Boschniakia strobilacea***	California ground-cone
	Castilleja tenuis	hairy Indian paintbrush
	Pedicularis densiflora	Indian warrior
PAPAVERACEAE	***Dicentra formosa***	bleeding heart
PINACEAE	***Abies concolor***	white fir
	Abies magnifica	red fir
	Pinus lambertiana	sugar pine
	Pinus ponderosa	ponderosa pine
	Pseudotsuga menziesii	Douglas fir
PLANTAGINACEAE	*Plantago lanceolata*	English plantain
	Veronica anagallis-aquatica	water speedwell
PHRYMACEAE	***Mimulus breviflorus***	short flowered monkey flower
	Mimulus guttatus	seep monkey flower
POACEAE	***Agrostis scabra***	rough bent grass
	Alopecurus aequalis	short awned foxtail
	Alopecurus geniculatus	marsh foxtail
	Bromus carinatus	mountain brome
	Bromus tectorum	cheatgrass
	Calamagrostis canadensis	bluejoint reedgrass
	Cynosurus echinatus	annual dogtail grass
	Dactylis glomerata	orchardgrass
	Deschampsia cespitosa	tufted hairgrass
	Deschampsia danthonioides	annual hair grass
	Elymus caput-medusae	medusahead
	Elymus elymoides	bottlebrush
	Elymus glaucus	blue wild-rye
	Elymus trachycaulus	slender wheatgrass
	Festuca arundinacea	tall fescue

Appendix B. Plant Species Encountered within the Fountain Wind Project.

Family	Scientific Name*	Common Name
	Festuca occidentalis	western fescue
	Glyceria borealis	Northern mannagrass
	Glyceria striata	fowl mannagrass
	Phleum pratense	Timothy
	Poa bulbosa	bulbous bluegrass
	Poa palustris	fowl bluegrass
	Poa pratensis	Kentucky bluegrass
	Poa secunda	Sandberg's bluegrass
	Stipa nelsonii	mountain needle grass
POLEMONIACEAE	***Gilia aggregata***	scarlet gilia
	Navarretia divaricata	mountain navarretia
POLYGONACEAE	***Eriogonum lobbii***	buckwheat
	Eriogonum nudum	naked buckwheat
	***Eriogonum* sp.**	buckwheat
	Eriogonum umbellatum	sulfur buckwheat
	Eriogonum vimineum	wicker-stem wild buckwheat
	Polygonum aviculare	prostrate knotweed
	Polygonum bistortoides	American bistort
	Rumex acetosella	field sorrel
	Rumex salicifolius	willow dock
PRIMULACEAE	***Primula hendersonii***	mosquito bill
PTERIDACEAE	***Myriopteris gracillima***	lace lip fern
RANUNCULACEAE	***Aconitum colombianum***	monkshood
	Aquilegia formosa	columbine
	Delphinium nudicaule	canyon larkspur
	Ranunculus aquatilis	whitewater crowfoot
	Thalictrum fendleri	meadow-rue
RHAMNACEAE	***Ceanothus cordulatus***	mountain whitethorn
	Ceanothus cuneatus	buck brush
	Ceanothus integerrimus	deer brush
	Ceanothus prostratus v. prostratus	Mahala mat
	Ceanothus velutinus	tobacco brush
	Frangula californica	California coffee berry
ROSACEAE	***Amelanchier alnifolia***	serviceberry
	Cercocarpus betuloides	birch leaf mountain mahogany
	Fragaria virginiana	mountain strawberry
	Geum macrophyllum	large leaved avens
	Potentilla gracilis	Northwest cinquefoil
	Prunus emarginata	bitter cherry
	Rhamnus purshiana	cascara
	Rosa woodsii* var. *ultramontana	interior rose
	Rubus armeniacus	Himalayan blackberry
	Rubus parviflorus	thimbleberry
	Sorbus californica	mountain ash
	Spiraea douglasii	Douglas spiraea
RUBIACEAE	***Gallium aparine***	common bedstraw
RUSCACEAE	***Maianthemum racemosum***	feathery false lily of the valley
	Maianthemeum stellatum	starry false lily of the valley
SALICACEAE	***Populus tremuloides***	quaking aspen
	Salix scouleriana	Scouler willow

Appendix B. Plant Species Encountered within the Fountain Wind Project.

Family	Scientific Name*	Common Name
	Salix lasiandra	Pacific willow
	Salix lasiolepis	arroyo willow
SAPINDACEAE	***Acer circinatum***	vine maple
	Acer glabrum	Rocky Mountain maple
	Acer macrophyllum	bigleaf maple
SAXIFRAGACEAE	***Heuchera sp.***	alumroot
SCROPHULARIACEAE	***Castilleja* sp.**	paintbrush
	Mimulus guttatus	seep monkey flower
	Mimulus torreyi	Torrey's monkeyflower
	***Pedicularis* sp.**	lousewort
	Penstemon neotericus	Plumas County beardtongue
	***Penstemon* sp.**	penstemon
	Verbascum thapsus	common mullein
URTICACEAE	***Urtica dioica***	stinging nettle
VALERIANACEAE	***Valeriana californica***	California valerian
VERBENACEAE	***Verbena lasiostachys***	western vervain
VIOLACEAE	***Viola adunca***	Western dog violet
	Viola glabella	stream violet
	Viola lobata	pine violet
	Viola purpurea	mountain violet

*Native plant species in bold.

Appendix C. Natural Vegetation Communities Mapped within the Fountain Wind Project Evaluation Area.

Mixed Conifer Forest – Burned (MCF-B)

Areas mapped as this vegetation community type cover a majority of the Project and correspond to the Sierran mixed conifer forest natural community (Holland 1986). This community type intergrades with Sierran white fir forest, western ponderosa pine forest, and lower and upper montane chaparral communities in many places. The MCF-B community structure and composition within the Project have been significantly altered for many decades through active forest management (e.g., timber harvesting, tree planting). Additionally, these areas were burned during the 1992 Fountain Fire.

In the years following the Fountain Fire millions of ponderosa pine, Douglas fir, and white fir seedlings were planted at 10-foot spacing. Thus, the MCF-B vegetation community type was composed of even-aged stands of mixed conifer forest, generally between 23-25 years old, featuring a partially open canopy. Some thinning has occurred in this MCF-B mapped at the Project on the south side of Highway 299, and logging/thinning slash has been left in place. No thinning was observed in this vegetation community within the Project on the north side of the Highway 299. Overall, woody and herbaceous understory vegetation within the MCF-B was variable in composition and density, but typically included some combination of the following woody species: Mahala mat (*Ceanothus prostratus* var. *prostratus*), greenleaf manzanita (*Arctostaphylos patula*), whitethorn (*Ceanothus cordulatus*), Sierra gooseberry (*Ribes roezlii*), and creeping snowberry (*Symphoricarpos mollis*); and herbaceous species: bracken (*Pteridium aquilinum* var. *pubescens*), bottlebrush (*Elymus elymoides*), Pacific starflower (*Lysimachia latifolia*), and mountain needle grass (*Achnatherum nelsonii*). Although not as common as the dominant overstory species, incense cedar is present throughout the majority of areas mapped as MCF-B.

Mixed Conifer Forest – Unburned (MCF-U)

Mixed conifer forest-unburned was primarily mapped in the east-central and southern portions of the Project, where it formed a mosaic with recently logged areas. Areas mapped as MCF-U were not burned in the Fountain Fire. Within the Project this vegetation community featured a mostly-closed canopy of mature mixed conifer species, including sugar pine (*Pinus lambertiana*), incense cedar, red cedar (*Abies magnifica*), and Douglas fir, with some California black oak (*Quercus kelloggii*), ponderosa pine, and white fir. As a result of the closed canopy, understory vegetation was sparse and mostly composed of herbaceous species, including bracken, Pacific starflower, coralroot (*Corallorhiza* spp.), white veined shinleaf (*Pyrola picta*), and pipsissewa (*Chimaphila menziesii*). Scattered seedlings and saplings of the overstory tree species were also present in the understory. On rockier substrates MCF-U typically had a more open canopy and featured a denser understory composed of a variety of the woody and herbaceous species observed in MCF-B. The MCF-U communities mapped within the Project represent a managed (i.e., periodically disturbed) forest. As such, most stands were even-aged, but because of the different intervals at which harvest occurred a mosaic of different age-class even-aged stands exists within MCF-U communities at the Project.

Mixed Montane Riparian Forest (MMRF)

Mixed montane riparian forest was mapped in the southern half of the Project within MCF-U communities. It was documented primarily along perennial stream corridors but also occurred along intermittent streams in some areas. The overstory vegetation was typically composed of mature mixed conifer species which had not been harvested. Riparian tree species commonly observed in the mid-story canopy included bigleaf maple (*Acer macrophyllum*) and thinleaf alder (*Alnus incana* ssp. *tenuifolia*), with a shaded, woody understory of Rocky Mountain maple (*Acer glabrum*), vine maple (*Acer circinatum*), beaked hazelnut (*Corylus cornuta* var. *californica*), twinberry (*Lonicera involucrata*), and mountain dogwood (*Cornus nuttallii*). Understory vegetation was generally sparse and commonly included lily of the valley (*Maianthemum* spp.), common bedstraw (*Galium aparine*), and sweet cicely (*Osmorhiza berteroi*). Areas mapped as MMRF included patches of wetlands that were too small to map independently. These areas included fringe wetlands and small bands of wet montane meadow adjacent channels.

Mixed Montane Riparian Scrub (MMRS)

Mixed montane riparian scrub was primarily mapped throughout the northern half of the Project. Similar to the MMRF community type it occurred along perennial and intermittent drainages, but it can be distinguished (from MMRF) by the absence of a tree-dominated canopy and the presence of a shrub-dominated canopy that included several willow species (*Salix* spp.). The MMRS community type was typically composed of an inner band of vegetation immediately adjacent a drainage channel that was dominated by true riparian species, surrounded by a buffer of mixed montane chaparral species. MMRS was mapped along steep, broad, rocky drainages as well as gently sloping, narrow riparian corridors. Riparian species commonly observed along the immediate channel included arroyo willow (*Salix lasiolepis*), shining willow (*S. lucida*), scouler willow (*S. scouleriana*), thinleaf alder, and mountain dogwood. Shrub species adjacent this inner band of vegetation often included cascara (*Rhamnus purshiana*), blue elderberry (*Sambucus mexicana*), Rocky Mountain maple, and, to a lesser extent, Sierra gooseberry (*Ribes roezlii*) and bitter cherry (*Prunus emarginata*). Herbaceous understory vegetation was variable in composition and density, and typically included similar species as those observed in MMRF. Areas mapped as MMRS include patches of wetlands that were too small to map independently. These areas included fringe wetlands and small bands of wet montane meadow adjacent channels.

Mixed Montane Chaparral (MMC)

Mixed montane chaparral intergraded with almost all other community types within the Project. It was mapped in areas receiving full sunlight, on rocky ridgetops, on steep, rocky slopes, adjacent riparian areas, and in previously burned and logged areas. The majority of MMC observed within the Project corresponds to the *Arctostaphylos patula* Shrubland Alliance (Sawyer et al. 2008), which is characterized by the presence of dense, nearly impenetrable thickets dominated by greenleaf manzanita. Numerous other shrub species that sometimes occurred as co-dominants with greenleaf manzanita were observed within MMC within the Project. Such species included mountain whitethorn, deer brush (*Ceanothus integerrimus*), tobacco brush (*C. velutinus*), buck brush (*C. cuneatus*), bush chinquapin (*Chrysolepis sempervirens*), and golden chinquapin (*C. chrysophylla*). In several locations within the Project greenleaf manzanita formed an association with scrub-form black oak. Because of the thicket-like growth form of mixed montane chaparral no understory vegetation was observed.

Black Oak Woodland (BOW)
Black oak woodland was mapped in several areas within the Project. It typically either occurred at lower elevations or in previously burned areas, where it formed a mosaic with mixed montane chaparral. The BOW community type corresponds to the *Quercus kelloggii* Forest Alliance, which is composed of a wide variety of vegetation associations (Sawyer et al. 2008). Within the Project the majority of BOW featured a mostly open canopy of black oak with scattered greenleaf manzanita in the shrub strata. The BOW stands typically supported a well-developed herbaceous understory composed primarily of grasses, including Lemmon's needlegrass (*Achnatherum lemmonii*) and blue wildrye (*Elymus glaucus*).

Wet Montane Meadow (WMM)
Wet montane meadow was mapped throughout the Project in areas adjacent to stream corridors, ponds, and springs or seeps with high water tables. The WMM community can be distinguished from the montane meadow community (MM) because it typically remains saturated throughout the growing season. The WMM community within the Project was composed of a diversity of hydrophytic species including grasses, sedges, rushes, and perennial forbs. Commonly observed herbaceous plant species in WMM at the Project included redtop (*Agrostis alba*), bluejoint reedgrass (*Calamagrostis canadensis*), marsh foxtail (*Alopecurus geniculatus*), beaked sedge (*Carex rostrata*), bristly sedge (*C. comosa*), Nebraska sedge (*C. nebrascensis*), brown sedge (*C. subfusca*), swordleaf rush (*Juncus ensifolius*), Baltic rush (*Juncus balticus*), common spikerush (*Eleocharis macrostachya*), tufted hairgrass (*Deschampsia cespitosa*), American bistort (*Polygonum bistortoides*), horsetail (*Equisetum* spp.), Bigelow's sneezeweed (*Helenium bigelovii*), and seep monkey flower (*Mimulus guttatus*). One of the WMM communities mapped within the south-central portion of the Project featured several shallow bogs within the larger meadow. Shrub species observed around the perimeter of WMM and sometimes interspersed but not dominant included rose spirea (*Spiraea douglasii*), willow, and thinleaf alder seedlings and saplings. Additional small patches of WMM habitat were observed along drainage channels within MMRF and MMRS communities. Because of the small size of these patches, they were included in the larger riparian community mapping (i.e., they were not mapped independently).

Montane Meadow (MM)
Within the Project, montane meadow was mapped in forest openings and adjacent wet montane meadow and riparian habitats. This community type supports mesic and upland herbaceous vegetation but is distinguished from WMM by featuring soils that are not saturated during the growing season. Common grasses and forbs occurring within MM mapped within the Project included Timothy (*Phleum pratense*), Kentucky bluegrass (*Poa pratensis*), redtop, tall fescue (*Festuca arundinacea*), orchardgrass (*Dactylis glomerata*), blue wildrye, yarrow (*Achillea millefolium*), and goldenrod (*Solidago* sp.).

Logged/Recently Logged (L)

Logging operations are ongoing within the Project, particularly south of Highway 299. Areas mapped as logged have been harvested at various intervals within the last several years (or more). Most logged sites featured planted seedlings and saplings of various age classes. Ponderosa pine and, to a lesser extent, white fir were the most common tree species planted within recently logged areas. The majority of logged areas included small patches of mature trees that were presumably left to provide wildlife habitat. Understory vegetation was typically sparse in logged areas and was mostly composed of ruderal, disturbance-tolerant herbaceous species.

Rock Outcrop (RO)

The majority of areas mapped as rock outcrop included rocky knolls and outcrops that either featured sparse vegetation or were completely devoid of vegetation. Where vegetation was observed, it was mostly restricted to shelves, cracks, and crevices in the rock, and to scree slopes below the outcrops. Herbaceous species observed within this vegetation community included lace lip fern (*Myriopteris gracillima*), sulfur buckwheat (*Eriogonum umbellatum*), buckwheat (*Eriogonum* sp.), Plumas County beardtongue (*Penstemon neotericus*), and onion (*Allium* sp.).

Transmission Line Corridor (TLC)

A transmission line corridor was mapped in the central portion of the Project. It was situated on a more or less east-west axis. Vegetation within this corridor is maintained to deter the establishment of woody plant species, primarily trees. Dominant plant species observed along the corridor included bracken and a mix of recently established woody chaparral species (*Arctostaphylos* spp., *Ceanothus* spp.). Small patches devoid of vegetation were also observed along this corridor.

C4. Clarification of 2018 Rare Plant Surveys and Natural Vegetation Community Mapping

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TECHNICAL MEMORANDUM

DATE: January 10, 2019

TO: Kristen Goland, Pacific Wind Development LLC

FROM: Andrea Chatfield and Kurt Flaig, WEST, Inc.

RE: Request for clarifications on 2018 Rare Plant Survey and Natural Vegetation Community Mapping Report for the Fountain Wind Project

On behalf of Pacific Wind Development LLC, Western EcoSystems Technology, Inc. (WEST) prepared a Rare Plant Survey and Natural Vegetation Community Mapping Report (Report) for the proposed Fountain Wind Energy Project (Project). The Report, dated October 17, 2018, was submitted to Shasta County and subsequently reviewed by ESA. Based on their review, ESA requested, in a memorandum dated January 4, 2019, that clarifications or additional data be provided in regard to the Report. Each of ESA's specific requests is listed below followed by WEST's response.

1. *The report is not clear as to why a single year would be sufficient for the presence/absence study. Please elaborate on whether seasonal climate conditions were sufficient for detection or if there were any adverse conditions that could prevent surveyors from determining presence.*

No adverse conditions occurred within the Project area in 2017-2018 that may have precluded the presence or identification of special status plant species. A review of precipitation data from November 1, 2017 to May 31, 2018 shows that precipitation during the winter and spring time period preceding the survey was about 63% of average based on historical precipitation data for Redding, California (US Climate Data 2019). While this is somewhat lower than normal precipitation for the region, it would be expected that individuals of the targeted rare plant species would have been visible during the 2018 botanical survey, if present. Based on this expectation, a second year of rare plant surveys is not warranted for the Project. Additional rare plant surveys are scheduled to occur within newly added development corridors in the Project's southern Expansion Area in spring of 2019.

2. *Butte County morning-glory (Calystegia atriplicifolia ssp. buttensis) was described as present in the Site Characterization Study, and is listed as observed in their Rare Plant*

Survey report. While it is a CNPS Rare Plant Rank 4.2 (limited distribution), the species observation should be noted for analysis as part of the CEQA process.

For the purpose of the rare plant survey at the Project, target species were limited to state or federal-listed species, and species with a California Native Plant Society (CNPS) rare species rank of 1B and 2B (rare, threatened, or endangered in California). Butte County morning-glory has a CNPS ranking of 4.2 and was, therefore, not include as a focal species. However, individuals of species with a CNPS ranking of 3 and 4, including Butte County morning-glory, were noted when encountered over the course of the survey. The Butte County morning-glory observations were made just outside of the Project boundary, near a gate approximately 80 meters south of Hwy 299. These observations should not have been included in Appendix B (Plant Species Encountered within the Fountain Wind Project), as they fell just outside of the Project boundary. No other individuals of this species were located within the Project boundary or within survey corridors. The vast majority of historic Butte County morning-glory observations documented in the California Natural Diversity Database and included in the 2017 Site Characterization Study were located in the northwest portion of the larger Project area evaluated in the SCS and outside of the area surveyed during the 2018 botanical survey effort.

C5. 2019 Rare Plant Surveys and Natural Vegetation Community Mapping

RARE PLANT SURVEYS AND NATURAL VEGETATION COMMUNITY MAPPING

Fountain Wind Project
Shasta County, California

Prepared for:

ConnectGen Operating LLC

Prepared by:

Kurt Flaig, Andrea Chatfield, and Joel Thompson

Western EcoSystems Technology, Inc.
2725 NW Walnut Boulevard
Corvallis, Oregon 97330

December 20, 2019

STUDY PARTICIPANTS

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Rande Patterson	Biologist / field surveyor
Klarissa Lawrence	Biologist / field surveyor
Julia Preston-Fulton	Technical Editor

REPORT REFERENCE

Flaig, K., A. Chatfield, and J. Thompson. 2019. Rare Plant Surveys and Natural Vegetation Community Mapping, Fountain Wind Project, Shasta County, California. Prepared for ConnectGen Operating LLC, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. December 20, 2019.

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INTRODUCTION

In 2018, Western EcoSystems Technology, Inc. (WEST) performed rare plant surveys and vegetation community mapping at the proposed Fountain Wind Project (Project) in Shasta County, California. The methods and results of the 2018 survey effort are presented in Flaig et al. (2018). In early 2019, the Project layout was amended, and WEST performed supplemental rare plant surveys and vegetation mapping within newly added development corridors. The following memorandum describes the methods and results of rare plant surveys conducted at the Project during the 2018 and 2019 growing seasons. The primary purpose of these surveys was to determine the presence or absence of rare plant species that may be subject to impacts resulting from Project construction. A description of the natural vegetation communities present within the Project evaluation area and information on invasive plant species are also provided.

SURVEY AREA

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project is early seral mixed coniferous forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of ponderosa pine (*Pinus ponderosa*), white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense-cedar (*Calocedrus decurrens*), and sugar pine (*Pinus lambertiana*).

The Project is located within the Southern Cascades Ecoregion, near the southern terminus of the Cascade Mountains. A Mediterranean climate dominates the region, characterized by hot, dry summers and cold, wet winters. On average, the area receives about 63 inches (in; 160 centimeters [cm]) of precipitation per year, of which 28 in (71 cm) occur as rainfall and 35 in (89 cm) as snowfall (US Climate Data 2018). A number of perennial and intermittent streams flow primarily west and northwest from the Project into the Pit River and Sacramento River watersheds. Soils range from stony to clay loams that have formed in residuum weathered from volcanic rock (Natural Resources Conservation Service 2018). In August 1992, the Fountain Fire burned approximately 64,000 acres (ac; 25,900 hectares [ha]) in and around the Project. Post-fire management included salvage logging, site preparation, and planting in the year following the fire. Within five years of the fire, approximately 17 million seedlings were planted in industrial areas previously supporting timber (Zhang et al. 2008). Planted species included ponderosa pine, Douglas fir and white fir at 10-foot (ft; 3-meter [m]) spacing. Incense cedar were planted along stream buffers. In order to reduce competition for (tree) seedling establishment, growth regulator herbicides were applied in many areas where manzanita (*Arctostaphylos* spp.) and California lilac (*Ceanothus* spp.) had naturally colonized (Zhang et al. 2008). With historic and on-going timber management activities and post-Fountain Fire salvage and reclamation activities, the natural vegetation communities have been periodically altered and/or disturbed, likely having at least some effect on plant species composition, distribution, and diversity in these areas.

For the purpose of conducting rare plant surveys, development corridors were provided in Global Information System (GIS) format by the project proponent. The initial 2018 surveys were performed within development corridors provided by the project proponent on May 11, 2018. Supplemental surveys performed in 2019 were conducted within newly added development corridors provided by the project proponent on May 20, 2019. Both the 2018 and 2019 rare plant survey corridors included areas of potential disturbance during Project construction (Figure 1). The survey corridors varied in size and included buffers of all areas of proposed infrastructure that may be subject to ground disturbance (e.g., newly proposed roads, roads that may be expanded, turbine pads, and underground collection lines). Natural vegetation communities were mapped in a broader evaluation area that encompassed the rare plant survey corridors and additional surrounding lands (Figure 2).

METHODS

Rare Plant Surveys

WEST conducted a query of the California Natural Diversity Database (CNDDB), an inventory of the status and locations of rare plants, rare plant communities, and animals in California managed by the California Department of Fish and Wildlife (CDFW), and searched the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants to compile a list of special status plant species and sensitive natural vegetation communities that may have potential to occur within the evaluation area. The CNDDB query was limited to an area within a 10-mile radius of the Project and the CNPS search was focused on Shasta County. Additional special status plant species were identified by CDFW personnel and were added to the list.

Sixty-nine rare plants were identified in the pre-field review (Appendix A). Based on further review of the habitat requirements of the 69 species and knowledge of the natural vegetation communities known to occur within the evaluation area (based on previous WEST surveys in the region), WEST biologists determined that potential suitable habitat was present for 47 of the 69 rare plant species (identified as “Possible” in Appendix A). These 47 species were targeted for rare plant surveys within the Project area. WEST determined that suitable habitat was not present within the Project area for 22 of the original 69 rare plant species (identified as “Unlikely” in Appendix A). Rationales for exclusion included absence of suitable habitat within the Project (e.g., vernal pools) and absence of appropriate substrates (e.g., ultramafic soils, granitic crevices). Two of the 69 species on the initial list were federally-listed, including slender Orcutt grass (*Orcuttia tenuis*; Threatened) and Greene’s tuctoria (*Tuctoria greenei*; Endangered). However, both of these plant species are endemic to vernal pool habitats which are absent from the survey corridors. No state-listed plants are among the 47 rare plant species identified as possibly occurring in the survey area.

Prior to conducting surveys, WEST reviewed species descriptions, habitat requirements, and photographs of all 69 species identified in the initial assessment. Although 22 species were determined “unlikely” to occur based on their habitat requirements, they were included in the pre-field review because their flowering/fruiting periods overlapped with those of the 47 targeted species (Appendix A).

Focused surveys to determine presence or absence of target species were conducted in 2018 and 2019, during two survey periods. Surveys in 2018 occurred from May 21 – 29 and July 30 – August 3, and were conducted in the northern portion of the Project area (Figure 1). Surveys in 2019 were primarily focused on the southern portion of the Project area (Figure 1), but included additional infrastructure in the northern portion, and were conducted from May 29 – June 3 and July 30 – August 2. The two survey periods were selected to capture the range of flowering and fruiting periods for the 47 targeted species. All surveys were conducted by experienced WEST botanists and botanical field surveyors; qualifications of field surveyors are included in Appendix B. WEST field surveyors conducted pedestrian transect surveys within the survey corridors, with special attention given to areas that might provide suitable habitat for rare plant species, in accordance with the 2018 *CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities*. The survey corridors were uploaded to Global Positioning System units with sub-foot accuracy (Trimble Geo 7x). In addition, surveyors used aerial imagery-based field maps depicting the evaluation area to map natural vegetation communities and invasive plant species and for general navigation.

A list of all vascular plant species encountered during the rare plant surveys was maintained. Plant species were identified to the highest taxonomic level possible when encountered using *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012).

Natural Vegetation Communities

Mapping of natural vegetation communities within the evaluation area was conducted by WEST during the 2018/2019 rare plant surveys. WEST botanists documented natural vegetation community types while conducting rare plant surveys and while transiting through the evaluation area in route to survey areas. Natural vegetation communities were identified on-site using *A Manual of California Vegetation* (Sawyer et al. 2009). Based on the field data collected during rare plant surveys, natural vegetation communities were hand-drawn on aerial imagery-based field maps created at a scale appropriate for broad-scale mapping (i.e., 1 in = 1,000 ft [2.5 cm = 304.8 m]). The field maps were later digitized in a GIS to incorporate into other GIS mapping efforts.

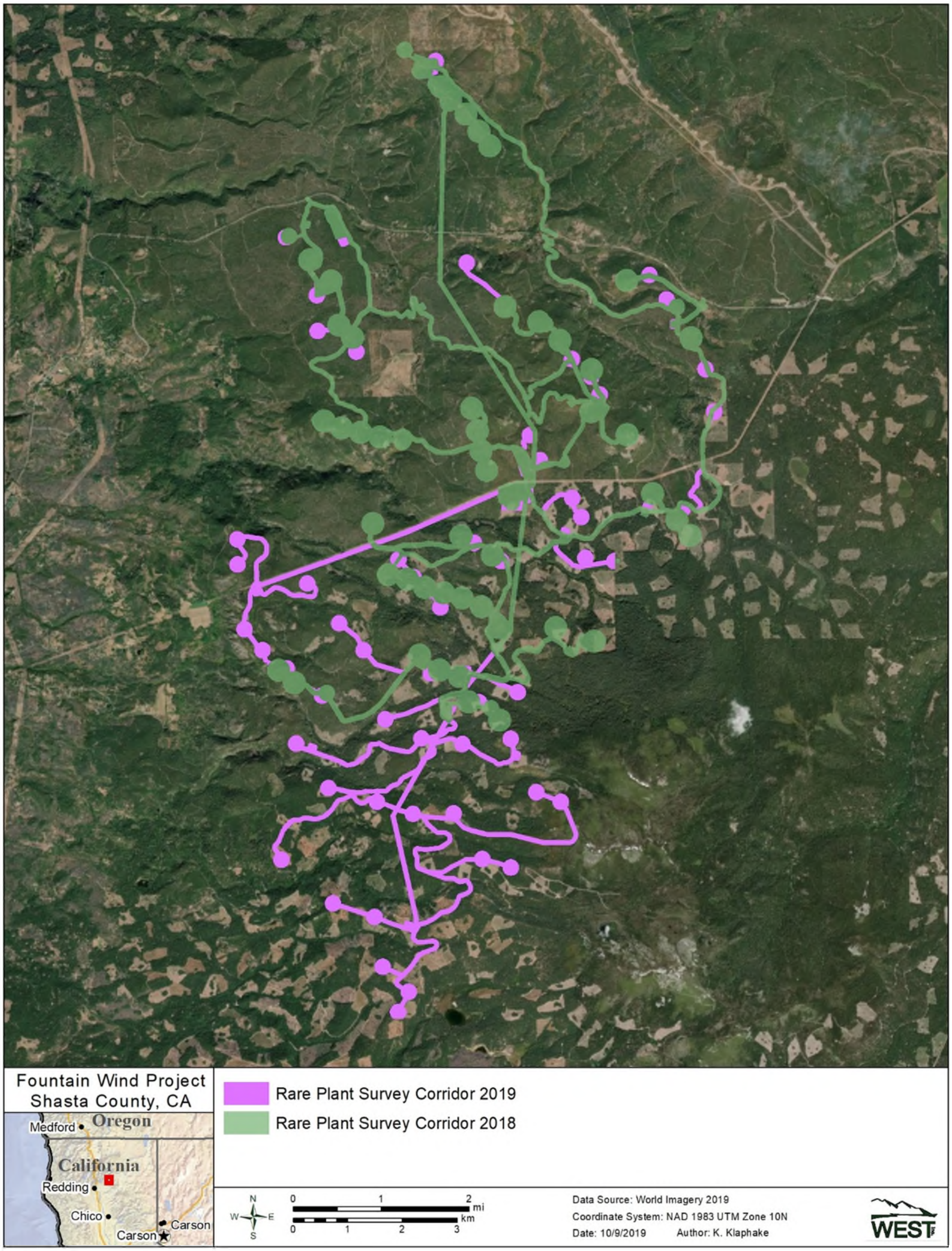

Figure 1. Survey corridors for 2018 and 2019 rare plant surveys at the Fountain Wind Project, Shasta County, California.

Invasive Plant Species

WEST recorded non-native invasive plant species encountered and conducted broad-scale invasive species mapping during the 2018/2019 rare plant surveys. Mapping was primarily focused on roadsides within the corridors. Based on observations during the rare plant surveys, vegetation composition within turbine pad areas (most of which were away from developed roads) was largely native, with only a few, occasional non-native invasive species observed; no mapping of non-native species was conducted within these locations. Additionally, limited mapping was conducted within recently logged (e.g., within the past 10 years) areas because of the abundance of the same three non-native invasive species (i.e., common mullein [*Verbascum Thapsus*], bull thistle [*Cirsium vulgare*], and Klamath weed [*Hypericum perforatum*]) within all such areas.

Mapping of non-native invasive species along access roads was conducted by walking and slowly driving roads and estimating the number of individuals of non-native invasive species observed. Non-native plant species for which mapping was conducted included all species identified by the California Invasive Plant Council (CAL-IPC) as “high” (i.e., species that have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure), “moderate” (i.e., species that have substantial and apparent, but generally not severe ecological impacts on physical processes, plant and animal communities, and vegetation structure), and “limited” (i.e., species that are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score). Survey corridors in which invasive species were encountered were broken into survey segments identified with alternating blue and yellow lines (see Figure 2) to differentiate the non-native invasive species present and their relative distribution documented within the segment. Within these segments, non-native invasive plant species-level distributions were rated as “Abundant” (A: over one thousand plants), “Common” (C: 200-1,000 individuals), or “Infrequent” (I: less than 200 individuals). Additional non-native invasive plant species mapping included several point locations along roads where invasive plants were concentrated/clustered. These locations were typically located in high-disturbance areas (e.g., near gates).

RESULTS AND DISCUSSION

Rare Plant Surveys

None of the 47 rare plant species identified as possibly occurring was encountered during the two survey periods in 2018 or 2019. Given the lack of rare plants identified in the survey corridors, no impacts to rare plants are anticipated during Project construction. A comprehensive list of plant species encountered during the 2018/2019 surveys was compiled and is provided in Appendix C.

Precipitation data for Redding, California, the nearest town for which historical data was reported, was reviewed to determine if adequate seasonal climatic conditions existed for the 2018 and 2019 surveys. During the winter and spring time period preceding the 2018 surveys (November 1, 2017 − May 31, 2018) precipitation was 63% of average (US Climate Data 2019). While this is somewhat lower than normal for the Region, it would be expected that individuals of the targeted plant species would have been visible during the 2018 botanical survey, if present. Recorded precipitation during the same time period preceding the 2019 surveys was 138% of average (US Climate Data 2019). This indicates that seasonal climatic conditions were most favorable (i.e., well above average) for the 2019 survey year and that the likelihood of detection of individuals of the targeted plant species, if present, was high. Despite the variation in seasonal differences preceding the 2018 and 2019 surveys, WEST botanists observed no noticeable differences in the composition or abundance of flowering plant species between years.

Natural and Sensitive Vegetation Communities

Eight natural vegetation communities were identified within the Project evaluation area (Figure 2). These include: *Pinus ponderosa* Forest Alliance; *Pinus ponderosa* Forest Alliance–Logged/Recently Logged; *Abies concolor–Pseudotsuga menziesii* Forest Alliance; *Quercus kelloggii* Forest Alliance; *Acer glabrum* Provisional Shrubland Alliance; *Arctostaphylos patula* Shrubland Alliance; *Carex utriculata* Herbaceous Alliance, and; *Agrostis* (*gigantea,stolonifera*)–*Festuca arundinacea* Harbaceous Semi-Natural Alliance. Descriptions of the eight natural vegetation communities are provided in Appendix D. One of the mapped natural vegetation communities may be considered a sensitive natural community by the CDFW. The *Acer glabrum* Provisional Shrubland Alliance is designated as a State Rank "3?" natural community by the CDFW. Vegetation communities with a State Rank of S1−S3 are considered sensitive natural communities by CDFW. The question mark in the ranking denotes "an inexact numeric rank because we (CDFW) know we have insufficient samples over the full expected range of the type, but existing information points to this rank…" (CDFW 2019). Based on the 2018/2019 vegetation community mapping at the Project, approximately 1,036 ac (419 ha) within the evaluation area are classified as *Acer glabrum* Provisional Shrubland Alliance (4.1%), most of which are located in the southeastern portion of the Project (Figure 2). Within the 2019 development corridors, this vegetation community occurs on just 31 ac (12 ha) or 1.5% of the total area potentially impacted by Project development. .

Mixed coniferous forest (i.e., *Pinus ponderosa* Forest Alliance and *Abies concolor–Pseudotsuga menziesii* Forest Alliance) is the predominant vegetation cover type within the evaluation area (see Figure 2). This cover type is heavily managed for timber production throughout the region. Other vegetation communities occur in far lesser amounts and are largely outside of areas potentially at risk of disturbance due to Project construction. While riparian communities cross the develoment corridors in many areas, they are largely at existing road crossings or in areas where future roads may be constructed. It is assumed that any future modifications to habitat along streams (e.g., riparian areas) due to added road work will incorporate riparian protections consistent with other ongoing management activities (i.e., timber harvesting) in the region.

Invasive Plant Species

The most common invasive plant species observed within the Project evaluation area included common mullein (CAL-IPC ranked "limited"), bull thistle (CAL-IPC ranked "moderate"), Klamath weed (CAL-IPC ranked "limited"), and houndstongue (*Cynoglossum officinale*; CAL-IPC "moderate"). Based on other plant survey work conducted by WEST within the Project vicinity (Young et al. 2007), these four species are ubiquitous in the area. As mentioned above, mullein, bull thistle, and Klamath weed are widespread within all logged and recently logged areas within the evaluation area. Three invasive plant species ranked "high" by CAL-IPC were observed within the Project evaluation area, including Himalayan blackberry (*Rubus armeniacus*), yellow star thistle (*Centaurea solstitialis*), and medusahead (*Elymus caput-medusae*; Figure 3). Additional CAL-IPC ranked invasive plant species observed within the evaluation area included annual dogtail grass (*Cynosurus echinatus*; "moderate"), tall fescue (*Festuca arundinacea*; "moderate"), common velvet grass (*Holcus lanatus*; "moderate"), field sorrel (*Rumex acetosella*; "moderate"), orchardgrass (*Dactylis glomerata*; "limited"), and English plantain (*Plantago lanceolata*; "limited"; Figure 3).

Based on the data collected during 2018/2019 surveys, a number of invasive plant species are present within proposed development corridors. These results are not unexpected given the primary land use (i.e., commercial timber production), which results in recurring disturbance throughout the area and relatively high traffic volumes resulting from timber harvest activities, and WEST knowledge of invasive plant species within the region. Many of the invasive species are actively managed by the landowners to minimize competition with conifer seedlings and enhance timber growth. Many disturbances related to Project construction will be similar to those which occur in the Project evaluation area already (e.g., harvest of trees, road construction and widening, seasonal/temporary increases in vehicle traffic). While Project construction will create some additional disturbance to the landscape, once construction is complete, the Project will have minimal influence on the future distribution of invasive species relative to the influence of ongoing commercial timber operations.

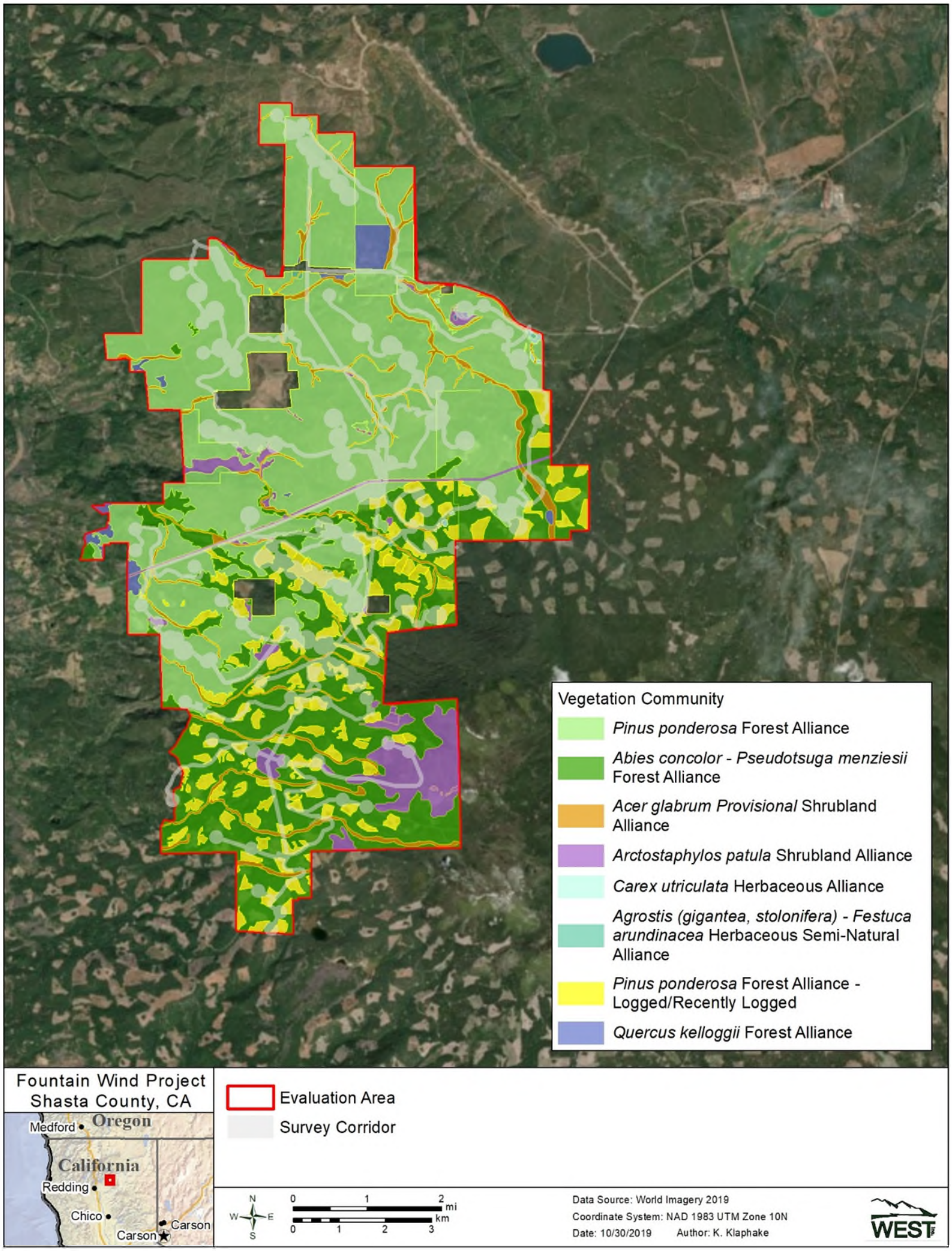

Figure 2. Vegetation communities identified and mapped during rare plant surveys conducted in 2018 and 2019 at the Fountain Wind Project, Shasta County, California.

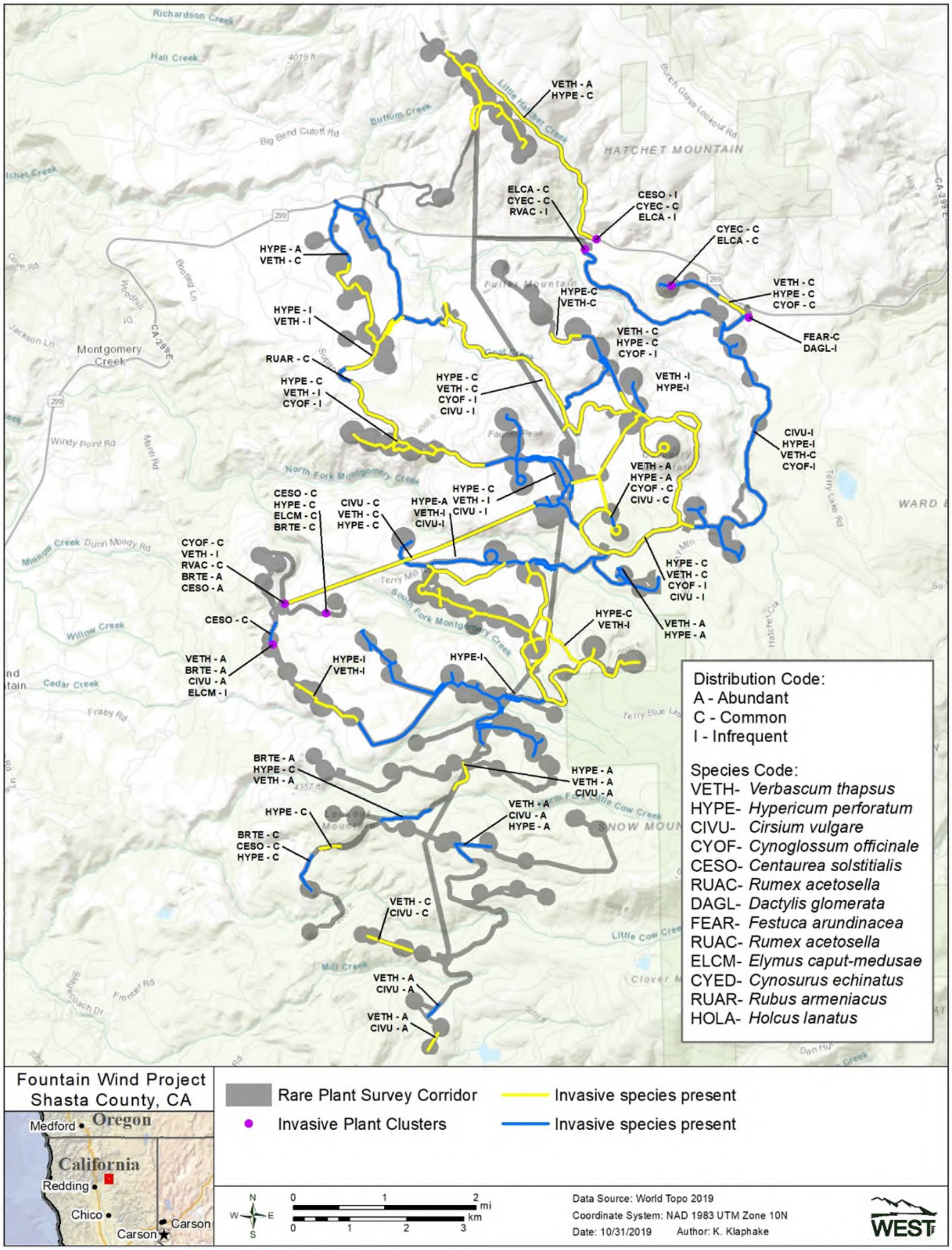

Figure 3. Non-native invasive plant species mapping within the Fountain Wind Project, Shasta County, California. To differentiate adjacent survey segments in which invasive species were encountered, alternating blue and yellow lines with accompanying notations as to the species present (4-letter species codes) and relative distribution (1-letter distribution code) were used.

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Appendix A. Federally listed, State-listed, and California Native Plant Society Rare Plant Species and Their Potential for Occurrence within the Fountain Wind Project

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS Status**	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Shasta ageratina *Ageratina shastensis*		1B.2	June-Oct	Rocky, often carbonate sites; lower montane coniferous forest	**Possible.** Although uncommon, suitable habitat may be present within the Project
Scabrid alpine tarplant *Anisocarpus scabridus*		1B.3	June-Sept	Open ridges or slopes on metamorphics	**Possible.** Suitable habitat may be present within the Project
Slender silver-moss *Anomobryum julaceum*		4.2		Rocky, moist (bryophyte-moss)	**Possible.** Although far from its known range, suitable habitat may be present within the Project
vanilla-grass *Anthoxanthum nitens* ssp. *nitens*		2B.3	Apr-July	Meadows and seeps	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Klamath manzanita *Arctostaphylos klamathensis*		1B.2	May-Aug	Chaparral and upper montane and subalpine coniferous forests; rocky outcrops and slopes	**Possible.** Although uncommon, suitable habitat may be present within the Project; CNDDB documents only 2 occurrences in Shasta County
marbled wild-ginger *Asarum marmoratum*		2B.3	Apr-Aug	Understory of lower montane coniferous forests	**Possible.** Suitable habitat may be present within the site
northern spleenwort *Asplenium septentrionale*		2B.3	July-Aug	Chaparral and montane coniferous forests; form grass-like tufts in granitic rock crevices	**Unlikely.** No granitic rock crevices present within the survey corridors
upswept moonwort *Botrychium ascendens*		2B.3	July-Aug	Lower montane coniferous forests; grassy fields and woodlands near springs and creeks	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
scalloped moonwort *Botrychium crenulatum*		2B.2	June-Sept	Lower montane coniferous forests; moist meadows near creeks; marshes	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
mingan moonwort *Botrychium minganense*		2B.2	July-Sept	Creek banks in mixed conifer forests	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
western goblin *Botrychium montanum*		2B.1	July-Sept	Creek banks in old-growth coniferous forests	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS Status**	Survey period	Habitat Requirements	Potential for Occurrence within the Project
northwestern moonwort *Botrychium pinnatum*		2B.3	July-Oct	Montane coniferous forests; in meadows or along creek banks	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
rattlesnake fern *Botrypus virginianus*		2B.2	June	Streams; bogs and fens; lower montane coniferous forest; meadows and seeps	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
Watershield *Brasenia schreberi*		2B.3	Apr-Oct	Freshwater marshes and swamps	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
long-haired star-tulip *Calochortus longebarbatus* var. *longebarbatus*		1B.2	June-Aug	Clay, mesic sites in Great Basin scrub, lower montane coniferous forest openings, meadows and seeps	**Possible.** Suitable habitat may be present within the Project
Callahan's mariposa lily *Calochortus syntrophus*		1B.1	May-June	Cismontane woodland; vernally mesic valley and foothill grassland	**Possible.** Suitable habitat may be present within the Project
Butte County morning-glory *Calystegia atriplicifolia* ssp. *buttensis*		4.2	May-July	Dry, rocky places in open forest, chaparral	**Possible.** Suitable habitat may be present within the Project
Castle Crags harebell *Campanula shetleri*		1B.3	June-Sept	In protected rock crevices in granite; lower montane coniferous forests	**Unlikely.** No granitic rock outcrops present within the survey corridors
bristly sedge *Carex comosa*		2B.1	May-Sept	Marshes and swamps (lake margins); valley and foothill grasslands	**Possible.** Although limited, suitable wetland habitat may be present within the Project
woolly-fruited sedge *Carex lasiocarpa*		2B.3	June-July	Bogs and fens; freshwater marshes and swamps, lake margins	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Lassen paintbrush *Castilleja lassenensis*		1B.3	June-Sept	Meadows and seeps; subalpine forest (volcanic)	**Unlikely.** Known occurrences restricted to flanks of Lassen and granite substrates in the Sierras

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS Status**	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Shasta clarkia *Clarkia borealis* ssp. *arida*		1B.1	June-Aug	Cismontane woodlands	**Possible.** Suitable habitat may be present within the Project
northern clarkia *Clarkia borealis* ssp. *borealis*		1B.3	June-Sept	Cismontane woodland; lower montane coniferous forest	**Possible.** Suitable habitat may be present within the Project
silky cryptantha *Cryptantha crinita*		1B.2	April-May	Gravelly streambeds of cismontane woodlands, valley foothill grasslands, lower montane coniferous forests, and riparian forests	**Possible.** Although limited, suitable streambed habitat may be present within the Project
Jepson's dodder *Cuscuta jepsonii*		1B.2	July-Sept	Broadleafed upland forest, lower and upper montane coniferous forest (host spp. are *Ceanothus diversifolius* and *C. prostratus*)	**Possible.** Suitable habitat may be present within the Project
English sundew *Drosera anglica*		2B.3	June-Sept	Bogs and fens; meadows	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
Oregon fireweed *Epilobium oreganum*		1B.2	June-Sept	Montane coniferous forests; in and near springs and bogs; sometimes on serpentine	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Tracy's eriastrum *Eriastrum tracyi*		3.2	June-July	Open areas on shale or alluvium	**Possible.** Suitable habitat may be present within the Project
blushing wild buckwheat *Eriogonum ursinum var. erubescens*		1B.3	June-Sept	Rocky sites within lower montane coniferous forest and montane chaparral	**Possible.** Suitable habitat may be present within the Project
Shasta limestone monkeyflower *Erythranthe taylorii*		1B.1	April-May	Openings, carbonate crevices and rocky outcrops of cismontane woodlands and lower montane coniferous forest	**Unlikely.** Suitable carbonate habitat not present within survey corridors
Shasta fawn lily *Erythronium shastense*		1B.2	March-April	Usually carbonate, rocky, north-facing or shaded slopes in cismontane woodland and lower montane coniferous forest	**Unlikely.** No suitable carbonate habitats present within the survey corridors

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS Status**	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Butte County fritillary *Fritillaria eastwoodiae*		3.2	March-June	Dry benches, slopes of yellow pine forest, chaparral	**Possible.** Suitable habitat may be present within the Project
Boggs Lake hedge hyssop *Gratiola heterosepala*		1B.2	April-Aug	Freshwater marshes and swamps, vernal pools; clay soils	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
Stebbins' harmonia *Harmonia stebbinsii*		1B.2	May-June	Chaparral and lower montane coniferous forests; in ultramafic soils, often along roads	**Unlikely.** No ultramafic substrates present within the Project
little hulsea *Hulsea nana*		2B.3	July-Aug	Alpine boulder and rock fields, subalpine coniferous forests; volcanic substrates	**Unlikely.** Suitable habitat not present within the Project
Baker's globe mallow *Iliamna bakeri*		4.2	June-Sept	Chaparral, juniper woodland	**Possible.** Suitable habitat may be present within the Project
Castle Crags ivesia *Ivesia longibracteata*		1B.3	June	Crevices in granitic cliffs; lower montane coniferous forests	**Unlikely**. No granitic cliff habitat present within the survey corridors
Finger rush *Juncus digitatus*		1B.1	May-June	Vernal pools, swales, volcanic seeps	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*		1B.1	March-May	Vernally mesic meadows and seeps; valley and foothill grassland; vernal pools	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Santa Lucia dwarf rush *Juncus luciensis*		1B.2	April-July	Vernal pools, ephemeral drainages, wet meadows habitats and streamsides	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Cantelow's lewisia *Lewisia cantelovii*		1B.2	May-Oct	Mesic, granite; lower montane coniferous forest; cismontane woodland	**Unlikely.** Suitable granitic or serpentine seeps not present within the Project
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*		1B.2	April-June	Mesic; cismontane woodland; meadows and seeps	**Possible.** Although limited, suitable wetland habitat may be present within the Project
tufted loosestrife *Lysimachia thyrsiflora*		2B.3	May-Aug	Meadows and seeps; mesic; upper montane coniferous forest	**Possible.** Although limited, suitable wetland habitat may be present within the Project

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS Status**	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Three-ranked hump-moss *Meesia triquetra*		4.2	July	Wetlands (fens)	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
broad-nerved hump-moss *Meesia uliginosa*		2B.2	July, Oct	Moss on damp soil within meadows and seeps, bogs and fens, upper montane coniferous forest, and subalpine coniferous forest	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Shasta snow-wreath *Neviusia cliftonii*		1B.2	May-June	Lower montane coniferous forests, riparian woodlands; shady, north-facing or sheltered canyons	**Possible.** Although limited, suitable habitats may be present within the Project
slender Orcutt grass *Orcuttia tenuis*	T	1B.1	May-Oct	Vernal pools	**Unlikely.** No vernal pool habitat present within the survey corridors
Cascade grass of Parnassus *Parnassia cirrata* var. *intermedia*		2B.2	Aug-Sept	Rock serpentine soils; montane coniferous forests, meadows and seeps, bogs and fens	**Unlikely.** Suitable habitat absent from the survey corridors; nearest occurrence approximately 30 miles northwest of site
thread leaved beardtongue *Penstemon filiformis*		1B.3	May-July	Cismontane woodlands and lower montane coniferous forests; dry stony sites, grassy openings, and meadows	**Possible.** Suitable habitat may be present within the Project
Engelmann spruce *Picea engelmannii*		2B.2	May-June	Upper montane coniferous forest	**Possible.** Suitable habitat may be present within the Project
Sierra blue grass *Poa sierrae*		1B.3	April-June	Lower montane coniferous forests; shady, moist, rock slopes; often in canyons	**Possible.** Suitable habitat may be present within the Project
Profuse flowered pogogyne *Pogogyne floribunda*		4.2	May-Sept	Vernal pools, seasonal lakes	**Unlikely.** No suitable habitat present within the survey corridors
Modoc county knotweed *Polygonum polygaloides* ssp. *esotericum*		1B.3	May-Sept	Mesic; lower montane coniferous forest (vernal pools)	**Unlikely.** No vernal pool habitat present within the survey corridors

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS Status**	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Eel grass pondweed *Potamogeton zosteriformis*		2B.2	June-July	Freshwater marsh	**Unlikely.** No suitable habitat present within the survey corridors
Newberry's cinquefoil *Potentilla newberryi*		2B.3	May-Aug	Receding shorelines	**Unlikely.** No suitable habitat present within the survey corridors
Pacific fuzz wort *Ptilidium californicum*		4.3	May-Aug	Bark of standing mature or recently fallen logs	**Possible.** Although limited, suitable wetland habitat may be present within the Project
marsh sckullcap *Scutellaria galericulata*		2B.2	June-Sept	Meadows and freshwater marshes of lower montane coniferous forests	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Canyon creek stonecrop *Sedum obtusatum* ssp. *paradisum*		1B.3	May-June	In crevices of exposed granite; chaparral and coniferous forests	**Unlikely.** No exposed granite habitat present within the survey corridors
long-stiped campion *Silene occidentalis* ssp. *longistipitata*		1B.2	July-Aug	Lower and upper montane coniferous forest	**Possible.** Suitable habitat may be present within the Project
Klamath Mountain catchfly *Silene salmonacea*		1B.2	June-July	Openings, usually serpentine, within lower montane coniferous forest	**Unlikely.** Potential suitable habitat likely absent within the survey corridors
English Peak greenbriar *Smilax jamesii*		4.2	May-July	Riparian, streambanks, lake margins	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
hairy marsh hedgenettle *Stachys pilosa*		2B.3	June-Sept	Mesic sites in Great Basin scrub	**Unlikely.** Suitable scrub habitat not present within the survey corridors
Long leaved starwort *Stellaria longifolia*		2B.2	May-July	Meadows and seeps, riparian woodlands	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
Fineleaf pondweed *Stuckenia filiformis* ssp. *alpina*		2B.2	May-July	Shallow, clear water of lakes, drainage channels	**Unlikely.** Potential suitable habitat absent from the survey corridors
Piorkowski's clover *Trifolium piorkowski*		1B.2	April-May	Chaparral, cismontane woodland, lower montane coniferous forest (volcanic clay)	**Unlikely.** Potential suitable habitat likely absent within site; nearest occurrence over 30 miles north of site

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS Status**	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Siskiyou clover *Trifolium siskiyouense*		1B.1	June-July	Wet mountain meadows	**Unlikely.** Potential suitable habitat likely absent from the survey corridors; nearest occurrence on volcanic plateau approximately 30 miles south of Project
Greene's tuctoria *Tuctoria greenei*	E	1B.1	May-July	Vernal pools	**Unlikely.** No vernal pool habitat present within the survey corridors
Shasta huckleberry *Vaccinium shastense* ssp. *shastense*		1B.3	Dec-May	Acidic, mesic site; often on streambanks; sometimes on rocky outcrops, seeps, roadsides, and disturbed areas (chaparral, lower montane and subalpine coniferous forest, and riparian forest)	**Possible.** Although limited, suitable habitat may be present within the Project
oval-leaved viburnum *Viburnum ellipticum*		2B.3	May-June	Chaparral, cismontane woodlands, and lower montane coniferous forests	**Possible.** Suitable habitat may be present within the Project

Information from CNPS 2019, California Natural Diversity Database 2019, US Fish and Wildlife Service 2017.

*E: Federally listed endangered species; T: Federally listed threatened species

**CNPS: California Rare Plant Ranks (CNPS 2019):

CNPS 1A: Plants presumed extirpated in California and either rare or extinct elsewhere.

CNPS 1B: Plants rare, threatened, or endangered in California and elsewhere.

CNPS 2A: Plants presumed extirpated in California, but common elsewhere.

CNPS 2B: Plants rare, threatened, or endangered in California, but more common elsewhere.

CNPS 3: Plants about which more information is needed – a review list.

CNPS 4: Plants of limited distribution – a watch list.

Threat Ranks

- 0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat).
- 0.2 − Moderately threatened in California (20-80% of occurrences threatened/moderate degree and immediacy of threat).
- 0.3 – Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known).

Appendix B. Botanical Field Surveyor Qualifications

Kurt F. Flaig, *Plant Ecologist*

PROFESSIONAL EXPERIENCE

2004-Present	*Plant Ecologist,* Western EcoSystems Technology, Inc., Cheyenne, Wyoming
2001-2003	*Plant Ecologist,* H.T. Harvey & Associates, San Jose, California
2000-2001	*Range Technician,* Colorado State Cooperative Extension Program and Division of Wildlife, Weston, Colorado
2000-2001	*Natural Resource Technician,* Center for Ecological Management of Military Lands, Fort Collins Colorado
1999-2000	*Biological Science Technician,* U.S. Forest Service, Canyon Lakes District, Fort Collins, Colorado
1998-1999	*Range Technician,* Colorado State Cooperative Extension Program, Fort Collins, Colorado and Y-Cross Ranch, Horse Creek, Wyoming
1996-1999	*Graduate Research Assistant,* Department of Rangeland Ecosystem Science, Fort Collins, Colorado and Fort Richardson, Alaska

EDUCATION

M.S.
Colorado State University
Fort Collins, Colorado
1999
Range Ecology

B.S.
Colorado State University
Fort Collins, Colorado
1995
Natural Resource Management

B.A.
Florida Atlantic University
Boca Raton, Florida
1989
Political Science

SCIENTIFIC ORGANIZATION MEMBERSHIPS

California Native Plant Society

Colorado Native Plant Society

Wyoming Native Plant Society

Society of Wetland Scientists

SPECIALTY AREAS

Rare Plants: Kurt has been conducting rare plant assessments and surveys for county, state, BLM, and USFS sensitive species, and ESA listed species since 2001. This experience includes evaluating project impacts to rare plant species and communities, and designing and implementing mitigation measures to address such impacts. Kurt has detected numerous occurrences of special-status plant species, including federally threatened and endangered species, in the western U.S. This experience includes locating occurrences in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Texas, Utah, Washington, and Wyoming.

Wetlands: Kurt has 15 years of experience in conducting wetland delineations throughout the western U.S. He has prepared and assisted clients in preparing USACE Section 404 permits, California Department of Fish and Game Streambed Alteration Agreements, and in complying with various states' waters regulatory requirements. Kurt has designed wetland mitigation sites and conducted extensive mitigation monitoring. He also has formal training and considerable experience in conducting wetland functional assessments.

Vegetation Classification, Mapping and Monitoring: Kurt has extensive experience in the classification and mapping of vegetation in a variety of community and ecosystem types throughout the western U.S. This includes detailed descriptions of habitats and identification of component flora. Kurt has over 15 years of experience in conducting vegetation monitoring in systems ranging from shortgrass and coastal prairies to mixed coniferous forest and coastal salt marsh. This experience includes baseline studies and short- and long-term monitoring studies for projects involving range inventories, grassland restoration, wetland/riparian restoration and mitigation, and soil erosion analysis. Kurt is proficient in the utilization of numerous sampling methods.

Technical Report Preparation: Kurt is an accomplished technical writer and editor. He provides expertise in the preparation of various NEPA related documents, including Environmental Impacts Statements, Biological Assessments, Biological Evaluations, and Habitat Conservation Plans, and has authored numerous technical reports and documents.

ADDITIONAL TRAINING & CERTIFICATION

WAFWA Lesser Prairie Chicken Vegetation Monitoring Training, 2014

Wyoming Reclamation and Restoration Center Workshop, 2012

Functional Assessment of Colorado Wetlands (FACWet) Methodology Training, 2009

Biological Assessment/Biological Evaluation Preparation Training, 2008, USFS

Advanced Hydric Soils Course, 2005, Wetland Training Institute (CA)

Wetland Delineation Course, 2003, Wetland Training Institute (CA)

California Native Plant Society Rapid Assessment Course for Vegetation Mapping, 2001

EIR/EIS Preparation and Review, 2001, University of California Davis Extension

Wetland Regulations, 2001, University of California Davis Extension

RARE PLANT SURVEYS CONDUCTED

(Served as lead botanist for all projects with asterisk*)

Fountain Wind Project (2018/2019) – Shasta County, California
Surveyed for 51 state and ESA listed plant species and mapped natural vegetation communities.

Zapata Wind Project (2018) – Zapata County, Texas
Surveyed for Zapata bladderpod, ashy dogweed, prostrate milkweed, and bushy Whitlow-wort.

Desert Quartzite Solar Energy Project (2017) – Riverside County, California
Surveyed for Harwood's eriastrum.

Dyno Nobel Project (2017) – Laramie County, Wyoming
Surveyed for Ute ladies'-tresses and Colorado butterfly plant.

Moran Wind Project (2016) – Allen County, Kansas
Surveyed for western prairie fringed orchid and Mead's milkweed.

Infigen Strata Solar Project (2015) – Eddy County, New Mexico
Surveyed for Tharp's blue-star, Scheer's beehive cactus, and gypsum wild buckwheat.

Spar Canyon-Round Valley Transmission Line (2014) – Custer County, Idaho
Surveyed for Challis milkvetch, Lemhi milkvetch, white eatonella, Welsh's buckwheat, Salmon wildrye, Challis crazyweed, Simpson's hedgehog cactus, elusive Jacob's-ladder, and wavy-leaf thelypody.

WYDOT US Highway Hazard Tree Removal Project (2014) – Albany County, Wyoming
Surveyed for 53 special status plant species including federally listed species and USFS sensitive species.

WYDOT Shutts Flat/Burgess Junction South Section (2014) – Sheridan County, Wyoming
Surveyed for Sartwell's sedge, leafy thistle, Russet cotton-grass, slender cotton-grass, Howard forget-me-not, Hall's fescue, common sweetgrass, northern twayblade, broad-leaved twayblade, pink coil-beaked lousewort, large-leaved pondweed, hairy tranquil goldenweed, Nagoonberry, soft aster, slim-pod Venus' looking-glass, and lesser bladderwort.

Meritage Pipeline Project (2013) – Platte and Laramie counties, Wyoming
Surveyed for Ute ladies'-tresses and Colorado butterfly plant.

Rising Tree Wind Energy Project (2013) – Kern County, California
Surveyed for Bakersfield cactus.

Uinta County 3D Seismic Project (2012) – Uintah County, Wyoming
Surveyed for Unita greenthread and Cedar Mountain Easter daisy.

Bear Den Pipeline Project (2012) – Dunne and McKenzie counties, North Dakota
Surveyed for Missouri foxtail cactus and Hooker's Townsend daisy.

Bakken Natural Gas Liquids Pipeline Project (2011-2012) – Laramie, Goshen, Niobrara, Weston, and Crook counties, Wyoming
Surveyed for Ute ladies'-tresses and Colorado butterfly plant.

Wildflower Green Renewable Energy Project (2010, 2011) – Los Angeles County, California
Surveyed for round-leaved filaree, golden goodmania, Coulter's goldfields, Pierson's morning glory, Barstow woolly sunflower, and pale-yellow layia.

Rising Tree Wind Energy Project (2010, 2011) – Kern County, California
Surveyed for alkali mariposa-lily, white pygmy-poppy, Mojave spineflower, white-bracted spineflower, desert cymopterus, Bakersfield cactus, Barstow woolly sunflower, Red Rock

poppy, short-joint beavertail, and golden goodmania.

China Mountain Wind Energy Project (2010) – Twin Falls County, Idaho
Surveyed for slickspot peppergrass.

**Mojave Solar Energy Project (2010) – Kern County, California*
Surveyed for alkali mariposa-lily, white pygmy-poppy, Mojave spineflower, white-bracted spineflower, desert cymopterus, Barstow woolly sunflower, Red Rock poppy, short-joint beavertail, and golden goodmania.

**WYDOT Douglas West Section (2010) – Converse County, Wyoming*
Surveyed for Ute ladies'-tresses.

**Kanda to Wamsutter Expansion Pipeline Project (2008) – Sweetwater County, Wyoming*
Surveyed for Ute ladies'-tresses, Nelson's milkvetch, Trelease's racemose milkvetch, Cedar Rim thistle, Ownbey's thistle, Gibben's penstemon, large-fuited bladderpod, prostrate bladderpod, tufted twinpod, persisitent sepal yellowcress, Laramie false sagebrush, and Green River greenthread.

**WYDOT Cody Northeast Section (2010) – Park County, Wyoming*
Surveyed for Ute ladies'-tresses.

**WYDOT Douglas-Glenrock Section (2010) – Converse County, Wyoming*
Surveyed for Ute ladies'-tresses.

**Sidewinder Wind Energy Project (2008) – San Bernardino County, California*
Surveyed for Lane Mountain milkvetch, desert cymopterus, Barstow woolly sunflower, Mojave monkeyflower, short-joint beavertail.

**White Hills Wind Energy Project (2008) – Mohave County, Arizona*
Surveyed for Las Vegas bearpoppy, clustered barrel cactus, silverleaf sunray, and Navajo bridge cactus.

**Victor, Longreach, and Ballard Petroleum Project (2008) – Campbell County, Wyoming*
Surveyed for Ute ladies'-tresses, Colorado butterfly plant, Barr's milkvetch, Iowa moonwort, and narrow-leaf moonwort.

**Overland Pass Pipeline Project (2007-2008) – Larimer, Weld, Logan, Washington, and Yuma counties, Colorado; Albany, Carbon, Laramie, Lincoln, and Sweetwater counties, Wyoming*
Surveyed for Ute ladies'-tresses, Colorado butterfly plant, dwarf milkweed, prairie moonwort, sandhills goosefoot, showy gentian, Wyoming feverfew, Nelson's milkvetch, Trelease's racemose milkvetch, Cedar Rim thistle, Ownbey's thistle, Gibben's penstemon, large-fuited bladderpod, prostrate bladderpod, tufted twinpod, persisitent sepal yellowcress, Laramie false sagebrush, and Green River greenthread.

**Halligan Seaman Water Supply Project EIS (2006-2008) – Larimer and Weld counties, Colorado*
Surveyed for Ute ladies'-tresses, Colorado butterfly plant, lavender hyssop, Larmier aletes, slender wildparsley, dwarf milkweed, Park milkvetch, kittentails, prairie moonwort, lesser-panicled sedge, Rocky Mountain sedge, yellow lady's-slipper, wood lily, white adder's-mouth orchid, purple cliff brake, Bell's twinpod, western polypody, Rocky Mountain cinquefoil, and prairie goldenrod.

**WYDOT Tisdale Creek Section (2008) – Campbell County, Wyoming*
Surveyed for Ute ladies'-tresses.

**Hatchet Ridge Wind Energy Project (2007) – Shasta County, California*
Surveyed for scabrid alpine tarplant, Butte County morning glory, long stolon sedge, western campion, northern clarkia, and Callihan's mariposa lily.

**PPM Dry Lake Wind Energy Project (2006) – Navajo County, Arizona*
Surveyed for roundleaf errazurizia, paper-spined cactus, and Peebles Navajo cactus.

**Vantage Wind Energy Project (2006) – Kittitas County, Washington*

**Whiskey Ridge Wind Energy Project (2006) – Kittitas County, Washington*

Valentine National Wildlife Refuge (2005) – Cherry County, Nebraska
Surveyed for western prairie fringed orchid.

**Rosebud Wind Energy Project (2005) – Todd County, South Dakota*
Surveyed for western prairie fringed orchid.

**WYDOT Saratoga South Section (2005) – Carbon County, Wyoming*
Surveyed for Ute ladies'-tresses.

**Westside Irrigation District EIS (2005) – Big Horn and Washakie counties, Wyoming*
Surveyed for Ute ladies'-tresses.

**Entrega Pipeline Project (2004-2005) – Laramier, Weld, Rio Blanco and Moffat counties, Colorado; Albany, Carbon, Laramie, and Sweetwater counties, Wyoming*
Surveyed for Ute ladies'-tresses, Colorado butterfly plant, dwarf milkweed, prairie moonwort, sandhills goosefoot, showy gentian, Wyoming feverfew, Nelson's milkvetch, Trelease's racemose milkvetch, Cedar Rim thistle, Ownbey's thistle, Gibben's penstemon, large-fuited bladderpod, prostrate bladderpod, tufted twinpod, Dudley Bluffs bladderpod, Piceance twinpod, persisitent sepal yellowcress, Laramie false sagebrush, and Green River greenthread.

Hoover's woolly-star (Eriastrum hooveri) Survey (2003) – Los Angeles County and Kern County, California
Surveyed for Hoover's woolly-star at various locations throughout the Antelope Valley in support of its proposed delisting as a Federal-threatened species by the USFWS.

Vista Oaks Draft Environmental Impact Report (2003) – Placer County, California

Dublin Ranch/Fallon Road Initial Study (2003) – Alameda County, California

Kottinger Ranch Initial Study (2003) – Contra Costa County, California

EDUCATION

M.S.
University of Wyoming
Laramie, Wyoming
1987
Zoology and Physiology

B.S.
University of Wyoming
Laramie, Wyoming
1983
Wildlife Conservation and Management

CERTIFICATIONS

Certified Senior Ecologist,
Ecological Society of America

Certified Wildlife Biologist,
The Wildlife Society

Professional Wetland Scientist,
Society of Wetland Scientists

Gregory D. Johnson, *Research Biologist*

Professional Experience

1991-Present	Research Biologist, Western EcoSystems Technology, Inc., Cheyenne, Wyoming
1987-1991	*Study Director/Project Manager*, Wildlife International, Easton, Maryland
1985-1987	*Research Assistant,* University of Wyoming, Laramie, Wyoming
1984-1986	*Teaching Assistant,* University of Wyoming, Laramie, Wyoming
1984	*Wildlife Technician,* U.S. Forest Service, Laramie, Wyoming
1983	*Wildlife Technician,* University of Wyoming, Laramie, Wyoming

Professional Summary

Greg Johnson has been an Ecologist and Project Manager for WEST since 1991. He received a B.S. degree in Wildlife Conservation and Management and a M.S. degree in Zoology and Physiology from the University of Wyoming. He has over 30 years of consulting experience in wildlife and ecological studies. He is a Certified Wildlife Biologist through The Wildlife Society, a Professional Wetland Scientist through the Society of Wetland Scientists, and a certified Senior Ecologist through the Ecological Society of America. His specialty areas include wildlife research with an emphasis on contaminants and wind power development; endangered species; wetland delineation, mitigation, and functional value assessment; and vegetation sampling. He is the author/coauthor of 49 professional journal articles, book chapters or peer reviewed proceedings papers and is an author/coauthor of 61 presentations at scientific meetings.

Relevant Work Experience

Mr. Johnson has extensive experience sampling vegetation. He prepared a weed management plan and collected quantitative data on weed cover to establish baseline conditions prior to implementing the plan for a reservoir project in CO. He collected transect data on willows and alders along 7.5 miles of stream south of Rawlins, WY to establish baseline conditions of woody riparian habitats used for mitigation purposes. He has collected quantitative plot and transect data on over 60 created and restored wetlands. In 1995 and 1996, he monitored success of reclamation of the 41-mile Wasatch Sour Gas Gathering System pipeline on the Utah/Wyoming border through quantifying vegetation species composition and % cover. He has identified wetland plants on over 100 project sites while conducting wetland delineations. In the summer of 1984, he collected quantitative vegetation data on an elk winter range in southern WY. In the summers of 1979-82, he was employed by the USDA Agricultural Research Service, where he collected extensive vegetation data on reclaimed mined lands in southeast WY. He has mapped vegetation, described vegetation types, and prepared the vegetation portion of numerous EIS's, EA's, and BA's. He has also conducted numerous searches for rare and sensitive plant species prior to construction activities in Wyoming, Idaho, Colorado, Oregon, Washington and California.

He has been certified as a Professional Wetland Scientist (PWS) by the Society of Wetland Scientists since 1997. He is formally trained in wetland delineations, wetland construction and restoration, and wetland plant identification. He has 23 years of wetland experience and has delineated over 5,000 acres of wetland using the Corps of Engineers 1987 manual on over 100 project sites. He was selected by the Corps of Engineers to peer review the Great Plains Region and Western Mountains, Valleys and Coast Region regional supplements to the 1987 Corps of Engineers wetland delineation manual. He has selected numerous wetland mitigation sites and assisted engineers with designs of created wetlands for mitigation purposes. He has quantitatively assessed the functions and values of impacted wetlands as well as wetlands created for mitigation purposes to ensure that proposed wetland mitigation plans will result in created wetlands that completely replace the functions and values of impacted wetlands. He has also monitored the success of over 75 created wetlands using quantitative line transect and plot methods to measure vegetative composition and success.

Rare Plant Survey Experience:

2018 Fountain Wind Energy Project, Shasta County, California.
Species: Fifty-one state and ESA listed plant species

2017 Proposed Quartzsite Solar Energy Project, Riverside County, California.
Species: Harwood's eriastrum (*Eriastrum harwoodii*)

2014 U.S. Highway 14 reconstruction project, Sheridan County, Wyoming.
Species: 59 species of U.S. Forest Service and Wyoming Natural Diversity database sensitive species.

2013 Highway 130 roadside hazard tree clearing project, Carbon County, Wyoming.
Species: 53 species of U.S. Forest Service sensitive species.

2013 Confidential Pipeline, Laramie and Platte Counties,Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2012 Cheyenne Prairie Generating Station Pipeline, Laramie County, Wyoming
Species: Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2006 Wyoming State Highway 150 Reconstruction Project, Campbell County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2006 Lance Creek East Highway Reconstruction Project, Niobrara County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2005 Entrega Gas Pipeline Project, Carbon County, Wyoming
Species: Nelson’s milkvetch (*Astragalus nelsonianus*), Gibben’s penstemon (*Penstemon gibbensii*)

2004 Reuter-Hess Reservoir Project, Parker, Colorado
Species: Carrionflower (*Smilax lasioneura*) and American black currant (*Ribes americanum*). Located over 40 currant and over 300 carrionflower plants for transplant from the reservoir site.

2004 Entrega Gas Pipeline Project, Rio Blanco and Moffat Counties, Colorado
Species: debris milkvetch (*Astragalus detritalis*), narrow-stem gilia (*Gilia stenothysra*), Rollins cryptanth (*Oreocarya rollinsii*)

2004 City of Cheyenne Belvoir Ranch Landfill and Access Road, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2004 Bear Creek Bridge replacement project, Goshen County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2004 Happy Jack Road Reconstruction Project, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2004 Basin - Greybull Highway Reconstruction Project, Bighorn County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2004 Farson-Lander Highway Reconstruction Project, Sweetwater County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Casper East I-25 Reconstruction Project, Natrona County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Evanston South Highway Reconstruction Project, Uinta County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Henry's Fork Bridge replacement Project, Uinta County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Wild Horse Wind Development Project, Kittitas County, Washington.
Species: Tall agoseris (*Agoseris elata*), Pasque flower (*Anemone nuttalliana*), Palouse milk-vetch (*Astragalus arrectus*), Columbia milk-vetch (*Astragalus columbianus*), Pauper milk-vetch (*Astragalus misellus* var. *pauper*), Dwarf evening-primrose (*Camissonia pygmaea*), Naked-stemmed evening primrose (*Camissonia scapoidea*), Bristle-flowered collomia (*Collomia macrocalyx*), Golden corydalis (*Corydalis aurea*), Beaked cryptantha (*Cryptantha rostellata*), Shining flatsedge (*Cyperus bipartitus*), Wenatchee larkspur (*Delphinium viridescens*), White eatonella (*Eatonella nivea*), Basalt daisy (*Erigeron basalticus*), Piper's daisy (*Erigeron piperianus*), Sagebrush stickseed (*Hackelia hispida* var. *disjuncta*), Longsepal globemallow (*Iliamna longisepala*), Hoover's desert-parsley (*Lomatium tuberosum*), Suksdorf's monkey-flower (*Mimulus suksdorfii*), Coyote tobacco (*Nicotiana attenuata*), Cespitose evening-primrose (*Oenothera cespitosa* ssp.*cespitosa*), Hedgehog cactus (*Pediocactus simpsonii* var. *robustior*), Brewer's cliff-brake (*Pellaea breweri*), Fuzzytongue penstemon (*Penstemon eriantherus* var.*whitedii*), Least phacelia (*Phacelia minutissima*), Sticky goldenweed (*Pyrrocoma hirta* var. *sonchifolia*), Seely's silene (*Silene seelyi*), Ute ladies'-tresses (*Spiranthes diluvialis*), and Hoover's tauschia (*Tauschia hooveri*).

2002 Crystal Canyon Pipeline Project, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2002 Harriman Road Interchange, Interstate 80, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2002 Dubois - Moran Junction Highway Reconstruction project, Fremont County, Wyo.
Species: Pink agoseris (*Agoseris lackschewitzii*), Teton wire-lettuce (*Stephanoneria fluminea*).

2001 Unnamed tributary to Lone Tree Creek, Albany County, Wyoming, Prestridge Stock Reservoir Project
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2001 South Fork of Crow Creek, Laramie County, Wyoming, City of Cheyenne Diversion Dam Rehabilitation Project
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2001 City of Cheyenne water line crossing of the South Fork of Crow Creek
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2000 & 2001 Seminoe Dam Road improvement project, Carbon County, Wyo.
Species: blowout penstemon (*Penstemon haydenii*)

2000 22 abandoned bentonite mines, Crook and Weston counties, Wyo.
Species: water-thread pondweed (*Potamogeton diversifolius*), slender bulrush (*Scirpus heterochaetus*), matted broom-spurge (*Euphorbia serpens*), spring forget-me-not (*Myosotis verna*), small-flowered flame-flower (*Talinum parviflorum*), prairie three-awn (*Aristida oligantha*), roundleaf water-hyssop (*Bacopa rotundifolia*), Texas spreading loeflingia (*Loeflingia squarrosa* var. *texana*)

2000 Sand mining operation, BP Amoco Soda Lake Remediation site, Casper, Wyo.
Species: blowout penstemon (*Penstemon haydenii*)

1999 Snow Sail project, Teton County, Wyoming
Species: Soft aster (*Aster mollis*), Boreal draba (*Draba borealis*), Narrowleaf goldenweed *(Haplopappus macronema* var. *linearis)*, Payson's bladderpod *(Lesquerella paysonii)*

1999 Haul Road construction project, Hanna, Wyoming
Species: bun milk-vetch (*Astragalus simplicifolius*), bedstraw milkweed (*Asclepias subverticillata*)

1998 Sinks Canyon Highway Reconstruction Project, Fremont County, Wyoming
Species: Fremont bladderpod (*Lesquerella fremontii*), Beaver Rim phlox (*Phlox pungens*), Rocky Mountain twinpod (*Physaria saximontana* var *saximontana*), Barneby's clover (*Trifolium barnebyi*)

1998 Dubois - Moran Junction Highway Reconstruction project, Fremont County, Wyo.
Species: Wyoming Tansymustard *(Descurainia torulosa),* Sweet-flowered Rock Jasmine *(Androsace chamaejasme),* Upward-lobe Moonwort *(Botrychium ascendens),* Seaside Sedge (*Carex incurviformis*), Narrowleaf Goldenweed (*Haplopappus macronema*)

1997 Proposed campground site, Bighorn National Forest, Wyoming
Species: limestone columbine *(Aquilegia jonsii)*, northern arnica *(Arnica lonchophylla)*, soft aster *(Aster mollis)*, balsamroot *(Balsamorhiza X tomentosa)*, moonwort *(Botrychium lunaria)*, livid sedge *(Carex livida)*, northern single-spike sedge *(Carex scirpoidea)*, conimitella *(Conimetella williamsii)*, Williams waterparsnip *(Cymopterus williamsii)*, yellow ladyslipper *(Cypripedium calceolus)*, mountain ladyslipper *(Cypripedium montanum)*, giant helleborine *(Epipactis gigantea)*, rough fescue *(Festuca hallii)*, broad-leaved twayblade *(Listera convallaroides)*, marsh muhly *(Muhlenbergia glomerata)*, Kotzebue's grass of parnassus *(Parnasia kotzebuei)*, mountain lousewort *(Pedicularis pulchella)*, Cary beardtongue *(Penstemon caryii)*, Pacific bluegrass *(Poa gracillima)*, greenland primrose *(Primula egaliksensis)*, nagoonberry *(Rubus acaulis)*, Hapeman's saxifrage *(Sullivantea hapmanii)*

1997 Three abandoned uranium mines, Gas Hills in Fremont County, Wyoming
Species: cedar rim thistle (*Cirsium aridum*), contracted Indian ricegrass (*Oryzopsis contracta*), Payson beardtongue (*Penstemon paysoniorum*), bun milk-vetch (*Astragalus simplicifolius*), Nelson's milkvetch (*Astragalus nelsonianus* a.k.a. *Astragalus pectinatus* var. *platyphyllus*)

1995 Five abandoned uranium mines, Gas Hills in Fremont County, Wyoming
Species: cedar rim thistle (*Cirsium aridum*), contracted Indian ricegrass (*Oryzopsis contracta*), Beaver Rim phlox (*Phlox pungens*), meadow pussytoes (*Antennaria arcuata*), Payson beardtongue (*Penstemon paysoniorum*), wild yellowcress (*Rorippa truncata*), Brandegee's Jacob's-ladder (*Polemonium brandegei*), swamp willow-herb (*Epilobium palustre* var *palustre*), bun milk-vetch (*Astragalus simplicifolius*), Nelson's milkvetch (*Astragalus nelsonianus* a.k.a. *Astragalus pectinatus* var. *platyphyllus*)

1995 One abandoned bentonite mine, Crook County, Wyoming
Species: Texas spreading loeflingia (*Loeflingia squarrosa* var. *texana*)

1995 Proposed Tribal Casino, Klamath Basin, Oregon
Species: Applegate's milk-vetch (*Astragalus applegatei*), Pumice grape-fern (*Botrychium pumicola*), long-bearded mariposa-lily (*Calochortus longebarbatus* var. *longebarbatus*),

pygmy monkeyflower (*Mimulus pygmaeus*), red-root yampah (*Perideridia erythrorhiza*), Columbia cress (*Rorippa columbiae*)

1995 Two proposed reservoir sites, Park County, Wyoming
Species: sand dropseed (*Sporobolus cryptandrus*), persistant sepal yellowcress (*Rorippa calycina*)

1994 Five abandoned coal mine sites near Hanna, Wyoming
Species: bun milk-vetch (*Astragalus simplicifolius*), bedstraw milkweed (*Asclepias subverticillata*

Klarissa Lawrence, *Wetland Specialist/Biologist*

EDUCATION

B.A.
Metropolitan State University
Denver, Colorado
2004
Biology

A.S.
Metropolitan State University
Denver, Colorado
2004
Chemistry

SCIENTIFIC ORGANIZATION MEMBERSHIPS

California Native Plant Society

Colorado Native Plant Society

National Audubon Society

PROFESSIONAL EXPERIENCE

2018-Present	*Wetland Specialist/Biologist,* Western EcoSystems Technology, Inc., Fort Collins, Colorado
2006-2018	*Biological Field Technical,* Western EcoSystems Technology, Inc., Cheyenne, Wyoming
2017-2017	*Wetland Ecology Technician,* Center for Environmental Management of Military Lands (CEMML) Fort Greely, Delta Junction, Alaska

SPECIALTY AREAS

Klarissa Lawrence has over 13 years' experience in wetland and floristic surveys, including rare plant surveys, wetland delineations, and habitat mapping. Klarissa has had the opportunity to work in much of the Western United States and interior Alaska. Areas of focus include northern California, the high plains of Montana, Wyoming, and Colorado, and the northern plains of North and South Dakota. Her wide range experience includes energy pre- and post-construction, rare plant surveys, wetland delineations, habitat surveys, and species-specific surveys. Target species include eagles, bats, whooping cranes, lesser prairie chicken, Dakota skipper, Preble's meadow jumping mouse, Utes ladies'-tresses, Colorado butterfly plant, and numerous other plant species. She has worked on several interstate pipeline projects ranging from small collection lines to large-scale multi-state transmission lines; wind projects across the US with a focus in the plains states, rocky mountain region, and pacific northwest; and timber harvest projects.

SKILLS AND EXPERTISE

Rare plant surveys (Threatened and Endangered; State, USFS, and BLM specific)

Wetland delineations

Sensitive Species-Surveys, including big game, pigmy rabbits, black-footed ferrets, fishers, prairie dogs, whooping cranes, mountain plovers, burrowing owls, and northern spotted owls

Habitat mapping for sensitive plant and animal species

Post Construction Monitoring (Pipeline and Wind Turbine), including vegetation re-growth analysis, habitat monitoring, wetland plantings, erosion control, and bird & bat fatality counts

Pre-Construction Monitoring

Aerial Surveys (Fixed wing and helicopter)

Date Entry, collection, and organizational procedures

Field Coordination

Field Crew Management

Client Interactions

ADDITIONAL TRAINING & CERTIFICATION

Certified Hydric Soil Investigator, 2019, Swamp School, NC

1st Aid/CPR/AED Training, 2019, American Red Cross, CO

Lesser Prairie Chicken Vegetation Monitoring Training, 2014, WAFWA, KS

Wetland Delineation Course, 2008, Wetland Training Institute, CA

RARE PLANT SURVEYS CONDUCTED

Fountain Wind Project (2019) – Shasta County, California
Surveyed for 51 state and ESA listed plant species.

North Bakken Pipeline Expansion Project (2019) – McKenzie County, North Dakota
Surveyed for 14 USFS sensitive species on the Little Missouri National Grassland.

Zapata Wind Project (2018) – Zapata County, Texas
Surveyed for Zapata bladderpod, ashy dogweed, prostrate milkweed, and bushy Whitlow-wort

Roseburg Resource Timber Harvest (2016) – Siskiyou and Shasta Counties, California
Surveyed for 71 state listed plant species.

Sam's Creek Transmission Line (2015 - 2016) – Jackson and Josephine Counties, Oregon
Surveyed for 21 state listed plant species.

Bakken Natural Gas Liquids Pipeline Project (2012) – Laramie, Goshen, Niobrara, Weston, and Crook counties, Wyoming
Surveyed for Ute ladies'-tresses and Colorado butterfly plant.

Sunstone Pipeline Project (2008)— Elmore and Ada Counties, Idaho
Surveyed for slickspot peppergrass.

Overland Pass Pipeline Project (2007) – Larimer, Weld, Logan, Washington, and Yuma counties, Colorado; Albany, Carbon, Laramie, Lincoln, and Sweetwater counties, Wyoming
Surveyed for Ute ladies'-tresses, Colorado butterfly plant, dwarf milkweed, prairie moonwort, sandhills goosefoot, showy gentian, Wyoming feverfew, Nelson's milkvetch, Trelease's racemose milkvetch, Cedar Rim thistle, Ownbey's thistle, Gibben's penstemon, large-fuited bladderpod, prostrate bladderpod, tufted twinpod, persisitent sepal yellowcress, Laramie false sagebrush, and Green River greenthread

Hatchet Ridge Wind Energy Project (2007) – Shasta County, California
Surveyed for scabrid alpine tarplant, Butte County morning glory, long stolon sedge, western campion, northern clarkia, and Callihan's mariposa lily.

Appendix C. Plant Species Encountered within the Fountain Wind Project

Appendix C. Plant Species Encountered within the Fountain Wind Project.

Family	Scientific Name*	Common Name
ALLIACEAE	***Allium parvum***	dwarf onion
	***Allium* spp.**	onion
ANACARDIACEAE	***Toxicodendron diversilobum***	poison oak
APIACEAE	***Angelica breweri***	Brewer's angelica
	Heracleum lanatum	common cow parsnip
	Ligusticum californicum	California licorice root
	***Lomatium* spp.**	lomatium
	Osmorhiza berteroi	sweet cicely
APOCYNACEAE	***Apocynum androsaemifolium***	bitter dogbane
ARISTOLOCHIACEAE	***Asarum hartwegii***	Hartweg's wild ginger
	Asarum caudatum	creeping wild ginger
ASCLEPIADACEAE	***Asclepias cordifolia***	heart leaf milkweed
	Asclepias speciosa	showy milkweed
ASTERACEAE	***Achillea millefolium***	common yarrow
	Agoseris grandiflora	giant mountain dandelion
	Arnica cordifolia	heartleaf arnica
	Centaurea solstitialis	yellow star thistle
	Cichorium intybus	chicory
	Cirsium vulgare	bull thistle
	Ericameria nauseosa	gray rabbitbrush
	***Erigeron* spp.**	fleabane
	Eriophyllum lanatum	woolly sunflower
	Grindelia hirsutula	hairy gumweed
	Helenium bigelovii	Bigelow's sneezeweed
	Helianthella californica	California helianthella
	Hieracium nudicaule	naked-stemmed hawkweed
	Hypochaeris spp.	cat's ear
	Lactuca serriola	prickly lettuce
	Madia glomerata	mountain tarweed
	***Senecio* spp.**	groundsel
	***Solidago* spp.**	goldenrod
	Symphyotrichum bracteolatum	Eaton's aster
	Taraxacum officinale	common dandelion
	Wyethia mollis	mountain mule ear
	Tragopogon dubius	yellow salsify
BETULACEAE	***Alnus incana* ssp. *tenuifolia***	mountain alder
	Corylus cornuta* var. *californica	beaked hazelnut
BORAGINACEAE	***Cryptantha* spp.**	cryptantha
	Cynoglossum officinale	houndstongue
	Eriodictyon californicum	California yerba santa
	Eriodictyon lobbii	matted yerba santa
	Plagiobothrys stipitatus* var. *micranthus	stalked popcornflower
BRASSICACEAE	***Erysimum capitatum***	western wallflower
	Lepidium campestre	field pepperweed
	Nasturtium officinale	watercress
	Sisymbrium altissimum	tall tumblemustard
	Streptanthus tortuosus	mountain jewelflower
CAMPANULACEAE	***Asyneuma prenanthoides***	California harebell
CAPRIFOLIACEAE	***Lonicera involucrata***	twinberry honeysuckle
	Sambucus mexicana	blue elderberry
	Symphoricarpos mollis	creeping snowberry
CARYOPHYLLACEAE	*Dianthus deltoides*	maiden pink
	Silene bernardina	Palmer's catchfly

Appendix C. Plant Species Encountered within the Fountain Wind Project.

Family	Scientific Name*	Common Name
CELASTRACEAE	***Paxistima myrsinites***	Oregon boxleaf
CHENOPODIACEAE	*Chenopodium album*	lamb's quarters
CONVOLVULACEAE	*Convolvulus* spp.	morning glory
CORNACEAE	***Cornus nuttallii***	mountain dogwood
	Cornus sessilis	blackfruit dogwood
CUPRESSACEAE	***Calocedrus decurrens***	Incense-cedar
CYPERACEAE	***Carex densa***	dense sedge
	Carex inops* ssp. *inops	long-stoloned sedge
	Carex nebrascensis	Nebraska sedge
	Carex praegracilis	field sedge
	Carex subfusca	brown sedge
	Carex utriculata	beaked sedge
	Carex spp.	sedge
	Eleocharis acicularis	needle spikerush
	Eleocharis macrostachya	common spikerush
	Schoenoplectus acutus	tule
	Scirpus microcarpus	mountain bog bulrush
DENNSTAEDTIACEAE	***Pteridium aquilinum* var. *pubescens***	Western brackenfern
EQUISETACEAE	***Equisetum arvense***	common horsetail
	Equisetum hymale	Scouring-rush horsetail
ERICACEAE	***Arctostaphylos patula***	greenleaf manzanita
	Chimaphila menziesii	pipsissewa
	Pterospora andromedea	pinedrops
	Pyrola picta	whiteveined shinleaf
	Rhododendron occidentale	western azalea
FABACEAE	***Acmispon americanus***	Spanish clover
	Hosackia crassifolia	Broad-leaved lotus
	Hosackia pinnata	pinnate lotus
	Lathyrus lanszwertii	Nevada pea
	Trifolium pratense	red clover
FAGACEAE	***Chrysolepis sempervirens***	chinquapin
	Quercus kelloggii	California black oak
GROSSULARIACEAE	***Ribes roezlii***	Sierra gooseberry
	Ribes divaricatum	spreading gooseberry
HYDROPHYLLACEAE	***Phacelia* spp.**	phacelia
HYPERICACEAE	*Hypericum perforatum*	Klamath weed
IRIDACEAE	***Iris missouriensis***	western blue flag
	Iris tenuissima	slender iris
	Sisyrinchium bellum	western blue-eyed grass
JUNCACEAE	***Juncus balticus***	Baltic rush
	Juncus ensifolius	swordleaved rush
	Juncus tenuis	slender rush
	Juncus xiphiodes	iris leaved rush
LAMIACEAE	***Mentha arvensis***	field mint
	Prunella vulgaris	self-heal
	Stachys adjugoides* var. *rigida	rigid hedge nettle
	Scutellaria nana	little skullcap
LILIACEAE	***Calochortus tolmiei***	hairy star tulip
	Clintonia uniflora	bride's bonnet
	Fritillaria recurva	scarlet fritillary
	Lilium pardalinum	leopard lily
	Lilium washingtonianum	Washington lily
	Triteleia hyacinthina	wild hyacinth

Appendix C. Plant Species Encountered within the Fountain Wind Project.

Family	Scientific Name*	Common Name
	Triteleia ixioides	golden brodiaea
	Zigadenus venenosus	death camas
MALVACEAE	***Sidalcea malviflora***	checkermallow
	Sidalcea oregana* ssp. *spicata	Oregon checker mallow
MELANTHIACEAE	***Trillium albidum***	giant white wakerobin
	Trillium ovatum	Pacific trillium
	Veratrum californicum	California corn lily
MONTIACEAE	***Claytonia lanceolata***	lanceleaf springbeauty
	Claytonia perfoliata	miner's lettuce
MYRSINACEAE	***Lysimachia latifolia***	Pacific starflower
NYMPHACEAE	***Nuphar polysepala***	Rocky Mountain pond-lily
OLEACEAE	***Fraxinus latifolia***	Oregon ash
ONOGRACEAE	***Epilobium angustifolium***	fireweed
	Epilobium brachycarpum	tall annual willowherb
	Epilobium ciliatum	fringed willowherb
OPHIOGLOSSACEAE	***Sceptridium multifidum***	leather grapefern
ORCHIDACEAE	***Corallorhiza maculata***	spotted coralroot
	Corallorhiza striata	hooded coralroot
	Goodyera oblongifolia	rattlesnake plantain
	Listera convallarioides	broadlipped twayblade
	Platanthera dilitata* var. *leucostachys	Sierra bog orchid
	Spiranthes romanzoffiana	hooded lady's tresses
OROBANCHACEAE	***Boschniakia strobilacea***	California groundcone
	Castilleja tenuis	hairy Indian paintbrush
	Pedicularis densiflora	Indian warrior
PAPAVERACEAE	***Dicentra formosa***	bleeding heart
PINACEAE	***Abies concolor***	white fir
	Abies magnifica	red fir
	Pinus lambertiana	sugar pine
	Pinus jeffreyi	Jeffrey pine
	Pinus ponderosa	ponderosa pine
	Pseudotsuga menziesii	Douglas fir
PLANTAGINACEAE	*Plantago lanceolata*	English plantain
	Veronica anagallis-aquatica	water speedwell
PHRYMACEAE	***Mimulus breviflorus***	shortflower monkeyflower
	Mimulus guttatus	seep monkeyflower
POACEAE	***Agrostis scabra***	rough bent grass
	Agrostis stolonifera	bent grass
	Alopecurus aequalis	shortawn foxtail
	Alopecurus geniculatus	marsh foxtail
	Bromus carinatus	mountain brome
	Bromus tectorum	cheatgrass
	Calamagrostis canadensis	bluejoint reedgrass
	Cynosurus echinatus	annual dogtail grass
	Dactylis glomerata	orchardgrass
	Danthonia californica	California oatgrass
	Deschampsia cespitosa	tufted hairgrass
	Deschampsia danthonioides	annual hairgrass
	Elymus caput-medusae	medusahead
	Elymus elymoides	bottlebrush
	Elymus glaucus	blue wild rye
	Elymus trachycaulus	slender wheatgrass
	Festuca arundinacea	tall fescue

Appendix C. Plant Species Encountered within the Fountain Wind Project.

Family	Scientific Name*	Common Name
	Festuca occidentalis	western fescue
	Glyceria borealis	Northern mannagrass
	Glyceria striata	fowl mannagrass
	Phleum pratense	Timothy
	Poa bulbosa	bulbous bluegrass
	Poa palustris	fowl bluegrass
	Poa pratensis	Kentucky bluegrass
	Poa secunda	Sandberg bluegrass
	Stipa lemmonii	Lemmon's needlegrass
	Stipa nelsonii	mountain needle grass
POLEMONIACEAE	***Gilia aggregata***	scarlet gilia
	Navarretia divaricata	mountain navarretia
POLYGONACEAE	***Bistorta bistortoides***	American bistort
	Eriogonum lobbii	Lobb's wild buckwheat
	Eriogonum nudum	naked buckwheat
	***Eriogonum* spp.**	buckwheat
	Eriogonum umbellatum	sulfur buckwheat
	Eriogonum vimineum	wickerstem buckwheat
	Polygonum aviculare	prostrate knotweed
	Polygonum bistortoides	American bistort
	Rumex acetosella	field sorrel
	Rumex salicifolius	willow dock
PRIMULACEAE	***Primula hendersonii***	mosquito bill
PTERIDACEAE	***Myriopteris gracillima***	lace lip fern
RANUNCULACEAE	***Aconitum columbianum***	monkshood
	Aquilegia formosa	columbine
	Delphinium nudicaule	canyon larkspur
	Ranunculus aquatilis	White water crowfoot
	Thalictrum fendleri	meadow-rue
RHAMNACEAE	***Ceanothus cordulatus***	mountain whitethorn
	Ceanothus cuneatus	buckbrush
	Ceanothus integerrimus	deerbrush
	Ceanothus prostratus* var. *prostratus	Mahala mat
	Ceanothus velutinus	tobacco brush
	Frangula californica	California coffeeberry
ROSACEAE	***Amelanchier alnifolia***	Saskatoon serviceberry
	Cercocarpus betuloides	birch leaf mountain mahogany
	Fragaria virginiana	mountain strawberry
	Geum macrophyllum	Large-leaved avens
	Potentilla gracilis	Northwest cinquefoil
	Prunus emarginata	bitter cherry
	Rhamnus purshiana	cascara
	Rosa woodsii* var. *ultramontana	interior rose
	Rubus armeniacus	Himalayan blackberry
	Rubus parviflorus	thimbleberry
	Sorbus californica	mountain ash
	Spiraea douglasii	rose spirea
RUBIACEAE	***Galium aparine***	common bedstraw
RUSCACEAE	***Maianthemum racemosum***	feathery false lily of the valley
	Maianthemeum stellatum	starry false lily of the valley

Appendix C. Plant Species Encountered within the Fountain Wind Project.

Family	Scientific Name*	Common Name
SALICACEAE	***Populus tremuloides***	quaking aspen
	Salix scouleriana	Scouler's willow
	Salix lasiandra	Pacific willow
	Salix lasiolepis	arroyo willow
SAPINDACEAE	***Acer circinatum***	vine maple
	Acer glabrum	Rocky Mountain maple
	Acer macrophyllum	bigleaf maple
SAXIFRAGACEAE	***Heuchera* spp.**	alumroot
SCROPHULARIACEAE	***Castilleja* spp.**	paintbrush
	Mimulus torreyi	Torrey's monkeyflower
	***Pedicularis* spp.**	lousewort
	Penstemon neotericus	Plumas County beardtongue
	***Penstemon* spp.**	penstemon
	Verbascum thapsus	common mullein
URTICACEAE	***Urtica dioica***	stinging nettle
VALERIANACEAE	***Valeriana californica***	California valerian
VERBENACEAE	***Verbena lasiostachys***	western vervain
VIOLACEAE	***Viola adunca***	Western dog violet
	Viola glabella	stream violet
	Viola lobata	pine violet
	Viola purpurea	mountain violet

*Native plant species in bold.

Appendix D. Natural Vegetation Communities Mapped within the Fountain Wind Project Evaluation Area.

Pinus ponderosa Forest Alliance (Ponderosa pine forest)

Areas mapped as this vegetation community type cover a majority of the northern half of the Project (Figure 2) and were burned in the 1992 Fountain Fire. In the years following the fire millions of ponderosa pine, Douglas fir, and white fir seedlings were planted at 10-ft spacing. Thus, this forest alliance is composed of even-aged stands of mixed conifer forest, generally about 25 years old, featuring a partially open canopy. Ponderosa pine is the dominant overstory species but white fir and Douglas fir are common. Since the fire, forest thinning has occurred and much of the slash remains in place, particularly within areas mapped as this alliance on the south side of Highway 299.

Overall, woody and herbaceous understory vegetation is highly variable in composition and density, but typically includes some combination of the following woody species: Mahala mat (*Ceanothus prostratus* var. *prostratus*), greenleaf manzanita (*Arctostaphylos patula*), mountain whitethorn (*Ceanothus cordulatus*), Sierra gooseberry (*Ribes roezlii*), and creeping snowberry (*Symphoricarpos mollis*). Herbaceous vegetation is predominantly composed of the following herbaceous species: bracken (*Pteridium aquilinum* var. *pubescens*), bottlebrush (*Elymus elymoides*), Pacific starflower (*Lysimachia latifolia*), and mountain needle grass (*Achnatherum nelsonii*). Although not as common as the other conifers in the overstory, incense cedar is present throughout this alliance.

Pinus ponderosa Forest Alliance (Ponderosa pine forest) – Logged/Recently Logged

Logging operations are ongoing within the evaluation area, particularly south of Highway 299. Areas mapped as ponderosa pine forest–logged/recently logged have been harvested at various intervals within the last 10−15 years. Most logged sites featured planted seedlings and saplings of various age classes. Ponderosa pine and, to a lesser extent, white fir are the most common tree species planted within recently logged areas. The majority of logged areas include small patches of more mature trees that were presumably left to provide wildlife habitat. Understory vegetation is typically sparse in this alliance and, when present, is mostly composed of invasive, disturbance-tolerant herbaceous species such as mullein, bull thistle, Klamath weed, and houndstongue. Additionally, bottlebrush squirreltail, a native grass species, is often present.

Abies concolor – Pseudotsuga menziesii Forest Alliance (White fir – Douglas fir forest)

The white fir-Douglas fir forest alliance was primarily mapped in the east-central and southern portions of the Project, where it formed a mosaic with the logged/recently logged ponderosa pine forest community. Areas mapped as this alliance were not burned in the Fountain Fire. Within the Project this vegetation community featured a mostly-closed canopy of mature mixed conifer species, including white fir, Douglas fir, sugar pine, ponderosa pine, incense cedar, and red fir (*Abies magnifica*), with some California black oak (*Quercus kelloggii*), particularly in small forest openings. Largely because of the closed canopy, understory vegetation is sparse and mostly composed of herbaceous species, including bracken, Pacific starflower, coralroot (*Corallorhiza* spp.), whiteveined shinleaf (*Pyrola picta*), and pipsissewa (*Chimaphila menziesii*). Scattered seedlings and saplings of the overstory tree species are also present in the understory. On rockier substrates, the white fir–Douglas fir forest alliance typically has a more open canopy and features a denser understory composed of a variety of the woody and herbaceous species observed in the ponderosa pine forest alliance. Both of these forested vegetation communities mapped within the evaluation area represent a managed (i.e., periodically disturbed) forest system. As such, most stands are even-aged, but because of the different intervals at which timber harvesting has occurred, a mosaic of different age-class even-aged stands exist within the Project and surrounding area.

Quercus kelloggii **Forest Alliance (California black oak forest)**

California black oak forest typically occurs at lower elevations within the Project (e.g., the far western portion), or in previously burned areas where it forms a mosaic with the green leaf manzanita chaparral alliance. Within the Project the majority of this vegetation community features a mostly open canopy of black oak with scattered green leaf manzanita in the shrub strata and a dense herbaceous understory composed primarily of grasses. Common understory species include Lemmon's needlegrass (*Stipa lemmonii*), blue wild rye (*Elymus glaucus*), mountain brome (*Bromus carinatus*), and yarrow.

Acer glabrum **Provisional Shrubland Alliance (Rocky Mountain maple thickets)**

Riparian areas, mostly dominated by Rocky Mountain maple, were mapped along ephemeral, intermittent, and perennial drainages throughout the Project. Creek alder (*Alnus incana* ssp. *tenuifolia*) is often a codominant, particularly along shaded stream corridors more common to the southern portion of the Project. Woody and herbaceous understory vegetation composition is highly variable and is dependent on moisture regime (e.g., dry, mesic) and overstory canopy cover. In the northern portion of the Project, primarily within areas burned in the Fountain Fire, plant species better adapted to drier conditions are more common. Although Rocky Mountain maple, and often Scouler's willow (*Salix scouleriana*), is still common immediately along the drainage, the streambanks and adjacent riparian habitat are dominated by more xeric species including ceanothus (*Ceanothus* spp.), green leaf manzanita, blue elderberry (*Sambucus mexicana*), mountain dogwood (*Cornus nuttallii*), and bitter cherry (*Prunus emarginata*). In the southern portion of the Project, primarily in areas that escaped the Fountain Fire, more mesic conditions exist within the Rocky Mountain shrubland alliance. Incense cedar and Douglas fir often create a well-shaded forest canopy above dense woody riparian habitat dominated by Rocky Mountain maple and creek alder. Other common shrub and tree species include blackfruit dogwood (*Cornus sessilis*), twinberry honeysuckle (*Lonicera involucrata*), vine maple (*Acer circinatum*), willow (*Salix* spp.), Oregon boxleaf (*Paxistima myrsinites*), western azalea (*Rhododendron occidentale*), and bigleaf maple (*Acer macrophyllum*). Although variable across the Project, understory herbaceous vegetation is relatively sparse and typically includes some combination of the following species: common bedstraw (*Galium aparine*), feathery false lily of the valley (*Maianthemum racemosum*), bride's bonnet (*Clintonia uniflora*), common cow parsnip (*Heracleum lanatum*), arrowleaf ragwort (*Senecio triangularis*), and sweet cicely (*Osmorhiza berteroi*).

Arctostaphylos patula Shrubland Alliance (Green leaf manzanita chaparral)

Green leaf manzanita chaparral intergrades with almost all other vegetation communities within the Project. It occurs in areas receiving full sunlight, including rocky ridgetops, rocky slopes and flats, forest openings, and recently burned or logged areas. This vegetation community is characterized by the presence of dense, nearly impenetrable thickets dominated by green leaf manzanita. Additional shrub species that sometimes occur as co-dominants include bush chinquapin (*Chrysolepis sempervirens*), mountain whitethorn (*Ceanothus cordulatus*), deerbrush (*Ceanothus integerrimus*), tobacco brush (*Ceanothus velutinus*), and buckbrush (*Ceanothus cuneatus*). Because of the dense growth form of this shrubland alliance understory vegetation is virtually absent, except in small openings. Scattered herbaceous species observed in small, rocky openings within green leaf manzanita chaparral include Plumas County beardtongue (*Penstemon neotericus*), mountain jewelweed (*Streptanthus tortuosus*), lace lip fern (*Myriopteris gracillima*), sulfur buckwheat (*Eriogonum umbellatum*), buckwheat (*Eriogonum* sp.), and onion (*Allium* sp.).

Green leaf manzanita chaparral was also mapped along the transmission line corridor that extends across the central portion of the Project. Vegetation along this corridor is managed to discourage the establishment of tall shrub and tree species. In addition to other chaparral species (e.g., *Ceanothus* spp.), green leaf manzanita has established along much of the corridor. Portions of the transmission line where chaparral species have not established feature dense stands of Western brackenfern (*Pteridium aquilinum* var. *pubescens*), scattered shrubs, including Sierra gooseberry (*Ribes roezlii*), bitter cherry, creeping snowberry (*Symphoricarpos molllis*), and rose (*Rosa* spp.), and barren patches.

Carex utriculata Herbaceous Alliance (Beaked sedge meadows)

Beaked sedge meadows were mapped throughout the Project in seasonally or permanently saturated areas adjacent to stream corridors and ponds. Generally, these meadows are composed of a wide diversity of hydrophytic species, including grasses, sedges, rushes, and forbs. Beaked sedge is typically the dominant plant species in these meadows, but commonly observed species include bluejoint reedgrass (*Calamagrostis canadensis*), marsh foxtail (*Alopecurus geniculatus*), Nebraska sedge (*C. nebrascensis*), brown sedge (*C. subfusca*), sword leaved rush (*Juncus ensifolius*), Baltic rush (*Juncus balticus*), common spikerush (*Eleocharis macrostachya*), tufted hairgrass (*Deschampsia cespitosa*), American bistort (*Polygonum bistortoides*), horsetail (*Equisetum* spp.), Bigelow's sneezeweed (*Helenium bigelovii*), and seep monkeyflower (*Mimulus guttatus*). Scattered shrubs, including rose spirea (*Spiraea douglasii*), willow, and thinleaf alder seedlings and saplings, occur in some of these meadows. Additional patches of beaked sedge meadow were observed along drainage channels within the two forest alliances in the Project but were too small to map independently, and were thus included in the larger riparian community mapping.

***Agrostis* (*gigantea*, *stolonifera*) – *Festuca arundinacea* Herbaceous Semi-Natural Alliance (Bent grass – tall fescue meadows)**

Montane meadows dominated by bent grass and/or tall fescue were mapped in forest openings and adjacent some of the beaked sedge meadows within the Project. They are considered a semi-natural alliance because, although native species are present, both of the dominant species are non-natives. These meadows are typically somewhat disturbed and are not saturated during the growing season. They support mesic and/or upland herbaceous vegetation. Common grasses and forbs include common yarrow (*Achillea millefolium*), goldenrod (*Solidago* sp.), Timothy (*Phleum pratense*), Kentucky bluegrass (*Poa pratensis*), orchardgrass, and blue wildrye. Bent grass – tall fescue meadows occasionally include some of the herbaceous plant species found in the beaked sedge meadow vegetation community, particularly when they abut one another.

C6. Results of the Year 2 Avian Use Study at the Fountain Wind Project – Addendum to the Year 1 Avian Use Study Report and Risk Assessment

ENVIRONMENTAL & STATISTICAL CONSULTANTS

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TECHNICAL MEMORANDUM

DATE: September 5, 2019

TO: John Kuba – ConnectGen Operating LLC

FROM: Joel Thompson and Andrea Chatfield – Western EcoSystems Technology, Inc.

RE: Results of the Year 2 Avian Use Study at the Fountain Wind Project – Addendum to the Year 1 Avian Use Study Report and Risk Assessment.

INTRODUCTION

The Fountain Wind Project (Project), is a proposed renewable wind energy generation project under development in eastern Shasta County, California by Fountain Wind LLC (Fountain Wind), a subsidiary of Avangrid Renewables LLC. In August 2019, ConnectGen Operating LLC (ConnectGen) entered into agreement with Fountain Wind LLC to lead the continued development of the Project. To address potential impacts of Project development on birds, Western EcoSystems Technology, Inc. (WEST) was contracted to develop and implement a 2-year avian use study at the proposed Project. The study was conducted following the tiered approach outlined in the US Fish and Wildlife Service (USFWS) *Land-Based Wind Energy Guidelines* (WEG; USFWS 2012) and the USFWS *Eagle Conservation Plan Guidance* (ECPG; USFWS 2013), while also collecting data to satisfy the intent of the more dated voluntary California Wind Energy Guidelines (California Energy Commission and California Department of Fish and Game 2007). The principle objectives of the avian use study were to assess the relative abundance and spatial and temporal distribution of birds throughout the Project area, and to evaluate the potential for significant adverse impacts to avian species, particularly eagles, other diurnal raptors, and species of regulatory or management concern.

WEST conducted the initial first-year study (Year 1) over a 14-month period, from April 2017 through May 2018, and prepared the *Avian Use Study Report and Risk Assessment* based on those surveys (Thompson et al. 2018). Following recommendations presented in the ECPG, WEST completed a second year (Year 2) of eagle/avian use surveys at the Project over a 10-month period from June 2018 through March 2019, resulting in a full 2-year survey effort extending from April 2017 – March 2019. The following report presents the results the Year 2 surveys, as well as a comparison of the results between the two study years. Additionally, the avian risk assessment prepared as part of the Year 1 report was revisited, with a focus on potential risk to bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), as well as any inter-annual variation in species composition or use documented during the Year 2 surveys that may influence the perceived risk to avian species at the Project based on the Year 1 study alone.

During Year 2 of the study, large and small bird surveys were conducted at the same 39 observation points surveyed in Year 1 (Figure 1). Field and statistical methods were also consistent between the two years of study; for a detailed description of the Project area and survey methods please refer to the Year 1 *Avian Use Study Report and Risk Assessment* (Thompson et al. 2018). While the Project layout has been modified several times between 2017 and 2019, these modifications, including the most recent September 2019 layout, fall entirely within the larger area evaluated during the Year 1 and Year 2 avian use surveys (i.e., “Project Boundary” in Figure 1).

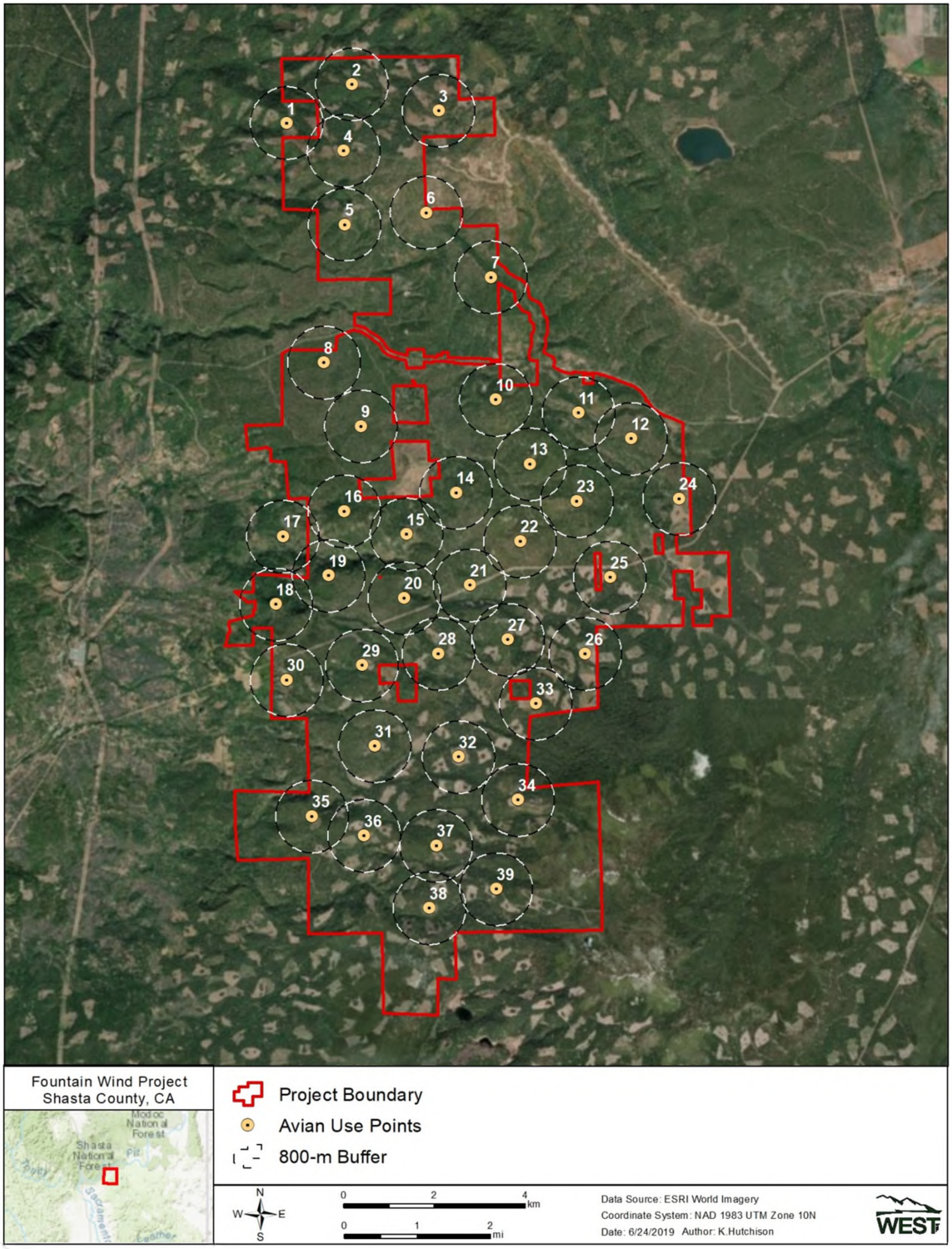

Figure 1. Location of survey plots used during fixed-point avian use surveys at the Fountain Wind Project, Shasta County, California, from 4 June 2018 – 31 March 2019.

YEAR 2 RESULTS

The Year 2 avian use surveys were conducted at the Project from 4 June 2018 through 31 March 2019. Results for large bird and small bird surveys are summarized in separate sections below, supplemented by appendices that present species-level detail on numbers of bird groups and observations observed during each season (Appendix A), species-level detail on seasonal use statistics (Appendix B), use by observation point for large and small bird types (Appendix C), and mapped flight paths for waterbirds, waterfowl, and diurnal raptor species (Appendix D).

Large Bird Surveys

During the Year 2 surveys, 383 60-minute (min) fixed-point large bird surveys were conducted at the Project over the course of 10 visits (Table 1). Not all points were surveyed each visit due to various constraints (e.g., inclement weather, limited access due to snow). Because the Year 1 survey period spanned approximately 14 months, the Year 2 surveys continued for a period of only 10 months, resulting in only a single visit completed in spring of Year 2.

Table 1. Summary of large bird species richness (species/800-meter plot/60-minute survey) and sample size by season and overall during large bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

Season	Number of Visits	Number of Surveys Conducted	Number of Species	Large Bird Species Richness
Summer	3	117	14	1.36
Fall	2	78	11	1.59
Winter	4	156	14	0.51
Spring	1	32	12	1.31
Overall	**10**	**383**	**22**	**1.08**

800 meters = 2,625 feet

Species Richness and Species Composition

During 60-min large bird surveys, 8,459 observations were recorded among 706 separate groups (defined as one or more individuals), regardless of distance from the observer (Appendix A1). This included documentation of 22 separate large bird species (Table 1). Large bird species richness (mean number of species per plot per survey) was highest during fall (1.59), followed by summer (1.36), spring (1.31), and winter (0.51; Table 1).

Among the large bird types, waterfowl (7,170 observations in 39 groups) accounted for 84.8% of all large bird observations during the study period (Appendix A1). Most (98.6%) waterfowl observations comprised just two species: greater white-fronted geese (*Anser albifrons*; 5,457 observations) primarily recorded in fall, and snow geese (*Chen caerulescens*; 1,616 observations) primarily recorded in winter (Appendix A1). Other large bird types observed during surveys included vultures (469 observations), waterbirds (366 observations), doves/pigeons (147 observations), diurnal raptors (144 observations), large corvids (143 observations), upland game birds (11 observations), and goatsuckers (nine observations; Appendix A1).

Eleven diurnal raptor species were recorded during large bird surveys, the most common being red-tailed hawk (*Buteo jamaicensis*; 79 observations), sharp-shinned hawk (*Accipiter striatus*; 26 observations), and Cooper's hawk (*A. cooperii*; 16 observations; Appendix A1). A total of seven eagle observations were recorded during surveys, including six bald eagle observations and one golden eagle observation. Bald eagles were recorded primarily in winter (four observations), with only one bald eagle observation in each of summer and spring. The single golden eagle observation was recorded in spring (Appendix A1).

Bird Use, Percent of Use, and Frequency of Occurrence

Mean large bird use (birds per 800-meter [2,625-foot; ft] plot per 60-min survey), percent of use, and frequency of occurrence were calculated by season for all large bird types and species (Appendix B1). The highest overall large bird use occurred in fall (70.10), followed by spring (24.00), winter (11.44), and summer (3.75).

<u>Waterbirds</u>

Waterbird use, comprising two species, American white pelican (*Pelecanus erythrorhynchos*) and sandhill crane (*Antigone canadensis*), was highest in spring (9.88 birds/800-m plot/60-min survey), and much lower in fall (0.37) and winter (0.13); no waterbird use was recorded in summer (Appendix B1). Waterbirds accounted for 41.1% of overall large bird use in spring, all of which was attributed to sandhill crane. Waterbirds accounted for 1.2% of large bird use in winter and 0.5% in fall. Waterbirds were recorded during 9.4% of winter surveys, but only 2.6% and 1.3% of fall and winter surveys, respectively.

<u>Waterfowl</u>

Waterfowl use was highest in fall (65.71 birds/800-m plot/60-min survey), followed by spring (11.25), winter (10.69), and summer (0.15; Appendix B1). Use by four waterfowl species was documented during surveys, with greater white-fronted goose accounting for all (100%) waterfowl use in fall, and snow goose accounting for all (100%) waterfowl use in spring and the majority (75.3%) of use in winter. Other, less abundant waterfowl species recorded included Canada goose (*Branta canadensis*; summer and winter only) and tundra swan (*Cygnus columbianus*; winter only). Waterfowl accounted for over 90% of overall large bird use in fall and winter, and 46.9% in spring, but only 4.1% in summer. Waterfowl were observed most frequently during winter and fall (9.0% and 7.7% of surveys, respectively) and less often during spring and summer (3.1% and 0.9% of surveys, respectively; Appendix B1).

<u>Diurnal Raptors</u>

Diurnal raptor use was highest in fall (0.73 birds/800-m plot/60-min survey), followed by spring (0.53), summer (0.40), and winter (0.15; Appendix B1). Use by 11 diurnal raptor species was recorded during surveys, with red-tailed hawk having the highest use of any diurnal raptor species in all four seasons (range of 0.07 bird/800-m plot/60-min survey in winter to 0.35 in fall), accounting for 47.9% to 67.5% of diurnal raptor use in any given season. Among other diurnal raptor species, sharp-shinned hawk and Cooper's hawk had relatively higher use in fall (0.22 and

0.08 bird/800-m plot/60-min survey, respectively) and spring (0.06 and 0.09 bird/800-m plot/60-min survey, respectively). All other diurnal raptor species recorded during surveys had use estimates of 0.04 bird/800-m plot/60-min survey or less in any given season. Bald eagle use was 0.03 bird/800-m plot/60-min survey in both winter and spring, less than 0.01 in summer, and no use was reported in fall. Golden eagle use was recorded only in spring (0.03 bird/800-m plot/60-min survey). Diurnal raptors accounted for 10.7% of overall large bird use in summer, but only 1.0% to 2.2% in other seasons. Diurnal raptors were observed most frequently in fall (41.0% of fall surveys) and least frequently in winter (12.2% of winter surveys; Appendix B1).

Vultures

Use by vultures (i.e., turkey vulture [*Cathartes aura*]), was highest in summer (2.40 birds/800-m plot/60-min survey), followed by fall (1.90), spring (1.22), and winter (less than 0.01; Appendix B1). Vultures accounted for the majority (64.0%) of overall large bird use during summer, but less than 6.0% of large bird use in other seasons. Vultures were observed during 64.1% of summer surveys, 44.9% of fall surveys, 31.2% of spring surveys, and 0.6% of winter surveys (Appendix B1).

Upland Game Birds

Mountain quail (*Oreortyx pictus*) was the only upland game bird species observed during surveys (Appendix A1). Use by this species was recorded only in summer (0.09 bird/800-m plot/60-min survey) and spring (0.03; Appendix B1). Upland game birds accounted for 2.3% of overall large bird use in summer and 0.1% in spring, and were recorded during 7.7% of summer surveys and 3.1% of spring surveys (Appendix B1).

Doves/Pigeons

Band-tailed pigeon (*Patagioenas fasciata*) was the only dove/pigeon species recorded during surveys (Appendix A1). Use by this species was highest in fall (0.82 bird/800-m plot/60-min survey), followed by spring (0.66), summer (0.32), and winter (0.15). Doves/pigeons accounted for 8.7% of overall large bird use in summer, 2.7% in spring, 1.3% in winter, and 1.2% in fall. Doves/pigeons were recorded during 1.9% to 19.2% of surveys in any given season (Appendix B1).

Large Corvids

Common raven (*Corvus corax*) was the only large corvid species recorded during surveys (Appendix A1). Use by this species was highest in fall (0.58 bird/800-m plot/60-min survey), followed by spring (0.44), and summer and winter (each with 0.31). Large corvids accounted for 8.2% of overall large bird use in summer, but only 0.8% to 2.7% in other seasons. Large corvids were recorded during 15.4% to 23.1% of surveys in any given season (Appendix B1).

Goatsuckers

Use by goatsuckers (0.08 bird/800-m plot/60-min survey) was attributed to a single species, common nighthawk (*Chordeiles minor*), recorded only during summer (Appendix B1).

Goatsuckers accounted for 2.1% of overall large bird use in summer and were recorded during 3.4% of summer surveys (Appendix B1).

Flight Height Characteristics

Flight height characteristics, based on initial flight height observations and estimated use, were calculated for large bird types and raptor subtypes (Table 2). During the 60-min large bird surveys, 666 groups of large birds, totaling 8,411 observations, were observed flying within the 800-m radius plots. Overall, 9.9% of flying large birds were recorded within the rotor-swept heights (RSH) for turbine blades of 30-200 m (98-656 ft) above ground level, 89.3% were above the RSH, and 0.8% were below the RSH (Table 2). The large bird types most often recorded flying within the RSH were goatsuckers (100%), large corvids (96.7%), and vultures (77.1%; Table 2). Overall, diurnal raptors were recorded flying within the RSH during 71.8% of observations, with 23.2% recorded above the RSH and 4.9% below the RSH (Table 2). Among diurnal raptor subtypes, falcons were most often observed flying within the RSH (100%, but based only on a single observation), followed by accipiters 81.4%; Table 2). The majority of waterbirds and waterfowl were recorded above the RSH (74.6% and 99.1%, respectively; Table 2).

Table 2. Flight height characteristics by bird type and raptor subtype during large bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

Type	# Groups Flying	# Obs Flying	Mean Flight Height (m)	% Obs Flying	% within Flight Height Categories*		
					0 - 30 m	30 - 200 m**	> 200 m
Waterbirds	10	366	350.00	100	0	25.4	74.6
Waterfowl	39	7,170	511.79	100	0	0.9	99.1
Diurnal Raptors	139	142	172.10	98.6	4.9	71.8	23.2
Accipiters	*43*	*43*	*107.14*	*97.7*	*14.0*	*81.4*	*4.7*
Buteos	*77*	*80*	*194.74*	*98.8*	*1.2*	*68.8*	*30.0*
Northern Harrier	*6*	*6*	*236.67*	*100*	*0*	*50.0*	*50.0*
Eagles	*7*	*7*	*220.00*	*100*	*0*	*71.4*	*28.6*
Falcons	*1*	*1*	*30.00*	*100*	*0*	*100*	*0*
Osprey	*4*	*4*	*207.50*	*100*	*0*	*75.0*	*25.0*
Other Raptors	*1*	*1*	*500.00*	*100*	*0*	*0*	*100*
Vultures	362	468	168.55	99.8	1.5	77.1	21.4
Upland Game Birds	0	0	-	0	-	-	-
Doves/Pigeons	44	134	40.82	91.2	36.6	63.4	0
Large Corvids	69	123	87.10	86.0	2.4	96.7	0.8
Goatsuckers	3	8	70.00	88.9	0	100	0
Overall	**666**	**8,411**	**174.79**	**99.4**	**0.8**	**9.9**	**89.3**

* Sums may not total 100% due to rounding

**The likely "rotor-swept height" for potential collision with a turbine blade, or 30-200 meters (m; 98-656 feet) above ground level

Obs = observations

Spatial Use

Mean use by point for all large birds, large bird types, and diurnal raptor subtypes is included in Appendix C1. For all large bird species combined, use (birds/60-min survey) was substantially higher at points 26 and 17 (459.70 and 109.10, respectively; Appendix C1). Use at points 26 and 17 was dominated by waterfowl, which accounted for 98.9% and 95.6% of large bird use at these points, respectively. Overall large bird use at other points varied widely, ranging from 0.40 bird/60-min survey at Point 22 to 39.80 at Point 10 (Appendix C1).

Waterfowl were observed across the Project area, with use recorded at 18 of the 39 observation points (Appendices C1 and D1). Alternatively, waterbird use was concentrated within the central portion of the Project area, with use recorded at just six of the 39 observation points, ranging from 0.80 to 15.50 birds/60-min survey (Appendices C1 and D1).

Diurnal raptor use (birds/60-min survey) was relatively consistent across the Project area, ranging from zero at points 23 and 35 to 1.00 bird/60-min survey at points 5, 17, and 26 (Appendix C1). Eagle use was recorded at six points, with use estimates ranging from 0.10 to 0.20 bird/60-min survey (Appendix C1). Obvious areas of concentrated use by eagles or other diurnal raptors or consistent flight patterns were not observed (Appendix D2 and D3). Vulture use was recorded at all 39 observation points, with use estimates ranging from 0.20 to 3.40 birds/60-min survey (Appendix C1).

Eagle Risk Minutes

Six bald eagle observations and one golden eagle observation were recorded within the Project area during 383 hours of large bird survey effort in Year 2 (Table 3). Bald eagles were observed in flight for a total of 16 minutes (Table 3). Of the 16 bald eagle minutes recorded during the study, five eagle risk minutes were recorded within the 800-m plots at flight heights of 200 m or less AGL (Table 3). The majority (80.0%) of bald eagle risk minutes were recorded in winter, with only a single bald eagle risk minute recorded in spring and no risk minutes recorded in summer or fall (Table 3). Bald eagle risk minutes per minute of survey were highest during spring (0.0312), followed by winter (0.0256; Table 3). The single golden eagle recorded during surveys was observed in flight for a total of five minutes, which resulted in a total of two golden eagle risk minutes recorded in spring (Table 3).

Bald eagle risk minutes were recorded at four of the 39 observation points (points 8, 20, 29, and 36; Appendix D4). Most of the bald eagle risk minutes were recorded at Point 20 (two risk minutes), with points 8, 29, and 36 contributing an additional one risk minute each. The two golden eagle risk minutes were recorded at Point 29 (Appendix D4).

Table 3. Bald eagle and golden eagle observations and risk minutes* (min) documented during 60-minute large bird surveys conducted at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

Season	Survey Effort (Hours)	Observations	Total Flight Minutes	Risk Minutes	Risk Minutes per Minute Survey
		Bald Eagle			
Summer (7/1 – 8/31)	117	1	6	0	0.0000
Fall (9/1 – 10/31)	78	0	0	0	0.0000
Winter (11/1 – 3/12)	156	4	9	4	0.0256
Spring (3/13 – 3/31)	32	1	1	1	0.0312
Total	**383**	**6**	**16**	**5**	**0.0131**
		Golden Eagle			
Summer (7/1 – 8/31)	117	0	0	0	0.0000
Fall (9/1 – 10/31)	78	0	0	0	0.0000
Winter (11/1 – 3/12)	156	0	0	0	0.0000
Spring (3/13 – 3/31)	32	1	5	2	0.0625
Total	**383**	**1**	**5**	**2**	**0.0052**

* Risk minutes are defined as flying behavior at or below 200 meters (m; 656 feet [ft]) and within 800 m (2,625 ft) of the survey location.

Small Bird Surveys

During Year 2 surveys, 383 10-min fixed-point small bird surveys were completed at the Project during 10 visits, for a total of 63.8 hours of small bird survey effort (Table 4).

Table 4. Summary of small bird species richness (species/100-meter plot/10-minute survey), and sample size by season and overall during small bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

Season	Number of Visits	Number of Surveys Conducted	Number of Species	Small Bird Species Richness
Summer	3	117	42	2.69
Fall	2	78	30	2.27
Winter	4	156	26	1.39
Spring	1	32	22	2.22
Overall	**10**	**383**	**50**	**2.05**

Species Richness and Species Composition

During 10-min small bird surveys, 1,711 small bird observations were recorded within 851 separate groups comprising 50 species (Table 4, Appendix A2). Small bird species richness was highest during summer (2.69 species per 100-m ([328-ft] plot per 10-min survey), followed by fall (2.27), spring (2.22), and winter (1.39; Table 4). Most (93.2%) small birds recorded were passerines (1,595 observations in 748 groups), with the most commonly observed species comprising mountain chickadee (*Poecile gambeli*; 166 observations), red-winged blackbird (*Agelaius phoeniceus*; 165 observations); western bluebird (*Sialia mexicana*; 142 observations), and Steller's jay (*Cyanocitta stelleri*; 133 observations; Appendix A2). Other small bird types recorded included woodpeckers (91 observations) and hummingbirds (25 observations; Appendix A2).

Bird Use, Percent of Use, and Frequency of Occurrence

Mean small bird use (birds/100-m plot/10-min survey), percent of use, and frequency of occurrence were calculated by season for all small bird species (Appendix B2). The highest small bird use was recorded in fall (7.54 birds/100-m plot/10-min survey), followed by spring (4.88), summer (4.84), and winter (2.50). Use by small birds was dominated by passerines during all four seasons. Higher small bird use in fall was primarily attributed to several large groups of red-winged blackbirds, resulting in a fall use estimate for this species of 2.12 birds/100-m plot/10-min survey (Appendix B2). The passerine species with the highest use in spring was western bluebird (1.91 birds/100-m plot/10-min survey), while dark-eyed junco (*Junco hyemalis*) had the highest use in summer (0.52), and mountain chickadee had the highest use in winter (0.51; Appendix B2). Use by woodpeckers was highest in fall (0.45 bird/100-m plot/10-min survey), followed by spring (0.22), summer (0.20), and winter (0.15; Appendix B2). Northern flicker (*Colaptes auratus*) had the highest use of any woodpecker species in summer (0.08 bird/100-m plot/10-min survey), fall (0.18), and spring (0.19), while white-headed woodpecker (*Picoides albolarvatus*) had the highest use in winter (0.06; Appendix B2). Hummingbird use was attributed to two identified species: Anna's hummingbird (*Calypte anna*) and rufous hummingbird (*Selasphorus rufus*), which together resulted in seasonal use ranging from 0.01 bird/100-m plot/10-min survey in fall to 0.14 in summer (Appendix B2).

Bird Flight Height and Behavior

During 10-min small bird surveys, 274 groups (977 observations) were recorded flying within the 100-m radius survey plots (Table 5). Of these, 42.4% were observed flying at heights within the estimated RSH and 57.6% were observed below the RSH; none were observed flying above the RSH (Table 5). Passerines were the small bird type most often observed flying within the RSH (44.2%; Table 5).

Table 5. Flight height characteristics by bird type during small bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

Type	# Groups Flying	# Obs Flying	Mean Flight Height (m)	% Obs. Flying	% within Flight Height Categories 0 - 30 m	30 - 200 m*	> 200 m
Passerines	222	915	16.27	57.7	55.8	44.2	0
Swifts/Hummingbirds	24	25	12.00	100	92.0	8.0	0
Woodpeckers	28	37	19.00	42.0	78.4	21.6	0
Overall	**274**	**977**	**16.18**	**57.5**	**57.6**	**42.4**	**0**

*The likely "rotor-swept height" for potential collision with a turbine blade, or 30-200 meters (m; 98-656 feet) above ground level.

Obs = observations

Spatial Use

Small bird use varied among the 39 observation points. The highest small bird use was recorded at Point 32 (20.00 birds/10-min survey), while the lowest use was observed at points 34 and 15 (1.20 and 1.50, respectively). Small bird use at other points ranged from 1.60 to 9.22 birds/10-min survey (Appendix C2).

Incidental Observations

Twelve bird species and two mammal species were recorded incidentally during the Year 2 surveys (Table 6). Of the 12 bird species recorded incidentally, only three species, northern pygmy-owl (*Glaucidium gnoma*; one observation), wild turkey (*Meleagris gallopavo*; four observations), and mourning dove (*Zenaida macroura*; two observations), were not observed during standardized fixed-point surveys (Appendices A1 and A2).

Table 6. Summary of number of groups (grps) and observations (obs) of incidental wildlife observed while conducting surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

Species	Scientific Name	# grps	# obs
northern goshawk	*Accipiter gentilis*	1	1
red-tailed hawk	*Buteo jamaicensis*	9	11
northern pygmy-owl	*Glaucidium gnoma*	1	1
turkey vulture	*Cathartes aura*	79	103
wild turkey	*Meleagris gallopavo*	2	4
mountain quail	*Oreortyx pictus*	11	11
band-tailed pigeon	*Patagioenas fasciata*	18	29
mourning dove	*Zenaida macroura*	2	2
common raven	*Corvus corax*	23	31
common nighthawk	*Chordeiles minor*	4	4
northern flicker	*Colaptes auratus*	13	14
pileated woodpecker	*Dryocopus pileatus*	11	11
Bird Total	**12 Species**	**174**	**222**
bobcat	*Lynx rufus*	1	1
black bear	*Ursus americanus*	1	1
Mammal Total	**2 Species**	**2**	**2**

Sensitive Species Observations

Ten bird species considered sensitive at the state and/or federal level were recorded during the Year 2 avian use surveys or incidentally (Table 7). At the state level, this included one state-endangered species (bald eagle), one state fully-protected species (golden eagle), and five state species of special concern (SSC; American white pelican, northern goshawk [*Accipiter gentilis*], northern harrier [*Circus hudsonius*], olive-sided flycatcher [*Contopus cooperi*], and yellow warbler [*Setophaga petechia*]; California Department of Fish and Wildlife [CDFW] 2018; Table 7). Additionally, sandhill crane was recorded during surveys; however, these observations were not identified to the subspecies level. The two subspecies potentially occurring at the Project include *Antigone canadensis tabida*, a state threatened species, and *A. c. canadensis*, a SSC (Table 7).

At the federal level, four species recorded during surveys are considered federal birds of conservation concern in the Sierra Nevada Bird Conservation Region (bald eagle, Cassin's finch [*Haemorhous cassinii*], Lewis's woodpecker [*Melanerpes lewis*], and olive-sided flycatcher; USFWS 2008). In addition, bald and golden eagles receive protection under the federal Bald and Golden Eagle Protection Act of 1940.

Table 7. Summary of sensitive species observed at the Fountain Wind Project during large bird and small bird surveys (LB/SB) and as incidental wildlife observations (Inc.) from 4 June 2018 to 31 March 2019.

			LB/SB		Inc.		Total	
Species	**Scientific Name**	**Status**	**#grps**	**# obs**	**# rps**	**# obs**	**#grps**	**#obs**
American white pelican	*Pelecanus erythrorhynchos*	SSC	4	42	0	0	4	42
bald eagle	*Haliaeetus leucocephalus*	EA; BCC; SE; FP	6	6	0	0	6	6
Cassin's finch	*Haemorhous cassinii*	BCC	4	9	0	0	4	9
golden eagle	*Aquila chrysaetos*	EA; FP	1	1	0	0	1	1
Lewis's woodpecker	*Melanerpes lewis*	BCC	2	10	0	0	2	10
northern goshawk	*Accipiter gentilis*	SSC	1	1	1	1	2	2
northern harrier	*Circus cyaneus*	SSC	6	6	0	0	6	6
olive-sided flycatcher	*Contopus cooperi*	BCC; SSC	6	6	0	0	6	6
sandhill crane	*Antigone canadensis*	ST/SSC**	6	324	0	0	6	324
yellow warbler	*Setophaga petechia*	SSC	3	3	0	0	3	3
Total	**10 Species**		**39**	**408**	**1**	**1**	**40**	**409**

*EA = Bald and Golden Eagle Protection Act of 1940, BCC = federal bird of conservation concern (USFWS 2008); SE = state endangered, ST = state threatened, FP = state fully protected, SSC = state species of special concern (California Department of Fish and Wildlife 2018).

**Observations of sandhill crane were not identified to subspecies level; greater sandhill crane (*A. c. tabida*) is a state-threatened species, while lesser sandhill crane (*A. c. canadensis*) is a state species of special concern.

Grps = groups, obs = observations

DISCUSSION

Following the tiered approach outlined in the WEG and ECPG, and consistent with the survey effort and methodologies recommended specifically for eagles in the ECPG, two full years of avian use surveys were conducted at the Project. Following the Year 1 surveys, conducted from April 2017 to May 2018, WEST prepared an avian use study report that included a detailed risk assessment (see Thompson et al. 2018). This risk assessment was based on the results of the Year 1 surveys that were reviewed in the context of existing publicly available data from post-construction fatality studies at wind energy facilities in the California and Pacific Northwest regions of the US (Thompson et al. 2018). The results of the Year 2 surveys presented herein were compared with the results from Year 1 to determine whether inter-annual variations in species composition or use, particularly for eagles and other sensitive species, warranted an update to the risk assessment presented in the Year 1 report.

In general, the results of the Year 2 surveys are consistent with those documented during Year 1 of the study. Overall use by large birds was higher in Year 2; however, this discrepancy was mainly attributed to the number and timing of several large groups of waterbirds and waterfowl, though species composition between the two years was nearly identical. Higher waterbird use in Year 2, specifically in spring, was attributed to several comparatively large groups of sandhill cranes (five groups totaling 316 observations), while higher waterfowl use in Year 2 was attributed to several large flocks of greater white-fronted geese (13 groups totaling 5,125 observations) recorded in fall. As a result of this increase in fall goose observations, waterfowl composed a much higher percentage of overall large bird use in Year 2 (85%) than in Year 1 (63%). However, as in Year 1, the majority of waterfowl observations (about 99%) were recorded flying at heights well above the estimated RSH, and therefore, not considered to be at risk of collision with Project turbines.

Seasonal trends in diurnal raptor use (raptors/800-m plot/60-min survey) were very similar between years, with fall and spring having the highest use during both years. During Year 1, diurnal raptor use ranged from 0.23 to 0.56 raptor/800-m plot/60-min survey across seasons (Thompson et al. 2018), while in Year 2, diurnal raptor use ranged from 0.15 to 0.73. Species composition of raptors, was also similar between years with red-tailed hawk having the highest use during each season and overall for both Year 1 and Year 2, and sharp-shinned hawk having the second highest overall use during both years. Bald eagle use was somewhat lower during Year 2 of the study. Over the course of 383 hours of survey effort, only six bald eagle observations were recorded during Year 2 surveys, resulting in a total of five bald eagle risk minutes. In Year 1, over the course of 531 survey hours, 16 bald eagle observations were recorded, resulting in 35 bald eagle risk minutes during that year. During both survey years, the majority of bald eagle observations and risk minutes were recorded during winter. Golden eagle use of the Project was very low during both years of study (two observations in Year 1 and one observation in Year 2) and was limited to spring during both years. Vulture use was also consistent between years, with the lowest use occurring in winter and highest use occurring in summer for both Year 1 and Year 2.

Small bird species composition and use were also very similar between survey years, with the highest small bird use (birds/100-m plot/10-min survey) recorded in fall (5.61 in Year 1 and 7.54 in Year 2) and the lowest use recorded in winter (2.79 in Year 1 and 2.50 in Year 2). Higher fall use in Year 2 was primarily due to several relatively large flocks of red-winged blackbirds, which were not recorded in Year 1. Small bird species composing the majority of use during both study years included dark-eyed junco, mountain chickadee, western bluebird, and Steller's jay. In Year 2, the only sensitive species (including both large and small birds) recorded during surveys that was not also seen in Year 1 was Lewis's woodpecker, which is a federal BCC.

CONCLUSION

The results of the Year 2 surveys at the Project presented herein are consistent with the results of the initial year of study, both in species composition and seasonal and spatial trends in use. The avian risk assessment prepared as part of the Year 1 Avian Use Study Report (Thompson et al. 2018), therefore, remains a valid assessment of the potential impacts to avian species, including eagles and other special-status species, resulting from the development of the Project.

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Appendix A. All Bird Types and Species Observed at the Fountain Wind Project during Fixed-Point Bird Use Surveys from 4 June 2018 – 31 March 2019

Appendix A1. Summary of number of groups (grps) and observations (obs) by bird type and species for 60-minute large bird surveys at the Fountain Wind Project* from 4 June 2018 – 31 March 2019.

		Summer		Fall		Winter		Spring		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Waterbirds		**0**	**0**	**3**	**29**	**2**	**21**	**5**	**316**	**10**	**366**
American white pelican	*Pelecanus erythrorhynchos*	0	0	3	29	1	13	0	0	4	42
sandhill crane	*Antigone canadensis*	0	0	0	0	1	8	5	316	6	324
Waterfowl		**1**	**18**	**13**	**5,125**	**24**	**1,667**	**1**	**360**	**39**	**7,170**
Canada goose	*Branta canadensis*	1	18	0	0	2	36	0	0	3	54
greater white-fronted goose	*Anser albifrons*	0	0	13	5,125	7	332	0	0	20	5,457
snow goose	*Chen caerulescens*	0	0	0	0	13	1,256	1	360	14	1,616
tundra swan	*Cygnus columbianus*	0	0	0	0	2	43	0	0	2	43
Diurnal Raptors		**45**	**47**	**56**	**57**	**23**	**23**	**17**	**17**	**141**	**144**
Accipiters		*9*	*9*	*24*	*24*	*6*	*6*	*5*	*5*	*44*	*44*
Cooper's hawk	*Accipiter cooperii*	4	4	6	6	3	3	3	3	16	16
northern goshawk	*Accipiter gentilis*	1	1	0	0	0	0	0	0	1	1
sharp-shinned hawk	*Accipiter striatus*	4	4	17	17	3	3	2	2	26	26
unidentified accipiter	*Accipiter* spp.	0	0	1	1	0	0	0	0	1	1
Buteos		*32*	*34*	*26*	*27*	*11*	*11*	*9*	*9*	*78*	*81*
ferruginous hawk	*Buteo regalis*	1	1	0	0	0	0	0	0	1	1
red-tailed hawk	*Buteo jamaicensis*	30	32	26	27	11	11	9	9	76	79
rough-legged hawk	*Buteo lagopus*	1	1	0	0	0	0	0	0	1	1
Northern Harrier		*0*	*0*	*3*	*3*	*2*	*2*	*1*	*1*	*6*	*6*
northern harrier	*Circus hudsonius*	0	0	3	3	2	2	1	1	6	6
Eagles		*1*	*1*	*0*	*0*	*4*	*4*	*2*	*2*	*7*	*7*
bald eagle	*Haliaeetus leucocephalus*	1	1	0	0	4	4	1	1	6	6
golden eagle	*Aquila chrysaetos*	0	0	0	0	0	0	1	1	1	1
Falcons		*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*1*	*1*
merlin	*Falco columbarius*	0	0	1	1	0	0	0	0	1	1
Osprey		*3*	*3*	*1*	*1*	*0*	*0*	*0*	*0*	*4*	*4*
osprey	*Pandion haliaetus*	3	3	1	1	0	0	0	0	4	4
Other Raptors		*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*1*	*1*
unidentified raptor		0	0	1	1	0	0	0	0	1	1
Vultures		**225**	**281**	**114**	**148**	**1**	**1**	**23**	**39**	**363**	**469**
turkey vulture	*Cathartes aura*	225	281	114	148	1	1	23	39	363	469

Appendix A1. Summary of number of groups (grps) and observations (obs) by bird type and species for 60-minute large bird surveys at the Fountain Wind Project* from 4 June 2018 – 31 March 2019.

		Summer		Fall		Winter		Spring		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Upland Game Birds		**9**	**10**	**0**	**0**	**0**	**0**	**1**	**1**	**10**	**11**
mountain quail	*Oreortyx pictus*	9	10	0	0	0	0	1	1	10	11
Doves/Pigeons		**20**	**38**	**22**	**64**	**3**	**24**	**6**	**21**	**51**	**147**
band-tailed pigeon	*Patagioenas fasciata*	20	38	22	64	3	24	6	21	51	147
Large Corvids		**26**	**36**	**20**	**45**	**35**	**48**	**7**	**14**	**88**	**143**
common raven	*Corvus corax*	26	36	20	45	35	48	7	14	88	143
Goatsuckers		**4**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**9**
common nighthawk	*Chordeiles minor*	4	9	0	0	0	0	0	0	4	9
Overall		**330**	**439**	**228**	**5,468**	**88**	**1,784**	**60**	**768**	**706**	**8,459**

* Regardless of distance from observer.

Appendix A2. Summary of number of groups (grps) and observations (obs) by bird type and species for 10-minute small bird surveys at the Fountain Wind Project* from 4 June 2018 – 31 March 2019.

		Summer		Fall		Winter		Spring		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Passerines		**314**	**533**	**161**	**553**	**206**	**364**	**67**	**145**	**748**	**1,595**
American robin	*Turdus migratorius*	12	28	3	6	12	46	0	0	27	80
Bewick's wren	*Thryomanes bewickii*	4	4	3	3	1	1	1	1	9	9
black-headed grosbeak	*Pheucticus melanocephalus*	1	1	0	0	0	0	0	0	1	1
black-tailed gnatcatcher	*Polioptila melanura*	1	1	0	0	0	0	0	0	1	1
black-throated gray warbler	*Setophaga nigrescens*	3	3	0	0	0	0	0	0	3	3
bushtit	*Psaltriparus minimus*	3	43	2	11	1	3	1	5	7	62
California scrub-jay	*Aphelocoma californica*	2	2	8	29	3	3	2	2	15	36
California towhee	*Melozone crissalis*	3	5	0	0	0	0	0	0	3	5
Cassin's finch	*Haemorhous cassinii*	0	0	1	1	1	1	2	7	4	9
Cassin's vireo	*Vireo cassinii*	4	4	0	0	0	0	0	0	4	4
Clark's nutcracker	*Nucifraga columbiana*	1	15	0	0	0	0	0	0	1	15
dark-eyed junco	*Junco hyemalis*	40	62	9	30	15	28	4	5	68	125
dusky flycatcher	*Empidonax oberholseri*	3	3	1	1	0	0	0	0	4	4
evening grosbeak	*Coccothraustes vespertinus*	1	7	1	25	0	0	0	0	2	32
fox sparrow	*Passerella iliaca*	10	11	0	0	1	1	1	1	12	13
golden-crowned kinglet	*Regulus satrapa*	1	1	10	17	26	43	6	17	43	78
green-tailed towhee	*Pipilo chlorurus*	1	1	0	0	0	0	0	0	1	1
hermit thrush	*Catharus guttatus*	2	2	1	1	1	1	0	0	4	4
Hutton's vireo	*Vireo huttoni*	2	2	0	0	3	4	1	1	6	7
lazuli bunting	*Passerina amoena*	3	4	0	0	0	0	0	0	3	4
lesser goldfinch	*Spinus psaltria*	2	5	0	0	0	0	0	0	2	5
mountain chickadee	*Poecile gambeli*	31	44	14	24	40	80	13	18	98	166
Nashville warbler	*Oreothlypis ruficapilla*	1	4	0	0	0	0	0	0	1	4
oak titmouse	*Baeolophus inornatus*	0	0	1	2	2	5	0	0	3	7
olive-sided flycatcher	*Contopus cooperi*	6	6	0	0	0	0	0	0	6	6
purple finch	*Haemorhous purpureus*	4	8	1	50	1	2	1	1	7	61
red-breasted nuthatch	*Sitta canadensis*	28	33	17	17	30	32	9	9	84	91
red-winged blackbird	*Agelaius phoeniceus*	0	0	3	165	0	0	0	0	3	165
ruby-crowned kinglet	*Regulus calendula*	0	0	5	5	10	13	1	1	16	19
song sparrow	*Melospiza melodia*	0	0	0	0	1	1	0	0	1	1
spotted towhee	*Pipilo maculatus*	30	31	10	10	6	6	1	1	47	48
Steller's jay	*Cyanocitta stelleri*	37	44	33	36	38	46	7	7	115	133
Townsend's solitaire	*Myadestes townsendi*	3	3	0	0	1	3	1	1	5	7
unidentified passerine		3	6	1	1	0	0	0	0	4	7
unidentified swallow		8	68	1	30	0	0	0	0	9	98

Appendix A2. Summary of number of groups (grps) and observations (obs) by bird type and species for 10-minute small bird surveys at the Fountain Wind Project* from 4 June 2018 – 31 March 2019.

		Summer		Fall		Winter		Spring		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
unidentified warbler		1	1	0	0	0	0	0	0	1	1
violet-green swallow	*Tachycineta thalassina*	0	0	1	20	0	0	1	4	2	24
western bluebird	*Sialia mexicana*	4	14	8	30	6	37	12	61	30	142
western tanager	*Piranga ludoviciana*	17	17	0	0	0	0	0	0	17	17
western wood-pewee	*Contopus sordidulus*	11	11	0	0	0	0	0	0	11	11
white-crowned sparrow	*Zonotrichia leucophrys*	0	0	1	1	0	0	0	0	1	1
wrentit	*Chamaea fasciata*	7	7	5	5	7	8	3	3	22	23
yellow warbler	*Setophaga petechia*	3	3	0	0	0	0	0	0	3	3
yellow-rumped warbler	*Setophaga coronata*	21	29	21	33	0	0	0	0	42	62
Swifts/Hummingbirds		**16**	**16**	**1**	**1**	**3**	**4**	**4**	**4**	**24**	**25**
Anna's hummingbird	*Calypte anna*	9	9	1	1	3	4	2	2	15	16
rufous hummingbird	*Selasphorus rufus*	0	0	0	0	0	0	2	2	2	2
unidentified hummingbird		7	7	0	0	0	0	0	0	7	7
Woodpeckers		**23**	**25**	**28**	**36**	**21**	**23**	**7**	**7**	**79**	**91**
northern flicker	*Colaptes auratus*	10	10	14	14	7	7	6	6	37	37
downy woodpecker	*Dryobates pubescens*	4	6	1	1	1	1	0	0	6	8
hairy woodpecker	*Dryobates villosus*	4	4	6	6	3	4	1	1	14	15
pileated woodpecker	*Dryocopus pileatus*	1	1	0	0	0	0	0	0	1	1
acorn woodpecker	*Melanerpes formicivorus*	0	0	1	1	0	0	0	0	1	1
Lewis's woodpecker	*Melanerpes lewis*	0	0	2	10	0	0	0	0	2	10
white-headed woodpecker	*Picoides albolarvatus*	3	3	3	3	9	10	0	0	15	16
red-breasted sapsucker	*Sphyrapicus ruber*	1	1	1	1	0	0	0	0	2	2
unidentified woodpecker		0	0	0	0	1	1	0	0	1	1
Overall		**353**	**574**	**190**	**590**	**230**	**391**	**78**	**156**	**851**	**1,711**

* Regardless of distance from observer.

Appendix B. Mean Use, Percent of Use, and Frequency of Occurrence for Large Birds and Small Birds Observed during Fixed-Point Bird Use Surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019

Appendix B1. Mean large bird use (number of large birds/800-meter plot/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each large bird type and species by season during large bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

	Mean Use				% of Use				% Frequency			
Type/Species	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**
Waterbirds	**0**	**0.37**	**0.13**	**9.88**	**0**	**0.5**	**1.2**	**41.1**	**0**	**2.6**	**1.3**	**9.4**
American white pelican	0	0.37	0.08	0	0	0.5	0.7	0	0	2.6	0.6	0
sandhill crane	0	0	0.05	9.88	0	0	0.4	41.1	0	0	0.6	9.4
Waterfowl	**0.15**	**65.71**	**10.69**	**11.25**	**4.1**	**93.7**	**93.4**	**46.9**	**0.9**	**7.7**	**9.0**	**3.1**
Canada goose	0.15	0	0.23	0	4.1	0	2.0	0	0.9	0	1.3	0
greater white-fronted goose	0	65.71	2.13	0	0	93.7	18.6	0	0	7.7	3.8	0
snow goose	0	0	8.05	11.25	0	0	70.4	46.9	0	0	4.5	3.1
tundra swan	0	0	0.28	0	0	0	2.4	0	0	0	1.3	0
Diurnal Raptors	**0.40**	**0.73**	**0.15**	**0.53**	**10.7**	**1.0**	**1.3**	**2.2**	**26.5**	**41.0**	**12.2**	**31.2**
Accipiters	*0.08*	*0.31*	*0.04*	*0.16*	*2.1*	*0.4*	*0.3*	*0.7*	*6.0*	*25.6*	*3.2*	*12.5*
Cooper's hawk	0.03	0.08	0.02	0.09	0.9	0.1	0.2	0.4	3.4	7.7	1.9	9.4
northern goshawk	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
sharp-shinned hawk	0.03	0.22	0.02	0.06	0.9	0.3	0.2	0.3	2.6	20.5	1.3	6.2
unidentified accipiter	0	0.01	0	0	0	<0.1	0	0	0	1.3	0	0
Buteos	*0.29*	*0.35*	*0.07*	*0.28*	*7.7*	*0.5*	*0.6*	*1.2*	*21.4*	*26.9*	*7.1*	*21.9*
red-tailed hawk	0.27	0.35	0.07	0.28	7.3	0.5	0.6	1.2	19.7	26.9	7.1	21.9
rough-legged hawk	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
ferruginous hawk	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
Northern Harrier	*0*	*0.04*	*0.01*	*0.03*	*0*	*<0.1*	*0.1*	*0.1*	*0*	*3.8*	*1.3*	*3.1*
northern harrier	0	0.04	0.01	0.03	0	<0.1	0.1	0.1	0	3.8	1.3	3.1
Eagles	*<0.01*	*0*	*0.03*	*0.06*	*0.2*	*0*	*0.2*	*0.3*	*0.9*	*0*	*2.6*	*3.1*
bald eagle	<0.01	0	0.03	0.03	0.2	0	0.2	0.1	0.9	0	2.6	3.1
golden eagle	0	0	0	0.03	0	0	0	0.1	0	0	0	3.1
Falcons	*0*	*0.01*	*0*	*0*	*0*	*<0.1*	*0*	*0*	*0*	*1.3*	*0*	*0*
merlin	0	0.01	0	0	0	<0.1	0	0	0	1.3	0	0
Osprey	*0.03*	*0.01*	*0*	*0*	*0.7*	*<0.1*	*0*	*0*	*2.6*	*1.3*	*0*	*0*
osprey	0.03	0.01	0	0	0.7	<0.1	0	0	2.6	1.3	0	0
Other Raptors	*0*	*0.01*	*0*	*0*	*0*	*<0.1*	*0*	*0*	*0*	*1.3*	*0*	*0*
unidentified raptor	0	0.01	0	0	0	<0.1	0	0	0	1.3	0	0
Vultures	**2.40**	**1.90**	**<0.01**	**1.22**	**64.0**	**2.7**	**<0.1**	**5.1**	**64.1**	**44.9**	**0.6**	**31.2**
turkey vulture	2.40	1.90	<0.01	1.22	64.0	2.7	<0.1	5.1	64.1	44.9	0.6	31.2

Appendix B1. Mean large bird use (number of large birds/800-meter plot/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each large bird type and species by season during large bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

	Mean Use				% of Use				% Frequency			
Type/Species	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**
Upland Game Birds	**0.09**	**0**	**0**	**0.03**	**2.3**	**0**	**0**	**0.1**	**7.7**	**0**	**0**	**3.1**
mountain quail	0.09	0	0	0.03	2.3	0	0	0.1	7.7	0	0	3.1
Doves/Pigeons	**0.32**	**0.82**	**0.15**	**0.66**	**8.7**	**1.2**	**1.3**	**2.7**	**12.8**	**19.2**	**1.9**	**18.8**
band-tailed pigeon	0.32	0.82	0.15	0.66	8.7	1.2	1.3	2.7	12.8	19.2	1.9	18.8
Large Corvids	**0.31**	**0.58**	**0.31**	**0.44**	**8.2**	**0.8**	**2.7**	**1.8**	**15.4**	**23.1**	**21.8**	**18.8**
common raven	0.31	0.58	0.31	0.44	8.2	0.8	2.7	1.8	15.4	23.1	21.8	18.8
Goatsuckers	**0.08**	**0**	**0**	**0**	**2.1**	**0**	**0**	**0**	**3.4**	**0**	**0**	**0**
common nighthawk	0.08	0	0	0	2.1	0	0	0	3.4	0	0	0
Overall*	**3.75**	**70.10**	**11.44**	**24.00**	**100**	**100**	**100**	**100**				

* Sums may not total values shown due to rounding.

Appendix B2. Mean small bird use (number of small birds/100-meter plot/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each small bird type and species by season during small bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

	Mean Use				% of Use				% Frequency			
Type/Species	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**
Passerines	**4.50**	**7.08**	**2.33**	**4.53**	**93.1**	**93.9**	**93.1**	**92.9**	**91.5**	**80.8**	**64.7**	**75.0**
American robin	0.23	0.08	0.29	0	4.8	1	11.8	0	8.5	3.8	7.7	0
Bewick's wren	0.03	0.03	<0.01	0.03	0.7	0.3	0.3	0.6	3.4	2.6	0.6	3.1
black-headed grosbeak	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
black-tailed gnatcatcher	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
black-throated gray warbler	0.03	0	0	0	0.5	0	0	0	2.6	0	0	0
bushtit	0.37	0.14	0.02	0.16	7.6	1.9	0.8	3.2	2.6	2.6	0.6	3.1
California scrub-jay	0.02	0.37	0.02	0.06	0.4	4.9	0.8	1.3	1.7	9	1.3	6.2
California towhee	0.04	0	0	0	0.9	0	0	0	2.6	0	0	0
Cassin's finch	0	0.01	<0.01	0.22	0	0.2	0.3	4.5	0	1.3	0.6	6.2
Cassin's vireo	0.03	0	0	0	0.7	0	0	0	3.4	0	0	0
Clark's nutcracker	0.13	0	0	0	2.7	0	0	0	0.9	0	0	0
dark-eyed junco	0.52	0.38	0.18	0.16	10.8	5.1	7.2	3.2	29.1	11.5	9	12.5
dusky flycatcher	0.03	0.01	0	0	0.5	0.2	0	0	2.6	1.3	0	0
evening grosbeak	0.06	0.32	0	0	1.2	4.3	0	0	0.9	1.3	0	0
fox sparrow	0.09	0	<0.01	0.03	1.9	0	0.3	0.6	6.8	0	0.6	3.1
golden-crowned kinglet	<0.01	0.22	0.28	0.53	0.2	2.9	11	10.9	0.9	12.8	16	18.8
green-tailed towhee	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
hermit thrush	0.02	0.01	<0.01	0	0.4	0.2	0.3	0	0.9	1.3	0.6	0
Hutton's vireo	0.02	0	0.03	0.03	0.4	0	1	0.6	1.7	0	1.9	3.1
lazuli bunting	0.03	0	0	0	0.7	0	0	0	2.6	0	0	0
lesser goldfinch	0.04	0	0	0	0.9	0	0	0	1.7	0	0	0
mountain chickadee	0.38	0.31	0.51	0.56	7.8	4.1	20.5	11.5	23.9	16.7	25	34.4
Nashville warbler	0.03	0	0	0	0.7	0	0	0	0.9	0	0	0
oak titmouse	0	0.03	0.03	0	0	0.3	1.3	0	0	1.3	1.3	0
olive-sided flycatcher	0.05	0	0	0	1.1	0	0	0	5.1	0	0	0
purple finch	0.07	0.64	0.01	0.03	1.4	8.5	0.5	0.6	3.4	1.3	0.6	3.1
red-breasted nuthatch	0.27	0.22	0.21	0.28	5.7	2.9	8.2	5.8	23.1	21.8	17.3	25
red-winged blackbird	0	2.12	0	0	0	28.1	0	0	0	2.6	0	0
ruby-crowned kinglet	0	0.06	0.08	0.03	0	0.9	3.3	0.6	0	6.4	5.8	3.1
song sparrow	0	0	<0.01	0	0	0	0.3	0	0	0	0.6	0
spotted towhee	0.26	0.13	0.04	0.03	5.5	1.7	1.5	0.6	22.2	11.5	3.2	3.1
Steller's jay	0.35	0.46	0.29	0.22	7.2	6.1	11.5	4.5	26.5	37.2	22.4	18.8
Townsend's solitaire	0.03	0	0.02	0.03	0.5	0	0.8	0.6	2.6	0	0.6	3.1
unidentified passerine	0.05	0.01	0	0	1.1	0.2	0	0	2.6	1.3	0	0

Appendix B2. Mean small bird use (number of small birds/100-meter plot/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each small bird type and species by season during small bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

	Mean Use				% of Use				% Frequency			
Type/Species	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**
unidentified swallow	0.58	0.38	0	0	12	5.1	0	0	6.8	1.3	0	0
unidentified warbler	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
violet-green swallow	0	0.26	0	0.12	0	3.4	0	2.6	0	1.3	0	3.1
western bluebird	0.12	0.38	0.24	1.91	2.5	5.1	9.5	39.1	3.4	10.3	3.8	34.4
western tanager	0.15	0	0	0	3	0	0	0	12.8	0	0	0
western wood-pewee	0.09	0	0	0	1.9	0	0	0	9.4	0	0	0
white-crowned sparrow	0	0.01	0	0	0	0.2	0	0	0	1.3	0	0
wrentit	0.06	0.06	0.05	0.09	1.2	0.9	2.1	1.9	5.1	5.1	4.5	6.2
yellow warbler	0.03	0	0	0	0.5	0	0	0	2.6	0	0	0
yellow-rumped warbler	0.25	0.42	0	0	5.1	5.6	0	0	15.4	24.4	0	0
Swifts/Hummingbirds	**0.14**	**0.01**	**0.03**	**0.12**	**2.8**	**0.2**	**1.0**	**2.6**	**12.8**	**1.3**	**1.3**	**12.5**
Anna's hummingbird	0.08	0.01	0.03	0.06	1.6	0.2	1.0	1.3	7.7	1.3	1.3	6.2
rufous hummingbird	0	0	0	0.06	0	0	0	1.3	0	0	0	6.2
unidentified hummingbird	0.06	0	0	0	1.2	0	0	0	6.0	0	0	0
Woodpeckers	**0.20**	**0.45**	**0.15**	**0.22**	**4.1**	**6.0**	**5.9**	**4.5**	**12.8**	**30.8**	**12.8**	**18.8**
northern flicker	0.08	0.18	0.04	0.19	1.6	2.4	1.8	3.8	6.8	17.9	4.5	15.6
downy woodpecker	0.05	0.01	<0.01	0	1.1	0.2	0.3	0	3.4	1.3	0.6	0
hairy woodpecker	0.03	0.08	0.03	0.03	0.7	1.0	1.0	0.6	3.4	7.7	1.9	3.1
pileated woodpecker	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
Lewis's woodpecker	0	0.13	0	0	0	1.7	0	0	0	2.6	0	0
white-headed woodpecker	0.02	0.04	0.06	0	0.4	0.5	2.6	0	1.7	3.8	5.8	0
red-breasted sapsucker	<0.01	0.01	0	0	0.2	0.2	0	0	0.9	1.3	0	0
unidentified woodpecker	0	0	<0.01	0	0	0	0.3	0	0	0	0.6	0
Overall*	**4.84**	**7.54**	**2.50**	**4.88**	**100**	**100**	**100**	**100**				

* Sums may not total values shown due to rounding.

Appendix C. Mean Use by Point for All Birds, Major Bird Types, and Diurnal Raptor Subtypes during Fixed-Point Surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019

Appendix C1. Mean use (number of birds/800-meter plot/60-minute survey) by point for all large birds, major bird types, and diurnal raptor subtypes observed at the Fountain Wind Project during large bird surveys from 4 June 2018 – 31 March 2019.

Obs. Pt.	**Waterbirds**	**Waterfowl**	**Diurnal Raptors**	*Accipiters*	*Buteos*	*Northern Harrier*	*Eagles*	*Falcons*	*Osprey*	**Other Raptors**	**Vultures**	**Upland Game Birds**	**Doves/ Pigeons**	**Large Corvids**	**Goatsuckers**	**All Large Birds***
1	0	0	0.22	*0.11*	*0*	*0*	*0.11*	*0*	*0*	0	0.78	0	0.33	0.22	0	**1.56**
2	0	0	0.22	*0*	*0.22*	*0*	*0*	*0*	*0*	0	0.67	0	0	0.78	0	**1.67**
3	0	22.44	0.33	*0*	*0.22*	*0.11*	*0*	*0*	*0*	0	0.33	0	0	0	0	**23.11**
4	0	0	0.22	*0.11*	*0.11*	*0*	*0*	*0*	*0*	0	0.44	0	0.22	0.22	0.11	**1.22**
5	0	3.33	1.00	*0.56*	*0.33*	*0*	*0*	*0*	*0.11*	0	1.33	0	0.67	0.44	0	**6.78**
6	0	0	0.33	*0.11*	*0.22*	*0*	*0*	*0*	*0*	0	0.56	0	1.22	0.44	0	**2.56**
7	0	0	0.11	*0*	*0.11*	*0*	*0*	*0*	*0*	0	0.67	0	0	0.56	0	**1.33**
8	0	0	0.10	*0*	*0*	*0*	*0.10*	*0*	*0*	0	0.40	0	0.10	0	0	**0.60**
9	0	5.70	0.30	*0.10*	*0.20*	*0*	*0*	*0*	*0*	0	0.70	0	0.10	0.30	0	**7.10**
10	0	38.20	0.20	*0*	*0.20*	*0*	*0*	*0*	*0*	0	1.00	0	0	0.40	0	**39.80**
11	0	4.00	0.30	*0.10*	*0.20*	*0*	*0*	*0*	*0*	0	1.60	0	0.10	0.40	0.20	**6.60**
12	0	1.50	0.10	*0*	*0.10*	*0*	*0*	*0*	*0*	0	1.10	0	0	0.20	0	**2.90**
13	0	0	0.20	*0*	*0.20*	*0*	*0*	*0*	*0*	0	0.50	0.10	1.00	0.30	0	**2.10**
14	0	0	0.40	*0*	*0.40*	*0*	*0*	*0*	*0*	0	1.10	0	0	0.30	0	**1.80**
15	0	0	0.40	*0.20*	*0.10*	*0.10*	*0*	*0*	*0*	0	1.00	0	0.80	0.50	0	**2.70**
16	0	0	0.10	*0*	*0.10*	*0*	*0*	*0*	*0*	0	0.70	0.20	1.50	0.10	0	**2.60**
17	0	104.30	1.00	*0.60*	*0.40*	*0*	*0*	*0*	*0*	0	3.40	0	0	0.40	0	**109.10**
18	0	2.00	0.50	*0.20*	*0.30*	*0*	*0*	*0*	*0*	0	3.30	0.10	1.10	0.30	0	**7.30**
19	0	0	0.50	*0*	*0.50*	*0*	*0*	*0*	*0*	0	0.80	0	0	0	0	**1.30**
20	0	0	0.60	*0.10*	*0.30*	*0.10*	*0.10*	*0*	*0*	0	0.60	0.10	0.70	0.30	0	**2.30**
21	0	1.80	0.10	*0.10*	*0*	*0*	*0*	*0*	*0*	0	2.90	0.20	0.10	0.20	0.20	**5.50**
22	0	0	0.20	*0.10*	*0.10*	*0*	*0*	*0*	*0*	0	0.20	0	0	0	0	**0.40**
23	0	7.40	0	*0*	*0*	*0*	*0*	*0*	*0*	0	0.80	0	1.00	0.10	0	**9.30**
24	0	14.40	0.40	*0.30*	*0.10*	*0*	*0*	*0*	*0*	0	2.70	0	0.10	0.80	0	**18.40**
25	0.80	3.10	0.50	*0.10*	*0.20*	*0.10*	*0.10*	*0*	*0*	0	1.90	0	0	0.70	0	**7.00**
26	0	454.80	1.00	*0.60*	*0.40*	*0*	*0*	*0*	*0*	0	3.00	0	0	0.90	0	**459.70**
27	0	36.00	0.20	*0.10*	*0.10*	*0*	*0*	*0*	*0*	0	0.90	0	0.80	0.40	0	**38.30**
28	4.00	16.30	0.40	*0.10*	*0.10*	*0*	*0*	*0*	*0.20*	0	0.90	0	0	0.10	0	**21.70**
29	12.30	0	0.50	*0*	*0.30*	*0*	*0.20*	*0*	*0*	0	1.40	0	0.30	0.20	0	**14.70**
30	2.70	0	0.50	*0.20*	*0.30*	*0*	*0*	*0*	*0*	0	2.00	0.30	0.40	0.30	0	**6.20**
31	1.30	0.80	0.10	*0*	*0.10*	*0*	*0*	*0*	*0*	0	0.80	0	0.30	0.20	0	**3.50**
32	15.50	0	0.70	*0*	*0.70*	*0*	*0*	*0*	*0*	0	0.90	0	0.40	0.20	0	**17.70**

Appendix C1. Mean use (number of birds/800-meter plot/60-minute survey) by point for all large birds, major bird types, and diurnal raptor subtypes observed at the Fountain Wind Project during large bird surveys from 4 June 2018 – 31 March 2019.

Obs. Pt.	**Waterbirds**	**Waterfowl**	**Diurnal Raptors**	*Accipiters*	*Buteos*	*Northern Harrier*	*Eagles*	*Falcons*	*Osprey*	**Other Raptors**	**Vultures**	**Upland Game Birds**	**Doves/ Pigeons**	**Large Corvids**	**Goatsuckers**	**All Large Birds***
33	0	0	0.30	*0.10*	*0.20*	*0*	*0*	*0*	*0*	0	0.70	0	0	0.30	0.40	**1.70**
34	0	0	0.80	*0.30*	*0.40*	*0.10*	*0*	*0*	*0*	0	0.90	0	0.40	0.20	0	**2.30**
35	0	0	0	*0*	*0*	*0*	*0*	*0*	*0*	0	1.30	0	0.50	0.20	0	**2.00**
36	0	2.30	0.10	*0*	*0*	*0*	*0.10*	*0*	*0*	0	1.70	0.10	0.20	0.10	0	**4.50**
37	0	1.20	0.60	*0.10*	*0.30*	*0*	*0*	*0.10*	*0.10*	0	0.90	0	0.20	0.40	0	**3.30**
38	0	0	0.80	*0.10*	*0.60*	*0*	*0*	*0*	*0*	0.10	0.90	0	2.40	1.80	0	**5.90**
39	0	0	0.30	*0.10*	*0.10*	*0.10*	*0*	*0*	*0*	0	1.60	0	0	1.30	0	**3.20**

Obs. Pt. = observation point.

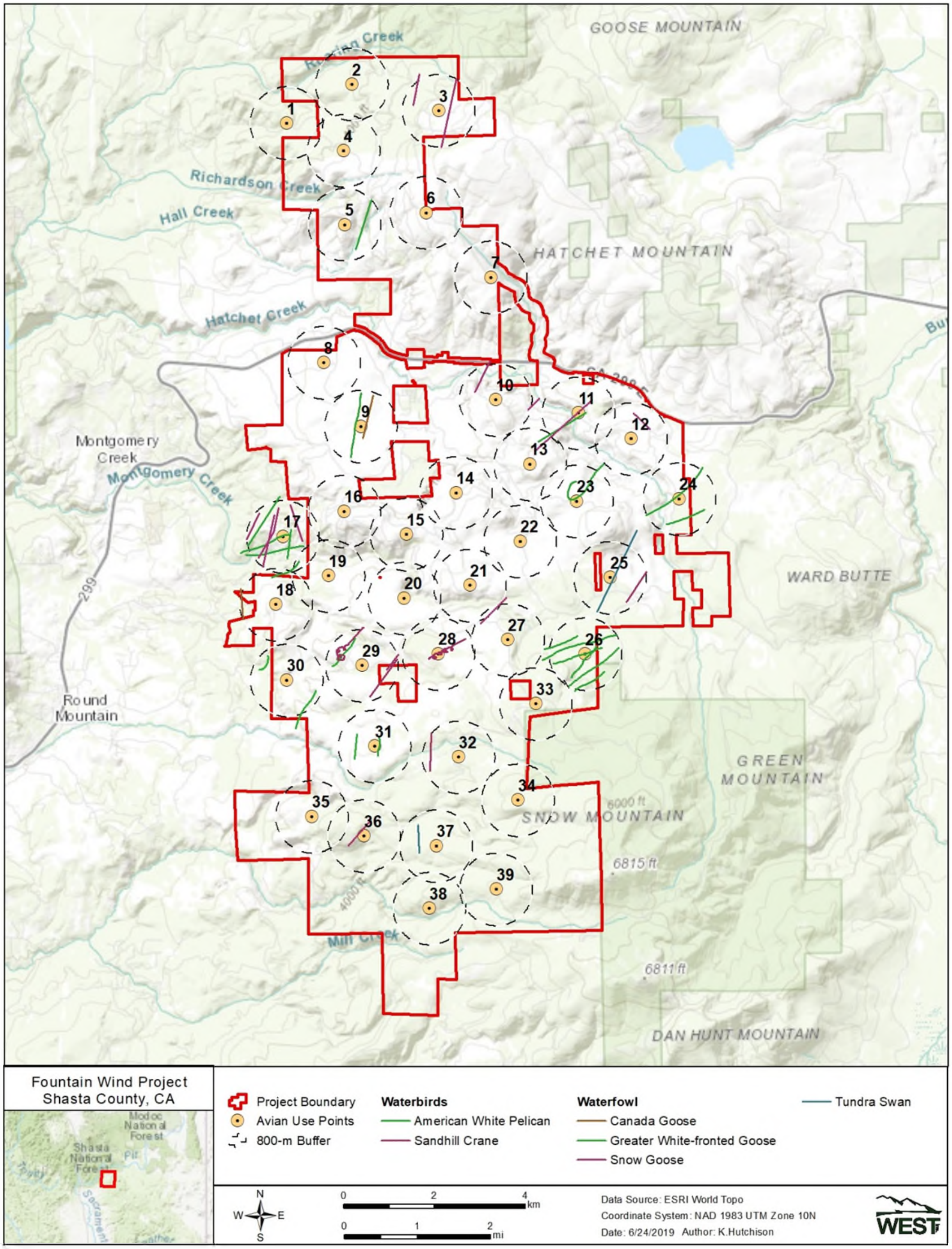
* Sums may not total values shown due to rounding.

Appendix C2. Mean use (number of birds/100-meter plot/10-minute survey) by point for all small birds and major small bird types observed at the Fountain Wind Project during small bird surveys from 4 June 2018 – 31 March 2019.

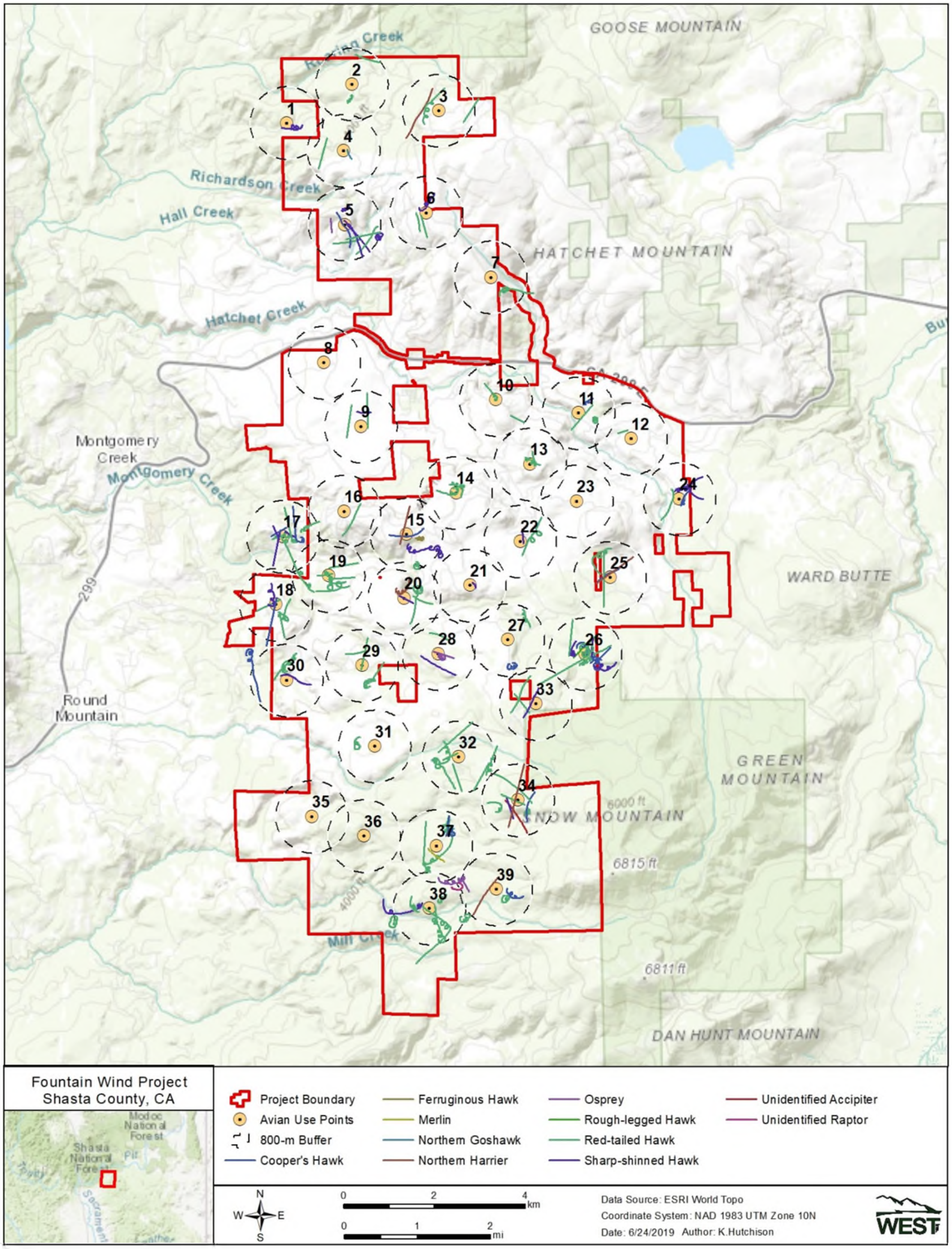
Observation Point	Passerines	Swifts/ Hummingbirds	Woodpeckers	All Small Birds*
1	3.89	0	0.11	**4.00**
2	2.56	0.11	0.22	**2.89**
3	6.33	0.22	0.56	**7.11**
4	8.56	0	0.67	**9.22**
5	7.56	0.44	0.56	**8.56**
6	2.00	0.22	0	**2.22**
7	2.44	0	0.11	**2.56**
8	2.20	0.10	0	**2.30**
9	4.40	0	0.10	**4.50**
10	6.00	0	0	**6.00**
11	3.90	0.20	0.30	**4.40**
12	2.60	0	0.20	**2.80**
13	2.60	0	0.20	**2.80**
14	2.20	0	0	**2.20**
15	1.40	0.10	0	**1.50**
16	3.20	0.10	0.20	**3.50**
17	8.00	0.30	0.30	**8.60**
18	3.00	0	0.20	**3.20**
19	3.10	0	0	**3.10**
20	4.80	0	0.10	**4.90**
21	3.40	0	0.30	**3.70**
22	1.60	0	0	**1.60**
23	3.00	0	0.20	**3.20**
24	5.60	0	0.10	**5.70**
25	3.10	0.10	0.20	**3.40**
26	7.30	0	0.30	**7.60**
27	3.50	0	0.70	**4.20**
28	5.50	0	0.30	**5.80**
29	1.30	0.10	0.30	**1.70**
30	2.70	0.30	0.60	**3.60**
31	2.80	0.10	0.30	**3.20**
32	19.70	0	0.30	**20.00**
33	2.80	0	0.30	**3.10**
34	1.10	0	0.10	**1.20**
35	4.40	0.10	0.40	**4.90**
36	5.20	0	0.30	**5.50**
37	3.90	0	0.50	**4.40**
38	2.50	0	0	**2.50**
39	1.90	0.10	0	**2.00**

* Sums may not total values shown due to rounding.

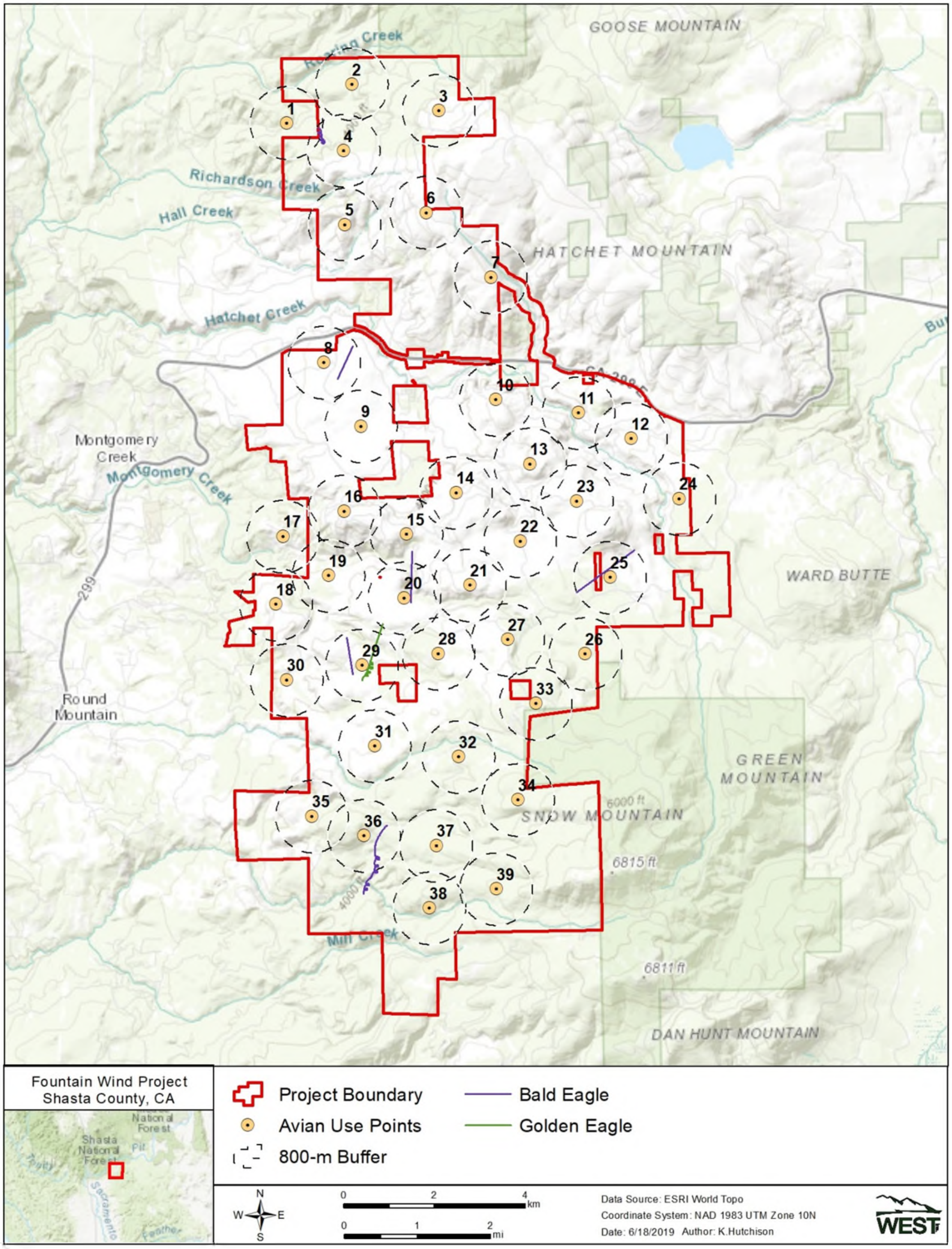
Appendix D. Flight Paths of Waterbirds, Waterfowl, Diurnal Raptors (Non-Eagle), and Eagles Recorded during Fixed-Point Avian Use Surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019



Appendix D1. Waterbird and waterfowl flight paths recorded during large bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.



Appendix D2. Diurnal raptor (non-eagle) flight paths recorded during large bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.



Appendix D3. Eagle flight paths recorded during large bird surveys at the Fountain Wind Project from 4 June 2018 – 31 March 2019.

C7. Year 1 Avian Use Study Report and Risk Assessment for the Fountain Wind Project

Year 1 Avian Use Study Report and Risk Assessment for the Fountain Wind Project

Shasta County, California

Prepared for:

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Prepared by:

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November 5, 2018

EXECUTIVE SUMMARY

In April 2017, Western EcoSystems Technology, Inc. (WEST) initiated an avian use study at the proposed Fountain Wind Project (Project) in Shasta County, California. The study was conducted following the tiered approach outlined in the US Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines and USFWS Eagle Conservation Plan Guidance (ECPG), and included the following principle objectives: 1) to assess the relative abundance and spatial and temporal distribution of birds throughout the Project area and 2) to evaluate the potential for adverse impacts to avian species, particularly eagles, other diurnal raptors, and species of regulatory or management concern. This report includes methods and results for the Year 1 avian use study at the Project, as well as an assessment of potential risk to avian species resulting from Project development.

Fixed-point avian use surveys were conducted at 39 observation points located throughout the Project area from 19 April 2017 through 22 May 2018. Two separate surveys were conducted at each point every month: a 10-minute (min) small bird survey followed immediately by a 60-min large bird survey. Over the course of the study, 531 large bird surveys were completed and a total of 3,267 large bird observations including 25 species were recorded. Large bird use was highest in winter, largely due to high use by waterfowl. Diurnal raptor use was highest during the fall (0.56 birds/plot/60-min survey) and lowest during summer (0.23). The most common raptor species observed in the Project was red-tailed hawk (148 observations), which composed 69% of overall diurnal raptor observations. This was followed by sharp-shinned hawk (18 observations), bald eagle (16 observations), and Cooper's hawk (nine observations). Diurnal raptors were observed at all 39 points with the highest use occurring at Point 30 (1.92 birds/60-min survey).

Over the course of the 531 small bird surveys conducted during the Year 1 study, a total of 2,408 small bird observations, comprising 71 separate species, were recorded. Six species (dark-eyed junco, mountain chickadee, western bluebird, red-breasted nuthatch, Steller's jay, and yellow-rumped warbler) accounted for nearly half (49.2%) of all small bird observations. The highest small bird use was recorded in fall (5.61 birds/plot/10-min survey), followed by summer (4.23), spring (3.56), and winter (2.79). Small bird use varied among the 39 observation points, with the highest use recorded at points 17 and 7 (8.77 and 7.14 birds/10-min survey, respectively), and the lowest use at points 39 and 15 (2.15 and 2.29).

During surveys or incidentally, 10 bird species considered sensitive at the state and/or federal level were recorded within the Project area. At the state level this included two state fully protected species (bald eagle and golden eagle), and six state species of special concern (American white pelican, northern goshawk, northern harrier, olive-sided flycatcher, Vaux's swift, and yellow warbler). Additionally, sandhill crane was recorded during surveys. Depending on the subspecies of sandhill crane observed, these were either state-threatened or state species of special concern; identification to subspecies level was not possible. Species considered sensitive at the federal level included four bird species of conservation concern in

the Sierra Nevada Bird Conservation Region (bald eagle, Cassin's finch, northern goshawk, and olive-sided flycatcher). Additionally, bald and golden eagles receive protection under the federal Bald and Golden Eagle Protection Act.

To date, overall fatality rates for birds at wind energy facilities in California and the Pacific Northwest have ranged from 0.16 to 17.44 fatalities/MW/year, while diurnal raptor fatality rates at these same facilities have ranged from zero to 1.06 fatalities/MW/year. However, the forested habitats covering the majority of the Project area are unique to wind energy facilities in the western US, which are more typically composed of desert scrub, grassland, and shrub-steppe vegetation communities, potentially limiting the inference from studies conducted at most other facilities. The one exception to this is the Hatchet Ridge Wind Energy Facility (Hatchet Ridge), located adjacent the Project and having similar ecological characteristics. Because of the proximity and similarity of Hatchet Ridge to the Project, Hatchet Ridge represents the most relevant source of information for assessing potential risk to avian species at the Project. The results of pre-construction avian use surveys conducted at Hatchet Ridge were largely consistent with those documented at the Project during this study, and based on post-construction monitoring data collected at Hatchet Ridge, all bird, small bird, and diurnal raptor fatality rates have all been low and within the range of other facilities in California and the Pacific Northwest. Given the similarity in species composition and temporal use patterns reported at Hatchet Ridge and observed at the Project, it is reasonable to expect that fatality rates and species composition of fatalities at the Project would be similar to that documented at Hatchet Ridge. Following recommendations presented in the ECPG, a second year of large bird/eagle use surveys is currently underway at the Project and because field studies were being conducted to gather a second year of large bird/eagle use data, Pacific Wind opted to capitalize on the efficiency of being in the field and is also completing a second year of small bird use surveys. An updated risk assessment will be prepared following the completion of the second year of surveys, in early summer 2019. The updated risk assessment will focus on risk to bald and golden eagles, as well as any inter-annual variations in species composition or use documented during the Year 2 surveys that may influence perceived risk to avian species at the Project.

STUDY PARTICIPANTS

Western EcoSystems Technology, Inc.

Quentin Hays	Project Manager
Joel Thompson	Senior Manager
Andrea Chatfield	Report Compiler
Karl Kosciuch	Report Reviewer
Erik Jansen	Report Reviewer
Guy DiDonato	Statistician
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Kori Hutchison	Field Coordinator
Pamela Bullard	Field Technician
Emily Culhane	Field Technician
David Garza	Field Technician

REPORT REFERENCE

J. Thompson, A. Chatfield, and Q. Hays. 2018. Year 1 Avian Use Study Report and Risk Assessment for the Fountain Wind Project, Shasta County, California. Prepared for Pacific Wind Development LLC, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. October 2018.

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INTRODUCTION

In 2016, Pacific Wind Development, LLC contracted Western EcoSystems Technology, Inc. (WEST) to conduct an avian use study at the proposed Fountain Wind Project (Project) to evaluate the potential impacts of Project construction and operation on birds. Agency guidelines regarding the study of wildlife and how to assess potential impacts of wind energy on wildlife have evolved over the past 10 years, with the most current guidance from the USFWS provided in the Land-based Wind Energy Guidelines (WEG; USFWS 2012) and Eagle Conservation Plan Guidance (ECPG; USFWS 2013). The study was designed to address the questions posed under Tier 3 of the WEG (USFWS 2012) and Stage 2 of the ECPG (USFWS 2013), while also collecting data comparable to those recommended in the more dated California Wind Energy Guidelines (CEC Guidelines; CEC and CDFG 2007). Similar to the WEG, the CEC Guidelines identify modified point counts surveys (i.e., bird use counts) as the primary survey technique to collect data on bird species composition, relative abundance, and bird behavior that might influence vulnerability to collisions with wind turbines (see top of page 44 of the CEC/CDFG Guidelines). Recommendations in the WEG, ECPG, and CEC Guidelines all result in data sufficient to document species composition, relative abundance, and behavior; therefore, to reconcile the slightly differing protocols as presented in the various guidelines, implementation of the more current ECPG (and WEG) were given precedent over strict interpretation of the CEC Guidelines.

The primary objectives of the study were to: 1) assess the relative abundance and spatial and temporal distribution of birds throughout the Project area and 2) evaluate the potential for adverse impacts to avian species, particularly eagles, other diurnal raptors, and species of regulatory or management concern. This document provides the results of fixed-point avian use surveys conducted at the Project from April 2017 to May 2018, which represents the first 13 months (Year 1) of the two-year study. In addition to a detailed description of survey methodology and results, this document presents an assessment of potential risk to avian species at the Project based on the Year 1 survey results.

STUDY AREA

The Project area includes approximately 32,000 acres (ac; 12,950 hectares [ha]) within Shasta County in northern California, northeast of the community of Redding (Figure 1). The Project is located within the Cascades Ecological Region (ecoregion; Griffith et al. 2016), which is a Level III Ecoregion primarily covering parts of Oregon and Washington but also including a discontinuous land area near Mount Shasta in California. This ecoregion is marked by a generally mesic, temperate climate which supports productive coniferous forests. At higher elevations, subalpine meadows provide habitat for unique flora and fauna. The land cover types within the Project area are predominantly coniferous forest (54.7%) and shrub/scrub (38.3%), with the shrub/scrub mostly comprising recently harvested stands of coniferous forest that have been replanted with conifer trees but also have a high shrub component (Figure 2, Table 1). Small areas of mixed montane chaparral and herbaceous vegetation (i.e., grassland) are scattered throughout the Project area (Figure 2, Table 1). Wetlands occur within the Project area primarily as riverine habitats, with much smaller areas of wet montane meadow and open water (Figure 2, Table 1). Remaining land cover within the Project is composed of very small areas of barren land, mixed forest, developed areas, and cultivated cropland (Table 1, Figure 2).

Table 1. Land cover types within the Fountain Wind Project area according to National Land Cover Data (US Geological Survey [USGS] National Land Cover Database [NLCD] 2011, Homer et al. 2015).

Land Cover	Acres	% Composition
Coniferous Forest	17,786.16	54.7
Shrub/Scrub	12,430.51	38.3
Herbaceous	1,516.25	4.7
Deciduous Forest	344.15	1.1
Barren Land	205.18	0.6
Mixed Forest	95.09	0.3
Developed, Open Space	74.90	0.2
Emergent Herbaceous Wetlands	21.26	0.1
Developed, Low Intensity	8.13	<0.01
Cultivated Crops	5.71	<0.01
Total	**32,487.34**	**100**

Dominant overstory species within the Project area include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*). A number of permanent and intermittent streams run throughout the Project area, flowing primarily to the west and northwest. The primary drainages in the north are Hatchet Creek and Montgomery Creek (north and south forks), while Cedar Creek and Little Cow Creek drain the southern portions of the Project area. Riparian vegetation along these creeks includes various willow species (*Salix* spp.), thinleaf alder (*Alnus incana* ssp. *tenuifolia*), several species of maple (*Acer* spp.), mountain dogwood (*Cornus nuttallii*), and California hazel (*Corylus cornuta* var. *californica*).

The Project area is entirely privately owned and actively managed for commercial timber production. In 1992 the Fountain Fire burned approximately 64,000 ac (25,900 ha) in and around the Project, including an area encompassing the north-central half of the Project area. Post-fire management included salvage logging, site preparation, and planting in the year following the fire. As of 2018, the burned portion of the Project area comprises mostly contiguous stands of roughly 25-30 year old timber. As a result of the Fountain Fire, merchantable timber is primarily confined to the southern half of the Project area, where ongoing harvest operations are regularly occurring (Figure 3). Given that the Project area is privately owned and managed for timber production, current and future commercial timber operations will continue to alter the landscape within the Project area, with older forests being harvested and replanted with conifer seedlings that eventually transition from a shrub-scrub cover type to densely treed early- seral forests over the following 10-20 years. As timber management changes the landscape within the Project area, bird communities will also change spatially within the Project area.

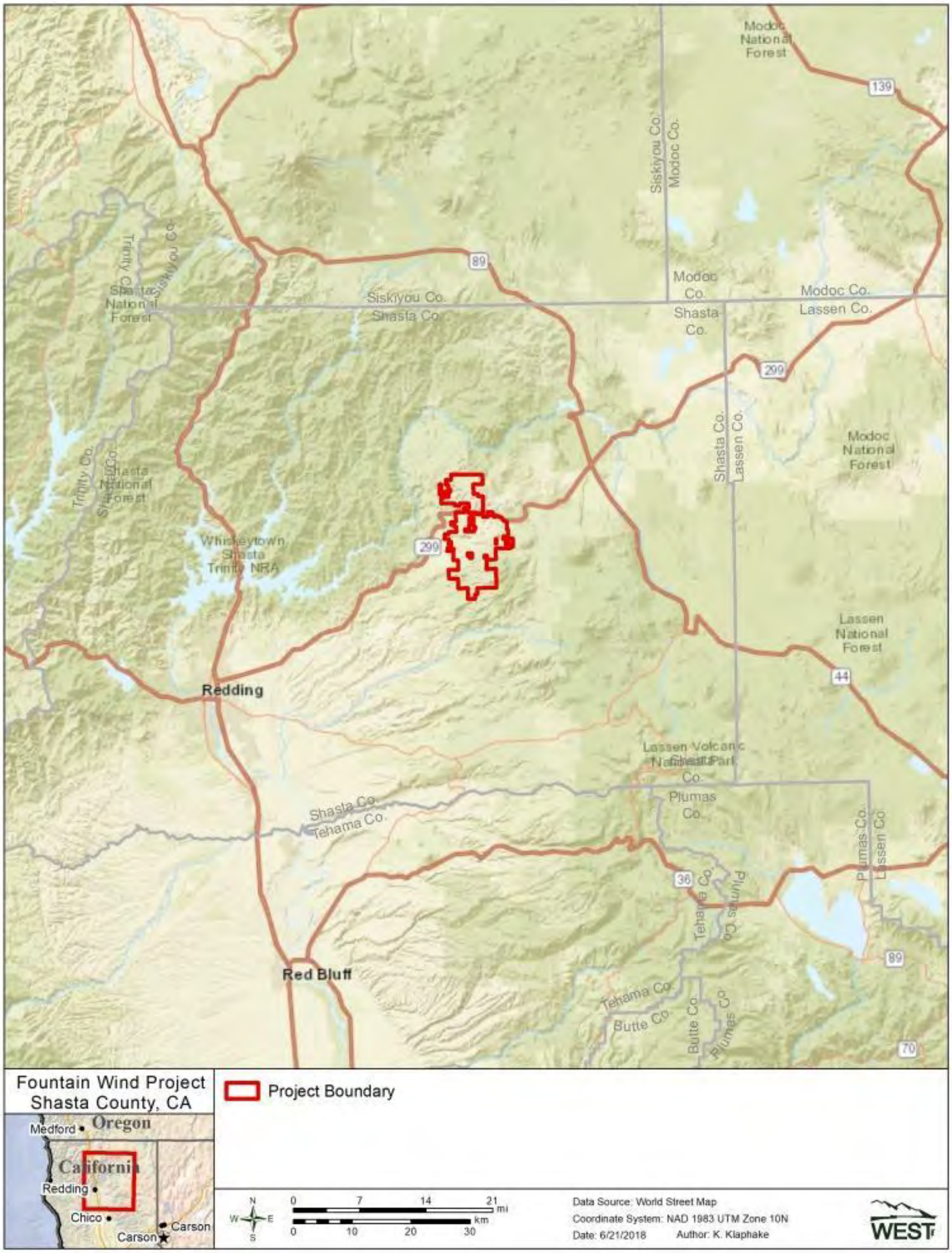

Figure 1. Location of the Fountain Wind Project, Shasta County, California

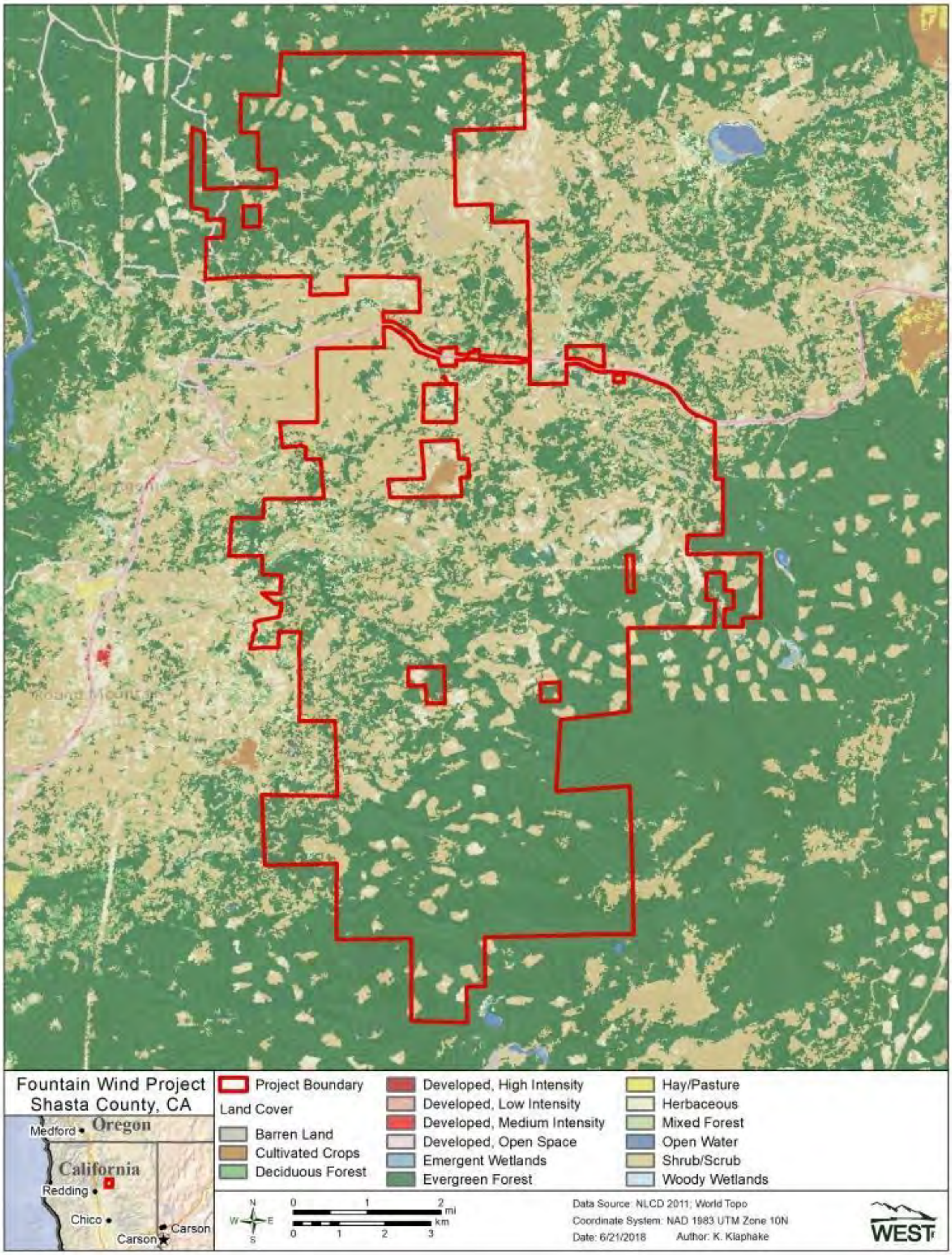

Figure 2. The land cover types and coverages within the Fountain Wind Project, Shasta County, California (US Geological Survey National Land Cover Database 2011, Homer et al. 2015).

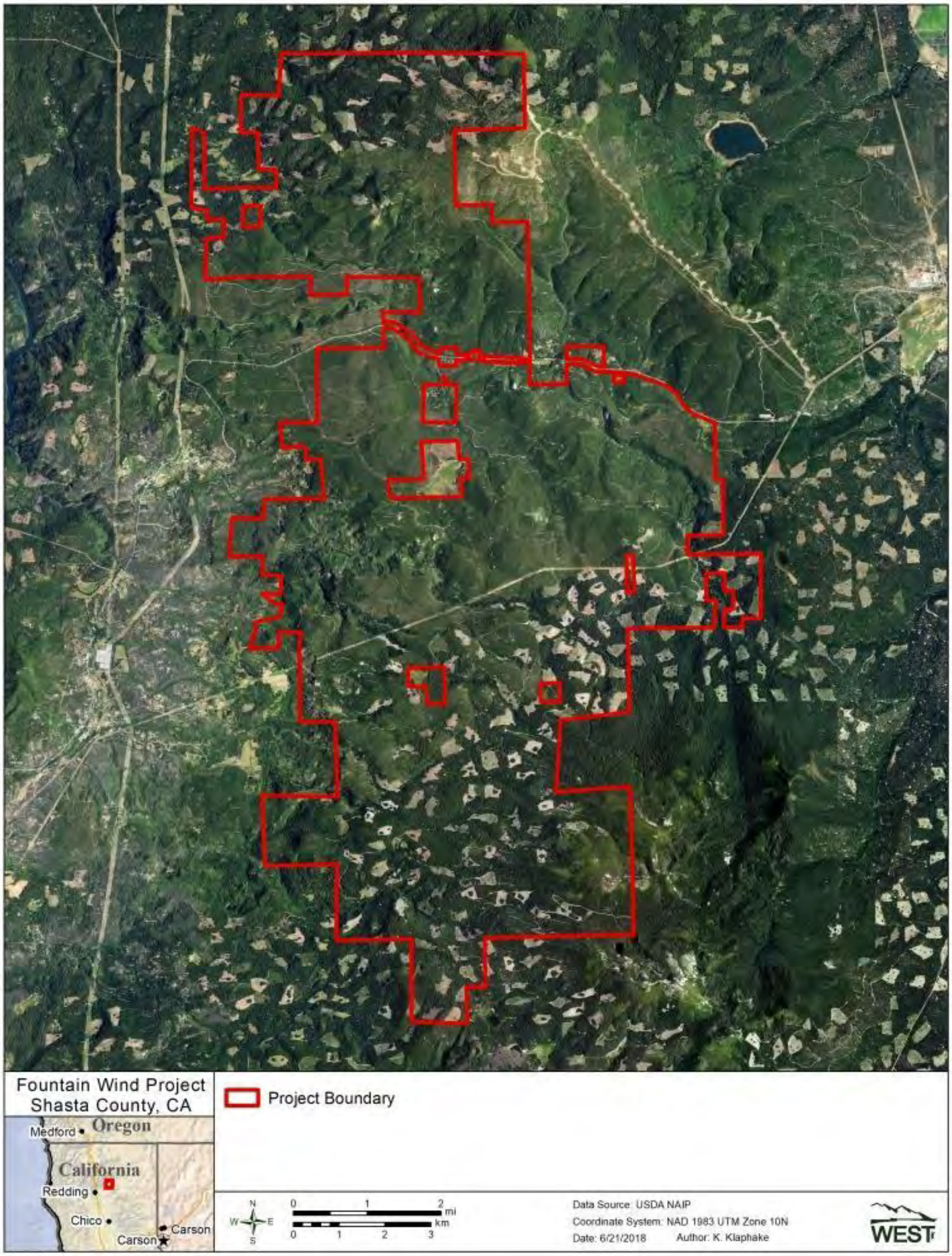

Figure 3. Aerial imagery of the Fountain Wind Project, Shasta County, California.

METHODS

Point-count surveys are the most widely used methodology for pre-construction avian use characterization and risk analyses (e.g., USFWS “Tier 3” studies [USFWS 2012]) because of their effectiveness and efficiency for characterizing use of selected sites by a broad spectrum of diurnally active birds (Ralph et al. 1993, Strickland et al. 2011). Fixed-point avian use surveys for both large and small birds were conducted using the field methods described by Reynolds et al. (1980). Survey methodologies were generally comparable to those used at other wind energy sites in California and the Pacific Northwest and were consistent with methods and survey effort recommended in the WEG and ECPG (USFWS 2012, 2013), as well as the CEC Guidelines (CEC and CDFG 2007). Separate surveys were conducted for large and small birds.

Large Bird Surveys

The primary objective of the large bird surveys was to estimate the seasonal and spatial use of the Project area by large birds, with an emphasis on eagles and other diurnal raptors (e.g., *Accipiter* spp., *Buteo* spp.).

Survey Plots

Thirty-nine observation points were located throughout the Project area with each observation point centered in an 800-meter (m; 2,625-foot [ft]) radius survey plot (Figure 4). Plots were selected for viewshed and to survey representative habitats and topography within the Project area, while meeting ECPG spatial sampling recommendations of at least 30% survey coverage of areas within 1.0 kilometer (km; 1.6 miles [mi]) of proposed turbine locations (USFWS 2013).

Field Methods

The survey duration at each point was 60 minutes (min), during which time only large birds were recorded. Large birds were defined as waterbirds, waterfowl, shorebirds, diurnal raptors, vultures, upland game birds, doves and pigeons, and large corvids (e.g., magpies, crows, and ravens). While all large birds, regardless of distance from the observer, were recorded during each survey, only birds within the 800-m radius plot were used for quantitative analysis and other comparative metrics.

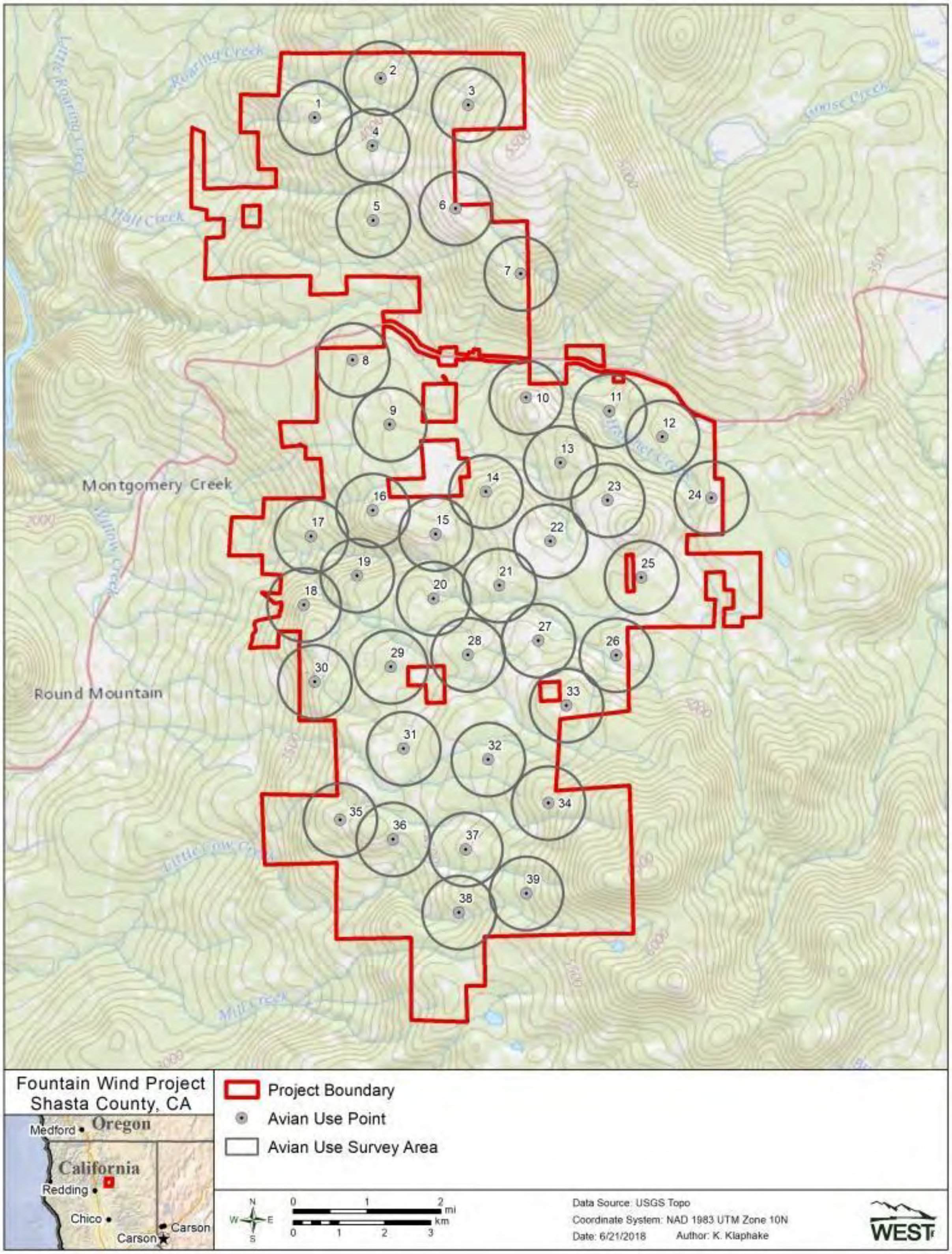

Figure 4. Location of survey plots used during fixed-point avian use surveys at the Fountain Wind Project, Shasta County, California.

Date, start and end time of the survey period, and weather information (e.g., temperature, wind speed and direction, cloud cover) were recorded for each survey. Every bird group observed during a survey was recorded and identified by a unique observation number. Information collected for each observation included: species or best possible identification, number of individuals, sex and age class (if possible), distance from plot center when first observed, closest distance, height above ground level (AGL), activity (behavior), and habitat(s). Bird behavior and habitat type were recorded based on the point of first observation. Approximate flight height AGL and distance from plot center at first observation were recorded to the nearest 5-m (16-ft) interval. Other information collected included whether or not the observation was auditory only, as well as the 10-min interval of the survey during which the detection first occurred. Topographic inset maps centered on each observation point were used to more accurately estimate flight height, distance from observer, and map flight paths during large bird observations. Additionally, data were collected following ECPG methodology to record eagle risk minutes, including minute by minute flight height AGL, distance from observer, and behavioral data for the entirety of each eagle observation (USFWS 2013).

Locations of all diurnal raptors observed during surveys were recorded on field maps. Flight paths and perch locations were digitized using ArcGIS 10.0; comments were recorded in the comments section of the data sheet.

Observation Schedule

Sampling intensity was designed to document large bird use and behavior by habitat and season within the Project area. Large bird surveys were conducted approximately once per month at each of the 39 observation points, with approximately 9-10 points surveyed each week of the study period. Seasons were defined as spring (March 1 – May 16), summer (May 17 – August 31), fall (September 1 – November 30), and winter (December 1 – February 28). Surveys were carried out during daylight hours and survey periods were varied to approximately cover all daylight hours during a season. To the extent practical, each point was surveyed roughly the same number of times. During each survey round, to the extent practicable, the order in which points were surveyed was randomized to ensure surveys occurred during different times of day among visits.

Small Bird Surveys

In addition to the large bird surveys described above, surveys were conducted to document the spatial and temporal use of the Project area by small birds. The ECPG recommends conducting surveys of this sort separately from eagle/large bird use surveys in order to increase detection probability and avoid observer distraction (USFWS 2013). Assessment of small bird use of the Project area is important as it may allow detection of previously unknown occurrence of sensitive species, identification of high use periods (e.g., migration windows, breeding seasons), or specific sites within the larger Project area that may be particularly important to small birds (e.g., reproductive habitats, stopover sites).

Survey Plots

Small bird surveys were conducted at the same 39 observation points used for the large bird surveys described above (Figure 4). Survey plots for small bird surveys consisted of a 100-m (328-ft) radius circle centered on the observation point.

Field Methods

The survey duration at each point was 10 min, during which time only small birds (e.g., cuckoos, hummingbirds, swifts, woodpeckers, and passerines) were recorded. Only small birds observed within the 100-m radius plot were used for quantitative analysis and other comparative metrics.

The date, start and end time of the survey period, and weather information (e.g., temperature, wind speed and direction, and cloud cover) were recorded for each survey. Every bird group (i.e., one or more individuals) recorded during a survey was recorded and identified by a unique observation number. Information collected for each observation included: species or best possible identification, number of individuals, sex and age class (if identifiable), distance from plot center when first observed, closest distance, activity (behavior), habitat(s), and whether or not the observation was auditory only. Bird behavior and habitat type were recorded based on the point of first observation. Approximate flight height and distance from plot center at first observation were recorded to the nearest 5-m (16-ft) interval.

Observation Schedule

As with the large bird surveys, small bird surveys were conducted at each of the 39 points approximately once per month with 9-10 points surveyed each week during the study period. The 10-min small bird surveys were conducted immediately prior to the 60-min large bird surveys to maximize efficiency.

Incidental Observations

Incidental wildlife observations provide records of wildlife seen outside of the standardized surveys. All diurnal raptors, unusual or unique birds, sensitive species, large mammals, reptiles, and amphibians were recorded in a similar fashion to standardized surveys. Observation number, date, time, species, number of individuals, sex/age class, distance from observer, activity, height above ground (for bird species) and habitat were recorded. The location of any sensitive species observed was recorded by Universal Transverse Mercator coordinates using a hand-held Global Positioning System unit.

Data Management

A Microsoft® ACCESS or SQL Server database was developed to store, organize, and retrieve survey data. Data were keyed into the electronic database using a pre-defined protocol to facilitate subsequent quality assurance and quality control (QA/QC) and data analyses. All data forms, field notebooks (if provided), and electronic data files were retained for reference.

At all stages of the study, including in the field, during data entry and analysis, and report writing, QA/QC measures were utilized. Following surveys, observers were responsible for inspecting data forms for completeness, accuracy, and legibility. Potentially erroneous data were identified using a series of database queries. Irregular codes or data suspected as being questionable were discussed with the observer and/or project manager. Errors, omissions, or problems identified in later stages of analysis were traced back to the raw data forms, and appropriate changes in all steps were made.

Statistical Analysis

For analytical purposes, a visit was defined as the required length of time, in days, to survey all of the plots within the Project once, as possible given logistical constraints (i.e., site conditions may have prevented access to certain points during a particular visit). Visits were assigned according to the following criteria: 1) a single visit had to be completed in a single season, and 2) a visit could be spread across multiple dates, but a single date could not contain surveys from multiple visits. Under certain circumstances, such as extreme weather conditions or access issues, plots were not surveyed during some visits. In these cases, a visit might not have constituted a survey of all plots.

Species Composition and Species Richness

The total number of species observed was calculated by season and overall for both large and small bird surveys. Species lists (with the number of observations and the number of groups) were generated by season and included all observations of birds detected. In some cases, the tally may represent repeated sightings of the same individual. For example, a sum of 20 observations of red-tailed hawk (*Buteo jamaicensis*) may be 20 separate birds, or may be one bird observed on 20 separate visits. Species richness by season was calculated by averaging the total number of species observed within each plot (800 m for large birds and 100-m for small birds) during a visit, then averaging across plots within each visit, followed by averaging across visits within the season. Overall species richness was calculated as an average of seasonal values weighted by the number of days in each season. Species richness was compared among seasons for both large and small birds.

Bird Use, Percent of Use, and Frequency of Occurrence

Estimates of bird use were calculated as the number of observations per plot per survey (i.e., number of large birds per 800-m plot per 60-min survey and number of small birds per 100-m plot per 10-min survey). These standardized estimates of bird use were used to compare differences among bird types, seasons, survey points, and other studies where similar methods were used. Mean use by season was calculated by summing the total number of birds seen within each plot during a visit, then averaging across plots within each visit, followed by averaging across visits within the season. Overall bird use was calculated as an average of seasonal values weighted by the number of calendar days in each season (as defined by the season dates). Percent of use was calculated as the proportion of large bird use that was attributable to a particular bird type or species, and frequency of occurrence was calculated as the percent of surveys in which a particular bird type or species was observed.

Bird Flight Height and Behavior

Bird flight was used to calculate the percentage of birds observed flying within rotor-swept heights (RSH) that encompass the full range of turbines with potential to be used at the Project. A RSH for potential collision with a turbine blade of 30-200 m (98-656 ft) AGL was used, which is a conservative estimate that covers the RSH of the smallest and largest turbines that may be used at the Project. The flight height recorded during the initial observation was used to calculate the percentage of birds flying within the RSH and mean flight height. The percentage of birds flying within the RSH at any time was calculated using the lowest and highest flight height recorded.

Spatial Use

Spatial use was evaluated by comparing large bird and small bird use among plots. In addition, flight paths for eagles and other diurnal raptors were mapped to qualitatively assess spatial use of the Project, including in relation to study area characteristics (e.g., topographic features). The objective of mapping locations and flight paths was to identify areas of concentrated use by diurnal raptors and other large birds, and/or consistent flight patterns within the Project.

Eagle Risk Minutes

Eagle risk minutes are defined as the number of minutes (rounded to the next highest integer) an eagle is observed flying within 800-m of the observer at or below 200 m (656 ft) AGL during the survey period (USFWS 2013). For example, a 30-second observation is rounded to one minute and an observation of one minute 10 seconds is rounded to two minutes. Eagle risk minutes were tallied for bald eagles and golden eagles separately by season. These data are provided for use in future eagle risk analyses, as appropriate and applicable once the second year of eagle use surveys has been completed.

Risk Assessment

The risk assessment uses the results of the Year 1 avian use surveys to evaluate the potential for impacts to birds from the construction and operation of the Project. The intent of the risk assessment is not to predict the number of fatalities, but rather to provide a contextual risk assessment based on the pre-construction avian use data collected at the Project to date. To assess the potential risk to birds at the Project, information on spatial and temporal patterns of bird use, abundance, and species composition collected during surveys was reviewed in the context of existing publicly available data from post-construction fatality studies at wind energy facilities in the California and Pacific Northwest regions of the US. These wind energy facilities exhibit a wide range of topographical and vegetative characteristics, and avian assemblages, which likely contribute to the wide range of fatality rates documented. The forested habitats that cover the majority of the Project are atypical of wind energy facilities in the western US which are more commonly composed of desert scrub, grassland, and shrub-steppe vegetation communities, potentially limiting the inference from other projects. Among wind energy facilities in California and the Pacific Northwest with publicly available mortality data, only the Hatchet Ridge Wind Energy Facility (Hatchet Ridge) is located in proximity to the Project and has similar forested habitats and mountainous terrain. As such, Hatchet Ridge likely provides the most relevant source of information for forecasting risk to birds at the proposed Project. While general trends in avian mortality at wind energy facilities throughout North America and the Western US, including the species and species groups most impacted, were considered, the risk assessment relies most heavily on the results of the post-construction fatality monitoring conducted at Hatchet Ridge from 2010-2013 (Tetra Tech 2014). Additionally, the results of pre-construction avian use data collected at Hatchet Ridge in 2006-2007 (Young et al. 2007a) were compared to the results of the Year 1 avian use surveys conducted at the Project in order to identify similarities or differences in avian species composition, use, and abundance that may influence relative risk to species or species groups at the two sites.

RESULTS

Avian use surveys were conducted at the Project from 19 April 2017 through 22 May 2018. Survey results for large bird and small bird surveys are summarized in separate sections below, supplemented by appendices that present species-level detail on numbers of bird groups and observations observed during each season (Appendix A), species-level detail on seasonal use statistics (Appendix B), use by observation point for large and small bird types (Appendix C), and mapped flight paths for diurnal raptor species (Appendix D).

Large Bird Surveys

A total of 531 60-min fixed-point large bird surveys were conducted at the Project over the course of 14 visits (Table 2).

Table 1. Summary of large bird species richness (species/800-meter plot/60-minute survey) and sample size by season and overall during large bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Season	Number of Visits	Number of Surveys Conducted	Number of Species	Large Bird Species Richness
Spring	3	102	18	1.19
Summer	5	195	12	0.91
Fall	3	117	17	0.96
Winter	3	117	11	0.59
Overall	**14**	**531**	**25**	**0.90**

Species Richness and Species Composition

During 60-min large bird surveys, a total of 3,267 observations were recorded among 864 separate groups, regardless of distance from the observer (Appendix A1). This included observation of 25 separate species: 18 in spring, 17 in fall, 12 in summer, and 11 in winter (Table 2). Large bird species richness (mean number of species per plot per survey) was highest during spring (1.19), followed by fall (0.96), summer (0.91), and winter (0.59; Table 2).

Among the large bird types, waterfowl (2,063 observations in 25 groups) accounted for 63.1% of large bird observations during the study period (Appendix A1). Most waterfowl observations were of snow geese (*Chen caerulescens*) recorded in fall and winter (582 and 702 observations, respectively; Appendix A1). Other large bird types observed during surveys included vultures (587 observations), large corvids (228 observations), diurnal raptors (216 observations), waterbirds (144 observations), doves/pigeons (27 observations), upland game birds (nine observations), and owls (two observations; Appendix A1).

Eleven diurnal raptor species were recorded during large bird surveys; the most common were red-tailed hawk (148 observations), sharp-shinned hawk (*Accipiter striatus*; 18 observations), bald eagle (*Haliaeetus leucocephalus;* 16 observations), and Cooper's hawk (*A. cooperii*; nine observations; Appendix A1). The number of diurnal raptor observations was similar across seasons, ranging from 49 observations in summer to 65 observations in fall (Appendix A1). Bald eagles were recorded during all four seasons, with the majority (nine of 16 observations) recorded in winter. Only one bald eagle was observed in summer. Two golden eagles (*Aquila chrysaetos*) were observed during surveys, both in spring (Appendix A1).

Bird Use, Percent of Use, and Frequency of Occurrence

Mean large bird use (birds/800-m plot/60-min survey), percent of use, and frequency of occurrence were calculated by season for all large bird types (Table 3) and species (Appendix B1). The highest overall large bird use occurred during winter (9.74), followed by fall (8.38), spring (4.17), and summer (3.39; Table 3).

<u>Waterbirds</u>

Waterbird use, comprising two species, American white pelican (*Pelecanus erythrorhynchos*) and sandhill crane (*Antigone canadensis*), was highest in winter (0.78), followed by fall (0.28), and spring (0.17). No waterbird use was recorded in summer (Table 3; Appendix B1). Waterbirds accounted for 8.0% of overall large bird use in winter, but only 4.1% in spring and 3.4% in fall. Waterbirds were recorded during 4.3% of winter surveys and 0.9% of both spring and fall surveys (Table 3).

<u>Waterfowl</u>

Waterfowl use was considerably higher in winter and fall (8.02 and 6.53, respectively), than during spring and summer (1.38 and 1.03, respectively; Table 3). Five species of waterfowl were recorded during surveys, with snow goose accounting for the majority of use in winter and fall (6.00 and 4.97, respectively), greater white-fronted goose (*Anser albifrons*) accounting for nearly all spring use (1.37), and unidentified goose composing all summer use (1.03; Appendix B1). Waterfowl accounted for 82.4% of overall large bird use in winter, 78.0% in fall, 33.0% in spring, and 30.2% in summer. Waterfowl were observed most frequently during winter (8.5% of winter surveys) and were rarely observed during summer (0.5% of summer surveys; Table 3).

<u>Diurnal Raptors</u>

Diurnal raptor use was highest during fall (0.56), followed by spring (0.46), winter (0.44), and summer (0.23; Table 3). Eleven diurnal raptor species were recorded during surveys; however, red-tailed hawk had the highest use of any diurnal raptor species during all four seasons (0.18 to 0.33), accounting for between 55.4% and 78.3% of seasonal diurnal raptor use (Appendix

B1). Among other diurnal raptor species, sharp-shinned hawk had relatively higher use in fall (0.13) and bald eagle had relatively higher use in winter (0.08; Appendix B1). Bald eagle use during other seasons ranged from <0.01 in summer to 0.03 in fall. Golden eagle use was recorded only during spring (0.02; Appendix B1). All other diurnal raptor species recorded during surveys had use estimates of 0.03 or less in any given season (Appendix B1).

Diurnal raptors accounted for 11.0% of overall large bird use in the spring, 6.8% in summer, 6.6% in fall, and 4.5% in winter (Table 3). Diurnal raptors were observed more frequently during fall and spring (32.5% and 31.2% of surveys, respectively) than during summer and winter (17.4% and 17.9% of surveys, respectively; Table 3).

Owls

Use by owls was recorded only during spring and was attributed to two species: great horned owl (*Bubo virginianus*) and northern pygmy-owl (*Glaucidium gnoma*), each with a use of <0.01 (Table 3, Appendix B1). Owls accounted for only 0.4% of overall large bird use in spring and were observed during 1.7% of spring surveys (Table 3).

Vultures

Use by vultures (i.e., turkey vultures [*Cathartes aura*]), was highest in summer and spring (1.82 and 1.39, respectively), and lower in fall and winter (0.41 and 0.13, respectively; Table 3, Appendix B1). Vultures accounted for over half (53.5%) of overall large bird use during summer, but only 1.3% of overall large bird use in winter. Vultures were observed during 54.4% of summer surveys, 45.6% of spring surveys, 22.2% of fall surveys, and 6.8% of winter surveys (Table 3).

Upland Game Birds

Mountain quail (*Oreortyx pictus*) was the only upland game bird species observed during surveys (Appendix B1). Use by this species was greatest in spring (0.04), followed by summer (0.02), and fall (<0.01); no upland game bird use was recorded in winter (Table 3). Upland game birds accounted for 1.0% of overall large bird use in spring, 0.5% in summer, and 0.1% in fall, and were recorded during less than 4.0% of surveys during each season (Table 3).

Doves/Pigeons

Band-tailed pigeon (*Patagioenas fasciata*) was the only dove/pigeon species recorded during surveys (Appendix B1). Use by this species was highest in summer (0.11), followed by spring (0.04), and fall (<0.01); no doves/pigeons were recorded in winter (Table 3). Doves/pigeons accounted for 3.2% of overall large bird use in summer, 1.0% in spring, and 0.1% in fall, and were recorded during less than 3.0% of survey during each season (Table 3).

Table 3. Mean large bird use (number of birds/800-meter plot/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each bird type and diurnal raptor subtype by season during large bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Type	Mean Use				Percent of Use				Percent Frequency			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
Waterbirds	0.17	0	0.28	0.78	4.1	0	3.4	8.0	0.9	0	0.9	4.3
Waterfowl	1.38	1.03	6.53	8.02	33.0	30.2	78.0	82.4	2.6	0.5	5.1	8.5
Diurnal Raptors	0.46	0.23	0.56	0.44	11.0	6.8	6.6	4.5	31.2	17.4	32.5	17.9
Accipiters	0.07	0.02	0.16	<0.01	1.6	0.6	1.9	<0.1	6.0	2.1	12.0	0.9
Buteos	0.31	0.18	0.32	0.33	7.4	5.4	3.9	3.4	22.1	15.4	20.5	12.0
Northern Harrier	<0.01	0	0.02	<0.01	0.2	0	0.2	<0.1	0.9	0	1.7	0.9
Eagles	0.03	<0.01	0.03	0.08	0.8	0.2	0.4	0.8	2.6	0.5	3.4	6.8
Falcons	0.02	0.01	0.02	0	0.5	0.3	0.2	0	2.2	1.0	1.7	0
Other Raptors	0.02	0.01	0	<0.01	0.4	0.3	0	<0.1	1.7	1.0	0	0.9
Owls	0.02	0	0	0	0.4	0	0	0	1.7	0	0	0
Vultures	1.39	1.82	0.41	0.13	33.4	53.5	4.9	1.3	45.6	54.4	22.2	6.8
Upland Game Birds	0.04	0.02	<0.01	0	1.0	0.5	0.1	0	3.4	1.5	0.9	0
Doves/Pigeons	0.04	0.11	<0.01	0	1.0	3.2	0.1	0	1.7	2.1	0.9	0
Large Corvids	0.67	0.20	0.58	0.38	16.0	5.9	6.9	3.9	27.6	12.8	23.1	16.2
Overall	**4.17**	**3.39**	**8.38**	**9.74**	**100**	**100**	**100**	**100**	**-**	**-**	**-**	**-**

Large Corvids

Large corvid use was highest in spring (0.67), followed by fall (0.58), winter (0.38), and summer (0.20; Table 3). Nearly all large corvid use was attributed to common raven (*Corvus corax*), with the exception of a single American crow (*Corvus brachyrhynchos*) recorded in summer (Appendix A1). Large corvids accounted for 16.0% of overall large bird use in spring, but only between 3.9% and 6.9% in other seasons. Large corvids were recorded during 12.3% to 27.6% of surveys during each season (Table 3).

Flight Height Characteristics

Flight height characteristics, based on initial flight height observations and estimated use, were calculated for large bird types and raptor subtypes (Table 4). During 60-min large bird surveys, 790 groups of large birds were observed flying within the 800-m plots, totaling 3,184 observations. Overall, 24.2% of flying large birds were recorded within the RSH for turbine blades of 30-200 m AGL, 71.7% were above the RSH, and 4.1% were flying below the RSH (Table 4). The large bird type most often recorded flying with the RSH was large corvids (76.2%; Table 4). Over half (63.4%) of all diurnal raptor observations were recorded flying within the RSH, with 27.8% recorded above the RSH, and 8.8% recorded below (Table 4). Among diurnal raptor subtypes, northern harriers (*Circus cyaneus*) and eagles were most often observed flying within the RSH (100% and 83.3%, respectively; Table 4). The majority of waterbirds and waterfowl were recorded above the RSH (78.5% and 97.1%, respectively; Table 4).

Table 4. Flight height characteristics by bird type and raptor subtype during large bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Type	# Groups Flying	# Obs Flying	Mean Flight Height (m)	% Obs Flying	% within Flight Height Categories		
					0 - 30 m	30 - 200 m*	> 200 m
Waterbirds	10	144	284.00	100	0	21.5	78.5
Waterfowl	24	2060	408.96	99.9	0	2.9	97.1
Diurnal Raptors	186	194	171.58	91.5	8.8	63.4	27.8
Accipiters	*31*	*31*	*150.84*	*96.9*	*19.4*	*61.3*	*19.4*
Buteos	*124*	*132*	*187.98*	*89.8*	*4.5*	*62.1*	*33.3*
Northern Harrier	*4*	*4*	*107.50*	*100*	*0*	*100*	*0*
Eagles	*18*	*18*	*128.33*	*100*	*5.6*	*83.3*	*11.1*
Falcons	*6*	*6*	*22.83*	*100*	*66.7*	*33.3*	*0*
Other Raptors	3	3	350.00	60.0	0	33.3	66.7
Owls	0	0	0	0	0	0	0
Vultures	447	568	143.92	100	11.4	69.5	19
Upland Game Birds	0	0	0	0	0	0	0
Doves/Pigeons	8	25	40.62	92.6	48	52	0
Large Corvids	115	193	91.29	84.6	19.2	76.2	4.7
Overall	**790**	**3,184**	**151.55**	**97.9**	**4.1**	**24.2**	**71.7**

*The likely "rotor-swept height" for potential collision with a turbine blade, or 30-200 meters (m; 98-656 feet) above ground level (AGL).

Spatial Use

Mean use by point for all large birds, major large bird types, and diurnal raptor subtypes is included in Appendix C1). For all large bird species combined, use (birds/800-m plot/60-min survey) was substantially higher at points 3 and 18 (44.14 and 37.62, respectively; Appendix C1). Use at these two points was dominated by waterfowl, which accounted for 96.7% and 93.9% of large bird use at these points, respectively. Overall large bird use at other points varied widely, ranging from 0.43 (birds/800-m plot/60-min survey) at Point 10 to 17.69 (birds/800-m plot/60-min survey) at Point 17 (Appendix C1). Diurnal raptor use was generally more consistent across observation points, ranging from 0.07 at Point 23 to 1.92 at Point 30 (Appendix C1). The higher diurnal raptor use at Point 30 was largely attributed to use by red-tailed hawk (see Appendix D1). Eagle use was recorded at 13 points with use estimates ranging from 0.07 to 0.23 (Appendix C1).

Diurnal raptor use was spread across the Project with no obvious areas of concentrated use or consistent flight patterns evident, with the exception of observation Point 30, which had a larger number of mapped red-tailed hawk flight paths (Appendix D1). Point 30 is adjacent to a large incised drainage where the landscape transitions from forest to shrub/scrub, and offers ideal habitat for soaring birds. Eagle activity was generally low and was recorded across the Project with no clear spatial use patterns evident (Appendix D2).

Eagle Risk Minutes

Sixteen bald eagle observations and two golden eagle observations were recorded within the Project area during 531 hours of large bird use survey effort (Tables 5a and 5b). Bald eagles were observed in flight for a total of 47 min, with 27 of those min recorded during winter, 10 in the fall, six in spring, and four in summer (Table 5a). Of the 47 bald eagle minutes recorded during the study, 35 eagle risk minutes were recorded within the 800-m plots at flight heights of 200 m or less AGL (Table 5a). The majority (68.6%) of bald eagle risk minutes were recorded in winter, with no bald eagle risk minutes recorded in spring (Table 5a). Bald eagle risk minutes per minute of survey were highest during winter (0.2051), followed by fall (0.0684), and summer (0.0154; Table 5a). Golden eagles were observed in flight for a total of four min, all of which were recorded in spring (Table 5a). For golden eagles, all four minutes of flight were within 800-m plots at flight heights of 200 m or less AGL (Table 5a).

Bald eagle risk minutes were recorded at 12 of the 39 observation points (points 1, 4, 7, 8, 12, 18, 19, 24, 26, 27, 35, and 39; Table 6b). The observation point with the greatest number of bald eagle risk minutes was Point 7 (six risk min), with points 18, 19, and 35 contributing an additional four risk minutes each (Table 5b). All four golden eagle risk minutes were recorded at Point 35 (Table 5b).

Table 5a. Bald eagle and golden eagle observations and risk minutes* (min) documented during 60-minute large bird surveys conducted at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Season	Survey Effort (Hours)	Observations	Flight Min.	Risk Min.	Risk Min. per Min. Survey
		Bald Eagle			
Spring (03/01 – 05/16)	102	2	6	0	0
Summer (05/17 – 08/31)	195	1	4	3	0.0154
Fall (09/01 – 11/30)	117	4	10	8	0.0684
Winter (12/01 – 02/28)	117	9	27	24	0.2051
Total	**531**	**16**	**47**	**35**	**0.0659**
		Golden Eagle			
Spring (03/01 – 05/16)	102	2	4	4	0.0392
Summer (05/17 – 08/31)	195	0	0	0	0
Fall (09/01 – 11/30)	117	0	0	0	0
Winter (12/01 – 02/28)	117	0	0	0	0
Total	**531**	**2**	**4**	**4**	**0.0075**

* Risk minutes are defined as flying behavior at or below 200 meters (m; 656 feet [ft]) and within 800 m (2,625 ft) of the survey location.

Table 5b. Bald eagle (BAEA) and golden eagle (GOEA) observations (obs) and risk minutes* (min) by survey location documented during 60-minute large bird surveys conducted at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Survey Location	Survey Effort (Hours)	BAEA Obs	BAEA Risk Min.	GOEA Obs	GOEA Risk Min.
1	14	1	2	0	0
2	14	0	0	0	0
3	14	0	0	0	0
4	14	1	3	0	0
5	14	0	0	0	0
6	14	0	0	0	0
7	14	2	6	0	0
8	14	1	1	0	0
9	14	0	0	0	0
10	14	0	0	0	0
11	14	0	0	0	0
12	14	1	1	0	0
13	14	0	0	0	0
14	14	0	0	0	0
15	14	0	0	0	0
16	14	0	0	0	0
17	13	0	0	0	0
18	13	3	4	0	0
19	13	1	4	0	0
20	13	1	0	0	0
21	14	0	0	0	0
22	14	0	0	0	0
23	14	0	0	0	0
24	14	1	2	0	0
25	14	0	0	0	0
26	14	1	2	0	0
27	14	1	3	0	0
28	13	0	0	0	0

Table 5b. Bald eagle (BAEA) and golden eagle (GOEA) observations (obs) and risk minutes* (min) by survey location documented during 60-minute large bird surveys conducted at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Survey Location	Survey Effort (Hours)	BAEA Obs	BAEA Risk Min.	GOEA Obs	GOEA Risk Min.
29	14	0	0	0	0
30	13	0	0	0	0
31	13	0	0	0	0
32	13	0	0	0	0
33	13	0	0	0	0
34	13	0	0	0	0
35	13	1	4	2	4
36	13	0	0	0	0
37	13	0	0	0	0
38	13	0	0	0	0
39	13	1	3	0	0
Total	**531**	**16**	**35**	**2**	**4**

* Risk minutes are defined as flying behavior at or below 200 meters (m; 656 feet [ft]) and within 800 m (2,625 ft) of the survey location.

Small Bird Surveys

A total of 531 10-min fixed-point small bird surveys were completed at the Project during 14 visits for a total of 88.5 hours of small bird survey effort (Table 6).

Table 6. Summary of small bird species richness (species/100-meter plot/10-minute survey), and sample size by season and overall during small bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Season	Number of Visits	Number of Surveys Conducted	Number of Species	Small Bird Species Richness
Spring	3	102	33	2.19
Summer	5	195	56	2.85
Fall	3	117	37	2.24
Winter	3	117	25	1.07
Overall	**14**	**531**	**71**	**2.12**

Species Richness and Species Composition

During 10-min small bird surveys, 2,408 small bird observations were recorded within 1,475 separate groups comprising 71 species (Table 6, Appendix A2). Small bird species richness was highest during summer (2.85 species/plot/survey), followed by fall (2.24), spring (2.19), and winter (1.07; Table 6). Most (90.4%) small birds recorded were passerines (2,177 observations in 1,289 groups), with the majority of these observations comprising dark-eyed junco (*Junco hyemalis*; 303 observations), mountain chickadee (*Poecile gambeli*; 245 observations), and western bluebird (*Sialia mexicana*; 209 observations; Appendix A2). Other small bird types recorded included woodpeckers (170 observations) and swifts/hummingbirds (59 observations; Appendix A2).

Bird Use, Percent of Use, and Frequency of Occurrence

Mean small bird use (birds/100-m plot/10-min survey), percent of use, and frequency of occurrence were calculated by season for all small bird species (Appendix B2). The highest small bird use was recorded in fall (5.61), followed by summer (4.23), spring (3.56), and winter (2.79).

Passerines

Use by passerines was highest during the fall (5.21), followed by summer (3.93), spring (2.92), and winter (2.59; Appendix B2). In fall and winter, western bluebird had the highest use by any passerine species (0.78 and 0.67, respectively), while dark-eyed junco had the highest use in spring and summer (0.47 and 0.72, respectively; Appendix B2). Passerines accounted for between 82.0% and 93.1% of small bird use during each season, and were observed during 89.7% of summer surveys, 81.7% of spring surveys, 80.3% of fall surveys, and 59.0% of winter surveys (Appendix B2).

Swifts/Hummingbirds

Use by swifts/hummingbirds was highest in spring (0.34), followed by winter (0.07), fall (0.03), and summer (0.02; Appendix B2). Swifts/hummingbirds composed 9.6% of overall small bird use in spring, and consisted primarily of use by Vaux's swift (*Chaetura vauxi*) during this season (0.30; Appendix B2). Swift/hummingbird use during other seasons represented between 0.4% and 2.5% of overall small bird use (Appendix B2). The only other identified swift/hummingbird species recorded during surveys were Anna's hummingbird (*Calypte anna*) and rufous hummingbird (*Selasphorus rufus*; Appendix B2).

Woodpeckers

Use by woodpeckers was highest in fall (0.37), followed by summer (0.28), spring (0.27), and winter (0.13; Appendix B2). Northern flicker (*Colaptes auratus*) had the highest use of any woodpecker species in fall (0.19), summer (0.16), and spring (0.13), while white-headed woodpecker (*Picoides albolarvatus*) had the highest use in winter (0.05; Appendix B2). Woodpeckers accounted for between 4.6% and 7.6% of overall small bird use in any given season. Woodpeckers were recorded during 26.5% of fall surveys, 22.1% of summer surveys, 20.6% of spring surveys, and 9.4% of winter surveys (Appendix B2).

Bird Flight Height and Behavior

During 10-min small bird surveys, 431 groups (1,091 observations) were recorded flying within the 100-m radius survey plots (Table 7). Of these, 28.9% were observed flying at heights within the estimated RSH (Table 7). The majority (70.9%) of small birds were recorded flying below the RSH, and only 0.2% were recorded above the RSH (Table 7). The small bird type most often observed flying within the RSH was swift/hummingbird (70.6%; Table 7).

Table 7. Flight height characteristics by bird type during small bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Type	# Groups Flying	# Obs Flying	Mean Flight Height (m)	% Obs. Flying	% within Flight Height Categories 0 - 30 m	30 - 200 m*	> 200 m
Passerines	367	989	12.39	49.5	72.2	27.6	0.2
Swifts/Hummingbirds	16	51	10.69	92.7	29.4	70.6	0
Woodpeckers	48	51	14.15	36.4	88.2	11.8	0
Overall	**431**	**1,091**	**12.52**	**49.7**	70.9	28.9	0.2

*The likely “rotor-swept height” for potential collision with a turbine blade, or 30-200 meters (m; 98-656 feet) above ground level.

Spatial Use

Small bird use varied among the 39 observation points. The highest small bird use was recorded at points 17 and 7 (8.77 and 7.14, respectively), while the lowest use was observed at points 39 and 15 (2.15 and 2.29, respectively; Appendix C2).

Incidental Observations

Eleven bird species and three mammal species were recorded incidentally during the study (Table 8). Of the 11 bird species recorded incidentally, only one species, sooty grouse (*Dendragapus fuliginosus*; one observation), was not also observed during standardized fixed-point surveys (Appendices A1 and A2). Evidence of gray wolf (*Canis lupus*) presence was also documented via tracks observed in February 2018 along a snow-covered road between avian survey points 22 and 26, in the east-central portion of the Project area. Gray wolves have been seen or heard by WEST staff and no other evidence of wolves has been documented during studies conducted to date.

Table 8. Summary of number of groups (grps) and observations (obs) of incidental wildlife observed while conducting surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Species	Scientific Name	# grps	# obs
sandhill crane	*Antigone canadensis*	1	12
bald eagle	*Haliaeetus leucocephalus*	1	1
northern goshawk	*Accipiter gentilis*	2	2
red-shouldered hawk	*Buteo lineatus*	1	1
red-tailed hawk	*Buteo jamaicensis*	8	8
sharp-shinned hawk	*Accipiter striatus*	5	5
great horned owl	*Bubo virginianus*	1	1
turkey vulture	*Cathartes aura*	4	4
sooty grouse	*Dendragapus fuliginosus*	1	1
band-tailed pigeon	*Patagioenas fasciata*	1	11
pileated woodpecker	*Dryocopus pileatus*	1	1
Bird Total	**11 Species**	**27**	**47**
bobcat	*Lynx rufus*	1	1
fisher	*Martes pennanti*	1	1
gray wolf (tracks only)*	*Canis lupus*	1	1
Mammal Total	**3 Species**	**3**	**3**

* Tracks consistent with size and gait of a single wolf documented in snow.

Sensitive Species Observations

A total of 10 bird species considered sensitive at the state and/or federal level were recorded during fixed-point avian use surveys or incidentally during the study (Table 9). At the state level, this included two state fully-protected species (bald eagle and golden eagle), and six state species of special concern (SSC; American white pelican, northern goshawk [*Accipiter gentilis*], northern harrier, olive-sided flycatcher [*Contopus cooperi*], Vaux's swift, and yellow warbler [*Setophaga petechia*]; Table 9). Additionally, sandhill crane was recorded during surveys and incidentally; however, these observations were not identified to the subspecies level. The two subspecies potentially occurring at the Project include *Antigone canadensis tabida*, a state threatened species, and *A. c. candadensis*, a state species of special concern (Table 9). Evidence of two sensitive mammal species was also recorded incidentally within the Project are during the study, visual observation of a single fisher (*Pekania pennanti*), which is considered a species of special concern in California, and tracks of a single wolf, which is listed as endangered at both the state and federal level (Table 9).

At the federal level, four species recorded during surveys are considered federal birds of conservation concern in the Sierra Nevada Bird Conservation Region (bald eagle, Cassin's finch [*Haemorhous cassinii*], northern goshawk, and olive-sided flycatcher; USFWS 2008). In addition, bald and golden eagles receive protection under the federal Bald and Golden Eagle Protection Act (1940).

Table 9. Summary of sensitive species observed at the Fountain Wind Project during large bird surveys (LB), small bird surveys (SB), and as incidental wildlife observations from 19 April 2017 to 22 May 2018.

			LB		SB		Inc.		Total	
Species	**Scientific Name**	**Status***	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
American white pelican	*Pelecanus erythrorhynchos*	SSC	2	28	0	0	0	0	2	28
bald eagle	*Haliaeetus leucocephalus*	EA; BCC; FP	16	16	0	0	1	1	17	17
Cassin’s finch	*Haemorhous cassinii*	BCC	0	0	2	2	0	0	2	2
golden eagle	*Aquila chrysaetos*	EA; FP	2	2	0	0	0	0	2	2
northern goshawk	*Accipiter gentilis*	BCC; SSC	3	3	0	0	2	2	5	5
northern harrier	*Circus cyaneus*	SSC	4	4	0	0	0	0	4	4
olive-sided flycatcher	*Contopus cooperi*	BCC; SSC	0	0	5	5	0	0	5	5
sandhill crane	*Antigone canadensis*	ST/SSC**	8	116	0	0	1	12	9	128
Vaux's swift	*Chaetura vauxi*	SSC	0	0	1	35	0	0	1	35
yellow warbler	*Setophaga petechia*	SSC	0	0	30	35	0	0	30	35
fisher	*Martes pennanti*	SSC	0	0	0	0	1	1	1	1
gray wolf	*Canis lupus*	SE, FE								
Total	**11 Species**		**35**	**169**	**38**	**77**	**5**	**16**	**78**	**262**

*EA = Bald and Golden Eagle Protection Act (BGEPA 1940), BCC = federal bird of conservation concern (USFWS 2008), ST = state threatened; SE = state endangered, FP = state fully protected; SSC = state species of special concern (CDFW 2018), FE = federally endangered.

**Observations of sandhill crane were not identified to subspecies level; greater sandhill crane (*A. c. tabida*) is a state-threatened species, while lesser sandhill crane (*A. c. canadensis*) is a state species of special concern.

Grps = groups, obs = observations

DISCUSSION AND RISK ASSESSMENT

Over the first 13 months of the two-year avian use study at the Project, approximately 620 hours of avian use surveys were completed and 5,675 bird observations comprising 96 separate species were recorded. Overall, large bird use varied substantially across the Project area; however, most of this variability was the result of large groups of waterfowl observed passing over the Project area, particularly at observation points 3 and 18 (Figure 4; Appendix C1). Most (97.1%) of these waterfowl observations were flying at heights well above the RSH of proposed turbines and not at risk of collision. Use by diurnal raptors was more consistent across observation points, with the exception of observation Point 30 which had a larger number of mapped red-tailed hawk flight paths (see Appendix D1). Point 30 is adjacent to a large incised drainage where the landscape transitions from forest to shrub/scrub, and offers ideal habitat for soaring birds. Eagle activity was generally low and was recorded across the Project area with no clear spatial use patterns evident (see Appendix D2); however, higher eagle use was recorded during winter suggesting temporal patterns in eagle use may exist. Large bird use was approximately twice as high in fall and winter than in summer and spring, and was again primarily the result of relatively few but relatively large (compared to other species observed during surveys) groups of waterfowl (up to about 250 individuals) passing over the Project area in fall and winter. Alternatively, diurnal raptor use was similar across seasons, while vulture use was substantially higher in summer and spring than during other seasons. Small bird use was relatively consistent across the Project area and across seasons with no clear concentration of use at any one observation point or season.

Although this document provides results for all bird species observed during surveys, the following discussion and risk assessment focuses on a smaller group of species, namely waterfowl, vultures, diurnal raptors, and passerines. The risk assessment was limited to these four bird types because: 1) they exhibited relatively higher seasonal or year-round use of the Project area than the other bird types documented during the Year 1 surveys, 2) they contained species that are considered sensitive at the state or federal level, and/or 3) they have shown susceptibility to the potentially adverse impact of wind energy development. In addition, potential impacts to state or federal species of conservation or regulatory concern documented during the surveys are addressed separately for individual species.

Potential Direct Impacts to Birds

Project construction could affect birds directly through loss of habitat or fatalities from construction equipment. Impacts from decommissioning of the facility are anticipated to be similar to construction in terms of noise, disturbance, and equipment used. Potential mortality from construction equipment is expected to be low, as equipment used in wind energy facility construction generally moves at slow rates or is stationary for long periods (e.g., cranes). The highest risk of direct mortality to birds during construction or decommissioning is most likely the potential destruction of nests during initial site clearing, although this risk can be minimized through best management practices that include use of existing roads or previously cleared lands during the construction phase (USFWS 2012). The most probable direct impact to birds at wind energy facilities is mortality resulting from collisions with turbines (Strickland et al. 2011, Marques et al. 2014). Collisions may occur with resident birds foraging and flying within the Project area, or with migrant birds seasonally moving through the Project area (Ferrer et al. 2012, Erickson et al. 2014, Watson et al. 2018, Welcker et al. 2018). Because collision with turbines is likely the primary direct impact to birds at the Project, publicly available information from post-construction fatality monitoring studies at regional wind energy facilities was used to evaluate the potential for avian fatalities at the Project in the context of the species composition and abundance documented during the Year 1 avian use surveys.

Avian Mortality at Regional Wind Energy Facilities

To date, overall fatality rates for birds at wind energy facilities in California and the Pacific Northwest with publicly available data have been variable, ranging from 0.16 to 17.44 birds/MW/year (Figure 5, Appendix E). These facilities are geographically dispersed throughout the western US and exhibit a wide range of ecological characteristics, potentially limiting the strength of inference from these facilities. The only wind energy facility in the western US with habitats and topography similar to the Project is Hatchet Ridge, located less than 3.2 km (2.0 mi) northeast of the Project. At Hatchet Ridge, direct impacts to birds have been low relative to other facilities in the western US. During three years of post-construction fatality monitoring conducted at Hatchet Ridge from 2011-2013, annual all bird fatality rates ranged from 0.84-2.50 birds/MW/year (Tetra Tech 2014). Given the Project's proximity to Hatchet Ridge and similar habitats and mountainous terrain, it is anticipated that overall direct impacts to avian species at the Project would be similar to those documented at Hatchet Ridge. Mortality information for several focal bird types (waterfowl, vultures, diurnal raptors, and passerines), based on data from local and regional wind energy facilities, is presented in greater detail below.

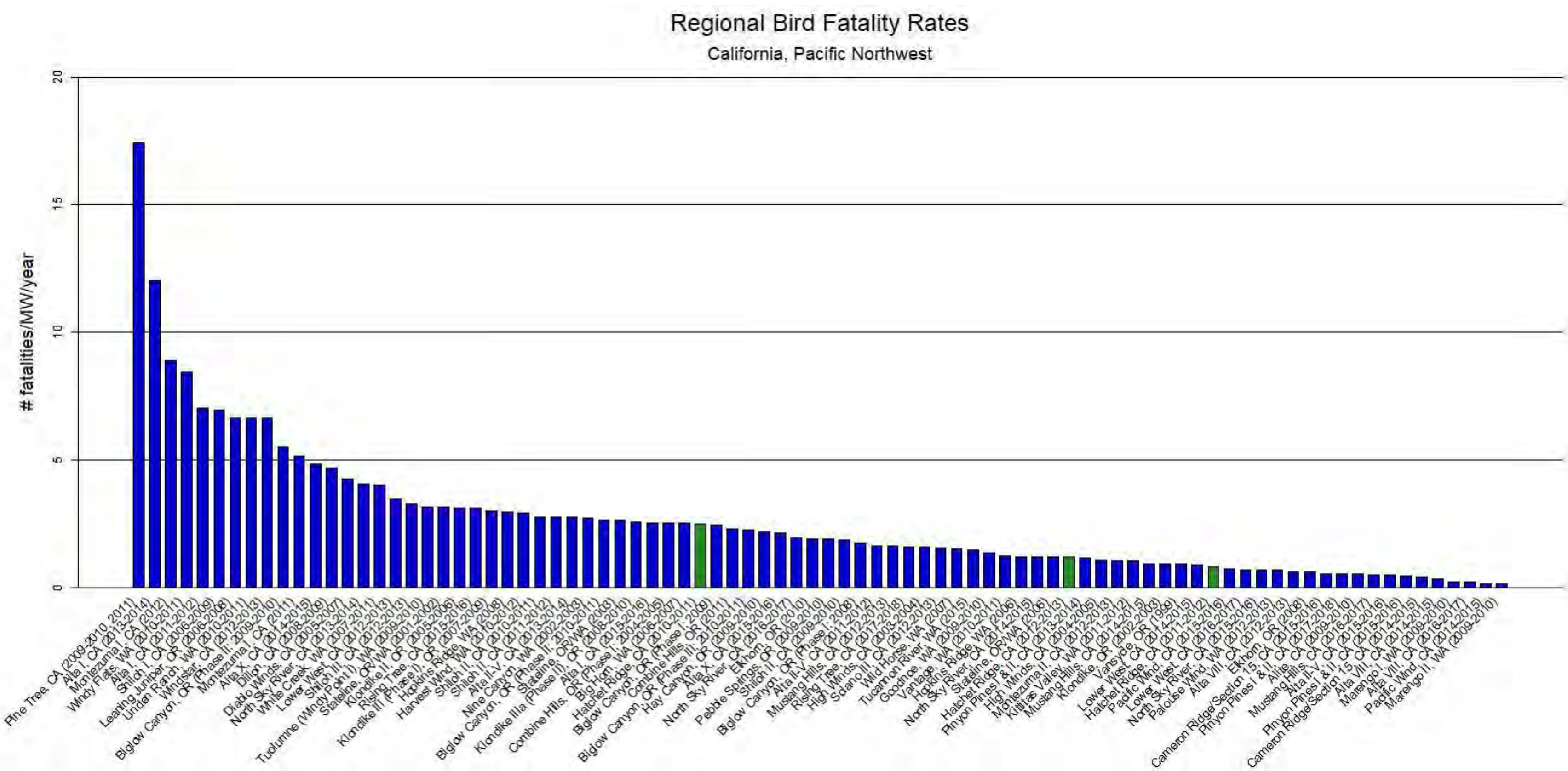

Figure 5. Fatality rates for all birds (number of birds per megawatt per year) from publicly available wind energy facilities in the California and Pacific Northwest regions of North America. Annual all bird fatality rates at the Hatchet Ridge Wind Energy Facility are indicated in green.

Figure 5 (*continued*). Fatality rates for all birds (number of birds per megawatt per year) from publicly available wind energy facilities in the California and Pacific Northwest regions of North America.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Pine Tree, CA (09-10, 11)	BCR 2012	Biglow Canyon, OR (Phase II; 10-11)	Enk et al. 2012a	Hatchet Ridge, CA (12-13)	Tetra Tech 2014
Alta I, CA (13-14)	Chatfield et al. 2014	Stateline, OR/WA (03)	Erickson et al. 2004	Pinyon Pines, CA (12-14)	Chatfield and Russo 2014
Montezuma I, CA (12)	ICF International 2013	Klondike IIIa (Phase II), OR (08-10)	Gritski et al. 2011	High Winds, CA (04-05)	Kerlinger et al. 2006
Windy Flats, WA (10-11)	Enz et al. 2011	Alta I, CA (15-16)	Thompson et al. 2016	Montezuma II, CA (12-13)	Harvey & Associates 2013
Alta I, CA (11-12)	Chatfield et al. 2012	Combine Hills, OR (Phase I; 04-05)	Young et al. 2006	Kittitas Valley, WA (11-12)	Stantec 2012
Shiloh I, CA (06-09)	Kerlinger et al. 2009	Big Horn, WA (06-07)	Kronner et al. 2008	Mustang Hills, CA (14-15)	WEST 2016c
Leaning Juniper, OR (06-08)	Gritski et al. 2008	Hatchet Ridge, CA (10-11)	Tetra Tech 2013	Klondike, OR (02-03)	Johnson et al. 2003
Linden Ranch, WA (10-11)	Enz and Bay 2011	Biglow Canyon, OR (Phase I; 09)	Enk et al. 2010	Vanscycle, OR (99)	Erickson et al. 2000
Windstar, CA (12-13)	Levenstein and Bay 2013b	Combine Hills, OR (11)	Enz et al. 2012	Lower West, CA (14-15)	Levenstein and DiDonato 2015
Biglow Canyon, OR (Phase II; 09-10)	Enk et al. 2011b	Biglow Canyon, OR (Phase III; 10-11)	Enk et al. 2012b	Hatchet Ridge, CA (11-12)	Tetra Tech 2013
Montezuma I, CA (11)	ICF International 2012	Hay Canyon, OR (09-10)	Gritski and Kronner 2010b	Pacific Wind, CA (15-16)	WEST 2017a
Alta X, CA (14-15)	Chatfield et al. 2015	Alta X, CA (15-16)	Thompson et al. 2016	Lower West, CA (16-17)	WEST 2017b
Dillon, CA (08-09)	Chatfield et al. 2009	North Sky River, CA (16-17)	WEST 2017c	North Sky River, CA (15-16)	WEST 2016d
Diablo Winds, CA (05-07)	WEST 2006, 2008	Elkhorn, OR (10)	Enk et al. 2011a	Palouse Wind, WA (12-13)	Stantec 2013a
North Sky River, CA (13-14)	Levenstein et al. 2014	Pebble Springs, OR (09-10)	Gritski and Kronner 2010a	Alta VIII, CA (12-13)	Chatfield and Bay 2014
White Creek, WA (07-11)	Downes and Gritski 2012a	Shiloh II, CA (09-10)	Kerlinger et al. 2010, 2013a	Elkhorn, OR (08)	Jeffrey et al. 2009b
Lower West, CA (12-13)	Levenstein and Bay 2013a	Biglow Canyon, OR (Phase I; 08)	Jeffrey et al. 2009a	Cameron Ridge/Section15, CA (15-16)	Rintz and Thompson 2017
Shiloh III, CA (12-13)	Kerlinger et al. 2013b	Alta II-V, CA (11-12)	Chatfield et al. 2012	Pinyon Pines, CA (17-18)	Rintz and Pham 2018
Tuolumne (Windy Point I), WA (09-10)	Enz and Bay 2010	Mustang Hills, CA (12-13)	Chatfield and Bay 2014	Alite, CA (09-10)	Chatfield et al. 2010
Stateline, OR/WA (01-02)	Erickson et al. 2004	Rising Tree, CA (17-18)	Chatfield et al. 2018	Mustang Hills, CA (16-17)	WEST 2018
Klondike II, OR (05-06)	NWC and WEST 2007	High Winds, CA (03-04)	Kerlinger et al. 2006	Alta II-V, CA (15-16)	Thompson et al. 2016
Rising Tree, CA (15-16)	Rintz et al. 2016	Solano III, CA (12-13)	AECOM 2013	Pinyon Pines, CA (15-16)	Rintz and Starcevich 2016
Klondike III (Phase I), OR (07-09)	Gritski et al. 2010	Wild Horse, WA (07)	Erickson et al. 2008	Cameron Ridge/Section15, CA (14-15)	WEST 2016b
Hopkins Ridge, WA (08)	Young et al. 2009a	Tucannon River, WA (15)	Hallingstad et al. 2016	Alta VIII, CA (14-15)	WEST 2016c
Harvest Wind, WA (10-12)	Downes and Gritski 2012b	Goodnoe, WA (09-10)	URS Corporation 2010a	Marengo I, WA (09-10)	URS Corporation 2010c
Shiloh II, CA (10-11)	Kerlinger et al. 2013a	Vantage, WA (10-11)	Ventus 2012	Alta VIII, CA (16-17)	WEST 2018
Shiloh II, CA (11-12)	Kerlinger et al. 2013a	Hopkins Ridge, WA (06)	Young et al. 2007b	Pacific Wind, CA (14-15)	WEST 2016a
Alta II-V, CA (13-14)	Chatfield et al. 2014	North Sky River, CA (14-15)	Levenstein et al. 2015	Marengo II, WA (09-10)	URS Corporation 2010b
Nine Canyon, WA (02-03)	Erickson et al. 2003	Stateline, OR/WA (06)	Erickson et al. 2007		

Waterfowl

Waterfowl were the most common large bird type recorded during the Year 1 avian use surveys at the Project (2,061 observations among 25 separate groups), accounting for 63.1% of large bird observations recorded. The majority of waterfowl observations (about 78%) comprised three species: snow goose, greater white-fronted goose, and Canada goose, all of which are abundant species in the Pacific flyway (NatureServe 2018). Additionally, the overwhelming majority (97.1%) of waterfowl observations were recorded flying above the estimated RSH, and therefore were not as risk of collision with turbines. Waterfowl were also the most abundant large bird type recorded during pre-construction surveys at Hatchet Ridge in 2005-2006 (Young et al. 2007a), and the most common bird type documented among fatalities during the post-construction monitoring at Hatchet Ridge, composing between 18% and 50% of all bird fatalities recorded annually (Tetra Tech 2014).

Despite accounting for the majority of large bird fatalities at Hatchet Ridge, annual waterfowl fatality rates at Hatchet Ridge were still comparatively low for the region and nationally, ranging from 0.27 to 0.39 birds/MW/year (Tetra Tech 2014). The most common waterfowl fatality at Hatchet Ridge was snow goose (10 fatalities over three years), followed by northern shoveler (*Anas clypeata*; six fatalities), and green-winged teal (*Anas crecca*; three fatalities). Most of these waterfowl fatalities were recorded in the spring and were primarily detected after storms moved through the area. As such, waterfowl fatalities at Hatchet Ridge were primarily attributed to species making localized movements under high wind and/or low visibility conditions (Tetra Tech 2014). Given the similar patterns of waterfowl use observed during pre-construction surveys at both projects, it is reasonable to anticipate similarly low levels of waterfowl mortality at the Project as that estimated at Hatchet Ridge.

Vultures

Vulture (i.e., turkey vulture; 578 observations in 453 separate groups) was the second most common large bird type recorded during surveys at the Project, accounting for 17.7% of all large bird observations. The majority (89.1%) of vulture observations were recorded in spring and summer. Similarly, during pre-construction avian use surveys at Hatchet Ridge, turkey vultures were routinely observed, accounting for 13.4% of all large bird observations (Young et al. 2007a); however, only one turkey vulture fatality was reported over the course of the three-year post-construction monitoring study (Tetra Tech 2014). During 239 post-construction fatality monitoring studies at modern wind energy facilities in North America, turkey vultures (165 fatalities) accounted for 1.6% of all bird fatalities documented (n=10,681; see Appendix E for a list of facilities and references), suggesting generally low risk of collision for this species. Based on the similarities in pre-construction survey data for vultures at Hatchet Ridge and the Project, and the low level of post-construction fatalities at Hatchet Ridge, which is supported by the available data at facilities across North America, impacts to turkey vultures are anticipated to be low at the Project, and similar to impacts documented at Hatchet Ridge.

Diurnal Raptors

Diurnal raptors were observed regularly at the Project, composing 6.6% of all large bird observations recorded during the Year 1 study (216 of 3,267 total large bird observations).

Eleven diurnal raptor species were recorded, the most common being red-tailed hawk (148 observations), sharp-shinned hawk *(*18 observations), bald eagle (16 observations), and Cooper's hawk (nine observations). Diurnal raptor use documented during the Year 1 surveys was fairly consistent across seasons, with the highest use observed in fall (0.56 raptors/800-m plot/60-min survey), followed by spring (0.46), winter (0.44), and summer (0.23), suggesting no obvious increase in diurnal raptor use during migration seasons.

Based on publicly available data from 30 wind energy facilities in California and the Pacific Northwest, diurnal raptor fatality rates have ranged from zero to 1.06 fatalities/MW/year, with a mean of 0.20 fatalities/MW/year (Figure 6). At these facilities, a total of 1,029 diurnal raptors representing 15 species have been documented as fatalities (Table 10; see Appendix E for a list of facilities and references). Red-tailed hawk was the diurnal raptor species most often found as a fatality (551 fatalities; 53.5% of diurnal raptor fatalities), followed by American kestrel (*Falco sparverius*; 261; 25.4%) and golden eagle (100; 9.7%; Table 10).

As mentioned above, the Project differs dramatically in topography and vegetation from other wind energy facilities in California and the Pacific Northwest. As such, species composition of diurnal raptor fatalities may differ somewhat from those found at other regional facilities. Again, Hatchet Ridge is likely the more relevant source of information to inform potential risk to diurnal raptors at the Project. During post-construction fatality monitoring at Hatchet Ridge, raptor fatality rates were not calculated due to low sample size (i.e., less than five fatalities found per year); however, over the three years of monitoring, seven diurnal raptor fatalities were documented: four red-tailed hawks, two sharp-shinned hawks, and one Cooper's hawk (Tetra Tech 2014). During pre-construction avian use surveys conducted at Hatchet Ridge in 2005-2006, red-tailed hawk was the most commonly recorded diurnal raptor species, accounting for 50.7% of all diurnal raptor observations (Young et al. 2007a). American kestrel (15.5%), bald eagle (8.5%), and Cooper's hawk (7.7%) represented the next three most common diurnal raptor species (Young et al. 2007a). The composition of diurnal raptor species recorded during Year 1 avian use surveys at the Project was similar to that recorded at Hatchet Ridge, with slightly higher red-tailed hawk and sharp-shinned hawk use at the Project, and slightly higher American kestrel and bald eagle use at Hatchet Ridge (Young et al. 2007a). Based on the results of pre- and post-construction studies at Hatchet Ridge, as well as the Year 1 avian use surveys conducted at the Project, it is reasonable to assume that diurnal raptor fatality rates at the Project will be similar to Hatchet Ridge.

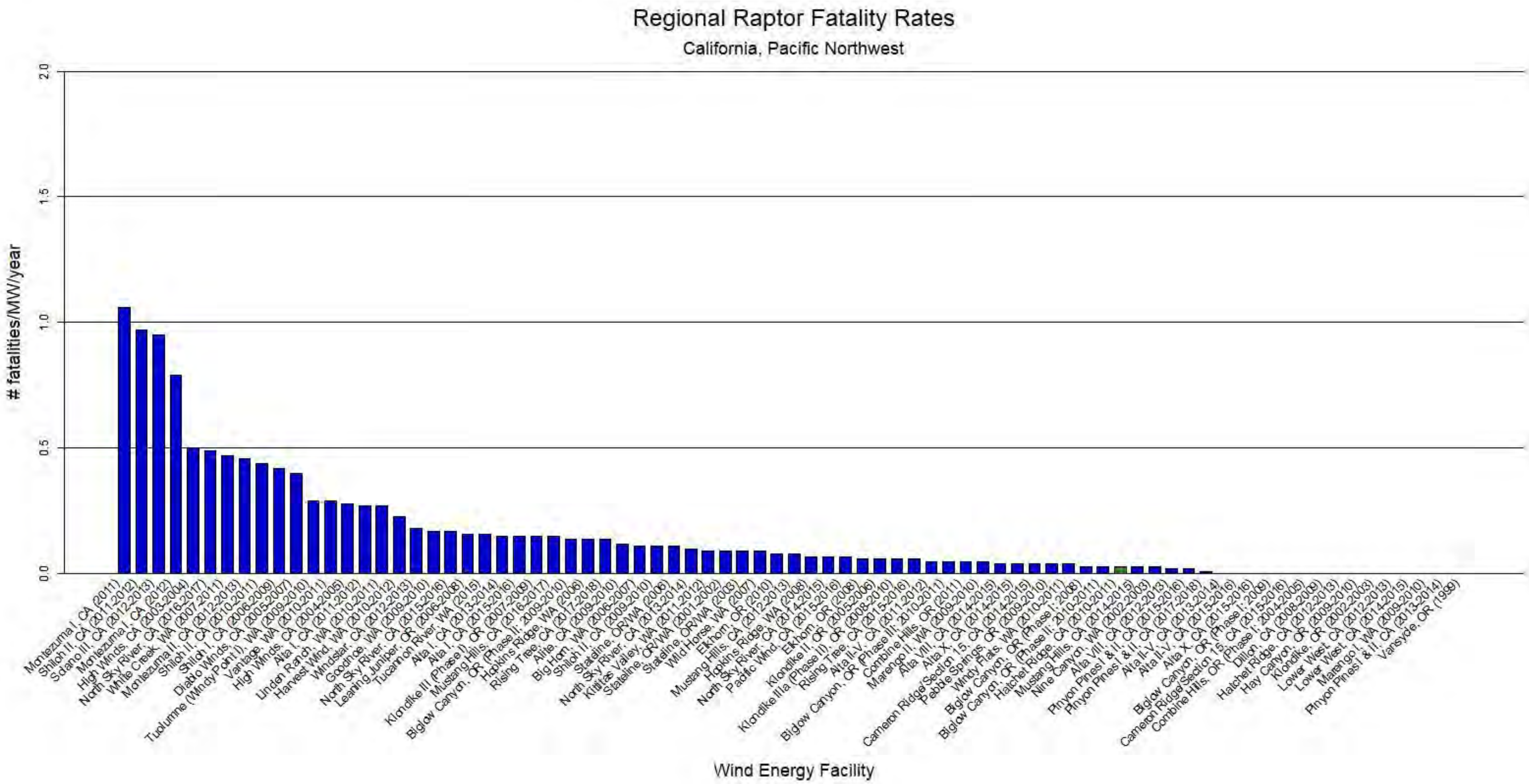

Figure 6. Fatality rates for diurnal raptors (number of raptors per megawatt per year) from publicly available wind energy facilities in the California and Pacific Northwest regions of North America.

Figure 6 (*continued*). Fatality rates for diurnal raptors (number of raptors per megawatt per year) from publicly available wind energy facilities in the California and Pacific Northwest regions of North America.

Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference	Wind Energy Facility	Reference
Montezuma I, CA (11)	ICF International 2012	Rising Tree, CA (17-18)	Chatfield et al. 2018	Pebble Springs, OR (09-15)	Gritski and Kronner 2010a
Shiloh II, CA (11-12)	Kerlinger et al. 2013a	Alite, CA (09-10)	Chatfield et al. 2010	Windy Flats, WA (10-11)	Enz et al. 2011
Solano III, CA (12-13)	AECOM 2013	Big Horn, WA (06-07)	Kronner et al. 2008	Biglow Canyon, OR (Phase I; 08)	Jeffrey et al. 2009a
Montezuma I, CA (12)	ICF International 2013	Shiloh II, CA (09-10)	Kerlinger et al. 2010, 2013a	Biglow Canyon, OR (Phase II; 10-11)	Enk et al. 2012a
High Winds, CA (03-04)	Kerlinger et al. 2006	Stateline, OR/WA (06)	Erickson et al. 2007	Hatchet Ridge, CA (10-11)	Tetra Tech 2013
North Sky River, CA (16-17)	WEST 2017c	North Sky River, CA (13-14)	Levenstein et al. 2014	Mustang Hills, CA (14-15)	WEST 2016c
White Creek, WA (07-11)	Downes and Gritski 2012a	Kittitas Valley, WA (11-12)	Stantec 2012	Nine Canyon, WA (02-03)	Erickson et al. 2003
Montezuma II, CA (12-13)	Harvey & Associates 2013	Stateline, OR/WA (01-02)	Erickson et al. 2004	Alta VIII, CA (12-13)	Chatfield and Bay 2014
Shiloh II, CA (10-11)	Kerlinger et al. 2013a	Stateline, OR/WA (03)	Erickson et al. 2004	Pinyon Pines, CA (15-16)	Rintz and Starcevich 2016
Shiloh I, CA (06-09)	Kerlinger et al. 2009	Wild Horse, WA (07)	Erickson et al. 2008	Pinyon Pines, CA (17-18)	Rintz and Pham 2018
Diablo Winds, CA (05-07)	WEST 2006, 2008	Elkhorn, OR (10)	Enk et al. 2011a	Alta II-V, CA (13-14)	Chatfield et al. 2014
Tuolumne (Windy Point I), WA (09-10)	Enz and Bay 2010	Mustang Hills, CA (12-13)	Chatfield and Bay 2014	Alta II-V, CA (15-16)	Thompson et al. 2016
Vantage, WA (10-11)	Ventus 2012	Hopkins Ridge, WA (06)	Young et al. 2007b	Alta X, CA (15-16)	Thompson et al. 2016
High Winds, CA (04-05)	Kerlinger et al. 2006	North Sky River, CA (14-15)	Levenstein et al. 2015	Biglow Canyon, OR (Phase I; 09)	Enk et al. 2010
Alta I, CA (11-12)	Chatfield et al. 2012	Pacific Wind, CA (15-16)	WEST 2017a	Cameron Ridge/Section15, CA (15-16)	Rintz and Thompson 2017
Linden Ranch, WA (10-11)	Enz and Bay 2011	Elkhorn, OR (08)	Jeffrey et al. 2009b	Combine Hills, OR (Phase I; 04-05)	Young et al. 2006
Harvest Wind, WA (10-12)	Downes and Gritski 2012b	Klondike II, OR (05-06)	NWC and WEST 2007	Dillon, CA (08-09)	Chatfield et al. 2009
Windstar, CA (12-13)	Levenstein and Bay 2013b	Klondike IIIa (Phase II), OR (08-10)	Gritski et al. 2011	Hatchet Ridge, CA (11-12)	Tetra Tech 2013
Goodnoe, WA (09-10)	URS Corporation 2010a	Rising Tree, CA (15-16)	Rintz et al. 2016	Hay Canyon, OR (09-10)	Gritski and Kronner 2010b
Leaning Juniper, OR (06-08)	Gritski et al. 2008	Alta II-V, CA (11-12)	Chatfield et al. 2012	Klondike, OR (02-03)	Johnson et al. 2003
Tucannon River, WA (15)	Hallingstad et al. 2016	Biglow Canyon, OR (Phase III; 10-11)	Enk et al. 2012b	Lower West, CA (12-13)	Levenstein and Bay 2013a
Alta I, CA (13-14)	Chatfield et al. 2014	Combine Hills, OR (11)	Enz et al. 2012	Lower West, CA (14-15)	Levenstein and DiDonato 2015
Alta I, CA (15-16)	Thompson et al. 2016	Marengo II, WA (09-10)	URS Corporation 2010b	Marengo I, WA (09-10)	URS Corporation 2010c
Klondike III (Phase I), OR (07-09)	Gritski et al. 2010	Alta VIII, CA (14-15)	WEST 2016c	Pacific Wind, CA (14-15)	WEST 2016a
Mustang Hills, CA (16-17)	WEST 2018	Alta X, CA (14-15)	Chatfield et al. 2015	Pinyon Pines, CA (13-14)	Chatfield and Russo 2014
Biglow Canyon, OR (Phase II; 09-10)	Enk et al. 2011b	Cameron Ridge/Section 15, CA (14-15)	WEST 2016b	Vanscycle, OR (99)	Erickson et al. 2000
Hopkins Ridge, WA (06)	Young et al. 2007b				

Table 10. Raptor fatalities, by species, recorded at new-generation wind energy facilities in the California and the Pacific Northwest regions of North America.

Species	Scientific Name	Number of Raptor Fatalities[1]	Percent Composition of Raptor Fatalities
red-tailed hawk	*Buteo jamaicensis*	551	53.5
American kestrel	*Falco sparverius*	261	25.4
golden eagle	*Aquila chrysaetos*	100	9.7
northern harrier	*Circus cyaneus*	19	1.8
Swainson's hawk	*Buteo swainsoni*	16	1.6
unidentified raptor		14	1.4
ferruginous hawk	*Buteo regalis*	14	1.4
rough-legged hawk	*Buteo lagopus*	12	1.2
Cooper's hawk	*Accipiter cooperii*	8	0.8
unidentified buteo		8	0.8
prairie falcon	*Falco mexicanus*	7	0.7
sharp-shinned hawk	*Accipiter striatus*	5	0.5
white-tailed kite	*Elanus leucurus*	4	0.4
merlin	*Falco columbarius*	4	0.4
unidentified hawk		2	0.2
peregrine falcon	*Falco peregrinus*	1	0.1
unidentified accipiter		1	0.1
bald eagle	*Haliaeetus leucocephalus*	1	0.1
red-shouldered hawk	*Buteo lineatus*	1	0.1
Total		**1,029**	**100**

[1] These are raw data and are not corrected for searcher efficiency or scavenging.

Cumulative fatalities and species from data compiled by Western EcoSystems Technology, Inc. from publicly available fatality documents (see Appendix E for a list of facilities and references).

Passerines and Other Small Birds

During the Year 1 avian use surveys at the Project, 71 small bird species were observed, most (90.4%) of which were passerines. Small bird species richness (species/plot/survey) was highest in the summer (56 species) and lowest in the winter (25 species). Over a third (34.8%) of passerine observations at the Project was attributed to just three species: dark-eyed junco, mountain chickadee, and western bluebird. Although small bird use varied among the 39 observation points, ranging from 2.15 to 8.77 birds/plot/survey, the data are not suggestive of any areas of concentrated small bird use, such as important reproductive habitats or migration stopover sites. Furthermore, seasonal small bird use estimates ranged from a low of 2.79 birds/survey in winter to a high of 4.23 birds/survey in summer, with more moderate use in spring and fall, suggesting no substantial increase in small bird use during migration seasons.

During the three-year fatality monitoring study at Hatchet Ridge (2010-2013), annual small bird fatality rates ranged from 0.31 to 2.03 fatalities/MW/year (Tetra Tech 2014). Of the 129 bird fatalities documented during the study, only 47 (36.4%), comprising 17 species, were passerines (Tetra Tech 2014). The most common passerine species found as fatalities at Hatchet Ridge were dark-eyed junco (five fatalities), golden-crowned kinglet (*Regulus satrapa*; four fatalities), and Steller's jay (*Cyanocitta stelleri*; three fatalities; Tetra Tech 2014). Of the 129 bird fatalities documented at Hatchet Ridge, 33 (25.6%) were potential nocturnal migrants (i.e., small bird fatalities documented in spring and fall comprising species known to be nocturnal migrants in the region). However, this is a conservative estimate, as most of the 17 passerine species documented as fatalities at Hatchet Ridge are also known summer or year-round residents in the area and it is likely that at least some of these fatalities were local resident birds rather than migrating birds.

The results of post-construction monitoring at Hatchet Ridge suggest low impacts to passerines and other small bird species at the facility, and no apparent disproportionate impacts to nocturnal migrants. Given the proximity of the Project to Hatchet Ridge, as well as similar topographic and habitat characteristics and species assemblages at the two sites, impacts to passerines and other small birds at the Project, including nocturnal migrants, are expected to be similarly low.

Potential Indirect Impacts

In addition to direct effects through collision mortality, wind energy development can indirectly affect wildlife resources, causing a loss of habitat where infrastructure is placed and loss of habitat through behavioral avoidance and perhaps habitat fragmentation (e.g., Leddy et al. 1999, Strickland et al. 2011, Pearce-Higgins et al. 2012, Marques et al. 2014; Shaffer and Buhl 2016). Loss of habitat from installation of wind energy facility infrastructure (i.e., turbines, access roads, maintenance buildings, substations and overhead transmission lines) can be long-term or temporary. Estimates of temporary construction impacts range from 0.2 to 1.0 ha (0.5 to 2.5 ac) per turbine (Strickland and Johnson 2006, Denholm et al. 2009), while long-term infrastructure generally occupies only 5% to 10% of the entire development area (Bureau of Land Management 2005). Behavioral displacement (avoidance) may lead to decreased habitat suitability for local populations (e.g., Stevens et al. 2013, Shaffer and Buhl 2016) and birds displaced by wind energy development may move to lower quality habitat with fewer disturbances, with an overall effect of reducing breeding success (Loesch et al. 2013, LeBeau et al. 2017). Behavioral avoidance may render much larger areas unsuitable or less suitable for some species of wildlife, depending on how far each species is displaced from wind energy facilities. Indirect effects also include habitat fragmentation (e.g., more habitat edges due to roads and smaller areas of contiguous habitat) which could provide more generalized habitats and resistance-free travel lanes for predators and competitors in, for example, large grasslands and in-tact forests. This may impact the survivorship and reproductive ability of birds in the vicinity of the wind energy facility. The greatest concern for indirect impacts of wind energy facilities on wildlife resources is where these facilities have been constructed in native vegetation communities that provide comparatively rare, high-quality habitat for some bird species and species of concern (USFWS 2012).

The Project area is predominantly coniferous forest which is heavily managed for timber production. This has resulted in a highly fragmented landscape with no large contiguous tracts of undisturbed wildlife habitat. Commercial timber operations currently and will continue to alter the landscape within the Project area, with areas of mature forest being harvested and replanted with conifer seedlings that eventually transition from a scrub-shrub cover type to densely treed early-seral forest over 10-20 years. As timber management changes the landscape, species composition and spatial distribution of bird communities will also change within the Project area. While small-scale displacement may occur for some species, particularly in areas cleared for turbines pads or roads, it is not expected to be different than that caused by the timber harvest operations currently occurring and that will continue to occur throughout the Project area. Siting Project facilities on previously disturbed land and using existing roads will help reduce the potential for increased habitat fragmentation and species displacement (USFWS 2012).

Potential Impacts to Species of Concern

Bald Eagle

During 531 hours of survey effort at the Project during the Year 1 surveys, a total of 16 bald eagles were observed. These 16 observations amounted to 35 bald eagle risk minutes, the majority (68.6%) of which was recorded in winter. Bald eagle risk minutes were recorded at 12 of the 39 observations points. Use of the Project area by bald eagles was lower than bald eagle use documented during pre-construction avian use surveys conducted at Hatchet Ridge, although seasonal patterns of use were relatively consistent. During 135 hours of survey effort at Hatchet Ridge, 12 bald eagle observations were recorded, the majority (75%) of which were recorded in fall and winter (Young et al. 2007a), yet no bald eagle fatalities were documented during the three years of post-construction monitoring at Hatchet Ridge (Tetra Tech 2014). Based on information compiled by the USFWS, there have been 49 documented bald eagle fatalities or injuries at wind energy facilities in the US between 2013 and 2018 (Kritz et al. 2018). The majority of bald eagle casualties occurred in the Upper Midwest, Intermountain West, and Alaska, with only single bald eagle fatalities documented in each of California, Oregon, and Washington (Kritz et al. 2018).

While bald eagle nesting habitat is generally absent from the Project area, the species is known to nest in areas adjacent to rivers and lakes in the surrounding landscape. During eagle nest surveys conducted within a 10-mi radius of the Project area, 11 occupied bald eagle nests were documented, with the closest nests to the Project area located at Lake Margaret, approximately 4.7 km (2.9 mi) east of the Project, and along the Pit River approximately 6.8 km (4.2 mi) north of the Project (Thompson 2018). Despite a number of occupied bald eagle nests in the vicinity of the Project, only three of the 16 bald eagle observations documented during the Year 1 surveys were recorded in the spring and summer nesting season, suggesting even lower use of the Project area by breeding eagles than migrating or wintering bald eagles. Based on the generally low direct impacts to bald eagles documented in the Pacific Northwest, including at Hatchet Ridge, as well as the relatively low use of the Project by bald eagles documented during the Year 1 study, risk of collision at the Project is anticipated to be low.

Golden Eagle

During 531 hours of survey effort at the Project, only two golden eagle observations were recorded, both during spring. These two observations totaled four golden eagle risk minutes. This is consistent with the pre-construction avian use data collected at Hatchet Ridge which included a single golden eagle observation recorded in winter (Young et al. 2007a). No golden eagle fatalities have been documented at Hatchet Ridge (Tetra Tech 2014). Typical golden eagle nesting habitat (e.g., cliffs, rocky outcrops) is absent from the Project area, and during eagle nest surveys conducted for the Project in 2017, no occupied golden eagle nests were identified within 10 mi of the Project (Thompson 2018). Based on the results of the Year 1 surveys which indicate very low use of the Project area by golden eagles, as well as pre- and post-construction information from Hatchet Ridge, risk of collision for golden eagles at the Project is anticipated to be low.

Northern Goshawk and Northern Harrier

Northern goshawk and northern harrier, both designated as California SSC, were recorded in low numbers (four northern harriers and three northern goshawks) during the Year 1 avian use surveys at the Project. Northern harriers generally prefer more open meadow and grassland habitats, and are not likely to frequent the forested habitats present throughout the majority of the Project area. Northern goshawk is a forest raptor; however, dense stands of older forest preferred as nesting habitat by this species are limited within the Project area as a result of management for timber production.

No northern goshawk fatalities have been reported among publicly available fatality data from 239 wind energy facilities throughout North America (see Appendix E for a list of study sites and references). While these data may suggest that northern goshawks are not vulnerable to collision with turbine blades, it may also reflect an absence of wind energy facilities constructed in areas of mature forest habitat used by goshawks. Given the generally low use of the area by goshawks documented during avian use surveys to date, the limited extent of mature forest stands within the Project area, and the absence of known goshawk fatalities at wind energy facilities across North America, potential impacts to the species resulting from collision with Project turbines is anticipated to be low, but cannot be entirely ruled out.

Relatively few northern harrier fatalities have been reported in publicly available fatality studies, despite the fact that they are commonly observed during fixed-point bird counts at wind energy facilities (Erickson et al. 2001, Whitfield and Madders 2006, Smallwood and Karas 2009). Among the 1,029 diurnal raptor fatalities in California and the Pacific Northwest, 19 northern harrier fatalities have been documented, representing 1.9% of all diurnal raptor fatalities (Table 10). Northern harriers typically fly close to the ground (MacWhirter and Bildstein 1996), with some studies reporting up to 97% of flights below 20 m (66 ft; Whitfield and Madders 2006); therefore, risk of collision with turbine blades is considered low for this species (Whitfield and Madders 2005, 2006). Given low use of the Project area by northern harriers, a general lack of the species' preferred open habitat, and low risk of collision, impacts to northern harriers resulting from Project development and operation are not anticipated.

American White Pelican and Sandhill Crane

American white pelican (two groups totaling 28 individuals) and sandhill crane (eight groups totaling 116 individuals), the only two waterbird species recorded during the Year 1 surveys, accounted for 4.4% of overall large bird observations at the Project. American white pelican is designated as a California SSC. Sandhill crane observations recorded during surveys were not identified to the subspecies level; however, each of the two subspecies potentially flying over the Project are considered sensitive at the state level; *Antigone canadensis tabida* is a state-threatened species, and *A. c. canadensis* is a state SSC.

Waterbirds, including sandhill crane and American white pelican, do not appear to be particularly susceptible to collision with wind turbines. According to the NRC (2007) cumulative effects report, waterbirds composed about 1% of documented fatalities at 14 wind energy facilities. Waterbirds made up 0.2% of all bird fatalities (n = 4,975) in an analysis of 116 standardized monitoring studies conducted at over 70 wind energy facilities throughout the US and Canada (Erickson et al. 2014). Among publicly available reports reviewed by WEST, waterbirds accounted for just 0.3% of fatalities recorded during 239 studies at facilities across North America (27 of 10,681 total fatalities; see Appendix E for a list of facilities and references). The 27 waterbird fatalities documented at these facilities include two American white pelicans and one sandhill crane; however, the tally in WEST's database does not include three sandhill crane fatalities documented in non-standardized fatality surveys. These include one fatality at an older-generation facility at Altamont Pass in California (Smallwood and Karas 2009), and two fatalities from a facility in west Texas (Navarrete and Griffis-Kyle 2014 as cited in Gerber et al. 2014; Stehn 2011), documented as part of a wintering crane displacement study conducted by graduate student L. Navarrete of Texas Tech University. No American white pelican or sandhill crane fatalities were documented during the three-year fatality monitoring study at Hatchet Ridge, despite both species recorded flying over the site during pre-construction avian use surveys (Young et al. 2007a, Tetra Tech 2014).

Researchers at WEST monitored use by migrating sandhill cranes at five wind energy facilities in North and South Dakota from 2009 – 2013 for three years at each site. Concurrently, they searched underneath all turbines daily for fatalities of cranes. Cumulatively, observers spent about 13,182 hours recording crane use over 1,305 days, and even though 42,727 sandhill crane observations were recorded, no fatalities of cranes were found beneath turbines (Derby et al. 2012e) A crane monitoring study was conducted at the Forward Energy Center, a wind energy facility in southern Wisconsin located within 3.2 km (2.0 miles) of a large wetland used by sandhill cranes. No crane fatalities were found during the crane monitoring study in the fall of 2008, or during regular bird fatality monitoring studies conducted in the fall of 2008, spring and fall of 2009, and in the spring of 2010, even though sandhill cranes were observed in the study area (Grodsky et al. 2013).

The sandhill crane's range in the Pacific Flyway is from Siberia and Alaska to California's Central Valley. Sandhill cranes typically use large freshwater marshes, prairie ponds, and marshy tundra during summer and grain fields or prairies during migration and winter. Although suitable breeding and stopover habitat is absent from the Project area, sandhill cranes are known to breed in the Fall River Valley approximately 32 km (20 mi) east of the Project area, and there is potential for the species to migrate over the Project in spring and fall. Breeding and stopover habitat for American white pelican is also absent from the Project area. In California, the American white pelican's breeding range is restricted to the Klamath Basin to the north of the Project (Shuford and Gardali 2008); although there is potential for groups to migrate throughout the region, particularly in spring and fall. Given the absence of suitable breeding and stopover habitat within the Project area and the available data regarding these species' interactions with wind turbines, impacts to sandhill crane and American white pelican from Project development and operation are anticipated to be low.

Olive-sided Flycatcher, Yellow Warbler, and Vaux's Swift

Sensitive small bird species recorded during Year 1 avian use surveys at the Project included three species designated as California SSC: olive-sided flycatcher (five observations), yellow warbler (35 observations), and Vaux's swift (35 observations within one group). All three species are likely summer residents, but may also occur as migrants within the Project area. Both olive-sided flycatcher and yellow warbler were observed only in summer (with the exception of a single yellow warbler observed in fall), and the single group of Vaux's swifts was observed in spring. Both olive-sided flycatcher and yellow warbler were also recorded during pre-construction avian use surveys at Hatchet Ridge, primarily in summer.

Based on publicly available data from post-construction fatality monitoring conducted at North American wind energy facilities, all three species have been documented as fatalities, including two olive-sided flycatchers, 36 yellow warblers, and 16 Vaux's swifts (see Appendix E for a list of facilities and references). At Hatchet Ridge, a single yellow warbler fatality and a single Vaux's swift fatality were documented during the three-year monitoring study (Tetra Tech 2014).

Given the presence of these three species within the Project area and known impacts observed at Hatchet Ridge and other wind energy facilities nationwide, risk of collision with Project turbines is anticipated to be low to moderate. The most likely direct impact to potentially suitable nesting habitat would be timber harvest and vegetation clearing in preparation of turbine pads or road construction. However, given the existing level of disturbance and habitat fragmentation within the Project area, it is unlikely that Project development will cause displacement of sensitive small bird species beyond what has occurred and will continue to occur from ongoing timber harvest operations.

CONCLUSIONS

To date, overall fatality rates for birds at wind energy facilities in California and the Pacific Northwest have ranged from 0.16 to 17.44 fatalities/MW/year, while diurnal raptor fatality rates at these same facilities have ranged from zero to 1.06 fatalities/MW/year (Appendix E). However, the forested habitats covering the majority of the Project area are unique to wind energy facilities in the western US, which are more typically composed of desert scrub, grassland, and shrub-steppe vegetation communities, potentially limiting the inference from studies conducted at these facilities. The one exception to this is the Hatchet Ridge facility, which has similar ecological characteristics to the Project, and is located immediately to the northeast, providing the most relevant source of information for assessing potential risk to avian species at the Project. The results of pre-construction avian use surveys conducted at Hatchet Ridge were largely consistent with those documented at the Project during this study. Furthermore, based on post-construction monitoring at Hatchet Ridge, all bird, small bird, and diurnal raptor fatality rates have all been low and within the range of other facilities in California and the Pacific Northwest. Given the similarity in species composition and temporal use patterns reported at Hatchet Ridge and observed at the Project, it is reasonable to expect that fatality rates and the species composition of fatalities at the Project will be similar to that documented at Hatchet Ridge. Following recommendations presented in the ECPG, a second year of large bird/eagle use surveys is currently underway at the Project to collect data sufficient to support a future application for an incidental eagle take permit under the BGEPA, should unanticipated impacts to eagles suggest a need for such permit. Because field studies were being conducted to gather a second year of large bird/eagle use data, Pacific Wind opted to capitalize on the efficiency of being in the field and is also completing a second year of small bird use surveys. The additional avian use surveys are expected to conclude in May 2019 and. an updated risk assessment will be prepared following the completion of the two-year study. The updated risk assessment will focus on risk to bald and golden eagles, as well as any inter-annual variations in species composition or use documented during the Year 2 surveys that may influence perceived risk to avian species at the Project.

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Appendix A. All Bird Types and Species Observed at the Fountain Wind Project during Fixed-Point Bird Use Surveys from 19 April 2017 – 22 May 2018

Appendix A1. Summary of number of groups (grps) and observations (obs) by bird type and species for 60-minute large bird surveys at the Fountain Wind Project[a] from 19 April 2017 – 22 May 2018.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Waterbirds		**1**	**20**	**0**	**0**	**2**	**33**	**7**	**91**	**10**	**144**
American white pelican	*Pelecanus erythrorhynchos*	1	20	0	0	0	0	1	8	2	28
sandhill crane	*Antigone canadensis*	0	0	0	0	2	33	6	83	8	116
Waterfowl		**4**	**161**	**1**	**200**	**7**	**764**	**13**	**938**	**25**	**2,063**
cackling goose	*Branta hutchinsii*	0	0	0	0	1	20	0	0	1	20
Canada goose	*Branta canadensis*	0	0	0	0	2	60	1	3	3	63
greater white-fronted goose	*Anser albifrons*	3	160	0	0	1	102	0	0	4	262
snow goose	*Chen caerulescens*	1	1	0	0	3	582	7	702	11	1,285
tundra swan	*Cygnus columbianus*	0	0	0	0	0	0	3	123	3	123
unidentified goose		0	0	1	200	0	0	2	110	3	310
Diurnal Raptors		**47**	**51**	**46**	**49**	**65**	**65**	**49**	**51**	**207**	**216**
Accipiters		*8*	*8*	*4*	*4*	*19*	*19*	*1*	*1*	*32*	*32*
Cooper's hawk	*Accipiter cooperii*	4	4	2	2	2	2	1	1	9	9
northern goshawk	*Accipiter gentilis*	3	3	0	0	0	0	0	0	3	3
sharp-shinned hawk	*Accipiter striatus*	1	1	2	2	15	15	0	0	18	18
unidentified accipiter	*Accipiter* spp.	0	0	0	0	2	2	0	0	2	2
Buteos		*30*	*34*	*37*	*40*	*38*	*38*	*37*	*39*	*142*	*151*
red-shouldered hawk	*Buteo lineatus*	0	0	1	1	2	2	0	0	3	3
red-tailed hawk	*Buteo jamaicensis*	30	34	36	39	36	36	37	39	139	148
Northern Harrier		*1*	*1*	*0*	*0*	*2*	*2*	*1*	*1*	*4*	*4*
northern harrier	*Circus cyaneus*	1	1	0	0	2	2	1	1	4	4
Eagles		*4*	*4*	*1*	*1*	*4*	*4*	*9*	*9*	*18*	*18*
bald eagle	*Haliaeetus leucocephalus*	2	2	1	1	4	4	9	9	16	16
golden eagle	*Aquila chrysaetos*	2	2	0	0	0	0	0	0	2	2
Falcons		*2*	*2*	*2*	*2*	*2*	*2*	*0*	*0*	*6*	*6*
American kestrel	*Falco sparverius*	0	0	0	0	1	1	0	0	1	1
merlin	*Falco columbarius*	1	1	0	0	1	1	0	0	2	2
prairie falcon	*Falco mexicanus*	1	1	1	1	0	0	0	0	2	2
unidentified falcon	*Falco* spp.	0	0	1	1	0	0	0	0	1	1
Other Raptors		*2*	*2*	*2*	*2*	*0*	*0*	*1*	*1*	*5*	*5*
unidentified raptor		2	2	2	2	0	0	1	1	5	5
Owls		**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
great horned owl	*Bubo virginianus*	1	1	0	0	0	0	0	0	1	1
northern pygmy-owl	*Glaucidium gnoma*	1	1	0	0	0	0	0	0	1	1
Vultures		**121**	**151**	**275**	**364**	**45**	**48**	**12**	**15**	**453**	**578**
turkey vulture	*Cathartes aura*	121	151	275	364	45	48	12	15	453	578

Appendix A1. Summary of number of groups (grps) and observations (obs) by bird type and species for 60-minute large bird surveys at the Fountain Wind Project[a] from 19 April 2017 – 22 May 2018.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Upland Game Birds		**4**	**5**	**3**	**3**	**1**	**1**	**0**	**0**	**8**	**9**
mountain quail	*Oreortyx pictus*	4	5	3	3	1	1	0	0	8	9
Doves/Pigeons		**2**	**5**	**7**	**21**	**1**	**1**	**0**	**0**	**10**	**27**
band-tailed pigeon	*Patagioenas fasciata*	2	5	7	21	1	1	0	0	10	27
Large Corvids		**43**	**77**	**33**	**39**	**44**	**68**	**29**	**44**	**149**	**228**
American crow	*Corvus brachyrhynchos*	0	0	1	1	0	0	0	0	1	1
common raven	*Corvus corax*	43	77	32	38	44	68	29	44	148	227
Overall		**224**	**472**	**365**	**676**	**165**	**980**	**110**	**1,139**	**864**	**3,267**

[a] Regardless of distance from observer.

Appendix A2. Summary of number of groups (grps) and observations (obs) by bird type and species for 10-minute small bird surveys at the Fountain Wind Project[a] from 19 April 2017 – 22 May 2018.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Passerines		**243**	**377**	**600**	**780**	**310**	**696**	**136**	**324**	**1,289**	**2,177**
American robin	*Turdus migratorius*	5	5	9	12	11	25	3	3	28	45
ash-throated flycatcher	*Myiarchus cinerascens*	0	0	3	3	0	0	0	0	3	3
Bewick's wren	*Thryomanes bewickii*	1	1	3	3	1	3	1	1	6	8
black-capped chickadee	*Poecile atricapillus*	0	0	13	21	0	0	0	0	13	21
black-headed grosbeak	*Pheucticus melanocephalus*	1	2	6	6	0	0	0	0	7	8
black-throated gray warbler	*Setophaga nigrescens*	1	1	6	9	0	0	0	0	7	10
black phoebe	*Sayornis nigricans*	0	0	0	0	0	0	1	1	1	1
blue-gray gnatcatcher	*Polioptila caerulea*	3	5	2	2	0	0	0	0	5	7
Brewer's blackbird	*Euphagus cyanocephalus*	0	0	0	0	2	2	0	0	2	2
brown-headed cowbird	*Molothrus ater*	0	0	0	0	1	2	0	0	1	2
brown creeper	*Certhia americana*	0	0	0	0	1	2	0	0	1	2
bushtit	*Psaltriparus minimus*	3	3	4	23	1	9	3	55	11	90
California scrub-jay	*Aphelocoma californica*	7	63	5	5	2	2	2	2	16	72
Cassin's finch	*Haemorhous cassinii*	1	1	1	1	0	0	0	0	2	2
Cassin's vireo	*Vireo cassinii*	1	1	2	2	0	0	0	0	3	3
cliff swallow	*Petrochelidon pyrrhonota*	1	3	1	3	0	0	0	0	2	6
dark-eyed junco	*Junco hyemalis*	34	54	107	140	47	84	6	25	194	303
dusky flycatcher	*Empidonax oberholseri*	0	0	4	4	0	0	0	0	4	4
evening grosbeak	*Coccothraustes vespertinus*	0	0	2	4	2	11	0	0	4	15
fox sparrow	*Passerella iliaca*	8	9	27	27	5	6	1	1	41	43
golden-crowned kinglet	*Regulus satrapa*	2	3	1	1	20	43	19	20	42	67
golden-crowned sparrow	*Zonotrichia atricapilla*	0	0	0	0	3	4	0	0	3	4
gray jay	*Perisoreus canadensis*	0	0	0	0	2	2	0	0	2	2
green-tailed towhee	*Pipilo chlorurus*	0	0	1	1	0	0	0	0	1	1
hermit thrush	*Catharus guttatus*	0	0	2	2	2	2	0	0	4	4
hermit warbler	*Setophaga occidentalis*	0	0	2	2	0	0	0	0	2	2
house finch	*Haemorhous mexicanus*	0	0	3	3	1	1	0	0	4	4
house wren	*Troglodytes aedon*	0	0	2	2	0	0	0	0	2	2
Hutton's vireo	*Vireo huttoni*	0	0	6	6	1	2	2	2	9	10
lesser goldfinch	*Spinus psaltria*	0	0	6	12	9	12	0	0	15	24
Lincoln's sparrow	*Melospiza lincolnii*	0	0	0	0	1	1	0	0	1	1
MacGillivray's warbler	*Geothlypis tolmiei*	0	0	1	1	0	0	0	0	1	1
mountain bluebird	*Sialia currucoides*	1	1	3	3	3	14	0	0	7	18
mountain chickadee	*Poecile gambeli*	31	40	42	60	26	88	24	57	123	245
Nashville warbler	*Oreothlypis ruficapilla*	6	6	17	18	0	0	0	0	23	24

Appendix A2. Summary of number of groups (grps) and observations (obs) by bird type and species for 10-minute small bird surveys at the Fountain Wind Project[a] from 19 April 2017 – 22 May 2018.

		Spring		Summer		Fall		Winter		Total	
Type/Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
northern rough-winged swallow	*Stelgidopteryx serripennis*	0	0	8	45	0	0	0	0	8	45
oak titmouse	*Baeolophus inornatus*	0	0	0	0	0	0	1	1	1	1
olive-sided flycatcher	*Contopus cooperi*	0	0	5	5	0	0	0	0	5	5
Pacific-slope flycatcher	*Empidonax difficilis*	0	0	1	1	0	0	0	0	1	1
pine siskin	*Spinus pinus*	0	0	0	0	3	22	0	0	3	22
purple finch	*Haemorhous purpureus*	1	1	5	7	6	46	1	4	13	58
red-breasted nuthatch	*Sitta canadensis*	33	44	16	22	45	62	52	59	146	187
ruby-crowned kinglet	*Regulus calendula*	0	0	0	0	10	16	4	4	14	20
song sparrow	*Melospiza melodia*	0	0	4	4	0	0	2	2	6	6
spotted towhee	*Pipilo maculatus*	13	13	51	53	10	12	1	1	75	79
Steller's jay	*Cyanocitta stelleri*	23	29	44	53	45	49	1	1	113	132
Townsend's solitaire	*Myadestes townsendi*	4	4	3	3	0	0	0	0	7	7
Townsend's warbler	*Setophaga townsendi*	0	0	3	4	0	0	0	0	3	4
tree swallow	*Tachycineta bicolor*	0	0	2	7	0	0	0	0	2	7
unidentified empidonax	*Empidonax* spp.	0	0	2	2	0	0	0	0	2	2
unidentified flycatcher		0	0	4	5	0	0	0	0	4	5
unidentified passerine		4	5	34	37	18	32	0	0	56	74
unidentified sparrow		1	1	0	0	0	0	0	0	1	1
unidentified swallow		2	11	2	3	0	0	0	0	4	14
unidentified warbler		2	3	1	1	1	1	0	0	4	5
unidentified wren		0	0	1	2	0	0	0	0	1	2
varied thrush	*Ixoreus naevius*	1	2	0	0	1	1	0	0	2	3
violet-green swallow	*Tachycineta thalassina*	0	0	1	1	0	0	0	0	1	1
western bluebird	*Sialia mexicana*	13	19	5	6	12	106	6	78	36	209
western kingbird	*Tyrannus verticalis*	1	1	0	0	0	0	0	0	1	1
western tanager	*Piranga ludoviciana*	0	0	30	34	0	0	0	0	30	34
western wood-pewee	*Contopus sordidulus*	0	0	13	15	0	0	0	0	13	15
white-breasted nuthatch	*Sitta carolinensis*	0	0	4	4	0	0	0	0	4	4
white-crowned sparrow	*Zonotrichia leucophrys*	0	0	1	1	0	0	0	0	1	1
Wilson's warbler	*Cardellina pusilla*	0	0	1	1	0	0	0	0	1	1
wrentit	*Chamaea fasciata*	8	8	6	7	5	8	6	7	25	30
yellow-rumped warbler	*Setophaga coronata*	31	38	43	47	12	25	0	0	86	110
yellow warbler	*Setophaga petechia*	0	0	29	34	1	1	0	0	30	35
Swifts/Hummingbirds		**6**	**40**	**4**	**7**	**4**	**4**	**7**	**8**	**21**	**59**
Anna's hummingbird	*Calypte anna*	3	3	1	1	2	2	7	8	13	14
rufous hummingbird	*Selasphorus rufus*	2	2	0	0	0	0	0	0	2	2

Appendix A2. Summary of number of groups (grps) and observations (obs) by bird type and species for 10-minute small bird surveys at the Fountain Wind Project[a] from 19 April 2017 – 22 May 2018.

Type/Species	Scientific Name	Spring # grps	Spring # obs	Summer # grps	Summer # obs	Fall # grps	Fall # obs	Winter # grps	Winter # obs	Total # grps	Total # obs
unidentified hummingbird		0	0	2	2	2	2	0	0	4	4
Vaux's swift	*Chaetura vauxi*	1	35	0	0	0	0	0	0	1	35
white-throated swift	*Aeronautes saxatalis*	0	0	1	4	0	0	0	0	1	4
Woodpeckers		**37**	**38**	**53**	**54**	**56**	**57**	**17**	**21**	**163**	**170**
downy woodpecker	*Picoides pubescens*	0	0	3	3	3	3	3	3	9	9
hairy woodpecker	*Picoides villosus*	7	8	9	10	12	12	2	2	30	32
northern flicker	*Colaptes auratus*	20	20	32	32	30	31	5	8	87	91
pileated woodpecker	*Dryocopus pileatus*	1	1	0	0	3	3	1	1	5	5
red-breasted sapsucker	*Sphyrapicus ruber*	0	0	1	1	0	0	0	0	1	1
unidentified woodpecker		3	3	5	5	2	2	0	0	10	10
white-headed woodpecker	*Picoides albolarvatus*	6	6	3	3	6	6	6	7	21	22
Unidentified Birds		**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
Unidentified small bird		2	2	0	0	0	0	0	0	2	2
Overall		**288**	**457**	**657**	**841**	**370**	**757**	**160**	**353**	**1,475**	**2,408**

[a] Regardless of distance from observer.

Appendix B. Mean Use, Percent of Use, and Frequency of Occurrence for Large Birds and Small Birds Observed during Fixed-Point Bird Use Surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018

Appendix B1. Mean large bird use (number of large birds/800-meter plot/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each large bird type and species by season during large bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

	Mean Use				% of Use				% Frequency			
Type/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Waterbirds	**0.17**	**0**	**0.28**	**0.78**	**4.1**	**0**	**3.4**	**8**	**0.9**	**0**	**0.9**	**4.3**
American white pelican	0.17	0	0	0.07	4.1	0	0	0.7	0.9	0	0	0.9
sandhill crane	0	0	0.28	0.71	0	0	3.4	7.3	0	0	0.9	4.3
Waterfowl	**1.38**	**1.03**	**6.53**	**8.02**	**33.0**	**30.2**	**78.0**	**82.4**	**2.6**	**0.5**	**5.1**	**8.5**
cackling goose	0	0	0.17	0	0	0	2.0	0	0	0	0.9	0
Canada goose	0	0	0.51	0.03	0	0	6.1	0.3	0	0	1.7	0.9
greater white-fronted goose	1.37	0	0.87	0	32.8	0	10.4	0	1.7	0	0.9	0
snow goose	<0.01	0	4.97	6.00	0.2	0	59.4	61.6	0.9	0	1.7	5.1
tundra swan	0	0	0	1.05	0	0	0	10.8	0	0	0	1.7
unidentified goose	0	1.03	0	0.94	0	30.2	0	9.7	0	0.5	0	1.7
Diurnal Raptors	**0.46**	**0.23**	**0.56**	**0.44**	**11.0**	**6.8**	**6.6**	**4.5**	**31.2**	**17.4**	**32.5**	**17.9**
Accipiters	*0.07*	*0.02*	*0.16*	*<0.01*	*1.6*	*0.6*	*1.9*	*<0.1*	*6.0*	*2.1*	*12.0*	*0.9*
Cooper's hawk	0.03	0.01	0.02	<0.01	0.8	0.3	0.2	<0.1	3.4	1.0	0.9	0.9
northern goshawk	0.03	0	0	0	0.6	0	0	0	1.7	0	0	0
sharp-shinned hawk	<0.01	0.01	0.13	0	0.2	0.3	1.5	0	0.9	1.0	11.1	0
unidentified accipiter	0	0	0.02	0	0	0	0.2	0	0	0	1.7	0
Buteos	*0.31*	*0.18*	*0.32*	*0.33*	*7.4*	*5.4*	*3.9*	*3.4*	*22.1*	*15.4*	*20.5*	*12.0*
red-shouldered hawk	0	<0.01	0.02	0	0	0.2	0.2	0	0	0.5	1.7	0
red-tailed hawk	0.31	0.18	0.31	0.33	7.4	5.3	3.7	3.4	22.1	14.9	20.5	12.0
Northern Harrier	*<0.01*	*0*	*0.02*	*<0.01*	*0.2*	*0*	*0.2*	*<0.1*	*0.9*	*0*	*1.7*	*0.9*
northern harrier	<0.01	0	0.02	<0.01	0.2	0	0.2	<0.1	0.9	0	1.7	0.9
Eagles	*0.03*	*<0.01*	*0.03*	*0.08*	*0.8*	*0.2*	*0.4*	*0.8*	*2.6*	*0.5*	*3.4*	*6.8*
bald eagle	0.02	<0.01	0.03	0.08	0.4	0.2	0.4	0.8	1.7	0.5	3.4	6.8
golden eagle	0.02	0	0	0	0.4	0	0	0	0.9	0	0	0
Falcons	*0.02*	*0.01*	*0.02*	*0*	*0.5*	*0.3*	*0.2*	*0*	*2.2*	*1.0*	*1.7*	*0*
American kestrel	0	0	<0.01	0	0	0	0.1	0	0	0	0.9	0
merlin	<0.01	0	<0.01	0	0.2	0	0.1	0	0.9	0	0.9	0
prairie falcon	0.01	<0.01	0	0	0.3	0.2	0	0	1.4	0.5	0	0
unidentified falcon	0	<0.01	0	0	0	0.2	0	0	0	0.5	0	0
Other Raptors	*0.02*	*0.01*	*0*	*<0.01*	*0.4*	*0.3*	*0*	*<0.1*	*1.7*	*1*	*0*	*0.9*
unidentified raptor	0.02	0.01	0	<0.01	0.4	0.3	0	<0.1	1.7	1.0	0	0.9
Owls	**0.02**	**0**	**0**	**0**	**0.4**	**0**	**0**	**0**	**1.7**	**0**	**0**	**0**
great horned owl	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
northern pygmy-owl	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
Vultures	**1.39**	**1.82**	**0.41**	**0.13**	**33.4**	**53.5**	**4.9**	**1.3**	**45.6**	**54.4**	**22.2**	**6.8**

Appendix B1. Mean large bird use (number of large birds/800-meter plot/60-minute survey), percent of total use (%), and frequency of occurrence (%) for each large bird type and species by season during large bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

	Mean Use				% of Use				% Frequency			
Type/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
turkey vulture	1.39	1.82	0.41	0.13	33.4	53.5	4.9	1.3	45.6	54.4	22.2	6.8
Upland Game Birds	**0.04**	**0.02**	**<0.01**	**0**	**1.0**	**0.5**	**0.1**	**0**	**3.4**	**1.5**	**0.9**	**0**
mountain quail	0.04	0.02	<0.01	0	1.0	0.5	0.1	0	3.4	1.5	0.9	0
Doves/Pigeons	**0.04**	**0.11**	**<0.01**	**0**	**1.0**	**3.2**	**0.1**	**0**	**1.7**	**2.1**	**0.9**	**0**
band-tailed pigeon	0.04	0.11	<0.01	0	1.0	3.2	0.1	0	1.7	2.1	0.9	0
Large Corvids	**0.67**	**0.20**	**0.58**	**0.38**	**16.0**	**5.9**	**6.9**	**3.9**	**27.6**	**12.8**	**23.1**	**16.2**
American crow	0	<0.01	0	0	0	0.2	0	0	0	0.5	0	0
common raven	0.67	0.19	0.58	0.38	16.0	5.7	6.9	3.9	27.6	12.3	23.1	16.2
Overall	**4.17**	**3.39**	**8.38**	**9.74**	**100**	**100**	**100**	**100**				

Appendix B2. Mean small bird use (number of small birds/100-meter plot/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each small bird type and species by season during small bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

	Mean Use				% of Use				% Frequency			
Type/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Passerines	**2.92**	**3.93**	**5.21**	**2.59**	**82.0**	**93.1**	**92.8**	**92.9**	**81.7**	**89.7**	**80.3**	**59.0**
American robin	0.03	0.06	0.09	0.02	0.7	1.5	1.7	0.6	2.6	4.1	4.3	1.7
ash-throated flycatcher	0	0.02	0	0	0	0.4	0	0	0	1.5	0	0
Bewick's wren	<0.01	0.02	0.03	<0.01	0.2	0.4	0.5	0.3	0.9	1.0	0.9	0.9
black-capped chickadee	0	0.11	0	0	0	2.5	0	0	0	6.2	0	0
black-headed grosbeak	0.03	0.03	0	0	0.8	0.7	0	0	1.4	2.6	0	0
black-throated gray warbler	<0.01	0.05	0	0	0.2	1.1	0	0	0.9	3.1	0	0
blue-gray gnatcatcher	0.07	0.01	0	0	1.9	0.2	0	0	2.8	1.0	0	0
Brewer's blackbird	0	0	0.02	0	0	0	0.3	0	0	0	0.9	0
brown-headed cowbird	0	0	0.02	0	0	0	0.3	0	0	0	0.9	0
brown creeper	0	0	0.02	0	0	0	0.3	0	0	0	0.9	0
bushtit	0.04	0.12	0.08	0.47	1.2	2.8	1.4	16.9	2.8	2.1	0.9	2.6
California scrub-jay	0.29	0.02	0.02	<0.01	8.2	0.5	0.3	0.3	3.4	2.1	1.7	0.9
Cassin's finch	<0.01	<0.01	0	0	0.2	0.1	0	0	0.9	0.5	0	0
Cassin's vireo	0	0.01	0	0	0	0.2	0	0	0	1.0	0	0
cliff swallow	0.03	0.02	0	0	0.7	0.4	0	0	0.9	0.5	0	0
dark-eyed junco	0.47	0.72	0.70	0.21	13.3	17.0	12.5	7.7	24.1	41.0	28.2	4.3
dusky flycatcher	0	0.02	0	0	0	0.5	0	0	0	2.1	0	0
evening grosbeak	0	0.02	0.09	0	0	0.5	1.7	0	0	0.5	1.7	0
fox sparrow	0.09	0.14	0.03	<0.01	2.6	3.3	0.6	0.3	7.1	10.3	3.4	0.9
golden-crowned kinglet	0.03	<0.01	0.37	0.17	0.7	0.1	6.6	6.1	1.7	0.5	17.1	16.2
golden-crowned sparrow	0	0	0.03	0	0	0	0.6	0	0	0	2.6	0
gray jay	0	0	0.02	0	0	0	0.3	0	0	0	1.7	0
green-tailed towhee	0	<0.01	0	0	0	0.1	0	0	0	0.5	0	0
hermit thrush	0	0.01	0.02	0	0	0.2	0.3	0	0	1.0	1.7	0
hermit warbler	0	0.01	0	0	0	0.2	0	0	0	1.0	0	0
house finch	0	0.02	<0.01	0	0	0.4	0.2	0	0	1.5	0.9	0
house wren	0	0.01	0	0	0	0.2	0	0	0	0.5	0	0
Hutton's vireo	0	0.03	0.02	0.02	0	0.7	0.3	0.6	0	2.6	0.9	1.7
lesser goldfinch	0	0.06	0.10	0	0	1.5	1.8	0	0	2.1	2.6	0
Lincoln's sparrow	0	0	<0.01	0	0	0	0.2	0	0	0	0.9	0
MacGillivray's warbler	0	<0.01	0	0	0	0.1	0	0	0	0.5	0	0
mountain bluebird	0	0.02	0.11	0	0	0.4	2.0	0	0	1.0	0.9	0
mountain chickadee	0.37	0.30	0.61	0.48	10.3	7.0	10.8	17.2	25.2	19.5	15.4	17.9

Appendix B2. Mean small bird use (number of small birds/100-meter plot/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each small bird type and species by season during small bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

	Mean Use				% of Use				% Frequency			
Type/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Nashville warbler	0.07	0.09	0	0	1.9	2.2	0	0	5.9	7.2	0	0
northern rough-winged swallow	0	0.23	0	0	0	5.5	0	0	0	3.1	0	0
oak titmouse	0	0	0	<0.01	0	0	0	0.3	0	0	0	0.9
olive-sided flycatcher	0	0.03	0	0	0	0.6	0	0	0	2.6	0	0
Pacific-slope flycatcher	0	<0.01	0	0	0	0.1	0	0	0	0.5	0	0
pine siskin	0	0	0.19	0	0	0	3.4	0	0	0	2.6	0
purple finch	<0.01	0.04	0.37	0.03	0.2	0.8	6.6	1.2	0.9	2.1	4.3	0.9
red-breasted nuthatch	0.33	0.10	0.42	0.36	9.4	2.3	7.5	12.9	22.2	7.7	23.1	26.5
ruby-crowned kinglet	0	0	0.14	0.03	0	0	2.4	1.2	0	0	8.5	3.4
song sparrow	0	0.02	0	0.02	0	0.5	0	0.6	0	2.1	0	0.9
spotted towhee	0.11	0.27	0.10	<0.01	3.1	6.4	1.8	0.3	11.1	21.5	8.5	0.9
Steller's jay	0.23	0.26	0.25	<0.01	6.4	6.2	4.4	0.3	16.8	19.5	20.5	0.9
Townsend's solitaire	<0.01	0.01	0	0	0.2	0.2	0	0	0.9	1.0	0	0
Townsend's warbler	0	0.02	0	0	0	0.5	0	0	0	1.5	0	0
tree swallow	0	0.04	0	0	0	0.8	0	0	0	1.0	0	0
unidentified empidonax	0	0.01	0	0	0	0.2	0	0	0	1.0	0	0
unidentified flycatcher	0	0.03	0	0	0	0.6	0	0	0	2.1	0	0
unidentified passerine	0.06	0.19	0.27	0	1.6	4.5	4.9	0	5	15.4	12.8	0
unidentified sparrow	0.01	0	0	0	0.4	0	0	0	1.4	0	0	0
unidentified swallow	0.01	<0.01	0	0	0.4	0.1	0	0	1.4	0.5	0	0
unidentified warbler	0.04	<0.01	<0.01	0	1.2	0.1	0.2	0	2.8	0.5	0.9	0
unidentified wren	0	0.01	0	0	0	0.2	0	0	0	0.5	0	0
varied thrush	0.02	0	<0.01	0	0.5	0	0.2	0	0.9	0	0.9	0
violet-green swallow	0	<0.01	0	0	0	0.1	0	0	0	0.5	0	0
western bluebird	0.17	0.03	0.78	0.67	4.7	0.6	13.9	23.9	11.6	2.1	6.8	5.1
western kingbird	<0.01	0	0	0	0.2	0	0	0	0.9	0	0	0
western tanager	0	0.17	0	0	0	4.1	0	0	0	14.4	0	0
western wood-pewee	0	0.08	0	0	0	1.8	0	0	0	5.6	0	0
white-breasted nuthatch	0	0.02	0	0	0	0.5	0	0	0	2.1	0	0
white-crowned sparrow	0	<0.01	0	0	0	0.1	0	0	0	0.5	0	0
Wilson's warbler	0	<0.01	0	0	0	0.1	0	0	0	0.5	0	0
wrentit	0.06	0.04	0.07	0.06	1.7	0.8	1.2	2.1	5.1	2.6	4.3	5.1
yellow-rumped warbler	0.32	0.24	0.21	0	8.9	5.6	3.8	0	24.1	19.5	7.7	0
yellow warbler	0	0.17	<0.01	0	0	4.1	0.2	0	0	9.2	0.9	0

Appendix B2. Mean small bird use (number of small birds/100-meter plot/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each small bird type and species by season during small bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

	Mean Use				% of Use				% Frequency			
Type/Species	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**
Swifts/Hummingbirds	**0.34**	**0.02**	**0.03**	**0.07**	**9.6**	**0.4**	**0.6**	**2.5**	**4.3**	**1.5**	**2.6**	**5.1**
Anna's hummingbird	0.03	<0.01	0.02	0.07	0.7	0.1	0.3	2.5	2.6	0.5	1.7	5.1
rufous hummingbird	0.02	0	0	0	0.5	0	0	0	1.7	0	0	0
unidentified hummingbird	0	0.01	0.02	0	0	0.2	0.3	0	0	1.0	0.9	0
Vaux's swift	0.30	0	0	0	8.4	0	0	0	0.9	0	0	0
Woodpeckers	**0.27**	**0.28**	**0.37**	**0.13**	**7.6**	**6.6**	**6.6**	**4.6**	**20.6**	**22.1**	**26.5**	**9.4**
downy woodpecker	0	0.02	0.03	0.03	0	0.4	0.5	0.9	0	1.5	2.6	2.6
hairy woodpecker	0.07	0.05	0.08	0.02	1.9	1.2	1.4	0.6	6.0	4.6	6.0	1.7
northern flicker	0.13	0.16	0.19	0.03	3.7	3.9	3.4	1.2	13.2	15.4	16.2	2.6
pileated woodpecker	0	0	<0.01	0	0	0	0.2	0	0	0	0.9	0
red-breasted sapsucker	0	<0.01	0	0	0	0.1	0	0	0	0.5	0	0
unidentified woodpecker	0.02	0.03	0.02	0	0.6	0.6	0.3	0	2.2	2.6	1.7	0
white-headed woodpecker	0.05	0.02	0.05	0.05	1.3	0.4	0.9	1.8	4.0	1.5	4.3	3.4
Unidentified Birds	**0.03**	**0**	**0**	**0**	**0.8**	**0**	**0**	**0**	**2.8**	**0**	**0**	**0**
Unidentified small bird	0.03	0	0	0	0.8	0	0	0	2.8	0	0	0
Overall	**3.56**	**4.23**	**5.61**	**2.79**	**100**	**100**	**100**	**100**				

Appendix C. Mean Use by Point for All Birds, Major Bird Types, and Diurnal Raptor Subtypes during Fixed-Point Surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018

Appendix C1. Mean use (number of birds/800-meter plot/60-minute survey) by point for all large birds, major bird types, and diurnal raptor subtypes observed at the Fountain Wind Project during large bird surveys from 19 April 2017 – 22 May 2018.

Obs. Pt.	Waterbirds	Waterfowl	Diurnal Raptors	Accipiters	Buteos	Northern Harrier	Eagles	Falcons	Other Raptors	Owls	Vultures	Upland Game Birds	Doves/ Pigeons	Large Corvids	All Large Birds
1	0	0	0.36	0.14	0.14	0	0.07	0	0	0.07	0.36	0	0	0.29	**1.07**
2	0	2.14	0.36	0.14	0.21	0	0	0	0	0	0.79	0	0	0.93	**4.21**
3	0.14	42.64	0.14	0	0.07	0.07	0	0	0	0	0.43	0	0	0.79	**44.14**
4	0	0	0.43	0.07	0.29	0	0.07	0	0	0	0.57	0	0	0.64	**1.64**
5	0	0.21	1	0.21	0.64	0.07	0	0.07	0	0	2.29	0	0	0.07	**3.57**
6	0	0	0.43	0.21	0.21	0	0	0	0	0	0.71	0	0	0.29	**1.43**
7	0	0	0.93	0	0.79	0	0.14	0	0	0	0.36	0	0	0.57	**1.86**
8	0	1.43	0.07	0	0	0	0.07	0	0	0	0.21	0.07	0	0.07	**1.86**
9	0	0	0.29	0.07	0.21	0	0	0	0	0	0.5	0.07	0.14	0.57	**1.57**
10	0	0	0.07	0	0	0	0	0	0.07	0	0.36	0	0	0	**0.43**
11	0	7.21	0.14	0	0	0	0	0.07	0.07	0	0.64	0	0.93	0.14	**9.07**
12	0	0	0.14	0	0.07	0	0.07	0	0	0	0.93	0	0	0.29	**1.36**
13	0	0	0.07	0	0.07	0	0	0	0	0	0.86	0.07	0	0	**1**
14	0	0	0.64	0.14	0.5	0	0	0	0	0.07	1.07	0	0.07	0.07	**1.93**
15	0	0	0.43	0	0.36	0	0	0.07	0	0	1.64	0	0	0.36	**2.43**
16	0	13.57	0.29	0	0.29	0	0	0	0	0	0.64	0.07	0	0	**14.57**
17	0	13.85	0.77	0.15	0.54	0	0	0	0.08	0	2.85	0	0.23	0	**17.69**
18	0	35.31	0.46	0	0.23	0	0.23	0	0	0	1.77	0	0	0.08	**37.62**
19	0	0	0.31	0.08	0.15	0	0.08	0	0	0	0.85	0	0	0.15	**1.31**
20	0	0.08	0.08	0	0	0	0.08	0	0	0	0.62	0	0	0.08	**0.85**
21	0	2	0.14	0	0.14	0	0	0	0	0	1.07	0.07	0.43	0.43	**4.14**
22	0	0	0.21	0.07	0.14	0	0	0	0	0	0.64	0	0	0.21	**1.07**
23	0	0.71	0.07	0	0.07	0	0	0	0	0	0.21	0	0	0	**1**
24	0	0	0.36	0.14	0.14	0	0.07	0	0	0	1.5	0	0	1.86	**3.71**
25	1.14	7.29	0.21	0	0.21	0	0	0	0	0	0.93	0	0	0.64	**10.21**
26	2.36	0	0.86	0.07	0.71	0	0.07	0	0	0	1.93	0	0	0.86	**6**
27	0	8.36	0.36	0.07	0.14	0	0.07	0.07	0	0	0.5	0	0	0.14	**9.36**
28	0	0	0.46	0.15	0.31	0	0	0	0	0	0.85	0.15	0	0.62	**2.08**
29	4.21	0	0.71	0	0.57	0.07	0	0	0.07	0	2.07	0	0.14	0.64	**7.79**
30	0	3.08	1.92	0.15	1.62	0	0	0.15	0	0	3.77	0.08	0	1.31	**10.15**
31	0.38	0	0.31	0	0.31	0	0	0	0	0	1	0	0	0	**1.69**
32	0	0	0.31	0	0.23	0	0	0	0.08	0	1.08	0	0	0.69	**2.08**
33	0	8.85	0.23	0.08	0.15	0	0	0	0	0	1.38	0	0	0.46	**10.92**
34	0	0	0.46	0.15	0.31	0	0	0	0	0	0.85	0	0	0.23	**1.54**
35	0	5.38	0.62	0.08	0.31	0	0.23	0	0	0	1.31	0.08	0	0.15	**7.54**
36	0	0	0.23	0	0.15	0.08	0	0	0	0	1.46	0	0	1	**2.69**

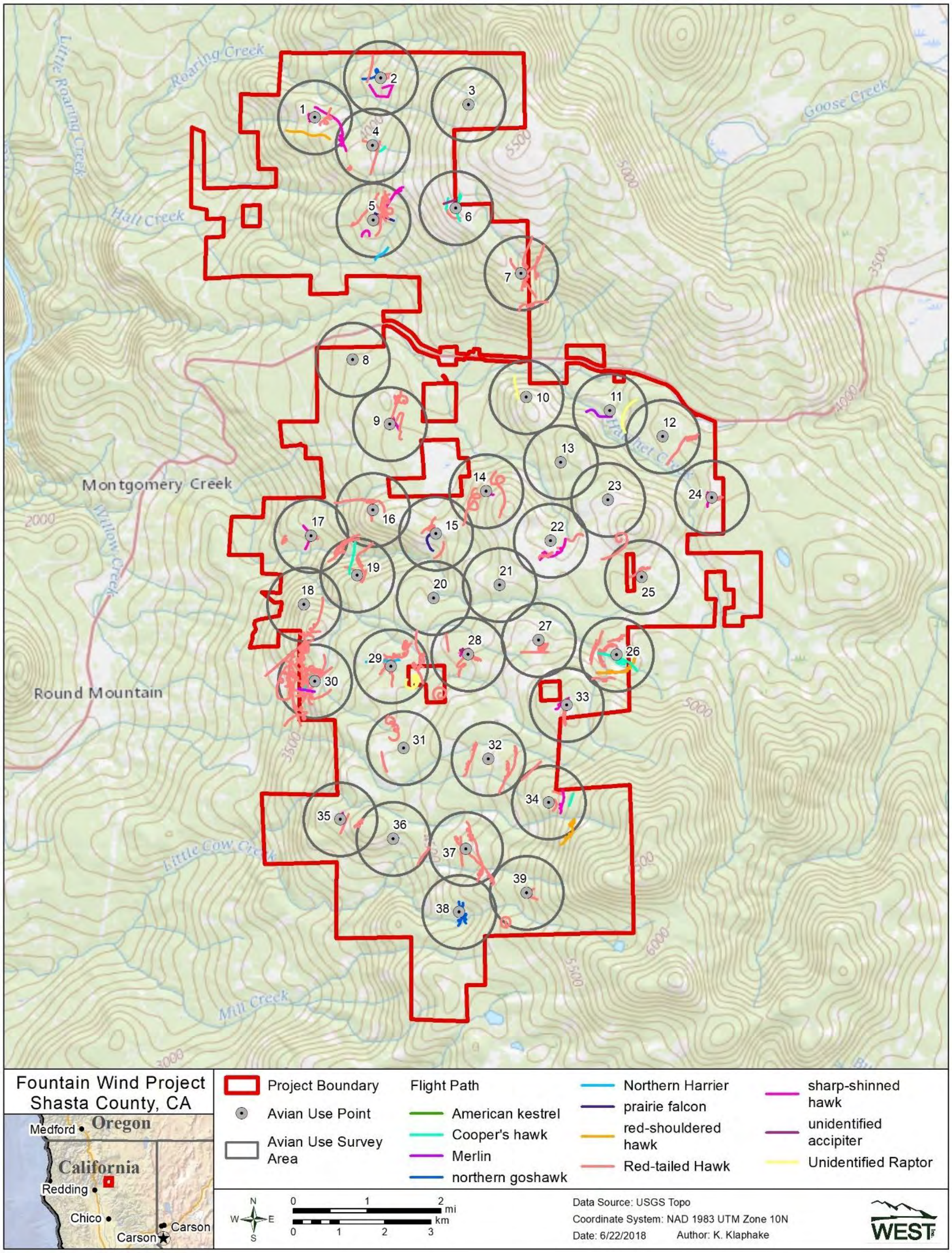
Appendix C1. Mean use (number of birds/800-meter plot/60-minute survey) by point for all large birds, major bird types, and diurnal raptor subtypes observed at the Fountain Wind Project during large bird surveys from 19 April 2017 – 22 May 2018.

Obs. Pt.	Waterbirds	Waterfowl	Diurnal Raptors	Accipiters	Buteos	Northern Harrier	Eagles	Falcons	Other Raptors	Owls	Vultures	Upland Game Birds	Doves/ Pigeons	Large Corvids	All Large Birds
37	0	0	0.31	0	0.31	0	0	0	0	0	1.92	0	0	0.62	**2.85**
38	0	0	0.23	0.15	0.08	0	0	0	0	0	0.69	0	0	0.85	**1.77**
39	2.23	0	0.23	0	0.15	0	0.08	0	0	0	0.46	0	0	0.69	**3.62**

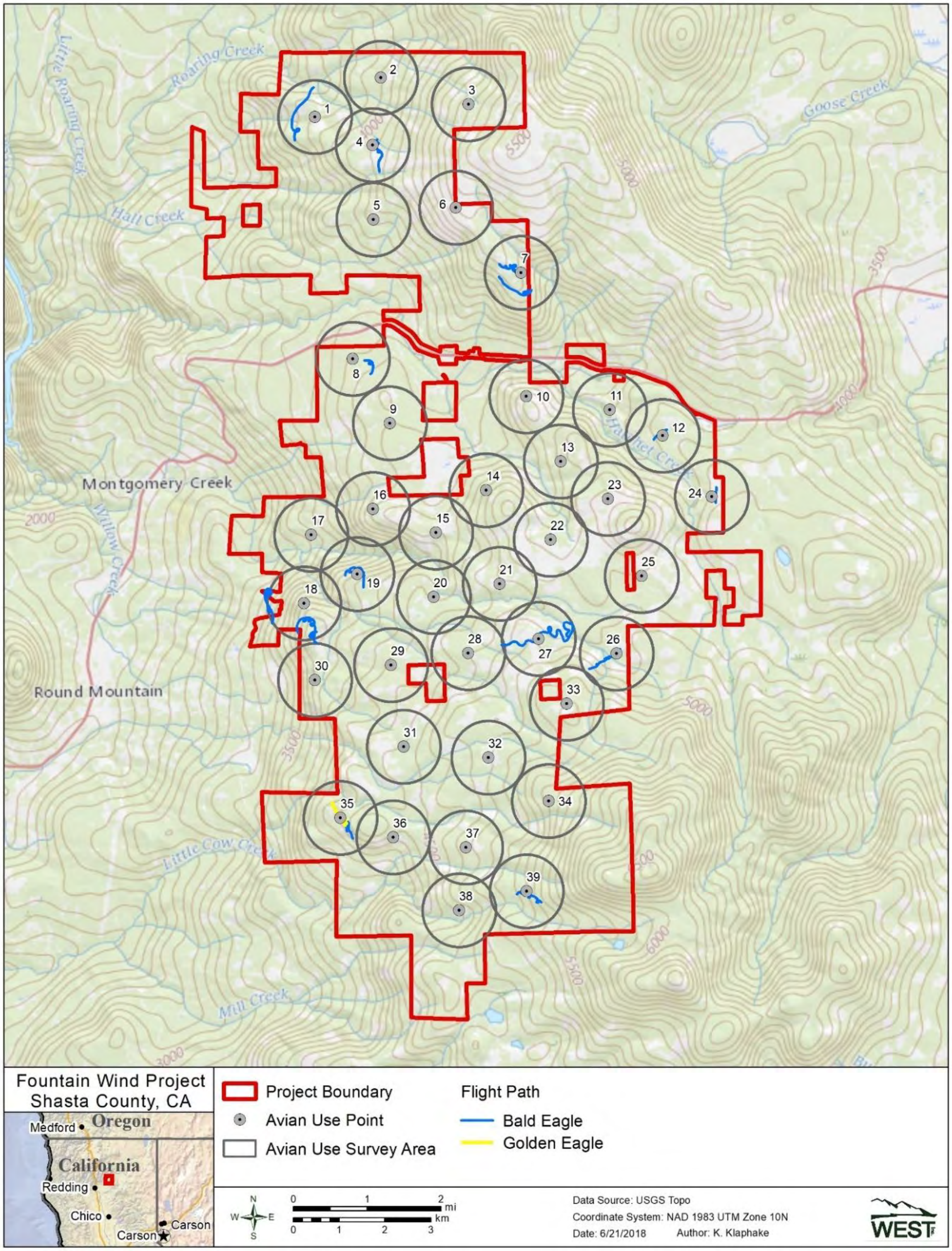
Appendix C2. Mean use (number of birds/100-meter plot/10-minute survey) by point for all small birds and major small bird types observed at the Fountain Wind Project during small bird surveys from 19 April 2017 – 22 May 2018.

Observation Point	Passerines	Swifts/ Hummingbirds	Woodpeckers	Unidentified Birds	All Small Birds
1	5.36	0	0.29	0	5.64
2	2.79	0	0.50	0	3.29
3	3.79	0	0.29	0	4.07
4	3.57	0.07	0.57	0	4.21
5	2.86	0.07	0	0	2.93
6	2.50	2.57	0.36	0	5.43
7	6.93	0	0.21	0	7.14
8	3.64	0	0.14	0	3.79
9	3.14	0	0.07	0	3.21
10	2.86	0	0	0	2.86
11	5.50	0.07	0.14	0.07	5.79
12	3.29	0	0.50	0.07	3.86
13	3.36	0	0.07	0	3.43
14	4.43	0	0.07	0	4.50
15	2.00	0	0.29	0	2.29
16	4.29	0	0.14	0	4.43
17	8.15	0.31	0.31	0	8.77
18	2.85	0.15	0	0	3.00
19	4.38	0.08	0.31	0	4.77
20	2.23	0	0.46	0	2.69
21	3.50	0	0.29	0	3.79
22	2.71	0	0.14	0	2.86
23	4.00	0	0.07	0	4.07
24	4.79	0	0.21	0	5.00
25	3.64	0	0.21	0	3.86
26	1.64	0.07	0.43	0	2.14
27	2.36	0.07	0.36	0	2.79
28	2.23	0	0.54	0	2.77
29	3.57	0.21	0.29	0	4.07
30	4.85	0.23	0.31	0	5.38
31	5.85	0	0.23	0	6.08
32	3.15	0	0.15	0	3.31
33	4.69	0	0.46	0	5.15
34	5.31	0	0.38	0	5.69
35	5.54	0	0.23	0	5.77
36	2.92	0	0.31	0	3.23
37	3.00	0	0.54	0	3.54
38	3.62	0	0.08	0	3.69
39	1.69	0.08	0.38	0	2.15

Appendix D. Diurnal Raptor and Eagle Flight Paths Recorded during Fixed-Point Avian Use Surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018



Appendix D1. Diurnal raptor (non-eagle) flight paths recorded during large bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.



Appendix D2. Eagle flight paths recorded during large bird surveys at the Fountain Wind Project from 19 April 2017 – 22 May 2018.

Appendix E. All Bird and Diurnal Raptor Fatality Rates at Wind Energy Facilities in North America

Appendix E. Wind energy facilities in North America, by region, with publicly available and comparable fatality data for all bird species and diurnal raptor species.

Wind Energy Facility	All Bird Fatality Estimate[A]	Diurnal Raptor Fatality Estimate	No. of Turbines	Total MW
	California			
Pine Tree, CA (2009-2010, 2011)	17.44	-	90	135
Alta I, CA (2013-2014)	12.05	0.15	290	720
Montezuma I, CA (2012)	8.91	0.79	16	36.8
Alta I, CA (2011-2012)	7.07	0.27	100	150
Shiloh I, CA (2006-2009)	6.96	0.42	100	150
Windstar, CA (2012-2013)	6.65	0.18	53	106
Montezuma I, CA (2011)	5.19	1.06	16	36.8
Alta X, CA (2014-2015)	4.88	0.04	48	137
Dillon, CA (2008-2009)	4.71	0	45	45
Diablo Winds, CA (2005-2007)	4.29	0.4	31	20.46
Lower West, CA (2012-2013)	3.25	0	7	14
Shiloh III, CA (2012-2013)	3.3	-	50	102.5
Rising Tree, CA (2015-2016)	3.1	0.06	60	198
Shiloh II, CA (2010-2011)	2.8	0.44	75	150
Shiloh II, CA (2011-2012)	2.8	0.97	75	150
Alta II-V, CA (2013-2014)	2.79	0	290	720
Alta I, CA (2015-2016)	2.57	0.15	290	720
Hatchet Ridge, CA (2011)	2.5	0.03	44	101
Alta X, CA (2015-2016)	2.17	0	48	137
North Sky River, CA (2013-2014)	2.05	0.05	100	160
Shiloh II, CA (2009-2010)	1.9	0.11	75	150
Alta II-V, CA (2011-2012)	1.66	0.05	190	570
Mustang Hills, CA (2012-2013)	1.66	0.08	50	150
Rising Tree, CA (2017-2018)	1.63	0.14	60	198
High Winds, CA (2003-2004)	1.62	0.5	90	162
Solano III, CA (2012-2013)	1.6	0.95	55	128
North Sky River, CA (2014-2015)	1.23	0.07	100	160
Hatchet Ridge, CA (2013)	1.22	-	44	101
Pinyon Pines I & II, CA (2013-2014)	1.18	0	100	300
High Winds, CA (2004-2005)	1.1	0.28	90	162
Montezuma II, CA (2012-2013)	1.08	0.46	34	78.2
Mustang Hills, CA (2014-2015)	0.97	0.03	100	300
Lower West, CA (2014-2015)	0.9	0	7	14
Hatchet Ridge, CA (2012)	0.83	0	44	101
Pacific Wind, CA (2015-2016)	0.77	0.07	70	144
Lower West, CA (2016-2017)	0.73	0	7	14
North Sky River, CA (2015-2016)	0.72	0.17	100	160
Alta VIII, CA (2012-2013)	0.66	0.02	50	150
Cameron Ridge/Section 15, CA (2015-2016)	0.57	0	34	102
Pinyon Pines I & II, CA (2017-2018)	0.56	0.01	100	300
Alite, CA (2009-2010)	0.55	0.12	8	24
Mustang Hills, CA (2016-2017)	0.54	0.15	50	150
Alta II-V, CA (2015-2016)	0.51	0	290	720
Pinyon Pines I&II, CA (2015-2016)	0.5	0.02	100	300
Cameron Ridge/Section 15, CA (2014-2015)	0.45	0.04	34	102
Alta VIII, CA (2014-2015)	0.38	0.04	50	150
Alta VIII, CA (2016-2017)	0.25	0	50	150
Pacific Wind, CA (2014-2015)	0.17	0	70	144
	Pacific Northwest			

Appendix E. Wind energy facilities in North America, by region, with publicly available and comparable fatality data for all bird species and diurnal raptor species.

Wind Energy Facility	All Bird Fatality Estimate[A]	Diurnal Raptor Fatality Estimate	No. of Turbines	Total MW
Windy Flats, WA (2010-2011)	8.45	0.04	114	262.2
Leaning Juniper, OR (2006-2008)	6.66	0.16	67	100.5
Linden Ranch, WA (2010-2011)	6.65	0.27	25	50
Biglow Canyon, OR (Phase II; 2009-2010)	5.53	0.14	65	150
White Creek, WA (2007-2011)	4.05	0.47	89	204.7
Tuolumne (Windy Point I), WA (2009-2010)	3.2	0.29	62	136.6
Stateline, OR/WA (2001-2002)	3.17	0.09	454	299
Klondike II, OR (2005-2006)	3.14	0.06	50	75
Klondike III (Phase I), OR (2007-2009)	3.02	0.15	125	223.6
Hopkins Ridge, WA (2008)	2.99	0.07	87	156.6
Harvest Wind, WA (2010-2012)	2.94	0.23	43	98.9
Nine Canyon, WA (2002-2003)	2.76	0.03	37	48.1
Biglow Canyon, OR (Phase II; 2010-2011)	2.68	0.03	65	150
Stateline, OR/WA (2003)	2.68	0.09	454	299
Klondike IIIa (Phase II), OR (2008-2010)	2.61	0.06	51	76.5
Combine Hills, OR (Phase I; 2004-2005)	2.56	0	41	41
Big Horn, WA (2006-2007)	2.54	0.11	133	199.5
Biglow Canyon, OR (Phase I; 2009)	2.47	0	76	125.4
Combine Hills, OR (2011)	2.33	0.05	104	104
Biglow Canyon, OR (Phase III; 2010-2011)	2.28	0.05	76	174.8
Hay Canyon, OR (2009-2010)	2.21	0	48	100.8
Elkhorn, OR (2010)	1.95	0.08	61	101
Pebble Springs, OR (2009-2010)	1.93	0.04	47	98.7
Biglow Canyon, OR (Phase I; 2008)	1.76	0.03	76	125.4
Wild Horse, WA (2007)	1.55	0.09	127	229
Goodnoe, WA (2009-2010)	1.4	0.17	47	94
Vantage, WA (2010-2011)	1.27	0.29	60	90
Hopkins Ridge, WA (2006)	1.23	0.14	83	150
Stateline, OR/WA (2006)	1.23	0.11	454	299
Kittitas Valley, WA (2011-2012)	1.06	0.09	48	100.8
Klondike, OR (2002-2003)	0.95	0	16	24
Vansycle, OR (1999)	0.95	0	38	24.9
Palouse Wind, WA (2012-2013)	0.72	-	58	104.4
Elkhorn, OR (2008)	0.64	0.06	61	101
Marengo I, WA (2009-2010)	0.27	0	78	140.4
Marengo II, WA (2009-2010)	0.16	0.05	39	70.2
Southwestern				
Dry Lake I, AZ (2009-2010)	2.02	0	30	63
Dry Lake II, AZ (2011-2012)	1.57	0	31	65
Southern Plains				
Buffalo Gap I, TX (2006)	1.32	0.1	67	134
Barton Chapel, TX (2009-2010)	1.15	0.25	60	120
Buffalo Gap II, TX (2007-2008)	0.15	0	155	233
Big Smile, OK (2012-2013)	0.09	0	66	132
Red Hills, OK (2012-2013)	0.08	0.04	82	123
Rocky Mountains				
Foote Creek Rim, WY (Phase I; 1999)	3.4	0.08	69	41.4
Foote Creek Rim, WY (Phase I; 2000)	2.42	0.05	69	41.4
Foote Creek Rim, WY (Phase I; 2001-2002)	1.93	0	69	41.4

Appendix E. Wind energy facilities in North America, by region, with publicly available and comparable fatality data for all bird species and diurnal raptor species.

Wind Energy Facility	All Bird Fatality Estimate[A]	Diurnal Raptor Fatality Estimate	No. of Turbines	Total MW
Summerview, Alb (2005-2006)	1.06	0.11	39	70.2
Milford I & II, UT (2011-2012)	0.73	0.04	107	160.5
Milford I, UT (2010-2011)	0.56	-	58	145
Midwest				
Wessington Springs, SD (2009)	8.25	0.06	34	51
Blue Sky Green Field, WI (2008; 2009)	7.17	0	88	145
Cedar Ridge, WI (2009)	6.55	0.18	41	67.6
Buffalo Ridge, MN (Phase III; 1999)	5.93	0	138	103.5
Moraine II, MN (2009)	5.59	0.37	33	49.5
Barton I & II, IA (2010-2011)	5.5	0	80	160
Buffalo Ridge I, SD (2009-2010)	5.06	0.2	24	50.4
Buffalo Ridge, MN (Phase I; 1996)	4.14	0	73	25
Winnebago, IA (2009-2010)	3.88	0.27	10	20
Rugby, ND (2010-2011)	3.82	0.06	71	149
Cedar Ridge, WI (2010)	3.72	0.13	41	68
Elm Creek II, MN (2011-2012)	3.64	0	62	148.8
Buffalo Ridge, MN (Phase II; 1999)	3.57	0	143	107.25
Buffalo Ridge, MN (Phase I; 1998)	3.14	0	73	25
Ripley, Ont (2008)	3.09	0.1	38	76
Fowler I, IN (2009)	2.83	0	162	301
Buffalo Ridge, MN (Phase I; 1997)	2.51	0	73	25
Buffalo Ridge, MN (Phase II; 1998)	2.47	0	143	107.25
PrairieWinds SD1, SD (2012-2013)	2.01	0.03	108	162
Buffalo Ridge II, SD (2011-2012)	1.99	0	105	210
Kewaunee County, WI (1999-2001)	1.95	0	31	20.46
Port Dover and Nanticoke, ON (2014)	1.66	0.07	58	104
PrairieWinds SD1, SD (2013-2014)	1.66	0.17	108	162
NPPD Ainsworth, NE (2006)	1.63	0.06	36	20.5
PrairieWinds ND1 (Minot), ND (2011)	1.56	0.05	80	115.5
Elm Creek, MN (2009-2010)	1.55	0	67	100
PrairieWinds ND1 (Minot), ND (2010)	1.48	0.05	80	115.5
Buffalo Ridge, MN (Phase I; 1999)	1.43	0.47	73	25
PrairieWinds SD1, SD (2011-2012)	1.41	0	108	162
Top Crop I & II (2012-2013)	1.35	-	68	300
Heritage Garden I, MI (2012-2014)	1.3	-	14	28
Wessington Springs, SD (2010)	0.89	0.07	34	51
Rail Splitter, IL (2012-2013)	0.84	0	67	100.5
Top of Iowa, IA (2004)	0.81	0.17	89	80
Grand Valley, ON (2016)	0.68	0.04	16	40
Big Blue, MN (2013)	0.6	0	18	36
Grand Ridge I, IL (2009-2010)	0.48	0	66	99
Top of Iowa, IA (2003)	0.42	0	89	80
Big Blue, MN (2014)	0.37	0	18	36
Pioneer Prairie II, IA (2011-2012)	0.27	0	62	102.3
Northeast				
Stetson Mountain I, ME (2013)	6.95	0	38	57
Criterion, MD (2011)	6.4	0.02	28	70
Mount Storm, WV (2011)	4.24	0.03	132	264
Pinnacle, WV (2012)	3.99	0	23	55.2
Mount Storm, WV (2009)	3.85	0	132	264

Appendix E. Wind energy facilities in North America, by region, with publicly available and comparable fatality data for all bird species and diurnal raptor species.

Wind Energy Facility	All Bird Fatality Estimate[A]	Diurnal Raptor Fatality Estimate	No. of Turbines	Total MW
Record Hill, ME (2012)	3.7	-	22	50.6
Criterion, MD (2013)	3.49	-	28	70
Lempster, NH (2009)	3.38	0	12	24
Stetson Mountain II, ME (2012)	3.37	0	17	25.5
Rollins, ME (2012)	2.9	-	40	60
Casselman, PA (2009)	2.88	0	23	34.5
Mountaineer, WV (2003)	2.69	0.07	44	66
Stetson Mountain I, ME (2009)	2.68	0	38	57
Noble Ellenburg, NY (2009)	2.66	0.25	54	80
Lempster, NH (2010)	2.64	0	12	24
Mount Storm, WV (2010)	2.6	0.1	132	264
Maple Ridge, NY (2007)	2.34	0.03	195	321.75
Noble Bliss, NY (2009)	2.28	0.12	67	100
Criterion, MD (2012)	2.14	0.02	28	70
Maple Ridge, NY (2007-2008)	2.07	0.03	195	321.75
Record Hill, ME (2014)	1.84	-	22	50.6
Noble Altona, NY (2010)	1.84	0	65	97.5
High Sheldon, NY (2010)	1.76	0.06	75	112.5
Mars Hill, ME (2008)	1.76	0	28	42
Noble Wethersfield, NY (2010)	1.7	0.13	84	126
Mars Hill, ME (2007)	1.67	0	28	42
Noble Chateaugay, NY (2010)	1.66	0.08	71	106.5
Noble Clinton, NY (2008)	1.59	0.1	67	100
High Sheldon, NY (2011)	1.57	0	75	112.5
Casselman, PA (2008)	1.51	0	23	34.5
Beech Ridge, WV (2013)	1.48	0.01	67	100.5
Munnsville, NY (2008)	1.48	0.59	23	34.5
Stetson Mountain II, ME (2010)	1.42	0	17	25.5
Cohocton/Dutch Hill, NY (2009)	1.39	0	50	125
Cohocton/Dutch Hills, NY (2010)	1.32	0.08	50	125
Noble Bliss, NY (2008)	1.3	0.1	67	100
Beech Ridge, WV (2012)	1.19	0.01	67	100.5
Stetson Mountain I, ME (2011)	1.18	0	38	57
Noble Clinton, NY (2009)	1.11	0.16	67	100
Locust Ridge, PA (Phase II; 2009)	0.84	0	51	102
Noble Ellenburg, NY (2008)	0.83	0.11	54	80
Locust Ridge, PA (Phase II; 2010)	0.76	0	51	102
	Southeastern			
Buffalo Mountain, TN (2000-2003)	11.02	0	3	1.98
Buffalo Mountain, TN (2005)	1.1	0	18	28.98

A=number of bird fatalities/MW/year

Appendix E (*continued*). Wind energy facilities in North America, by region, with publicly available and comparable fatality data for all bird species and diurnal raptor species.

Data from the following sources:

Wind Energy Facility	Fatality Estimate	Wind Energy Facility	Fatality Estimate
Alite, CA (2009-2010)	Chatfield et al. 2010	Lower West, CA (2016-2017)	WEST 2017b
Alta I, CA (2011-2012)	Chatfield et al. 2012	Maple Ridge, NY (2007)	Jain et al. 2009a
Alta I, CA (2013-2014)	Chatfield et al. 2014	Maple Ridge, NY (2007-2008)	Jain et al. 2009b
Alta I, CA (2015-2016)	Thompson et al. 2016	Marengo I, WA (2009-2010)	URS Corporation 2010c
Alta II-V, CA (2011-2012)	Chatfield et al. 2012	Marengo II, WA (2009-2010)	URS Corporation 2010b
Alta II-V, CA (2013-2014)	Chatfield et al. 2014	Mars Hill, ME (2007)	Stantec 2008
Alta II-V, CA (2015-2016)	Thompson et al. 2016	Mars Hill, ME (2008)	Stantec 2009a
Alta VIII, CA (2012-2013)	Chatfield and Bay 2014	Milford I & II, UT (2011-2012)	Stantec 2012
Alta VIII, CA (2014-2015)	WEST 2016c	Milford I, UT (2010-2011)	Stantec 2011a
Alta VIII, CA (2016-2017)	WEST 2018	Montezuma I, CA (2011)	ICF International 2012
Alta X, CA (2014-2015)	Chatfield et al. 2015	Montezuma I, CA (2012)	ICF International 2013
Alta X, CA (2015-2016)	Thompson et al. 2016	Montezuma II, CA (2012-2013)	Harvey & Associates 2013
Barton Chapel, TX (2009-2010)	WEST 2011	Moraine II, MN (2009)	Derby et al. 2010a
Barton I & II, IA (2010-2011)	Derby et al. 2011a	Mount Storm, WV (2009)	Young et al. 2009b, 2010a
Beech Ridge, WV (2012)	Tidhar et al. 2013	Mount Storm, WV (2010)	Young et al. 2010b, 2011a
Beech Ridge, WV (2013)	Young et al. 2014a	Mount Storm, WV (2011)	Young et al. 2011b, 2012a
Big Blue, MN (2013)	Fagen Engineering 2014	Mountaineer, WV (2003)	Kerns and Kerlinger 2004
Big Blue, MN (2014)	Fagen Engineering 2015	Munnsville, NY (2008)	Stantec 2009b
Big Horn, WA (2006-2007)	Kronner et al. 2008	Mustang Hills, CA (2012-2013)	Chatfield and Bay 2014
Big Smile, OK (2012-2013)	Derby et al. 2013a	Mustang Hills, CA (2014-2015)	WEST 2016c
Biglow Canyon, OR (Phase I; 2008)	Jeffrey et al. 2009a	Mustang Hills, CA (2016-2017)	WEST 2018
Biglow Canyon, OR (Phase I; 2009)	Enk et al. 2010	Nine Canyon, WA (2002-2003)	Erickson et al. 2003
Biglow Canyon, OR (Phase II; 2009-2010)	Enk et al. 2011b	Noble Altona, NY (2010)	Jain et al. 2011a
Biglow Canyon, OR (Phase II; 2010-2011)	Enk et al. 2012a	Noble Bliss, NY (2008)	Jain et al. 2009c
Biglow Canyon, OR (Phase III; 2010-2011)	Enk et al. 2012b	Noble Bliss, NY (2009)	Jain et al. 2010a
Blue Sky Green Field, WI (2008; 2009)	Gruver et al. 2009	Noble Chateaugay, NY (2010)	Jain et al. 2011b
Buffalo Gap I, TX (2006)	Tierney 2007	Noble Clinton, NY (2008)	Jain et al. 2009d
Buffalo Gap II, TX (2007-2008)	Tierney 2009	Noble Clinton, NY (2009)	Jain et al. 2010b
Buffalo Mountain, TN (2000-2003)	Nicholson et al. 2005	Noble Ellenburg, NY (2008)	Jain et al. 2009e
Buffalo Mountain, TN (2005)	Fiedler et al. 2007	Noble Ellenburg, NY (2009)	Jain et al. 2010c
Buffalo Ridge I, SD (2009-2010)	Derby et al. 2010b	Noble Wethersfield, NY (2010)	Jain et al. 2011c
Buffalo Ridge II, SD (2011-2012)	Derby et al. 2012a	North Sky River, CA (2013-2014)	Levenstein et al. 2014
Buffalo Ridge, MN (Phase I; 1996)	Johnson et al. 2000	North Sky River, CA (2014-2015)	Levenstein et al. 2015
Buffalo Ridge, MN (Phase I; 1997)	Johnson et al. 2000	North Sky River, CA (2015-2016)	WEST 2016d
Buffalo Ridge, MN (Phase I; 1998)	Johnson et al. 2000	NPPD Ainsworth, NE (2006)	Derby et al. 2007
Buffalo Ridge, MN (Phase I; 1999)	Johnson et al. 2000	Pacific Wind, CA (2014-2015)	WEST 2016a
Buffalo Ridge, MN (Phase II; 1998)	Johnson et al. 2000	Pacific Wind, CA (2015-2016)	WEST 2017a
Buffalo Ridge, MN (Phase II; 1999)	Johnson et al. 2000	Palouse Wind, WA (2012-2013)	Stantec 2013a
Buffalo Ridge, MN (Phase III; 1999)	Johnson et al. 2000	Pebble Springs, OR (2009-2010)	Gritski and Kronner 2010a

Appendix E (*continued*). Wind energy facilities in North America, by region, with publicly available and comparable fatality data for all bird species and diurnal raptor species.

Data from the following sources:

Wind Energy Facility	Fatality Estimate	Wind Energy Facility	Fatality Estimate
Cameron Ridge/Section 15, CA (2014-2015)	WEST 2016b	Pine Tree, CA (2009-2010, 2011)	BioResource Consultants 2012
Cameron Ridge/Section 15, CA (2015-2016)	Rintz and Thompson 2017	Pinnacle, WV (2012)	Hein et al. 2013
Casselman, PA (2008)	Arnett et al. 2009	Pinyon Pines I & II, CA (2013-2014)	Chatfield and Russo 2014
Casselman, PA (2009)	Arnett et al. 2010	Pinyon Pines I & II, CA (2017-2018)	Rintz and Pham 2018
Cedar Ridge, WI (2009)	BHE Environmental 2010	Pinyon Pines, CA (2015-2016)	Rintz and Starcevich 2016
Cedar Ridge, WI (2010)	BHE Environmental 2011	Pioneer Prairie II, IA (2011-2012)	Chodachek et al. 2012
Cohocton/Dutch Hill, NY (2009)	Stantec 2010	Pleasant Valley, MN (2016-2017)	Tetra Tech 2017a
Cohocton/Dutch Hills, NY (2010)	Stantec 2011b	Port Dover and Nanticoke Wind Project, ON (2014)	Stantec Consulting Ltd. 2015
Combine Hills, OR (2011)	Enz et al. 2012	Prairie Rose, MN (2014)	Chodachek et al. 2015
Combine Hills, OR (Phase I; 2004-2005)	Young et al. 2006	PrairieWinds ND1 (Minot), ND (2010)	Derby et al. 2011b
Criterion, MD (2011)	Young et al. 2012b	PrairieWinds ND1 (Minot), ND (2011)	Derby et al. 2012b
Criterion, MD (2012)	Young et al. 2013	PrairieWinds SD1, SD (2011-2012)	Derby et al. 2012c
Criterion, MD (2013)	Young et al. 2014b	PrairieWinds SD1, SD (2012-2013)	Derby et al. 2013b
Diablo Winds, CA (2005-2007)	WEST 2006, 2008	PrairieWinds SD1, SD (2013-2014)	Derby et al. 2014
Dillon, CA (2008-2009)	Chatfield et al. 2009	Rail Splitter, IL (2012-2013)	Good et al. 2013a
Dry Lake I, AZ (2009-2010)	Thompson et al. 2011	Record Hill, ME (2012)	Stantec 2013b
Dry Lake II, AZ (2011-2012)	Thompson and Bay 2012	Record Hill, ME (2014)	Stantec 2015
Elkhorn, OR (2008)	Jeffrey et al. 2009b	Red Hills, OK (2012-2013)	Derby et al. 2013c
Elkhorn, OR (2010)	Enk et al. 2011a	Ripley, Ont (2008)	Jacques Whitford 2009
Elm Creek II, MN (2011-2012)	Derby et al. 2012d	Rising Tree, CA (2015-2016)	Rintz et al. 2016
Elm Creek, MN (2009-2010)	Derby et al. 2010c	Rising Tree, CA (2017-2018)	Chatfield et al. 2018
Foote Creek Rim, WY (Phase I; 1999)	Young et al. 2003	Rollins, ME (2012)	Stantec 2013c
Foote Creek Rim, WY (Phase I; 2000)	Young et al. 2003	Rugby, ND (2010-2011)	Derby et al. 2011c
Foote Creek Rim, WY (Phase I; 2001-2002)	Young et al. 2003	Shiloh I, CA (2006-2009)	Kerlinger et al. 2009
Fowler I, IN (2009)	Johnson et al. 2010	Shiloh II, CA (2009-2010)	Kerlinger et al. 2010, 2013a
Goodnoe, WA (2009-2010)	URS Corporation 2010a	Shiloh II, CA (2010-2011)	Kerlinger et al. 2013a
Grand Ridge I, IL (2009-2010)	Derby et al. 2010d	Shiloh II, CA (2011-2012)	Kerlinger et al. 2013a
Grand Valley, (2016)	Stantec Consulting Ltd. 2017	Shiloh III, CA (2012-2013)	Kerlinger et al. 2013b
Harvest Wind, WA (2010-2012)	Downes and Gritski 2012b	Solano III, CA (2012-2013)	AECOM 2013
Hatchet Ridge, CA (2011)	Tetra Tech 2013	Stateline, OR/WA (2001-2002)	Erickson et al. 2004
Hatchet Ridge, CA (2012)	Tetra Tech 2013	Stateline, OR/WA (2003)	Erickson et al. 2004
Hatchet Ridge, CA (2013)	Tetra Tech 2014	Stateline, OR/WA (2006)	Erickson et al. 2007
Hay Canyon, OR (2009-2010)	Gritski and Kronner 2010b	Stetson Mountain I, ME (2009)	Stantec 2009c
Heritage Garden I, MI (2012-2013)	Kerlinger et al. 2014	Stetson Mountain I, ME (2011)	Normandeau Associates 2011

Appendix E (*continued*). Wind energy facilities in North America, by region, with publicly available and comparable fatality data for all bird species and diurnal raptor species.

Data from the following sources:

Wind Energy Facility	Fatality Estimate	Wind Energy Facility	Fatality Estimate
Heritage Garden I, MI (2013-2014)	Kerlinger et al. 2014	Stetson Mountain I, ME (2013)	Stantec 2014
High Sheldon, NY (2010)	Tidhar et al. 2012a	Stetson Mountain II, ME (2010)	Normandeau Associates 2010
High Sheldon, NY (2011)	Tidhar et al. 2012b	Stetson Mountain II, ME (2012)	Stantec 2013d
High Winds, CA (2003-2004)	Kerlinger et al. 2006	Summerview, Alb (2005-2006)	Brown and Hamilton 2006
High Winds, CA (2004-2005)	Kerlinger et al. 2006	Top Crop I & II (2012-2013)	Good et al. 2013b
Hopkins Ridge, WA (2006)	Young et al. 2007b	Top of Iowa, IA (2003)	Jain 2005
Hopkins Ridge, WA (2008)	Young et al. 2009a	Top of Iowa, IA (2004)	Jain 2005
Kewaunee County, WI (1999-2001)	Howe et al. 2002	Tucannon River, WA (2015)	Hallingstad et al. 2016
Kittitas Valley, WA (2011-2012)	Stantec 2012	Tuolumne (Windy Point I), WA (2009-2010)	Enz and Bay 2010
Klondike II, OR (2005-2006)	NWC and WEST 2007	Vansycle, OR (1999)	Erickson et al. 2000
Klondike III (Phase I), OR (2007-2009)	Gritski et al. 2010	Vantage, WA (2010-2011)	Ventus 2012
Klondike IIIa (Phase II), OR (2008-2010)	Gritski et al. 2011	Waverly Wind, KS (2016-2017)	Tetra Tech 2017b
Klondike, OR (2002-2003)	Johnson et al. 2003	Wessington Springs, SD (2009)	Derby et al. 2010e
Leaning Juniper, OR (2006-2008)	Gritski et al. 2008	Wessington Springs, SD (2010)	Derby et al. 2011d
Lempster, NH (2009)	Tidhar et al. 2010	White Creek, WA (2007-2011)	Downes and Gritski 2012a
Lempster, NH (2010)	Tidhar et al. 2011	Wild Horse, WA (2007)	Erickson et al. 2008
Linden Ranch, WA (2010-2011)	Enz and Bay 2011	Wildcat, IN (2017)	Stantec 2018
Locust Ridge, PA (Phase II; 2009)	Arnett et al. 2011	Windstar, CA (2012-2013)	Levenstein and Bay 2013b
Locust Ridge, PA (Phase II; 2010)	Arnett et al. 2011	Windy Flats, WA (2010-2011)	Enz et al. 2011
Lower West, CA (2012-2013)	Levenstein and Bay 2013a	Winnebago, IA (2009-2010)	Derby et al. 2010f
Lower West, CA (2014-2015)	Levenstein and DiDonato 2015		

C8. Great Gray Owl Habitat Assessment

ENVIRONMENTAL & STATISTICAL CONSULTANTS
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TECHNICAL MEMORANDUM

DATE: October 24, 2018

TO: Kristen Goland, Pacific Wind Development LLC

FROM: Joel Thompson and Kori Hutchison, WEST, Inc.

RE: Great Gray Owl Habitat Assessment, Fountain Wind Project, CA

INTRODUCTION

Pacific Wind Development LLC contracted Western EcoSystems Technology, Inc. (WEST) to provide biological survey support for the development of the proposed Fountain Wind Project (Project; Figure 1). Great gray owl (*Strix nebulosa*) is currently designated as endangered by the state of California (CDFW 2018), with an estimated population size of only 100-200 pairs in the state (IBP 2015). According to the California Natural Diversity Database (CNDDB), there are no known occurrences of great gray owl within or immediately adjacent to the Project area; the nearest known occupied territories are located approximately 85 miles (mi; 136.7 kilometers [km]) to the northeast of the Project in Modoc County (CDFW 2018). While the Project is within the historical range of this species, based on CNDDB data (CDFW 2018) no confirmed detections of great gray owl have been recorded within Shasta County, and no indications of species presence have been observed during surveys conducted by WEST for various other species/species groups (e.g., northern goshawk, willow flycatcher, fixed point avian use surveys). Great gray owl nesting habitat in California is most commonly associated with dense forest stands adjacent to montane meadow foraging habitat (Huff and Godwin 2016; IBP 2015). Although this species has not been documented within the Project area, CDFW's Great Gray Owl Habitat Model (CDFW Model) indicated that potentially suitable foraging and nesting habitat may occur within the Project area (CDFW 2011), with all of the modeled potential habitat occurring on a private inholding within the larger Project area boundary (Figure 1). To determine the need for field surveys specific for great gray owl, WEST conducted desktop and field assessments of potential great gray owl habitats within the Project area in 2018, the methods and results of which are described in this memo.

SURVEY AREA

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project area is mixed coniferous forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*).

METHODS

Geographic Information System (GIS) data from the CNDDB and examination of aerial imagery were used to conduct a desktop review of potential great gray owl nesting and foraging habitat within the Project area using the CDFW Model (CNDDB 2011; Figure 1). This GIS-based model estimates where potential great grey owl nest sites may occur by extracting potential nesting areas along with their associated foraging areas from CALVEG land cover data (CALVEG 2004; CDFW 2011).

Once identified during the desktop assessment, a WEST biologist visited the Project to evaluate areas of modelled great gray owl habitat and to identify areas of potential habitat not predicted by the model. Consistent with the CDFW Model, criteria for inclusion as potential foraging habitat included the following Wildlife Habitat Relationship (WHR) types: wet meadows, annual grasslands and perennial grasslands; criteria for inclusion as potential nesting habitat included WHR size 4M (11-24 inches diameter at breast height, 12-24 foot (ft) crowns, and 40-59% canopy cover) and larger/denser (CDFW 2011, CDFW 2014). The CDFW Model nesting habitat criteria are generally consistent with criteria identified in the survey protocol for great gray owl within the Northwest Forest Plan (NWFP) Area (Huff and Godwin 2016), which indicates that suitable nesting habitat must include mature or old-growth conifer stands with greater than 50% canopy cover containing potential nest trees (broken-top snags greater than 16-in diameter at breast height, trees containing pre-existing stick nests from hawks, ravens, or squirrels; or mistletoe brooms). The NWFP protocol also states that although the minimum patch size of nesting habitat needed to support this species is unknown, all nests encountered in southwest Oregon were within patches exceeding 40 acres (Huff and Godwin 2016).

Because the only modeled nesting habitat was located in and adjacent the large meadow (Figure 1) on a private inholding, no specific measurements of tree size or canopy closure were taken within the area of modeled habitat. The field assessment was limited to a view of the modeled nesting habitat from the fence located on the west side of the meadow and an assessment of tree sizes in close proximity (i.e., visible from the edge of the meadow and immediately west of the meadow). Information from the field assessment was used for additional evaluations of aerial imagery comparing the modeled nesting habitat to nearby areas visited during the field assessment.

RESULTS AND DISCUSSION

Based on the CDFW Model and NWFP survey protocol, suitable nesting habitat requires 10 or more acres of foraging habitat within 660 feet of a potential nest site (CDFW 2011; Huff and Godwin 2016). One area of potential great gray owl nesting and associated foraging habitat was predicted to occur within the Project area by the CDFW Model (Figure 1). However, the desktop review of aerial imagery and habitat classifications determined that the area of modeled nesting habitat within the Project area does not meet the minimum criteria for suitability, which was confirmed during the field assessment. The modeled habitat within the Project area includes one very small area (0.9 acre) of nesting habitat consisting of a few scattered residual trees intermixed within early-seral conifers and open meadow. Based on a review of aerial imagery and visual inspection of the modeled nesting habitat from the edge of the meadow, relative to surrounding forest age classes, the nesting habitat did not appear to meet the CDFW (CDFW 2011) or NWFP (Huff and Godwin 2016) criteria for consideration as great gray owl nesting habitat. The associated foraging habitat consists of 15 acres of modeled habitat within a larger approximately 82-acre meadow/pasture that appears to be used for cattle grazing and some hay production. No other areas of potentially suitable nesting or foraging habitat were identified in the Project area during the desktop review.

Based on the desktop review and field assessment, the CDFW modeled habitat does not meet the criteria of suitable great gray owl nesting habitat and no other areas of potentially suitable habitat were identified in the Project area. Additionally, even though the modeled nesting habitat does not meet the criteria of suitable great gray owl nesting habitat, because it is located on an inholding within the larger Project area Project construction and operations will have no impacts on the modeled habitat. Given the lack of suitable great gray owl habitat within the Project area, species-specific field surveys for great gray owl are not warranted in support of the Project.

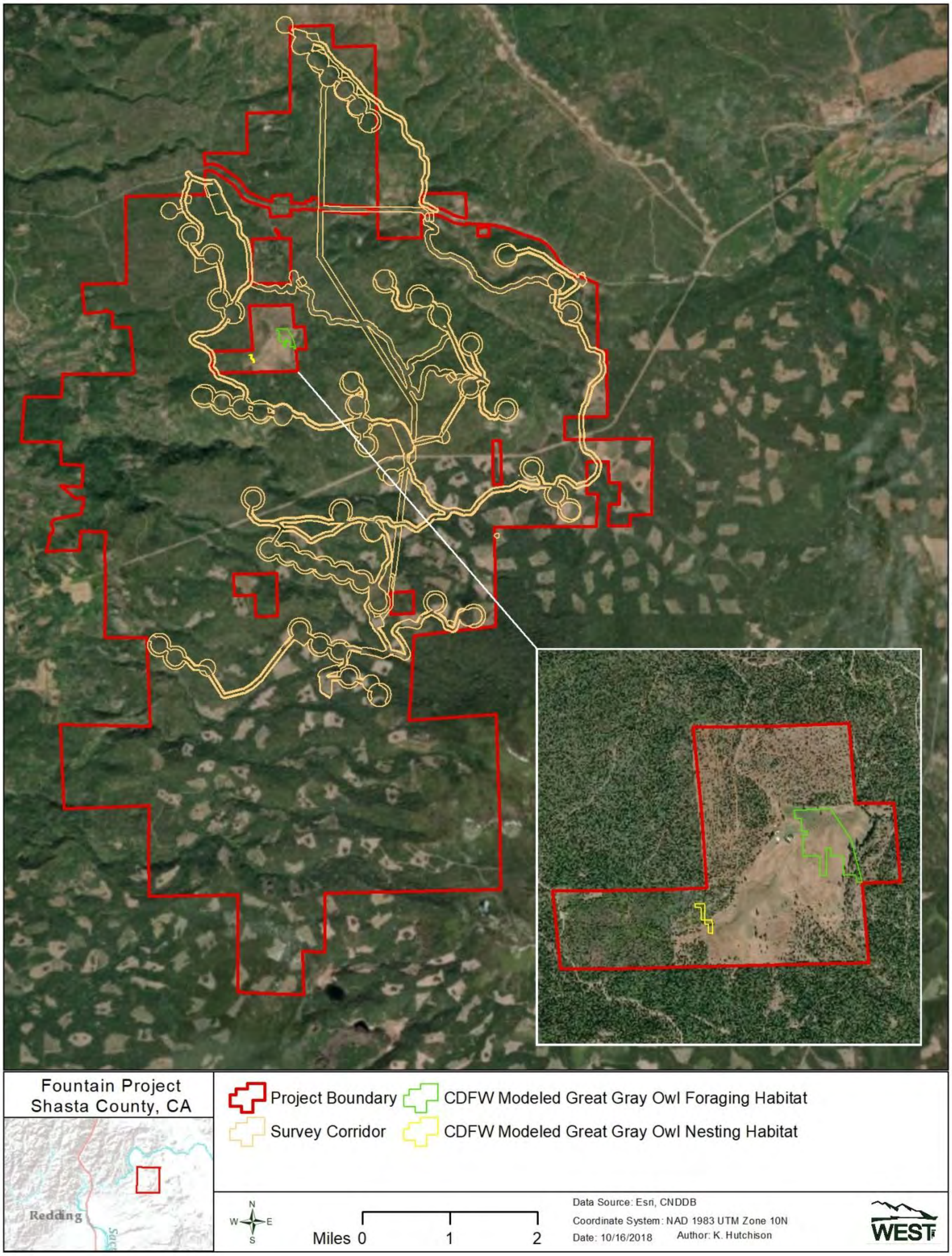

Figure 1. Areas of modeled nesting and foraging habitat identified by the CDFW Great Gray Habitat Model within the Fountain Wind Project, Shasta County, California.

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C9. Bat Acoustic Survey Report

BAT ACOUSTIC SURVEY REPORT

Fountain Wind Project
Shasta County, CA

Prepared for:

Pacific Wind Development LLC

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Prepared by:

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October 22, 2018

EXECUTIVE SUMMARY

In April 2017, Western Ecosystems Technology, Inc. (WEST) initiated bat acoustic surveys at the proposed Fountain Wind Project (Project) in Shasta County, California. WEST designed bat acoustic surveys to evaluate levels of bat activity and species' use of the Project during periods of expected peak activity (i.e., spring through fall). To address the two key study questions posed in the California Wind Energy Guidelines and assess the potential risk the Project may pose to bats, WEST conducted bat acoustic surveys to: 1) determine the bat species present at the Project during the peak bat activity period of spring through fall, and 2) assess the spatial and temporal patterns of bat activity which may influence the risk of collision for bats at the Project.

Bat acoustic surveys were conducted between 30 April and 13 November 2017 at seven stations representative of potential turbine locations ('representative' sampling stations) and at one station with feature(s) thought to be attractive to bats ('feature' sampling station) to assess risk to bats from Project development. Wildlife Acoustics Song Meter (SM3) full-spectrum bat detectors were placed at each of two meteorological (met) towers located in cleared montane coniferous forest. At each met tower, one microphone was placed near the ground ('ground' sampling station) at approximately 5.0 feet (ft; 1.5 meters [m]) above ground level (AGL) and a second microphone was elevated ('raised' sampling station) to approximately 148 ft (45 m) AGL. Raised sampling stations were placed to sample bat activity within the potential rotor-swept zone of commercial wind turbines. In total, there were four representative stations located at the two met towers; two raised stations and two ground stations. Three additional representative ground stations were added to increase spatial coverage at the Project. The one feature station was placed near ground level in a riparian meadow considered attractive to bats to provide an upper reference of bat activity at the Project.

Bat activity was monitored at eight sampling stations for a total of 1,301 detector-nights between 30 April and 13 November 2017. Overall, sampling stations recorded 96,107 bat passes for a mean of 68.18 bat passes per detector-night. Overall mean bat activity levels varied among representative sampling stations, ranging from 25.60 - 87.94 bat passes per detector-night. Ground representative sampling stations averaged 50.25 bat passes per detector-night, whereas raised representative sampling stations, which collected data on bat activity in the rotor-swept zone, averaged 26.07 bat passes per detector-night; roughly half the level of activity recorded at ground stations. The single feature station recorded 49,541 bat passes on 190 detector-nights for a mean of 260.74 bat passes per detector-night; however, the mean activity rate at the single feature station is not representative of activity levels at future turbine locations and should be considered an upper reference for activity in the Project area.

Overall bat activity at all representative sampling stations was greater in summer (45.73 bat passes per detector-night) than in spring (26.98) and fall (41.88), which was consistent with the pattern observed for the high-frequency species group, consisting of mostly smaller species (e.g., Myotis). In contrast, the activity rate of the larger low-frequency (LF) species (e.g., hoary

bat, silver-haired bat, Mexican free-tailed bat) was greater in fall (28.70 bat passes per detector-night) than in spring (20.52) and summer (25.01), with the late summer and early fall (i.e., the fall migration period) having the highest level of LF bat activity (35.83). Bat activity at ground representative sampling stations was higher than at raised representative sampling stations throughout the study period, except in late August to early September and mid to late October, when activity at raised representative sampling stations exceeded activity rates at ground stations.

Fourteen bat species, none of which were unexpected, were documented from acoustic survey data collected within the Project area, including two California species of special concern (SSC): spotted bat, and western mastiff bat. Three species (Townsend's big-eared bat, pallid bat, and western red bat) were identified prior to field studies as having potential to occur, but were not documented from the acoustic survey data. Silver-haired bat and hoary bat were the most commonly recorded species, present on 76% and 75% of operational detector-nights, respectively. Mexican free-tailed bat was the third most frequently identified species, present on 70% of detector-nights. Other commonly detected species included big brown bat (64% of detector nights), and California bat (54%).

Consistent with the California Wind Energy Guidelines' two key study questions: 1) "*which species of bats use the project area and how do their numbers vary throughout the year?"* and 2) "*how much time do these species spend in the risk zone (i.e., rotor-swept area) and does this vary by season*?" WEST conducted bat acoustic surveys to determine the bat species present at the Project and assess the spatial and temporal patterns of bat activity which may influence the risk of collision for bats at the Project. Silver-haired bat, hoary bat, Mexican free-tailed bat, big brown bat, and California bat were the most commonly detected species (documented on more than 50% of operational detector nights), while the two California SSC (spotted bat and western mastiff bat) were documented rarely (seven passes total on three separate nights) during the study period. Hoary bats, silver-haired bats, and Mexican free tailed bats all belong to the LF species group and are among the most commonly documented bat fatalities at wind energy facilities where these species occur.

While activity rates of LF species at paired sample sites (i.e., having both ground and raised stations) were 10-53% greater at ground stations in the spring and summer, activity rates of LF species in the fall were more mixed, with 7% greater activity at the ground station at one paired site and 20% lower activity at the ground station at the other paired site. While the data are not definitive, the temporal pattern of use at raised versus ground stations suggests that LF bats may spend more time at greater heights (and potentially within the rotor-swept zone) during the fall than during spring and summer. Furthermore, while data indicate that LF bats are active at all sampled heights, they clearly represent the majority of bat activity recorded within the rotor-swept zone, accounting for 96% of bat passes recorded at raised sampling stations.

It has been generally presumed that pre-construction bat activity rates are positively related to post-construction bat fatalities; however, to date, the relationship between pre-construction activity rates and post-construction fatality rates has not been established. At European wind energy facilities, risk of collision was higher for bat species that fly at greater heights, and in Canada, a significant positive association was found between pass rates measured at 98 ft (30 m) AGL and fatality rates for hoary and silver-haired bats across five sites in southern Alberta; however, on a continental scale, a similar relationship has not been established. A recent meta-analysis of commercial wind projects in Maine showed no relationship between pre-construction bat activity and post-construction bat fatality rates. Other studies that have estimated both pre-construction activity and post-construction fatalities show results that trend toward a positive association between activity and fatality rates, but lack statistically significant correlations, resulting in the inability to use pre-construction acoustic data to predict post-construction bat fatalities. While researchers continue to investigate the potential utility of pre-construction acoustics in predicting post-construction fatalities, the current science remains consistent with that depicted in the California Wind Energy Guidelines, which state that passive acoustic surveys can provide pre-permitting information useful in establishing baseline patterns of seasonal bat activity, but that a fundamental gap exists regarding links between pre-permitting assessments and operations fatalities.

In other parts of the western US where wind energy facilities are clustered, bat fatality rates have generally been consistent among neighboring facilities; therefore, to evaluate the potential for bat fatalities at the Project, fatality rates documented at nearby facilities were examined to determine if patterns were evident. The only wind energy facility in the western US with publicly available post-construction fatality data and habitat similar to the Project is the Hatchet Ridge facility, located less than two mi (3.2 km) northeast of the Project. The Hatchet Ridge facility is very similar to the Project in terms of geography, topography and habitat, and is in close proximity; therefore, it is likely that bat fatality rates documented at the Hatchet Ridge facility are among the best indicators of potential risk at the Project. Bat fatality rates at the Hatchet Ridge facility were estimated to be 2.23, 5.22, and 4.20 bats/MW/year in the first, second, and third years of operation, respectively. Documented fatalities at the Hatchet Ridge facility were highest from July – September and primarily comprised hoary bats, silver-haired bats, and Mexican free-tailed bats, similar to patterns of bat fatalities throughout the US. The species found as fatalities at the Hatchet Ridge facility are consistent with the species most commonly detected in bat acoustic surveys conducted for the Project, and the timing of the peak fatality rate at the Hatchet Ridge facility aligns with peak bat activity rates documented at the Project.

Given that the species composition and temporal patterns of bat activity documented at the Project align with the results of fatality studies conducted at the nearby Hatchet Ridge facility; pre-construction bat acoustic data suggest that bat fatality patterns at the Project would likely be similar to those documented at the Hatchet Ridge facility. Based on the available data, fatality rates are anticipated to be similar to those documented at the Hatchet Ridge facility (2.23 – 5.22 bats/MW/year) and primarily consist of fatalities of hoary bats, silver-haired bats, and Mexican free-tailed bats during the late summer and fall migration period.

STUDY PARTICIPANTS

Western EcoSystems Technology, Inc.

Quentin Hays	Project Manager
Joel Thompson	Senior Manager
Karl Kosciuch	Senior Reviewer
Andrea Chatfield	Report Reviewer
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REPORT REFERENCE

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INTRODUCTION

Pacific Wind Development LLC (Pacific Wind) is considering development of a wind energy facility in Shasta County, California, referred to as the Fountain Wind Project (Project). Pacific Wind contracted Western EcoSystems Technology, Inc. (WEST) to complete a study of bat activity based on recommendations in the US Fish and Wildlife Service (USFWS) *Land-Based Wind Energy Guidelines* (USFWS 2012a), the *California Guidelines for Reducing Impacts to Birds and Bats from Wind Development* (California Energy Commission [CEC] and California Department of Fish and Game [CDFG] 2007), and Kunz et al. (2007a). The initial study plan was modified based on consultation with the USFWS and the California Department of Fish and Wildlife (CDFW), which occurred 15 June 2017. The CEC Guidelines (CEC and CDFG 2007) identify two key study questions that need to be addressed in order to assess risk to bats: 1) "*which species of bats use the project area and how do their numbers vary throughout the yea?"* and 2) *how much time do these species spend in the risk zone (i.e., rotor-swept area) and does this vary by season?".* To address these two key study questions and assess the potential risk the Project may pose to bats, WEST conducted bat acoustic surveys to: 1) determine the bat species present at the Project during the peak bat activity period of spring through fall, and 2) assess the spatial and temporal patterns of bat activity which may influence the risk of collision for bats at the Project. This report describes the bat acoustic surveys conducted at the Project in 2017, summarizes the results, and provides a qualitative risk assessment for the Project based on regional patterns in bat activity and fatalities.

STUDY AREA

The Project area currently encompasses approximately 32,000 acres (ac; 12,950 hectares [ha]) within Shasta County in northern California west of the community of Burney and northeast of the larger community of Redding (Figure 1). The east-west running California State Route 299 bisects the northern portion of the Project area, and the Hatchet Ridge Wind Energy Facility (Hatchet Ridge), in operation since 2010, is located approximately 1.48 miles (mi; 2.38 kilometers [km]) northeast of the Project. The Lassen National Forest is located to the southeast of the Project and the Shasta-Trinity National Forest is located to the north and east.

The Project area is entirely privately owned and actively managed for timber production, with recent and ongoing timber harvest operations occurring primarily within the southern half of the Project area. A large portion of the Project is early seral forest resulting from the Fountain Fire, which burned approximately 64,000 ac (24,900 ha) in 1992, including the north-central half of the Project area. Post-fire management included salvage logging, site preparation, and planting of conifer seedlings in the year following the fire to enhance forest regeneration for future timber harvesting.

The vegetation communities within the Project area are predominantly coniferous forest (54.7%) and harvested areas classified as shrub/scrub (38.3%; Figure 2, Table 1). The shrub/scrub classification is primarily the result of a temporary change in vegetation in recently harvested coniferous forests that persists until the replanted conifer trees become established and reclaim dominance in the site. These shrub/scrub areas may also be actively treated with herbicides to enhance conifer seedling establishment. Small areas of mixed montane chaparral and herbaceous vegetation (i.e., grassland) are scattered throughout the Project area (Figure 2, Table 1). Wetlands are present within the Project area, occurring primarily as riverine habitats, with much smaller areas of wet montane meadow and open water (Figure 2, Table 1). Cliffs and rocky outcrops are present in addition to several bridges, culverts, and other manufactured structures that offer habitat for bats. While some of the cover types should remain relatively consistent over time, the spatial distribution and amount of coniferous forest and shrub/scrub cover types within the Project area are likely to change substantially over time due to ongoing timber management activities.

Table 1. Land cover types within the Fountain Wind Project area according to National Land Cover Data (US Geological Survey [USGS] National Land Cover Database [NLCD] 2011, Homer et al. 2015).

Land Cover	Acres	% Composition
Coniferous Forest	17,786.16	54.7
Shrub/Scrub	12,430.51	38.3
Herbaceous	1,516.25	4.7
Deciduous Forest	344.15	1.1
Barren Land	205.18	0.6
Mixed Forest	95.09	0.3
Developed, Open Space	74.90	0.2
Emergent Herbaceous Wetlands	21.26	0.1
Developed, Low Intensity	8.13	<0.01
Cultivated Crops	5.71	<0.01
Total	**32,487.34**	**100**

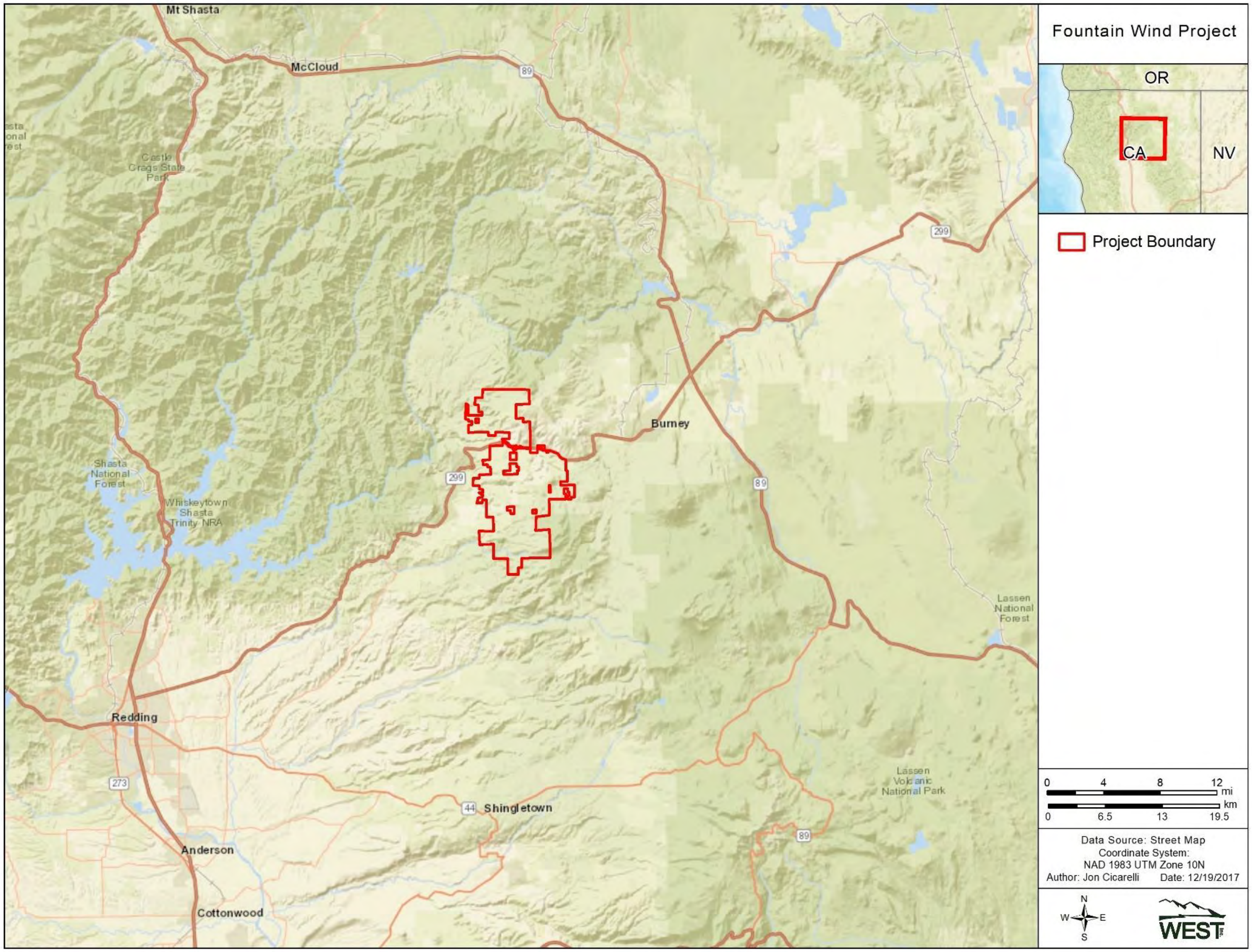

Figure 1. Location of the proposed Fountain Wind Project, Shasta County, California.

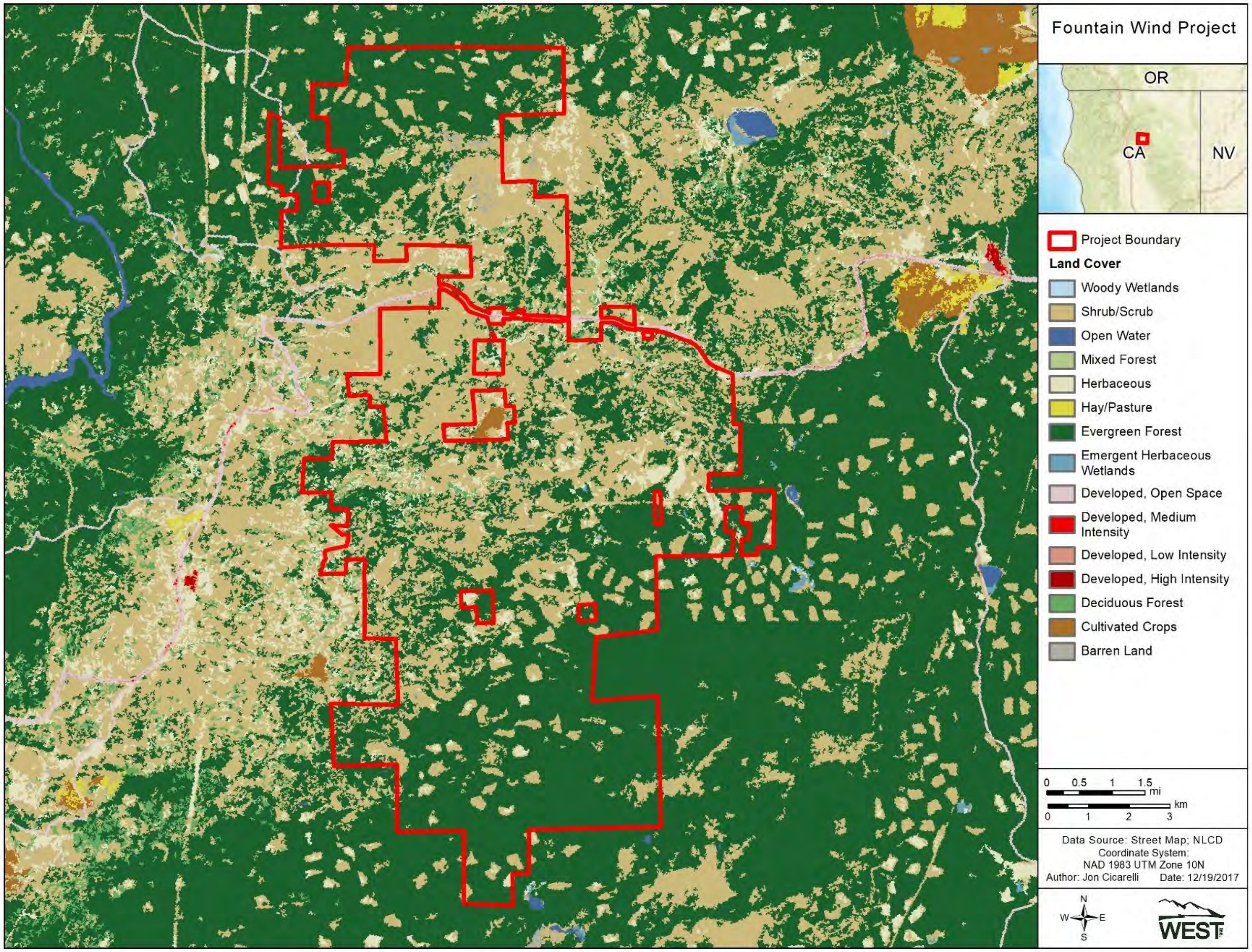

Figure 2. Land cover types within the proposed Fountain Wind Project (US Geological Survey [USGS] National Land Cover Database [NLCD] 2011, Homer et al. 2015).

Overview of Bat Diversity

Seventeen species of bats potentially occur at the Project (Table 2, International Union for Conservation of Nature [IUCN] 2016), none of which are federally protected. Eleven of the potentially occurring bat species have been documented as fatalities at wind energy facilities and five are considered Species of Special Concern (SSC) by the CDFW (Table 2).

Table 2. Bat species with the potential to occur within the Fountain Wind Project area categorized by echolocation call frequency.

Common Name	Scientific Name
High-Frequency (> 30 kilohertz [kHz])	
California bat	*Myotis californicus*
canyon bat[1, 4]	*Parastrellus hesperus*
little brown bat[1]	*Myotis lucifugus*
long-legged bat[1]	*Myotis volans*
western long-eared bat[1]	*Myotis evotis*
western red bat[1,2]	*Lasiurus blossevillii*
western small-footed bat [3]	*Myotis ciliolabrum*
Yuma bat	*Myotis yumanensis*
Low-Frequency (15 – 30 kHz)	
big brown bat[1]	*Eptesicus fuscus*
fringed bat	*Myotis thysanodes*
hoary bat[1]	*Lasiurus cinereus*
Mexican free-tailed bat[1]	*Tadarida brasiliensis*
pallid bat[3]	*Antrozous pallidus*
silver-haired bat[1]	*Lasionycteris noctivagans*
Townsend's big-eared bat[2]	*Corynorhinus townsendii*
Very Low-Frequency (< 15 kHz)	
spotted bat[2]	*Euderma maculatum*
western mastiff bat[2]	*Eumops perotis*

[1] Species known to have been killed at wind energy facilities (species reported by: Anderson et al. 2004, Kunz et al. 2007b, Baerwald 2008, Miller 2008, Arnett and Baerwald 2013, Barclay et al. 2017, AWWI 2018);
[2] California Species of Special Concern (CDFW 2018);
[3] Species not known to occur within the Project based on IUCN 2016 or BCI 2018 range maps but included in review due to proximity to known range and habitat suitability within the Project.

METHODS

Bat Acoustic Surveys

Sampling Stations

Bat activity levels and composition can vary with height above ground level (AGL; Baerwald and Barclay 2009, Collins and Jones 2009, Müeller et al. 2013), and high-flying bat species are at greater risk of collision with turbines (Roemer et al. 2017). Therefore, it is useful to monitor activity at different heights (Kunz et al. 2007b). Because most bat species spend at least some time flying at low flight heights, microphones near the ground may detect a more complete sample of the bat species present within a given area; however, elevated microphones may provide a more accurate assessment of bat species flying at rotor-swept heights (Kunz et al. 2007b, Müeller et al. 2013; but see Amorim et al. 2012).

Six Song Meter (SM3) full-spectrum ultrasonic bat detectors (Wildlife Acoustics, Inc., Concord, Massachusetts) were used to record bat echolocation and social calls during the study. Each SM3 detector is equipped with two microphone ports; each operational microphone was considered a sampling station. Biologists placed a single SM3 detector at each of two meteorological (met) towers, with one sampling station placed near the ground (g), and a second sampling station raised (r) to approximately 148 ft (45 m) AGL. Sampling stations are named by project, order of deployment, and type (e.g., MF1g = McCloud-Fountain, first-deployed, ground sampling station). Met towers are considered representative of future turbine locations; detectors at met towers comprise ‘representative sampling stations’. Raised representative sampling stations monitored bat activity near the proposed rotor-swept zone.

During initiation of the bat acoustic surveys, WEST placed two additional detectors at other locations within the Project area. One detector was deployed in an area representative of future turbine locations (i.e., a forest opening); another detector was deployed in an area with features possibly attractive to bats (i.e., a riparian meadow), but not representative of future turbine locations. Data collected by the bat detector deployed near a habitat feature possibly attractive to bats served to provide an upper reference for bat activity at the Project and to increase the likelihood of detecting all species that may be present within the Project area. The detector at the bat habitat feature is considered a ‘feature sampling station’ while the detector placed in the forest opening is a representative sampling station; both additional detectors comprised ground sampling stations only. Finally, following the 15 June meeting with CDFW and USFWS, two additional ground sampling stations were added in areas representative of future turbine locations to increase the spatial coverage of the Project area.

Microphones at all ground sampling stations were elevated slightly on 5-ft (1.5-m) masts to enhance the quality of sound recordings (e.g., to reduce recordings of insect calls) for improved species identification. Microphones at raised sampling stations were positioned on met towers using pulley systems and oriented at 75 degrees relative to the ground to maximize the amount of air space sampled. Large weatherproof boxes housed the SM3 units and external deep-cycle batteries for protection from weather and wildlife.

Survey Schedule

Acoustic monitoring surveys were conducted at the Project from 30 April to 13 November 2017. Detectors were programmed to turn on approximately 30 minutes (min) before sunset and turn off approximately 30 min after sunrise each day. To highlight seasonal activity patterns, the study was divided into three survey periods: spring (30 April – 31 May), summer (1 June – 14 August), and fall (15 August – 13 November).

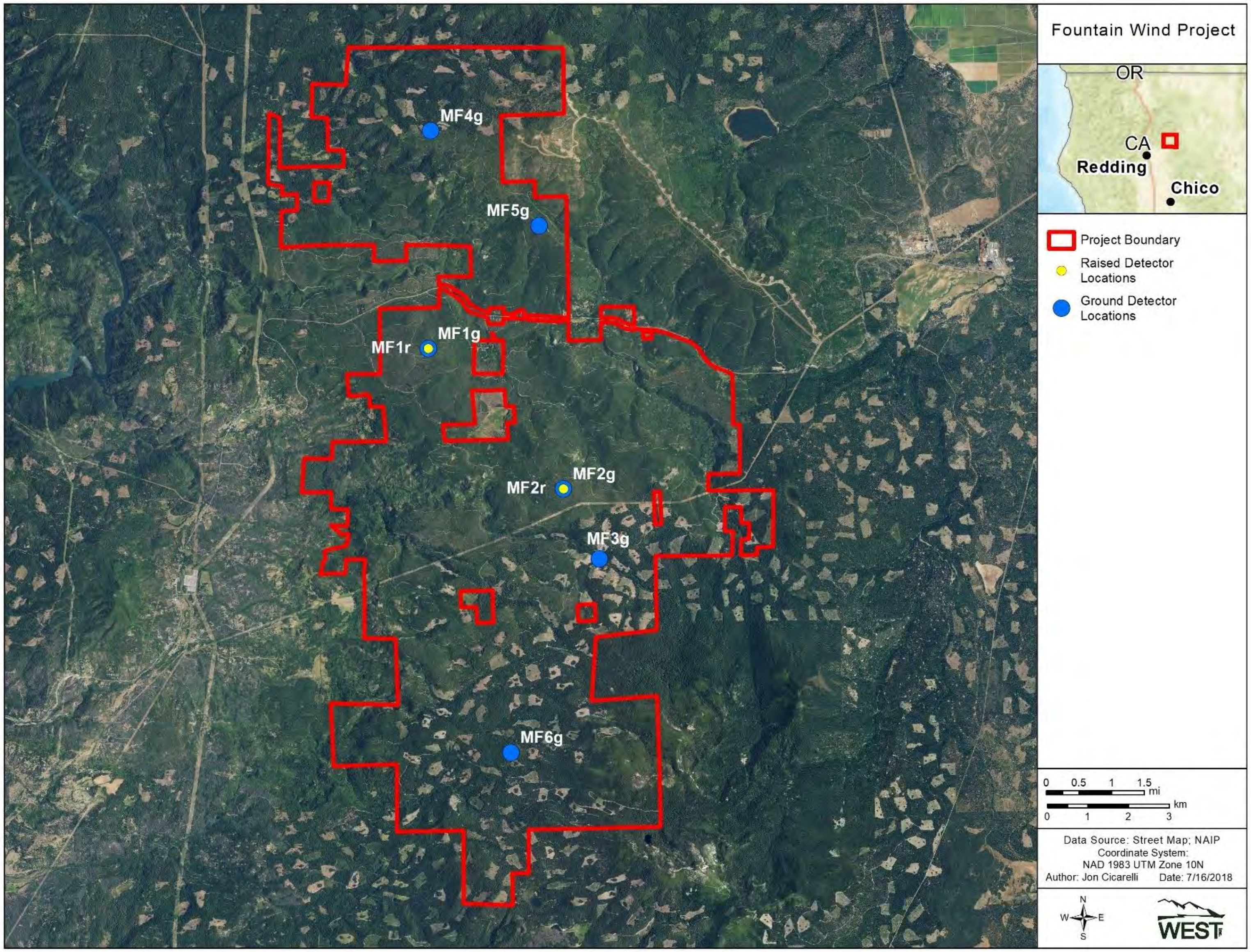

Figure 3. Location of sampling stations used during the bat acoustic surveys at the proposed Fountain Wind Project.

Data Collection and Call Analysis

The Song Meter SM3 is a highly reliable full-spectrum bat detector that records complete acoustic waveforms by sampling sound waves at 192 kilohertz (kHz). The high sampling rate enables the detector to record sound amplitude data at all frequencies up to 96 kHz and to make high resolution recordings. The high-quality recordings produced by the SM3 detector provide more information for making accurate species identifications at the cost of higher data storage requirements. SM3 detectors use an omnidirectional microphone to detect and record bat echolocation calls that are stored as files on Secure Digital (SD) cards.

All recorded files were converted from full-spectrum to zero-cross (division ratio 8) using the software program Kaleidoscope Pro (version 4.2.0; Wildlife Acoustics, Concord, Massachusetts). Noise files (i.e., files typically produced by wind or insects) were automatically filtered by Kaleidoscope into a Noise subfolder and not reviewed or included in results. All remaining ultrasonic files were viewed by a biologist as digital sonograms that show changes in echolocation call frequency over time in the bat call analysis software Analook©. Frequency versus time displays were used to separate bat calls from other types of ultrasonic noise (e.g., wind, insects) to determine the call frequency category, and when possible, identify the species of bat that generated the call.

For each sampling station, bat passes were grouped into three categories based on minimum frequency to aid in data sorting and because some species cannot be individually discerned through acoustic analysis. High-frequency (HF) bats such as *Myotis* species have minimum frequencies greater than 30 kHz. Low-frequency (LF) bats, such as big brown bat (*Eptesicus fuscus*), Mexican free-tailed bat (*Tadarida brasiliensis*), silver-haired bat (*Lasionycteris noctivagans*) and hoary bat (*Lasiurus cinereus*) typically emit echolocation calls with minimum frequencies between 15 and 30 kHz. Very low-frequency (VLF) bats, such as the western mastiff bat (*Eumops perotis*) and spotted bat (*Euderma maculatum*), have minimum echolocation frequencies below 15 kHz. Table 2 lists HF, LF, and VLF species that may occur in the Project area.

Files labeled as HF, LF, or VLF were then run through Kaleidoscope Pro again using the Bats of North America classifier (version 4.2.0) on the neutral (zero) setting to further define calls with sufficient call data (e.g., multiple pulses) to the species level, selecting for the 17 bat species that potentially occur in the Project area (Table 2). A qualified bat biologist reviewed all calls identified by Kaleidoscope Pro as spotted bat, western mastiff bat, pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii)*, and western red bat (*Lasiurus blossevillii*) to verify species-level identification because these five species are all listed as SSC. A qualified bat biologist also reviewed passes identified by Kaleidoscope Pro as western small-footed bat (*Myotis ciliolabrum*) or canyon bat (*Parastrellus hesperus*) until species presence was confirmed or all calls were reviewed, as the Project area includes potentially suitable habitat but is just outside the known range for these species. Calls of the remaining species, which have ranges that overlap with the Project area and are not considered SSC, were not reviewed by a bat biologist but assumed present based on the classification by Kaleidoscope Pro.

Statistical Analysis

The standard metric used for measuring bat activity, the number of bat passes per detector-night, was used as an index of bat activity at the Project. A bat pass was defined as a sequence of at least two echolocation calls (pulses) produced by an individual bat with no pause between calls of more than one second (Fenton 1980, White and Gehrt 2001, Gannon et al. 2003). A detector-night was defined as one sampling station (i.e., detector) operating for one entire night. The terms bat pass and bat call are used interchangeably in this report. Bat passes per detector-night were calculated for all bats, and for HF, LF, and VLF bats. Bat pass rates represent indices of bat activity and do not represent numbers of individuals.

Mean bat activity was calculated by sampling station, season, fall migration period (FMP), and overall (overall averages were calculated as unweighted averages of total activity at each individual detector station). The FMP, defined here as 30 July – 14 October 2017 is a known period of increased landscape-scale movement and reproductive behavior that occurs in late summer and early fall (Cryan 2008), and is often associated with increased levels of bat fatalities at operational wind energy facilities (Arnett et al. 2008, Arnett and Baerwald 2013). The defined FMP may vary among projects across the county, as the FMP may differ depending on latitude or regional climate patterns.

Using detector-nights as a metric for calculating bat activity controls for differences in sampling effort among individual sampling stations and provides unbiased estimates for the nights that were surveyed. The period of peak sustained bat activity was defined as the 7-day period with the highest average bat activity. If multiple 7-day periods equaled the peak sustained bat activity rate, all dates in these 7-day periods were reported. This and all multi-station averages reported here were calculated as unweighted averages of total activity at each sampling station.

Risk Assessment

Collision with wind turbine blades is the primary risk to bats at operating wind energy facilities (Arnett et al. 2008). The intent of the risk assessment is to use pre-construction bat activity data and other relevant information to describe the potential for bat fatalities at the Project. The intent of the risk assessment is not to predict the number of fatalities, but rather provide context for data collected at the Project. To assess the potential risk to bats, bat activity in the Project area was compared to existing publicly available pre- and post-construction data from other wind energy facilities in the California, Southwestern, and Pacific Northwest regions.

Forecasting collision risk for bats at the Project is challenging for several reasons. First, there are relatively few publicly available studies presenting both pre-construction bat activity and post-construction fatality data, and the ecological differences among geographically dispersed facilities could limit the strength of inference. Further, as explained in detail below, there is no clear correlation between pre-construction bat activity and post-construction fatality data. Second, among studies with both pre-construction bat activity and post-construction fatality data, most pre-construction data were collected during the fall (i.e., the period of greatest risk) using Anabat™ zero-cross detectors (Titley Scientific™, Columbia, Missouri) placed near the ground. In contrast, this study used SM3 full-spectrum detectors near the ground and elevated near the rotor-swept area. Finally, the primary limitation of conducting a qualitative risk assessment for the Project is the difference in data collected by Anabat (used at most other projects) and SM3 detectors (used at the Project). Full-spectrum detectors, such as the SM3 units used at the Project, may record more bat passes per detector-night on average than the Anabat (zero-cross) units used for data collection at the majority of wind farms. Full-spectrum detectors have more sensitive microphones that sample more airspace, as well as different data processing algorithms (Solick et al. 2011, Adams et al. 2012), which may combine to result in higher activity rates than those measured by Anabat detectors. For this reason, activity levels recorded by SM3 detectors are not directly comparable to activity levels recorded by Anabat detectors, though trends in spatial and temporal activity rates collected by Anabat detectors can serve to contextualize trends in data collected using SM3 detectors. Differences in data collection technology (i.e., full-spectrum versus zero-cross detectors), and the resultant possibility that use of SM3 detectors rather than Anabat units at the Project led to increased collection of bat acoustic data should be considered. Inclusion of Anabat data in this report is for general discussion purposes only.

It has been generally presumed that pre-construction bat activity rates are positively related to post-construction bat fatalities (Kunz et al. 2007b). However, to date, the relationship between pre-construction activity rates and post-construction fatality rates has not been definitively established. At European wind energy facilities, Roemer et al. (2017) determined risk of collision was higher for bat species that fly at greater heights. In Canada, Baerwald and Barclay (2009) found a significant positive association between pass rates measured at 98 ft (30 m) AGL and fatality rates for hoary and silver-haired bats across five sites in southern Alberta; however, on a continental scale, a similar relationship has not been established. A recent meta-analysis of commercial wind projects in Maine showed no relationship between pre-construction bat activity and post-construction bat fatality rates (Peterson 2017). Hein et al. (2013) analyzed studies at 12 wind projects that included both pre- and post-construction data to assess if pre-construction acoustic activity predicted post-construction fatality rates. Based on data from the 12 projects, the authors did not find a statistically significant relationship ($p=0.07$) between pre-construction activity and post-construction mortality; and although the results suggested a positive relationship only a small portion of the variation in fatalities was explained by the pre-construction activity (adj. R^2= 21.8%; Hein et al. 2013). Hein et al. (2013) went on to conclude that the analysis results indicated the inability to use pre-construction acoustic data to predict post-construction bat fatalities. While researchers continue to investigate the potential utility of pre-construction acoustics in predicting post-construction fatalities, the current science remains consistent with that depicted in the CEC Guidelines, which state that passive acoustic surveys can provide pre-permitting information useful in establishing baseline patterns of seasonal bat activity, but that a fundamental gap exists regarding links between pre-permitting assessments and operations fatalities (CEC and CDFW 2007).

RESULTS

Bat Acoustic Surveys

Bat activity was monitored at eight sampling stations for a total of 1,301 detector-nights between 30 April and 13 November 2017; sampling stations were operational 95.4% of the study period. All sampling stations, with the exception of MF4g, occasionally failed to collect data due to wildlife interference with equipment (e.g., small mammals chewing cables, bears disturbing detectors). Overall, sampling stations recorded 96,107 bat passes for a mean (± standard error) of 68.18 ± 4.08 bat passes per detector-night (Table 3).

Spatial Variation

Overall bat activity varied among representative sampling stations (Table 3), ranging from a mean of (± standard error) 25.60 ± 2.64 bat passes per detector-night at sampling station MF2r, to 87.94 ± 5.32 bat passes per detector-night at sampling station MF4g (Table 3, Figure 4). Ground representative sampling stations recorded 36,582 bat passes on 728 detector-nights for a mean of 50.25 ± 4.33 bat passes per detector-night (Table 3; Figure 4a). In contrast, raised representative sampling stations, which collected data on bat activity in the rotor-swept zone, recorded 9,984 bat passes on 383 detector-nights for a mean of 26.07 ± 2.76 bat passes per detector-night; roughly half the level of activity recorded at ground stations (Table 3).

The single feature sampling station recorded 49,541 bat passes on 190 detector-nights for a mean of 260.74 ± 18.75 bat passes per detector-night (Table 3). The mean activity rate at the single feature station is not representative of activity levels at future turbine locations and should be considered an upper reference for bat activity in the Project area.

Table 3. Results of bat acoustic surveys by sampling station in the Fountain Wind Project area from 30 April – 13 November 2017. Passes are separated by call frequency: high frequency (HF), low frequency (LF), and very low frequency (VLF).

Sampling Station	Type	Habitat	# of HF Bat Passes	# of LF Bat Passes	# of VLF Bat Passes	Total Bat Passes	Detector-Nights	Mean Bat Passes/Night (± Standard Error)*†
MF1g	Ground representative	Representative of future turbine locations	1,114	5,756	1	6,871	189	36.35 ± 3.32
MF1r	Raised representative		132	4,885	1	5,018	189	26.55 ± 3.18
MF2g	Ground representative	Representative of future turbine locations	2,151	4,324	1	6,476	194	33.38 ± 3.31
MF2r	Raised representative		284	4,681	1	4,966	194	25.60 ± 2.64
MF3g	Ground feature	Includes features possibly attractive to bats	23,031	26,508	2**	49,541	190	260.74 ±18.75
MF4g	Ground representative	Representative of future turbine locations	9,913	7,498	1	17,412	198	87.94 ± 5.32
MF5g**	Ground representative	Representative of future turbine locations	2,539	1,719	0	4,258	88	48.39 ± 5.72
MF6g**	Ground representative	Representative of future turbine locations	566	999	0	1,565	59	26.53 ± 3.99
Total: Ground Representative Sampling Stations			16,283	12,798	3	36,582	728	50.25 ± 4.33
Total: Raised Representative Sampling Stations			416	9,566	2	9,984	383	26.07 ± 2.76
Total: Feature Sampling Stations			23,031	26,508	2	49,541	190	260.74 ±18.75
Total			**39,730**	**56,370**	**7**	**96,107**	**1,301**	**68.18 ± 4.08**

*± bootstrapped standard error.
†Sums may not total the values shows due to rounding.
**Sampling stations added 17 August

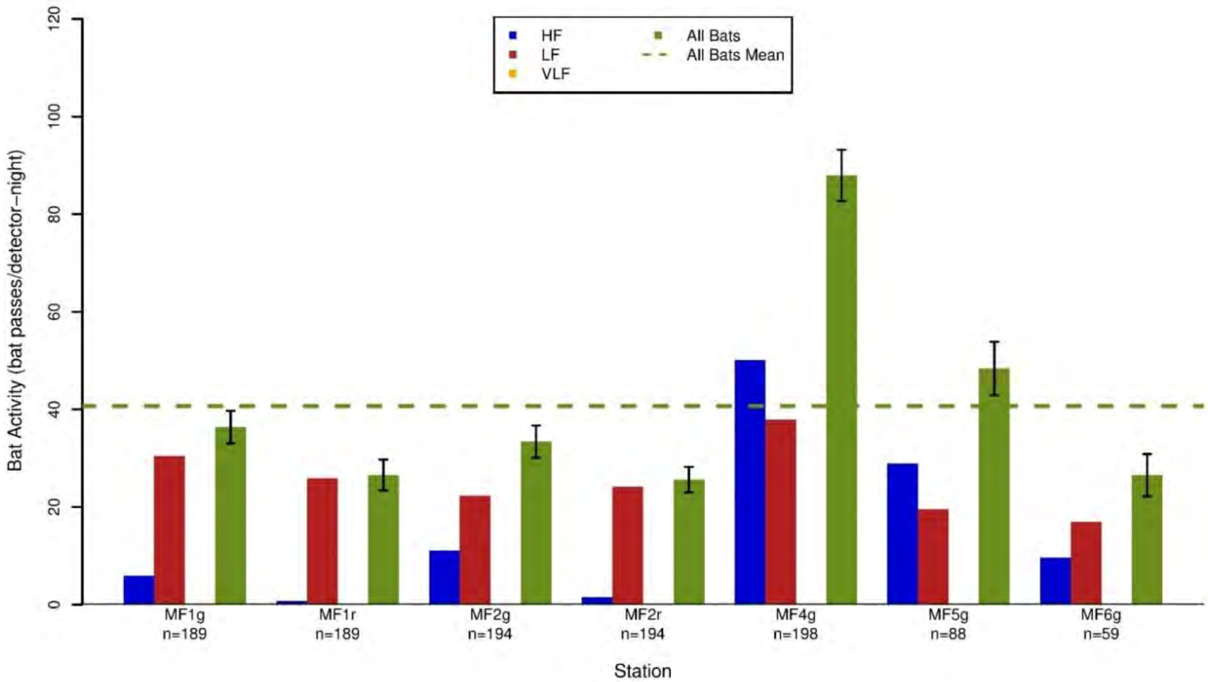

Figure 4. Number of high-frequency (HF), low-frequency (LF), and very low-frequency (VLF) bat passes per detector-night recorded at SM3 representative stations in the Fountain Wind Project area from 30 April – 13 November 2017. The bootstrapped standard errors are represented by the black error bars on the "All Bats" columns. VLF bat passes per detector night were very low at all stations and are thus not discernable here.

Temporal Variation

Overall bat activity at all representative sampling stations was lowest in spring (26.98 ± 3.38 bat passes per detector-night), highest in summer (45.73 ± 2.73), and slightly decreased numerically during fall (41.88 ± 5.37), which was consistent with the pattern observed for the HF species group (Table 4; Figure 5). In contrast, activity rates of LF species were greater in fall (28.70 ± 3.59 bat passes per detector-night) than in spring (20.52 ± 2.66) and summer (25.01 ± 1.52), with activity during the FMP (35.83 ± 2.74), which overlaps late summer and early fall, having the highest levels of LF bat activity (Table 4). The week of peak activity for all bats and HF bats at representative sampling stations was 29 July to 4 August (90.57 and 46.71 bat passes per detector night, respectively), while LF bat activity peaked the week of 3-9 October.

Bat activity at ground representative sampling stations was higher than at raised representative sampling stations throughout the study period, except in late August/early September and mid to late October, when activity at raised representative sampling stations exceeded activity rates at ground stations (Figure 5). Activity by VLF species was documented only in the spring and fall, consisting of a spotted bat pass recorded simultaneously at stations MF1g and MF1r in the spring and western mastiff bat calls detected in mid-October at multiple representative sampling stations (Table 3).

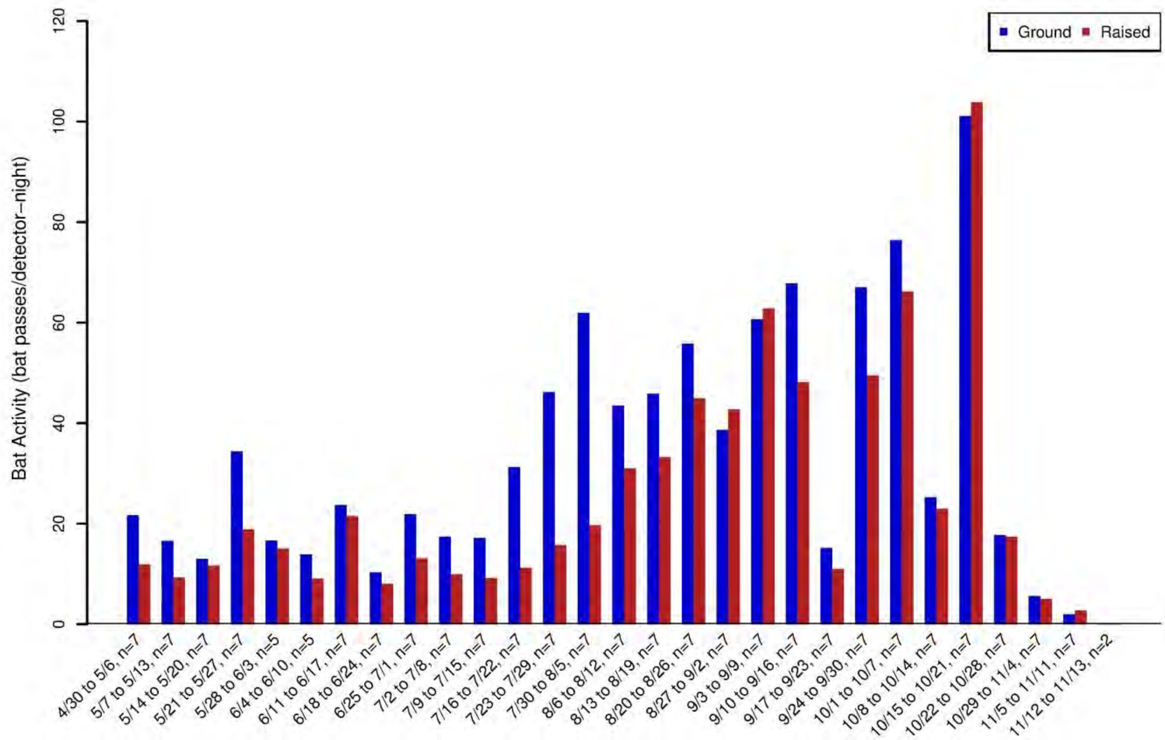

Figure 5. Number of bat passes per detector-night recorded at raised and ground level stations considered representative of future turbine locations in the Fountain Wind Project area from 30 April – 13 November 2017.

Species Composition

Calls of 17 bat species were identified by Kaleidoscope Pro from bat acoustic survey data collected in the Project area, including five California SSC: western red bat, pallid bat, Townsend's big-eared bat, spotted bat, and western mastiff bat (Table 5). However, calls for three (western red bat, Townsend's big-eared bat, and pallid bat) of the five SSC could not be verified upon review by an experienced bat biologist. A bat biologist also reviewed and verified the calls of western small-footed bat and canyon bat during review because the Project is located at the edge of the range of these species. The remaining 10 species were assumed present based on the Kaleidoscope Pro classifications because the calls were numerous and all 10 species were expected based on species ranges and habitats; thus 14 species were documented from acoustic survey data collected within the Project area. Silver-haired bat and hoary bat were the most commonly recorded species, present on 76% and 75% of operational detector-nights, respectively. Mexican free-tailed bat was the third most frequently recorded species, present on 70% of detector-nights. Other commonly detected species included big brown bat (64%), California bat (*Myotis californicus*; 54%), and Yuma bat (*Myotis yumanensis;* 41%). All other species were detected on less than 30% of operational detector-nights (Table 5).

Table 4. Number of bat passes per detector-night recorded at representative sampling stations in the Fountain Wind Project area during each season and during the standardized Fall Migration Period, separated by call frequency: high-frequency (HF), low-frequency (LF), very low-frequency (VLF), and all bats (AB).

Station	Call Frequency	Spring 30 April – 31 May	Summer 1 June – 14 August	Fall 15 August – 13 November	Fall Migration Period 30 July – 14 October
MF1g	VLF	0.04	0	0	0
	LF	22.11	22.23	39.35	44.75
	HF	2.75	6.96	6.04	8.86
	AB	24.89	29.19	45.4	53.61
MF1r	VLF	0.04	0	0	0
	LF	16.39	15.73	36.54	37.51
	LF	0.14	0.09	1.34	0.35
	AB	16.57	15.81	37.88	37.86
MF2g	VLF	0	0	0.01	0
	LF	14.59	18.23	28.16	34.36
	HF	3.22	12.70	12.59	13.47
	AB	17.81	30.93	40.77	47.83
MF2r	VLF	0	0	0.01	0
	LF	9.53	16.58	35.15	40.13
	HF	0.16	0.04	3.03	0.57
	AB	9.69	16.62	38.20	40.70
MF4g	VLF	0.03	0	0	0
	LF	40	52.29	25.23	43.53
	HF	25.91	83.8	30.76	55.88
	AB	65.94	136.09	55.99	99.42
MF5g*	VLF	-	-	0	0
	LF	-	-	19.53	25.59
	HF	-	-	28.85	38.37
	AB	-	-	48.39	63.97
MF6g*	VLF	-	-	0	0
	LF	-	-	16.93	24.97
	HF	-	-	9.59	12.55
	AB	-	-	26.53	37.52
Ground Station Totals	**VLF**	**0.02±0.02**	**0.00±0.00**	**0.00±0.00**	**0.00±0.00**
	LF	**25.57±3.57**	**30.92±1.88**	**25.84±2.89**	**34.64±2.62**
	HF	**10.62±2.06**	**34.49±2.63**	**17.57±2.26**	**25.83±2.44**
	AB	**36.21±4.71**	**65.40±4.06**	**43.41±4.76**	**60.47±4.18**
Raised Station Totals	**VLF**	**0.02±0.02**	**0.00±0.00**	**0.01±0.01**	**0.00±0.00**
	LF	**12.96±2.19**	**16.15±1.37**	**35.85±5.08**	**38.82±3.95**
	HF	**0.15±0.07**	**0.06±0.03**	**2.19±1.39**	**0.46±0.14**
	AB	**13.13±2.21**	**16.22±1.37**	**38.04±6.10**	**39.28±4.00**
Representative Sampling Station Overall	**VLF**	**0.02±0.02**	**0.00±0.00**	**0.00±0.00**	**0.00±0.00**
	LF	**20.52±2.66**	**25.01±1.52**	**28.70±3.59**	**35.83±2.74**
	HF	**6.43±1.42**	**20.72±1.53**	**13.17±2.11**	**18.58±1.97**
	AB	**26.98±3.38**	**45.73±2.73**	**41.88±5.37**	**54.41±3.89**

*Sampling stations added on 17 August

Table 5. The number and percent (in parentheses) of detector-nights that bat species were detected using Kaleidoscope Pro 4.2.0 and verified by a bat biologist at the proposed Fountain Wind Project from 30 April – 13 November 2017.

Common Name	MF1g	MF1r	MF2g	MF2r	MF3g	MF4g	MF5g	MF6g	Total
High-Frequency (> 30 kHz)									
California bat	122 (65)	10 (5)	134 (69)	9 (5)	163 (86)	171 (86)	60 (68)	35 (59)	704 (54)
canyon bat*	22 (12)	5 (3)	27 (14)	0 (0)	54 (28)	104 (53)	12 (14)	3 (5)	227 (17)
little brown bat	20 (11)	3 (2)	44 (23)	2 (1)	134 (71)	107 (54)	7 (8)	9 (15)	326 (25)
long-legged bat	11 (6)	0 (0)	14 (7)	0 (0)	112 (59)	85 (43)	8 (9)	12 (20)	242 (19)
western long-eared bat	16 (8)	0 (0)	76 (39)	0 (0)	118 (62)	114 (58)	31 (35)	19 (32)	374 (29)
western small-footed bat	13 (7)	0 (0)	15 (8)	0 (0)	66 (35)	85 (43)	21 (24)	4 (7)	204 (16)
Yuma bat	78 (41)	6 (3)	82 (42)	9 (5)	140 (74)	141 (71)	48 (55)	30 (51)	534 (41)
Low-Frequency (15 – 30 kHz)									
big brown bat	135 (71)	97 (51)	145 (75)	89 (46)	145 (76)	149 (75)	51 (58)	27 (46)	838 (64)
fringed bat	22 (12)	3 (2)	24 (12)	2 (1)	50 (26)	85 (43)	32 (36)	9 (15)	227 (17)
hoary bat	137 (72)	144 (76)	135 (70)	158 (81)	163 (86)	148 (75)	51 (58)	42 (71)	978 (75)
Mexican free-tailed bat	124 (66)	139 (74)	138 (71)	141 (73)	164 (86)	114 (58)	54 (61)	39 (66)	913 (70)
silver-haired bat	147 (78)	142 (75)	150 (77)	140 (72)	169 (89)	159 (80)	51 (58)	37 (63)	995 (76)

*Species presence verified by a bat biologist

**Very low-frequency bats (i.e., spotted bat and western mastiff bat) are not included in this table

***Kaleidoscope also identified calls by pallid bat, Townsend's big-eared bat, and western red bat; these calls were reviewed by a bat biologist and could not be confirmed

DISCUSSION AND RISK ASSESSMENT

Consistent with the California Wind Energy Guidelines' two key study questions: 1) *which species of bats use the project area and how do their numbers vary throughout the year?*, and 2) *how much time do these species spend in the risk zone (i.e., rotor-swept area) and does this vary by season?*, WEST conducted bat acoustic surveys to: 1) determine the bat species present at the Project during the peak bat activity period of spring – fall and 2) assess the spatial and temporal patterns of bat activity which may influence the risk of collision for bats at the Project.

Fourteen species of bat were confirmed as occurring at the Project during the bat activity study, none of which were unexpected. Three species (Townsend's big-eared bat, pallid bat, and western red bat) identified prior to field studies as having potential to occur were not documented from the acoustic survey data. Silver-haired bat, hoary bat, Mexican free-tailed bat, big brown bat, and California bat were the most commonly detected species, with calls of all five species documented on more than 50% of operational detector nights (see Table 5). Among the 14 identified species, two (spotted bat and western mastiff bat) are designated as California SSC. Calls of both SSC were documented in low numbers (seven passes total) on three separate nights during the study period. Hoary bats, silver-haired bats, and Mexican free-tailed bats all belong to the LF species group and were the three most commonly detected of the five LF bats identified, therefore, it is presumed in this discussion that the LF bat data is highly indicative of the amount of use and spatial and temporal patterns of use exhibited by these three species, while recognizing that there may be some variability among the three species. These three species are also among the most commonly documented bat fatalities at wind energy facilities where these species occur (Cryan and Barclay 2009, Arnett and Baerwald 2013, Tetra Tech 2013, Thompson et al. 2017, AWWI 2018).

Overall bat activity measured at representative stations was greater in the summer and fall, compared to spring; however the variability in temporal patterns was largely due to patterns within the HF species group, which varied up to about 70% across seasons and peaked in the summer. In contrast, LF bat activity was more consistent, varying only about 30% across seasons and peaking in the fall. LF species accounted for a larger proportion of overall bat activity in the spring and fall (76 and 66%, respectively) compared to the summer (55%), when HF bat activity was at its peak.

Based on the 2017 bat acoustic surveys at the Project, activity rates of LF species (inclusive of the three migratory species) were 10-53% greater at ground stations compared to raised stations at paired sample sites in the spring and summer. However, activity rates of LF species in the fall were more mixed, with 7% greater activity at the ground station at one paired site (MF1) and 20% lower activity at the ground station at the other paired site (MF2; see Table 4). While the data are not definitive, the temporal pattern of use at raised versus ground stations suggests that LF bats may spend more time at greater heights (and potentially within the rotor-swept zone) during the fall than during spring and summer. Furthermore, while data indicate that LF bats are active at all sampled heights, LF bats accounted for 96% of bat passes recorded at raised sampling stations within the rotor-swept zone compared to only 35% of bat passes at representative ground stations.

As the relationship between pre-construction activity rates and post-construction fatality rates has not been definitively established (Hein et al. 2013; see Risk Assessment in Methods section p. 9-10), fatality rates documented at nearby facilities were used to evaluate the potential for bat fatalities at the Project. In other parts of the western US where wind energy facilities are clustered, bat fatality rates have generally been consistent among neighboring facilities. For example, in the Tehachapi Wind Resource Area in southern California, bat fatality rates range from zero to 1.28 bats/MW/year, and at the Shiloh and Montezuma projects located in close proximity to each other in the Montezuma Hills, bat fatality rates are consistently less than 4.0 bats/MW/year (Appendix A). Similar patterns are evident in the Pacific Northwest, where a majority of wind projects are located along the Columbia Plateau and bat fatality rates have been consistently less than 3.0 bats/MW/year (Appendix A).

The only wind energy facility in the western US with publicly available post-construction fatality data and habitat similar to the Project is the Hatchet Ridge facility, located less than two mi (3.2 km) northeast of the Project. Given the proximity of the Hatchet Ridge facility to the Project and similarities in geography, topography and habitat, it is likely that bat fatality rates documented at the Hatchet Ridge facility are among the best indicators of potential risk at the Project. For the three years of fatality monitoring conducted at the Hatchet Ridge facility, bat fatality rates were estimated to be 2.23, 5.22, and 4.20 bats/MW/year in years 1, 2, and 3, respectively (Tetra Tech 2014). Although the three years of data at Hatchet Ridge suggest some annual variability in fatality rates, 90% confidence intervals for all three years of estimates overlapped, indicating no statistical difference among years. Documented fatalities at the Hatchet Ridge facility were highest from July – September and primarily comprised hoary bats, silver-haired bats, and Mexican free-tailed bats, similar to patterns of bat fatalities throughout the US (Cryan and Barclay 2009, Arnett and Baerwald 2013, Tetra Tech 2014, Thompson et al. 2017, AWWI 2018). The species found as fatalities at the Hatchet Ridge facility are consistent with the species most commonly detected in bat acoustic surveys conducted for the Project, and the timing of peak fatalities at Hatchet Ridge aligns with peak activity rates documented at the Project.

Given that the species composition and temporal patterns of bat activity documented at the Project align with the results of fatality studies conducted at the nearby Hatchet Ridge facility; pre-construction bat acoustic data suggest that bat fatality patterns at the Project would likely be similar to those documented at the Hatchet Ridge facility. Based on the available data, fatality rates are anticipated to be similar to those documented at the Hatchet Ridge facility (2.23 – 5.22 bats/MW/year) and primarily consist of fatalities of hoary bats, silver-haired bats, and Mexican free-tailed bats during the late summer and fall migration period.

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Appendix A: Western US Bat Fatality Table

Appendix A1. Wind energy facilities in the western US with comparable fatality data for bats, separated by geographic region.

Wind Energy Facility	Fatality Estimate	No. of Turbines	Total MW
California			
Hatchet Ridge, CA (2010-2011)	2.23	44	101.2
Hatchet Ridge, CA (2011-2012)	5.22	44	101.2
Hatchet Ridge, CA (2012-2013)	4.20	44	101.2
Shiloh I, CA (2006-2009)	3.92	100	150
Shiloh II, CA (2010-2011)	3.8	75	150
Shiloh II, CA (2011-2012)	3.4	75	150
Shiloh II, CA (2009-2010)	2.6	75	150
High Winds, CA (2003-2004)	2.51	90	162
Dillon, CA (2008-2009)	2.17	45	45
Montezuma I, CA (2011)	1.9	16	36.8
High Winds, CA (2004-2005)	1.52	90	162
Alta I, CA (2011-2012)	1.28	100	150
Montezuma II, CA (2012-2013)	0.91	34	78.2
Montezuma I, CA (2012)	0.84	16	36.8
Diablo Winds, CA (2005-2007)	0.82	31	20.46
Shiloh III, CA (2012-2013)	0.4	50	102.5
Solano III, CA (2012-2013)	0.31	55	128
Alite, CA (2009-2010)	0.24	8	24
Alta I-V, CA (2013-2014)	0.2	290	720 (150 GE, 570 vestas)
Mustang Hills, CA (2012-2013)	0.1	50	150
Alta II-V, CA (2011-2012)	0.08	190	570
Pinyon Pines I & II, CA (2013-2014)	0.04	100	NA
Alta VIII, CA (2012-2013)	0	50	150
Southwest			
Dry Lake I, AZ (2009-2010)	3.43	30	63
Dry Lake II, AZ (2011-2012)	1.66	31	65
Pacific Northwest			
Palouse Wind, WA (2012-2013)	4.23	58	104.4
Biglow Canyon, OR (Phase II; 2009-2010)	2.71	65	150
Nine Canyon, WA (2002-2003)	2.47	37	48.1
Stateline, OR/WA (2003)	2.29	454	299
Elkhorn, OR (2010)	2.14	61	101
White Creek, WA (2007-2011)	2.04	89	204.7
Biglow Canyon, OR (Phase I; 2008)	1.99	76	125.4
Leaning Juniper, OR (2006-2008)	1.98	67	100.5
Big Horn, WA (2006-2007)	1.9	133	199.5
Combine Hills, OR (Phase I; 2004-2005)	1.88	41	41
Linden Ranch, WA (2010-2011)	1.68	25	50
Pebble Springs, OR (2009-2010)	1.55	47	98.7
Hopkins Ridge, WA (2008)	1.39	87	156.6
Harvest Wind, WA (2010-2012)	1.27	43	98.9
Elkhorn, OR (2008)	1.26	61	101
Vansycle, OR (1999)	1.12	38	24.9
Klondike III (Phase I), OR (2007-2009)	1.11	125	223.6
Stateline, OR/WA (2001-2002)	1.09	454	299
Stateline, OR/WA (2006)	0.95	454	299
Tuolumne (Windy Point I), WA (2009-2010)	0.94	62	136.6
Klondike, OR (2002-2003)	0.77	16	24
Combine Hills, OR (2011)	0.73	104	104
Hopkins Ridge, WA (2006)	0.63	83	150

Appendix A1. Wind energy facilities in the western US with comparable fatality data for bats, separated by geographic region.

Wind Energy Facility	Fatality Estimate	No. of Turbines	Total MW
Biglow Canyon, OR (Phase I; 2009)	0.58	76	125.4
Biglow Canyon, OR (Phase II; 2010-2011)	0.57	65	150
Hay Canyon, OR (2009-2010)	0.53	48	100.8
Windy Flats, WA (2010-2011)	0.41	114	262.2
Klondike II, OR (2005-2006)	0.41	50	75
Vantage, WA (2010-2011)	0.4	60	90
Wild Horse, WA (2007)	0.39	127	229
Goodnoe, WA (2009-2010)	0.34	47	94
Marengo II, WA (2009-2010)	0.27	39	70.2
Biglow Canyon, OR (Phase III; 2010-2011)	0.22	76	174.8
Marengo I, WA (2009-2010)	0.17	78	140.4
Klondike IIIa (Phase II), OR (2008-2010)	0.14	51	76.5
Kittitas Valley, WA (2011-2012)	0.12	48	100.8

Facility	Fatality Estimate	Facility	Fatality Estimate
Alite, CA (09-10)	Chatfield et al. 2010	Klondike III (Phase I), OR (07-09)	Gritski et al. 2010
Alta Wind I, CA (11-12)	Chatfield et al. 2012	Klondike IIIa (Phase II), OR (08-10)	Gritski et al. 2011
Alta Wind I-V, CA (13-14)	Chatfield et al. 2014	Leaning Juniper, OR (06-08)	Gritski et al. 2008
Alta Wind II-V, CA (11-12)	Chatfield et al. 2012	Linden Ranch, WA (10-11)	Enz and Bay 2011
Alta VIII, CA (12-13)	Chatfield and Bay 2014	Marengo I, WA (09-10)	URS Corporation 2010b
Big Horn, WA (06-07)	Kronner et al. 2008	Marengo II, WA (09-10)	URS Corporation 2010c
Biglow Canyon, OR (Phase I; 08)	Jeffrey et al. 2009b	Montezuma I, CA (11)	ICF International 2012
Biglow Canyon, OR (Phase I; 09)	Enk et al. 2010	Montezuma I, CA (12)	ICF International 2013
Biglow Canyon, OR (Phase II; 09-10)	Enk et al. 2011b	Montezuma II, CA (12-13)	Harvey & Associates 2013
Biglow Canyon, OR (Phase II; 10-11)	Enk et al. 2012b	Mustang Hills, CA (12-13)	Chatfield and Bay 2014
Biglow Canyon, OR (Phase III; 10-11)	Enk et al. 2012a	Nine Canyon, WA (02-03)	Erickson et al. 2003
Combine Hills, OR (Phase I; 04-05)	Young et al. 2006	Palouse Wind, WA (12-13)	Stantec 2013
Combine Hills, OR (11)	Enz et al. 2012	Pebble Springs, OR (09-10)	Gritski and Kronner 2010b
Diablo Winds, CA (05-07)	WEST 2006, 2008	Pinyon Pines I&II, CA (13-14)	Chatfield and Russo 2014
Dillon, CA (08-09)	Chatfield et al. 2009	Shiloh I, CA (06-09)	Kerlinger et al. 2009
Dry Lake I, AZ (09-10)	Thompson et al. 2011	Shiloh II, CA (09-10)	Kerlinger et al. 2010, 2013a
Dry Lake II, AZ (11-12)	Thompson and Bay 2012	Shiloh II, CA (10-11)	Kerlinger et al. 2013a
Elkhorn, OR (08)	Jeffrey et a. 2009a	Shiloh II, CA (11-12)	Kerlinger et al. 2013a
Elkhorn, OR (10)	Enk et al. 2011a	Shiloh III, CA (12-13)	Kerlinger et al. 2013b
Goodnoe, WA (09-10)	URS Corporation 2010a	Solano III, CA (12-13)	AECOM 2013
Harvest Wind, WA (10-12)	Downes and Gritski 2012a	Stateline, OR/WA (01-02)	Erickson et al. 2004
Hatchet Ridge	Tetra Tech 2014	Stateline, OR/WA (03)	Erickson et al. 2004
Hay Canyon, OR (09-10)	Gritski and Kronner 2010a	Stateline, OR/WA (06)	Erickson et al. 2007
High Winds, CA (03-04)	Kerlinger et al. 2006	Tuolumne (Windy Point I), WA (09-10)	Enz and Bay 2010
High Winds, CA (04-05)	Kerlinger et al. 2006	Vansycle, OR (99)	Erickson et al. 2000
Hopkins Ridge, WA (06)	Young et al. 2007a	Vantage, WA (10-11)	Ventus 2012
Hopkins Ridge, WA (08)	Young et al. 2009b	White Creek, WA (07-11)	Downes and Gritski 2012b
Kittitas Valley, WA (11-12)	Stantec Consulting Services 2012	Wild Horse, WA (07)	Erickson et al. 2008
Klondike, OR (02-03)	Johnson et al. 2003	Windy Flats, WA (10-11)	Enz et al. 2011
Klondike II, OR (05-06)	NWC and WEST 2007		

C10. 2017 Raptor Nest Survey Report

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TECHNICAL MEMORANDUM

DATE: September 19, 2018

TO: Kristen Goland - Pacific Wind Development LLC

FROM: Joel Thompson - WEST, Inc.

RE: 2017 Raptor Nest Survey Report for the Fountain Wind Project, California

Introduction

Pacific Wind Development LLC (Pacific Wind) is developing the proposed Fountain Wind Project (Project) in Shasta County, California. To address potential impacts to nesting golden eagles (*Aquila chrysaetos*) and/or bald eagles (*Haliaeetus leucocephalus*), the U.S. Fish and Wildlife Service (USFWS) recommends conducting eagle nest surveys within survey areas that extend up to 10-miles (mi; 16-kilometer [km]) from proposed wind energy facilities prior to construction, with at least two rounds of surveys completed a minimum of 30 days apart during the nesting season (USFWS 2013). In addition to eagle nest surveys, the USFWS (2012) and California Department of Fish and Wildlife (CDFW; CEC and CDFG 2007) recommend conducting nest surveys for other nesting raptors within proposed wind energy projects and a surrounding buffer of at least one mi (1.6 km).

Western EcoSystems Technology, Inc. (WEST) was contracted to provide biological support for development of the Project, including aerial surveys for raptor nests within the Project and a surrounding 10-mi buffer for eagles, and 2-mi (3.2-km) buffer for other raptors that build large, conspicuous stick nests. To aid in planning eagle survey efforts, WEST gathered data on previously documented bald and golden eagle nests within the 10-mi Survey Area from the California Natural Diversity Database (CNDDB 2017) and CDFW (C. Battistone, personal communication). This memorandum provides a summary of the methods and results of aerial raptor nest surveys conducted by WEST in March and May 2017 in support of the Project.

Survey Areas

The Survey Areas included the Project Area, provided as Geographic Information System (GIS) data by Pacific Wind, which encompassed all possible areas under consideration of development at the time, plus 2- and 10-mi buffers of the Project Area. The 2- and 10-mi Survey Areas included the Project Area and surrounding buffers in Shasta County, California, west of the community of Burney (Figure 1). East-west running California State Route 299 bisects the Survey Areas. The Lassen National Forest extends into the southeastern portion of the Survey Areas, and parts of the Shasta -Trinity National Forest extend into the western and northern portions of the Survey Areas (Figure 1). The dominant vegetation type in the Survey Areas is Sierran mixed conifer forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use within the Project Area, and much of the Survey Areas outside of the national forests, is commercial timber production, which has resulted in a highly fragmented landscape across much of the Survey Areas.

The Survey Areas fall within the Cascades Ecological Region (ecoregion; Griffith et al. 2016), an area generally marked by steep ridges as well as both active and dormant volcanoes. The Cascades Ecoregion is characterized by a mesic, temperate climate, which supports productive coniferous forests. Topography within the Survey Areas includes gently rolling hills that transition to relatively steep, low mountains. The Pit River is the most significant waterway within the Survey Areas; however, numerous smaller creeks and several small reservoirs also are present (Figure 1).

Methods

The initial survey utilized an intuitive controlled survey method that focused on identifying and searching specific habitat features within the Survey Areas that held the highest potential to support the target species. Within the 2-mi Survey Area, efforts focused on habitat features typically used by raptors that build large, conspicuous stick nests (e.g., eagles, osprey [*Pandion haliaetus]*, and red-tailed hawk [*Buteo jamaicensis*]), while search efforts beyond the 2-mi buffer out to 10 mi focused on eagle nests specifically. Key habitat features within the Survey Areas included cliffs, rock outcrops, incised drainages and canyons, powerline structures, and large/dominant trees.

The second survey was conducted as described above for areas within the 2-mi buffer (i.e., an intuitive controlled search of key habitat features throughout the area), while surveys beyond the 2-mi buffer primarily focused on confirming the status of previously documented eagle nests. However, some additional effort was spent searching for eagle nests in a few specific areas identified during the initial survey as being most suitable for supporting eagle nests (e.g., cliffs, transmission line and river corridors) and in the vicinity of historical eagle nest locations where nests were not located during the initial survey.

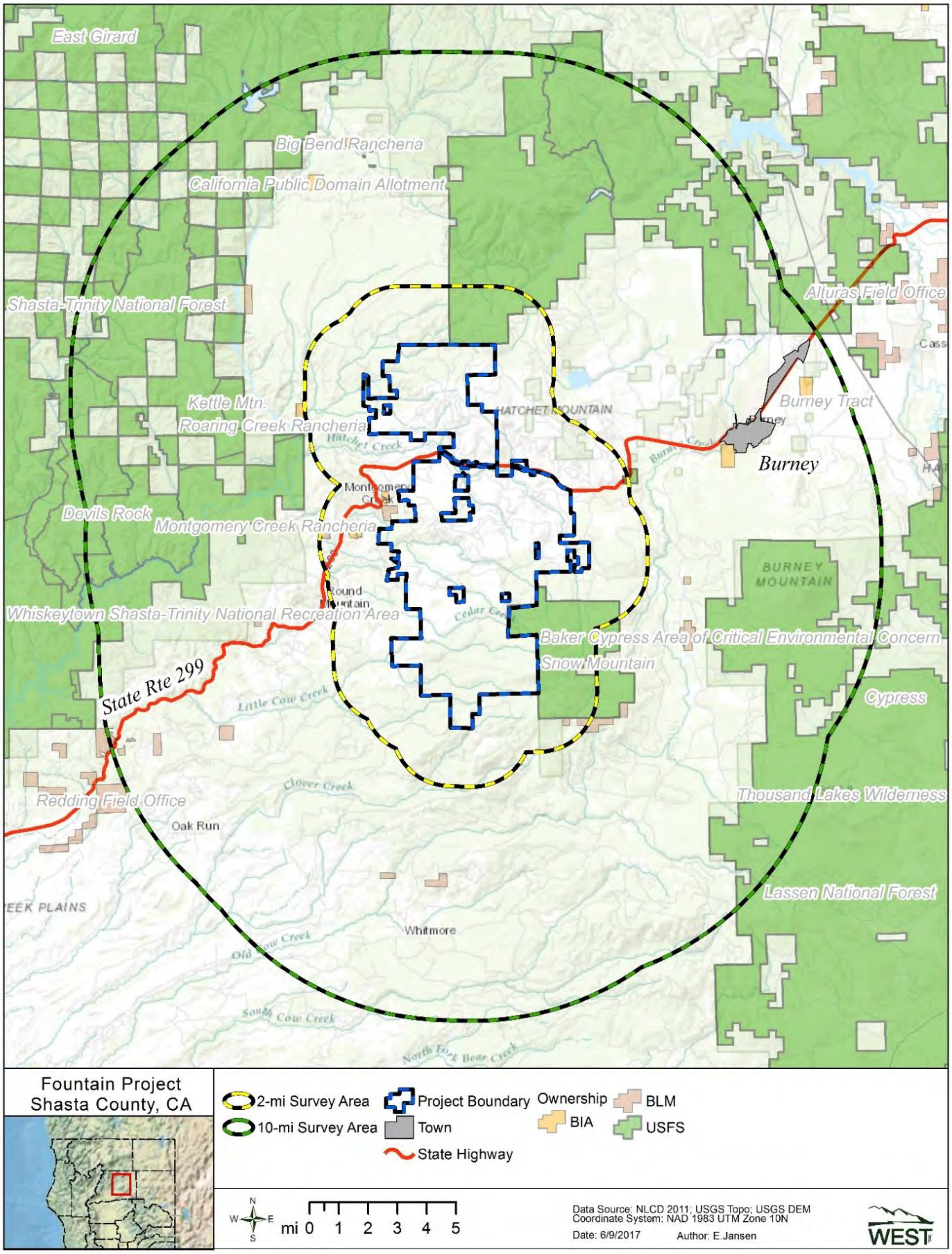

Figure 1. Overview of 2017 Fountain Wind Project raptor nest Survey Areas including 2-mile and 10-mile buffers (BIA = Bureau of Indian Affairs, BLM = Bureau of Land Management, USFS = U.S. Forest Service).

Two helicopter-based aerial nest surveys were conducted in 2017. The initial survey was conducted on March 20 and the second survey on May 9. Both surveys were conducted by two WEST biologists who have prior experience conducting similar surveys in California and elsewhere. The initial survey was conducted during a time period that overlapped the early reproductive period of eagles in northern California (e.g., nest initiation / early incubation), while the second survey was performed at a time when eagles and other raptor species would have been engaged in reproductive activities (e.g., incubating, brooding) at in-use nests.

During surveys, the helicopter was positioned to allow thorough visual inspection of appropriate habitat features. In general, the helicopter remained within a zone 100 feet (ft; 31 m) to 500 ft (152 m) above ground level (AGL) and moved at a relative air speed of approximately 50 mi per hour (80.5 km per hour). When nests were located, the helicopter reduced speed and adjusted flight to allow for a clear view of the nest for documentation and photographing. For each nest found, the location was recorded and nest attribute data were collected, including nest substrate, nest size, and nest condition, along with any comments useful in determining the nest status. Nest size was categorized as: small = small stick nest characteristic of corvids or accipiters (e.g., common raven [*Corvus corax*], sharp-shinned hawk [*Accipiter striatus*]); medium = medium stick nest characteristic of buteos and large owls (e.g., red-tailed hawk, great-horned owl [*Bubo virginianus*]); large = large stick nest that could support eagles, but may also be used by other large raptors (e.g., red-tailed hawk, great-horned owl, osprey); Very_Large = very large stick nest characteristic of eagle nests.

Nest suitability for eagles was also assessed. Bald eagle nests are usually placed in the top quarter of the tree, just below the crown, and against the trunk or in a fork of large branches near the trunk (Buehler 2000). On average, bald eagle nests are 5-6 ft (ft; 1.5-1.8 [m]) in diameter and 2-4 ft tall (0.6-1.2 m; Buehler 2000). Golden eagle nests are most commonly located on cliffs throughout most of North America, with trees nests more common in parts of Wyoming, Washington, and California (Kochert et al. 2002). Golden eagles tend to avoid building nests in dense stands of timber; however, when nesting in forested areas, nesting trees are usually the largest or one of the largest trees available, isolated or on the fringe of small stands of timber, and proximal (less than 0.3 mi [0.5 km]) to large openings (Kochert et al. 2002). Golden eagle nests are large, with nest size generally within the range of 3-8 ft (1.2–2.6 m) in diameter and 0.4-6.6 ft (0.13-2.0 m) tall (Kochert et al. 2002).

Nesting status was classified for the 2017 nesting season based on the recommended terminology of Steenhof et al. (2017), based on the most advanced level of nesting activity documented during the course of both surveys (i.e., status could change from unoccupied to occupied during subsequent surveys in a nesting season, but may not change from occupied to unoccupied in a season). A nest was considered “occupied” if it contained eggs, young, or an incubating eagle, or had a pair of eagles on or near it, or had been recently repaired or decorated (Steenhof et al. 2017). Occupied nests were further classified as “in-use” if eggs had been laid, as evidenced by the presence of an incubating bird, eggs, young, or any other indication that eggs had been laid in the current year (Steenhof et al. 2017). Nests not meeting the above criteria for “occupied” were classified as “unoccupied” if the nest had been visited at least twice. A status of “unknown” was assigned to nests that could not be effectively monitored and therefore did not meet the criteria of occupied or unoccupied as described above.

Results and Discussion

Eleven occupied bald eagle nests were documented within the 10-mi Survey Area in 2017 (Figure 2, Table 1). Historical golden eagle nest locations provided by CDFW were surveyed, along with other suitable golden eagle nesting substrates; however, no golden eagle nests were documented. Of the 11 occupied bald eagle nests, nine were documented as in-use during at least one survey (Table 1). The two other occupied bald eagle nests showed no evidence of being used for egg-laying during the 2017 nesting season (Figure 2, Table 1). Six of the in-use bald eagle nests contained either one or two chicks estimated to be between 14 and 28 days of age as of the second survey on May 9. One additional in-use nest contained an incubating/brooding adult on May 9, but the number of eggs/young could not be determined (Table 1). Two other occupied nests that were in-use during the March survey apparently failed, showing no evidence of eggs or young during the May survey (Table 1). Two additional nests, both previously documented as historical bald eagle nests by CDFW, were located and determined to be unoccupied in 2017 (Table 1). All of the eagle nests documented were in good to excellent condition. Photographs of the 13 bald eagle nests are included in Appendix A.

Six of the 11 occupied bald eagle nests were located along the Pit River, while the closest occupied bald eagle nest to the Project was at Lake Margaret, approximately 2.9 mi (4.7 km) east of the Project Area boundary (Figure 2). The eagles at Lake Margaret are part of a USFWS movement study, and as such, are fitted with platform transmitting terminal (PTT) tags that help track their movements. Details on how the Lake Margaret pair utilizes the landscape may be available in the future; however data were not available for inclusion in this report. An adult was observed on the Lake Margaret nest (Nest 5; Figure 2, Table 1) in an incubating position during the March survey, but no evidence of continued use was observed during the follow-up survey in May, indicating the nesting attempt had failed. All other occupied bald eagle nests were more than 4.2 mi (6.8 km) from the Project Area boundary (Figure 2).

Nests of other raptor species identified during the aerial survey included two osprey nests (one occupied and one in-use) located within one mi of the Project Area boundary, one occupied red-tailed hawk nest located about 1.5 mi (2.4 km) from the Project Area boundary, and two unoccupied nests located within 1.3 mi (2.1 km) of the Project Area boundary (Figure 2, Table 1). These two unoccupied nests were of medium size and inconsistent with the characterization of bald eagle nests, as described in Buehler (2000).

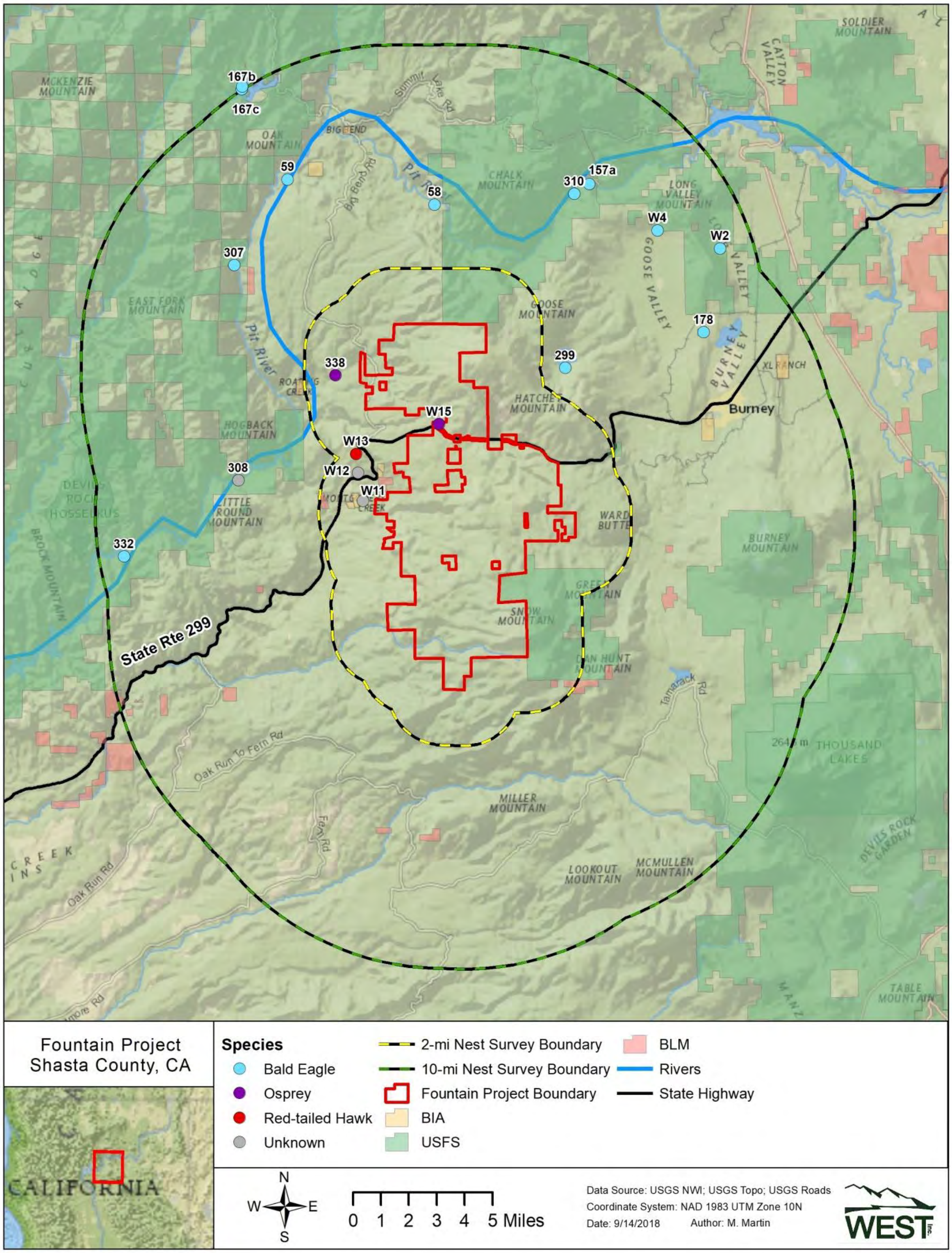

Figure 2. Eagle and other raptor nest locations documented during aerial surveys for the Fountain Wind Project, March 20 and May 9, 2017.

Table 1. Results of the 2017 eagle/raptor nest surveys conducted on March 20 and May 9 at the Fountain Wind Project in Shasta County, California.

Nest ID[1]	Species	2017 Nest Status[2]	Nest Attributes Substrate	Size[3]	Comments
310	Bald eagle	Occupied / In-use	Tree	Very large	One chick in nest estimated to be 28 days old on May 9
178	Bald eagle	Occupied / In-use	Tree	Very large	Two chicks in nest estimated to be 21-28 days old on May 9
58	Bald eagle	Occupied / In-use	Tree	Very large	Two chicks in nest estimated to be 21-28 days old on May 9
59	Bald eagle	Occupied / In-use	Tree	Very large	One chick in nest estimated to be 21 days old on May 9
307	Bald eagle	Occupied / In-use	Tree	Very large	One chick in nest estimated to be 14 days old on May 9
157a	Bald eagle	Occupied / In-use	Tree	Very large	One chick in nest estimated to be 21 days old on May 9
W4	Bald eagle	Occupied / In-use	Tree	Very large	Adult in incubating/brooding position during May survey. No of young/eggs unknown
332	Bald eagle	Occupied / In-use	Tree	Very large	Adult observed in incubating position in March; no evidence of nesting in May indicate failed nesting attempt
299	Bald eagle	Occupied / In-use	Tree	Very large	Adult in incubating position in March; no sign of nesting in May indicate failed nesting attempt
W2	Bald eagle	Occupied	Tree	Very large	Adult observed tending nest in March; no evidence of nesting in May
167b	Bald eagle	Occupied	Tree	Very large	Adult observed tending nest in March; no evidence of nesting in May
167c	Bald Eagle	Unoccupied	Tree	Very large	Historical bald eagle nest in good condition; no evidence of use
308	Bald eagle	Unoccupied	Tree	Very large	Historical bald eagle nest in good condition; no evidence of use
W15	Osprey	Occupied / In-use	Tree	Large	Three eggs observed in nest during May survey
338	Osprey	Occupied	Powerline	Very large	Adult osprey observed tending nest in March; no evidence of nesting in May
W13	Red-tailed hawk	Occupied	Powerline	Medium	Medium-sized nest in good condition
W11	Unknown raptor	Unoccupied	Powerline	Medium	Medium-sized nest in good condition
W12	Unknown raptor	Unoccupied	Powerline	Medium	Medium-sized nest in good condition

[1] IDs preceded by W indicate nests newly discovered by WEST during surveys. All other IDs are consistent with historical IDs provided by California Department of Fish and Wildlife.
[2] Highest level of reproductive status determined for the current breeding season: **Occupied** = contained eggs, young, or an incubating eagle, or had a pair of eagles on or near it, or had been recently repaired or decorated. **In-use** = an occupied nest in which eggs were laid, as evidenced by the presence of an incubating bird, eggs, young, or any other indication that eggs had been laid in the current year. **Unoccupied** = no sign of nesting or territory occupancy in the current nesting season, based on at least two visits. **Unknown** = nest was not located or status as occupied/unoccupied could not be confirmed as defined herein.
[3] **Small** = small stick nest characteristic of corvids or accipiters; **Medium** = medium stick nest characteristic of buteos and large owls.; **Large** = large stick nest that could support eagles, but may also be used by other large buteos, osprey, large owls; **Very Large** = very large stick nest characteristic of eagle nests

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Appendix A: Photographs of Bald Eagle Nests Documented During Nest Surveys Conducted in 2017 at the Fountain Wind Project, Shasta County, California.

Nest 310, located approximately 5.5 miles northeast of the Fountain Wind Project.

Nest W2, located approximately 8.8 miles northeast of the Fountain Wind Project.

Nest 178, located approximately 6.0 miles east of the Fountain Wind Project.

Nest W4, located approximately 6.7 miles northeast of the Fountain Wind Project.

Nest 299, located approximately 2.9 miles east of the Fountain Wind Project.

Nest 58, located approximately 4.2 miles north of the Fountain Wind Project.

Nest 59, located approximately 6.5 miles northeast of the Fountain Wind Project.

Nest 307, located approximately 5.5 miles northeast of the Fountain Wind Project.

Nest 332, located approximately 9.1 miles west of the Fountain Wind Project.

Nest 157, located approximately 6.2 miles northeast of the Fountain Wind Project.

Nest 308, located approximately 5.0 mi (8.0 km) west of the Fountain Wind Project.

Nest 167c, located approximately 10.1 mi (16.3 km) north of the Fountain Wind Project.

Nest 167b, located approximately 10.1 mi (16.3 km) north of the Fountain Wind Project.

C11. 2018 Northern Goshawk Nest

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Phone: 541-230-1790 ◆ www.west-inc.com ◆ Fax: 307-637-6981

TECHNICAL MEMORANDUM

DATE: October 15, 2018

TO: Kristen Goland – Pacific Wind Development LLC

FROM: Joel Thompson and Kori Hutchison - WEST, Inc.

RE: 2018 Northern Goshawk Nest Survey Results, Fountain Wind Project, CA

Introduction

Pacific Wind Development LLC contracted Western EcoSystems Technology, Inc. (WEST) to provide biological survey support for the development of the proposed Fountain Wind Project (Project). The Project is located within a Project area that encompasses approximately 32,000 acres (12,950 hectares) of private land in central Shasta County, California. The primary land use within the Project area is commercial timber production. The dominant vegetation type in the Project area is early seral mixed coniferous forest (post-fire and unburned), with smaller amounts of mixed montane chaparral, and mixed montane riparian forest/scrub. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*). Late seral forest is largely lacking within the Project area due to both fire and commercial timber harvest activities.

Northern goshawk (goshawk; *Accipiter gentilis*) is currently designated as a California Species of Special Concern (CDFW 2018), and according to the California Natural Diversity Database (CNDDB), occurrence areas that encompass historical nest sites associated with four goshawk territories (territories 54, 50, 66, and Cow Creek) have been documented within the Project area (Figure 1). The last documented nesting activity within these four occurrence areas, according to CNDDB data, was in 2003, 1997, 1997, and 2003, respectively (CDFW 2018). While surveys conducted by the timberland owners in the mid-2000s indicated some continued use of territory 54 by goshawks, surveys found no evidence of use at the other three territories at that time (R. Klug, LandVest Inc., personal communication). This is consistent with information provided in the Cedar Boots timber harvest plan (THP-16-077-SHA; CDF 2018a), which was approved in October 2017 and overlaps three of the goshawk occurrence areas (50, 66, and Cow Creek). The THP indicates that none of the three sites (50, 66, Cow Creek) are currently active and that the last known surveys were conducted on the southern site (Cow Creek based on the location description provided) in 2006, 2007, and 2008, with no detections (CDF 2018a). The THP further indicates that no goshawks were detected during layout of this THP or previous THPs in the area (CDF 2018a). No other surveys have been conducted more recently within the Project area (R. Klug, personal communication). The THP approval process is considered a certified equivalent of the California Environmental Quality Act (CEQA); therefore, consideration of impacts to northern goshawk provided during the THP approval process for the Cow Creek THP should be considered equivalent to meeting the CEQA standards for that THP (CDF 2018b).

Given that the Project is located on private lands managed for timber production and the most likely direct impact to potentially suitable goshawk nesting habitat would be timber harvest in preparation of turbine pads or road construction, the California Forest Practice Rules (CFPR; CDF 2018b) were consulted in regard to protection of goshawk nests that could be impacted by timber harvest activities, and how those protections may influence survey efforts. According to the CFPR (sections 919.3, 939.3, 959.3), a minimum buffer area of five to 20 acres (equivalent to a 262- to 525-ft [80- to 160-m] radius circle) should be maintained around active goshawk nests when considering timber harvest in proximity to known active nests. Any such buffer applied should include known nest and perch trees, along with screen trees and replacement trees (CDF 2018b).

Northern goshawks have been detected within the Project area during fixed-point large bird use surveys and incidentally by WEST biologists in 2017 and 2018, totaling five observations between April 2017 and May 2018. Potential risk to goshawks from Project operations (i.e., potential collision impact with turbines) will be evaluated based on flight height and abundance data collected during fixed-point bird use surveys. However, goshawk nest sites have been documented historically within the Project area (CDFW 2018), and although the most recent survey data indicate that at least three of the four occurrence areas have been inactive in recent years, surveys for goshawk were conducted in 2018 to provide a more current assessment of potential presence of active nests within the four historical occurrence areas. Based on reviews of aerial imagery within the Project area, habitat within these historical occurrence areas appear to represent the most suitable nesting stands in close proximity (e.g., within 160 m) to areas of potential disturbance based on the most current Project layout as of the date of this report. This memo provides the methods and results of the 2018 surveys.

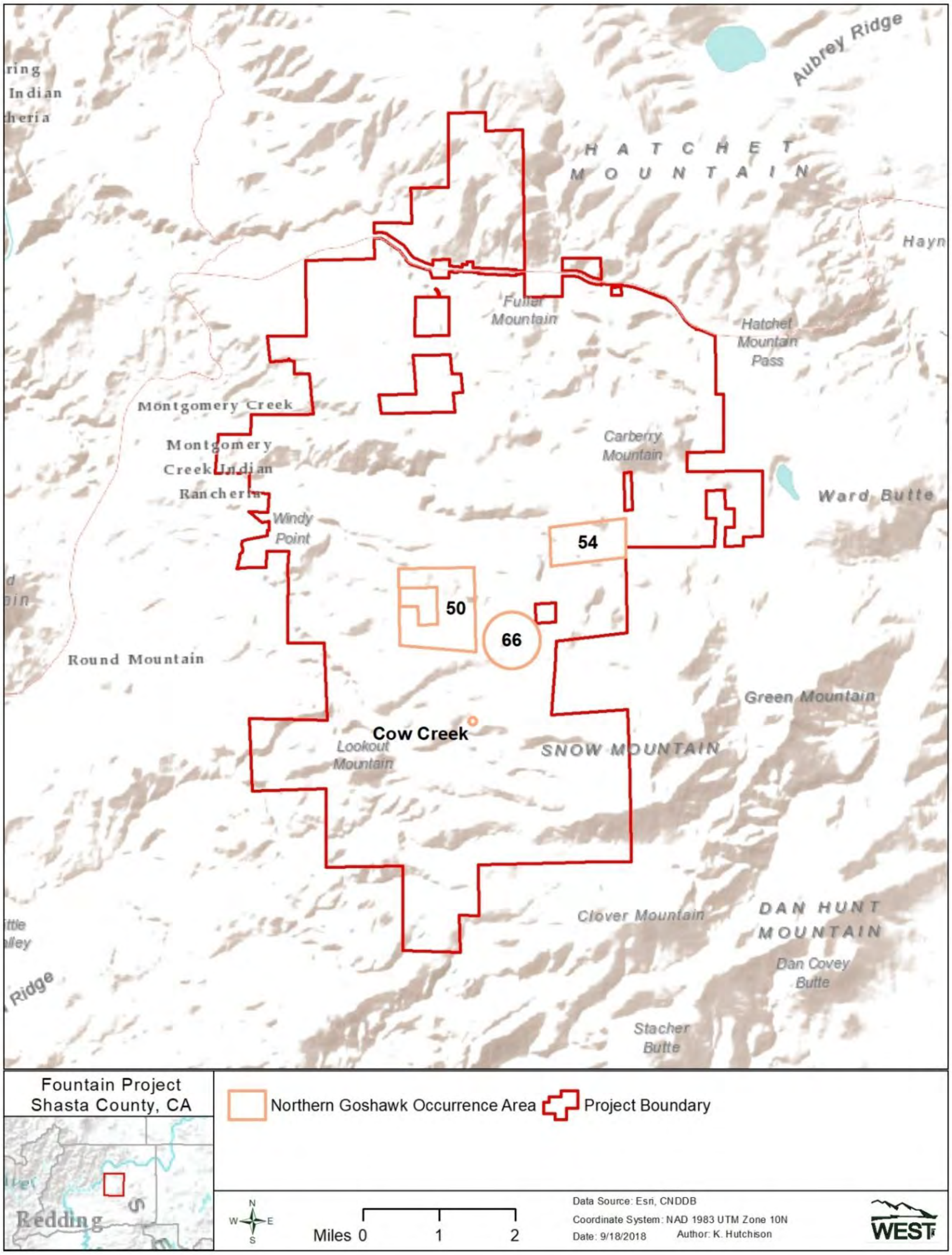

Figure 1. Historical northern goshawk occurrence areas, as depicted by the California Natural Diversity Database (CNDDB), within the Fountain Wind Project, Shasta County, California. Occurrence areas are labeled consistent with CNDDB territory names (i.e., territories, 50, 54, 66, and Cow Creek).

Methods

Field surveys were conducted in the four historical goshawk occurrence areas to assess the potential for occupancy in 2018 utilizing survey techniques described in the Northern Goshawk Inventory and Monitoring Technical Guide (Woodbridge and Hargis 2006). Surveys included two separate methods implemented during the two most vocal stages in the breeding chronology of this species. Dawn acoustical surveys were conducted during the courtship/nest-building stage (February – April), and broadcast acoustical surveys were conducted during the nestling/fledging stage (June – July; Woodbridge and Hargis 2006).

Dawn acoustical surveys are a passive monitoring technique where surveyors are positioned at “listening stations” in close proximity to known nests or patches of suitable habitat (Woodbridge and Hargis 2006). Dawn acoustical surveys were conducted at listening stations in April 2018 and consisted of an approximately 2-hour listening session beginning 0.5-hour prior to sunrise in each of the four occurrence areas (CDFW 2018; Figure 2). Prior to conducting dawn acoustical surveys, WEST biologists searched within the historical occurrence areas for the presence of previously marked nest trees and nests suitable for use by goshawks. Listening stations were located at known nest trees when possible or in close proximity to historical nest tree locations if the known nest tree could not be found (Figure 2).

Broadcast acoustical surveys were conducted in June in all four historical goshawk occurrence areas (CDFW 2018). These surveys consisted of walking transects spaced 200 meters apart in all suitable habitat within the occurrence areas as depicted by the CNDDB data. Surveyors searched for signs of nesting (e.g., nest structures, whitewash, prey remains) while walking transects and stopped periodically (e.g., approximately every 200 m) to broadcast goshawk calls and listen for responses (Woodbridge and Hargis 2006).

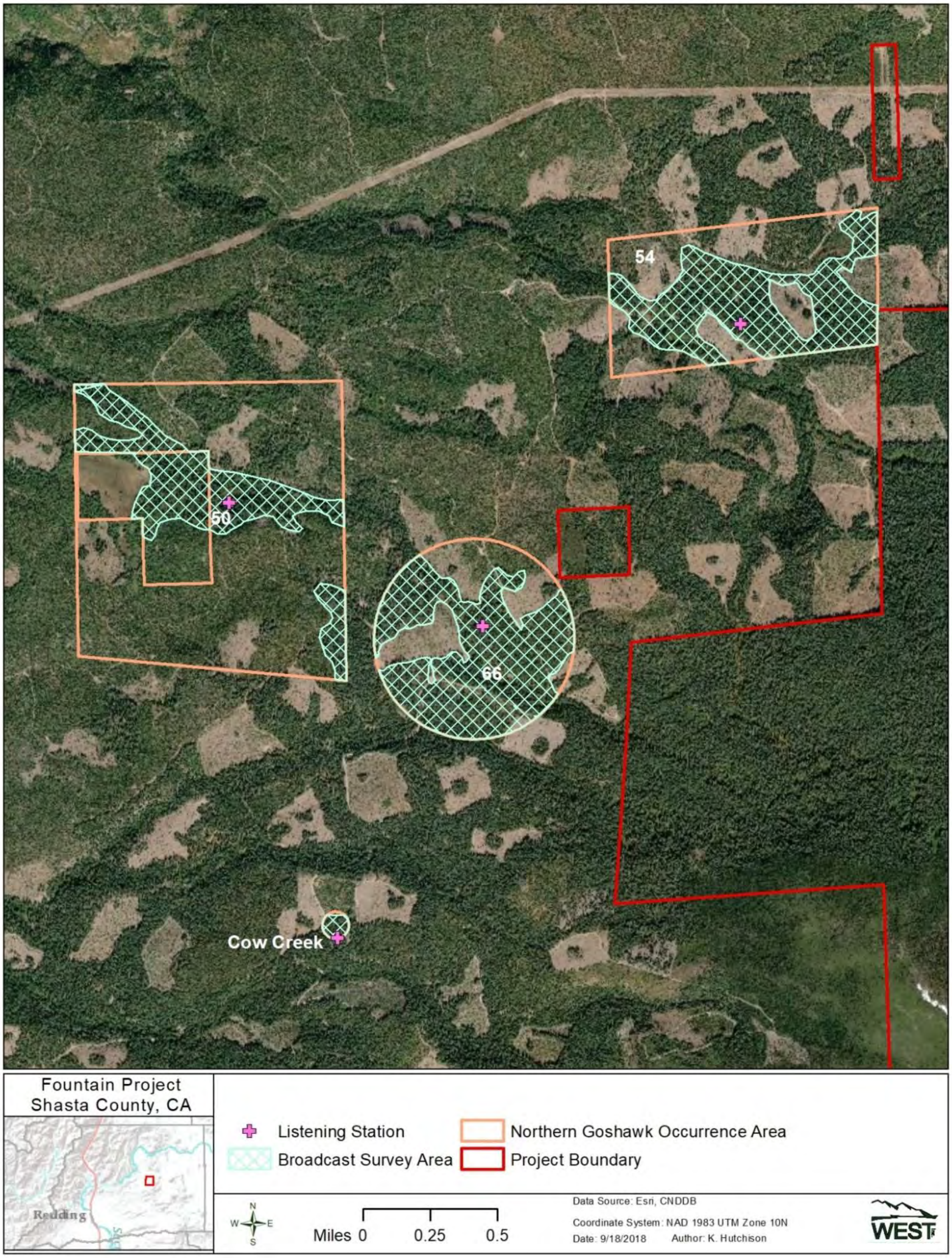

Figure 2. Location of northern goshawk occurrences as provided by the CNDDB, listening stations, and broadcast survey areas within the Fountain Wind Project, Shasta County, California. Occurrence areas are labeled consistent with CNDDB territory names (i.e., territories, 50, 54, 66, and Cow Creek).

Results

Two previously documented nest trees were located during field surveys, one each in occurrence areas associated with territories 50 and 54. One nest tree contained a nest that was occupied by a great horned owl (*Bubo virginianus*) and the other was a broken-top snag no longer capable of supporting a nest.

Dawn acoustical surveys were conducted in each of the four historical goshawk occurrence areas from April 18 – 20, 2018 (Table 1). No visual or auditory detections of goshawks were recorded and no evidence of nesting goshawks was observed during the dawn acoustical surveys.

Table 1. Results of dawn acoustical surveys conducted in historical northern goshawk occurrence areas, as provided by the CNDDB, from April 18 – 20, 2018 at the Fountain Wind Project, Shasta County, California.

Occurrence Area / Territory ID	Survey Date	Survey Time (minutes)	Detections
50	18 April 2018	137	0
54	18 April 2018	120	0
Cow Creek	19 April 2018	120	0
66	20 April 2018	120	0
Total		**497**	**0**

Broadcast acoustical surveys were conducted in suitable habitat within the four historical goshawk occurrence areas from June 23 – 25, 2018 (Table 2). No visual or auditory detections of northern goshawks were recorded and no evidence of nesting northern goshawks was observed during the broadcast acoustical surveys.

Table 2. Results of broadcast acoustical surveys conducted in historical northern goshawk occurrence areas, as provided by the CNDDB, from June 23 – 25, 2018 at the Fountain Wind Project, Shasta County, California.

Occurrence Area / Territory ID	Survey Date	Survey Time (minutes)	Detections
50	23 June 2018	124	0
54	24 June 2018	146	0
Cow Creek	25 June 2018	139	0
66	25 June 2018	127	0
Total		**536**	**0**

Discussion and Conclusions

Previously documented goshawk nest trees were only found in two of the four historical goshawk occurrence areas, one of which was no longer suitable for supporting a goshawk nest and the other which contained a nest that was occupied by a great horned owl. No other marked historical nest trees were located during searches conducted prior to or during surveys, nor were any other stick nests located that were consistent with the size, structure, and placement of nests typically used by goshawks. Based on the results of surveys conducted in historical goshawk occurrence areas in 2018, the likelihood of nesting goshawks appears to be low within the surveyed areas. This data supports the findings reported in THP-2-16-077-SHA (CDF 2018a), which indicate a lack of goshawk activity in the vicinity of the occurrence areas in recent years.

Surveys focused on historical goshawk occurrence areas, therefore the results are not broadly applicable across the Project area. However, habitat within the historical occurrence areas appears to represent the most suitable nesting stands in close proximity to areas of potential disturbance as of the date of this report, with much of the goshawk habitat in closest proximity to the Project slated for harvest as a part of the Cedar Boots THP (2-16-077-SHA). The CFPR (CDF 2018b) provide guidance on the protection of goshawk nests to ensure protection of both the nest site and nesting birds from the effects of timber operations. If final Project layouts result in direct impacts (e.g., harvesting) to suitable goshawk nesting habitat, then additional surveys, as described in Woodbridge and Hargis (2006), may need to be completed prior to construction to ensure nesting sites are appropriately protected (e.g., consistent with CFPR guidance [CDF 2018b]).

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C12. 2018 Eagle Nest Status Survey Report

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TECHNICAL MEMORANDUM

DATE: September 19, 2018

TO: Kristen Goland –Pacific Wind Development LLC

FROM: Joel Thompson - WEST, Inc.

RE: 2018 Eagle Nest Status Survey Report, Fountain Wind Project, California

Introduction

Pacific Wind Development LLC (Pacific Wind) is developing the proposed Fountain Wind Project (Project) in Shasta County, California. To address potential impacts to nesting golden eagles (*Aquila chrysaetos*) and/or bald eagles (*Haliaeetus leucocephalus*), the U.S. Fish and Wildlife Service (USFWS) recommends conducting eagle nest monitoring within survey areas that extend up to 10 miles (mi; 16 kilometers [km]) from proposed wind energy facilities prior to construction (USFWS 2013). Pacific Wind contracted Western EcoSystems Technology, Inc. (WEST) to provide biological support for the development of the proposed Project, and in 2017 WEST conducted aerial surveys for eagle and other raptor nests within 10- and 2-mi buffers of the Project, respectively (WEST 2018). In 2018, due to concerns raised by California Department of Wildlife (CDFW) regarding the need for a Memorandum of Understanding to conduct aerial surveys for eagles, 2018 eagle nest status surveys were conducted from the ground, as discussions regarding aerial surveys had not been resolved prior to the nesting season. The following memorandum describes the methods and results of eagle nest surveys conducted in support of the Project in 2018.

Methods

Ground-based eagle nest status surveys were conducted by WEST biologists in April 2018 at all previously documented bald eagle nests within the 10-mi survey area that were accessible by public road and viewable from a public access-point. Each survey lasted for a minimum of four hours, unless the nest was documented as being occupied earlier in the survey period (USFWS 2013). Each accessible bald eagle nest was visited once during the 2018 nesting season.

Nest status for the 2018 nesting season was classified based on the terminology of Steenhof et al. (2017). A nest was considered "occupied" if it contained eggs, young, or an incubating eagle, or had a pair of eagles on or near it, or had been recently repaired or decorated (Steenhof et al. 2017). Occupied nests were further classified as "in-use" if eggs had been laid, as evidenced by the presence of an incubating bird, eggs, young, or any other indication that eggs had been laid in the current year (Steenhof et al. 2017). For 2018, a status of "unknown" was assigned to any nest that could not be surveyed due to access issues, or that was not confirmed as occupied, as a single visit in April was considered insufficient to classify a nest as unoccupied for the season.

Results and Discussion

Ten bald eagle nests previously documented in 2017 were surveyed in 2018 (Table 1, Figure 1). Five of the 10 nests were determined to be occupied, two of which were further classified as in-use (Table 1; Figure 1). The occupancy status could not be confirmed for the five remaining nests surveyed in 2018; therefore they were classified as unknown status in 2018 (Table 1, Figure 1). Three nests surveyed in 2017 were not surveyed in 2018 due to lack of access (Table 1; Figure 1).

At each occupied nest, adult(s) were observed in incubating or brooding position, or perched in close proximity to the nest (e.g., in the nest tree; Table 1). For the two nests further classified as in-use, two nestlings were observed in Nest 178 (age not determined) and an adult was observed in incubating/brooding posture at Nest 308. Photographs of the five occupied eagle nests are included in Appendix A.

Adult bald eagles were observed during surveys conducted at 167b, 167c, and 157; however, no adults were observed visiting any of the three nests, nest trees, or trees in the immediate vicinity of these nests during the 4- or 6-hr long surveys conducted at these nest sites (Table 1). These three nests were therefore all classified as status unknown.

The five bald eagle nests documented as being occupied during 2018 surveys were all 5.0 mi (8.0 km) or more from the Project area boundary (Figure 1). Nest 299 (2.9 mi [4.7 km]) and Nest 58 (4.2 mi [6.8 km]) are both closer to the Project area boundary, but the status of both were unknown in 2018.

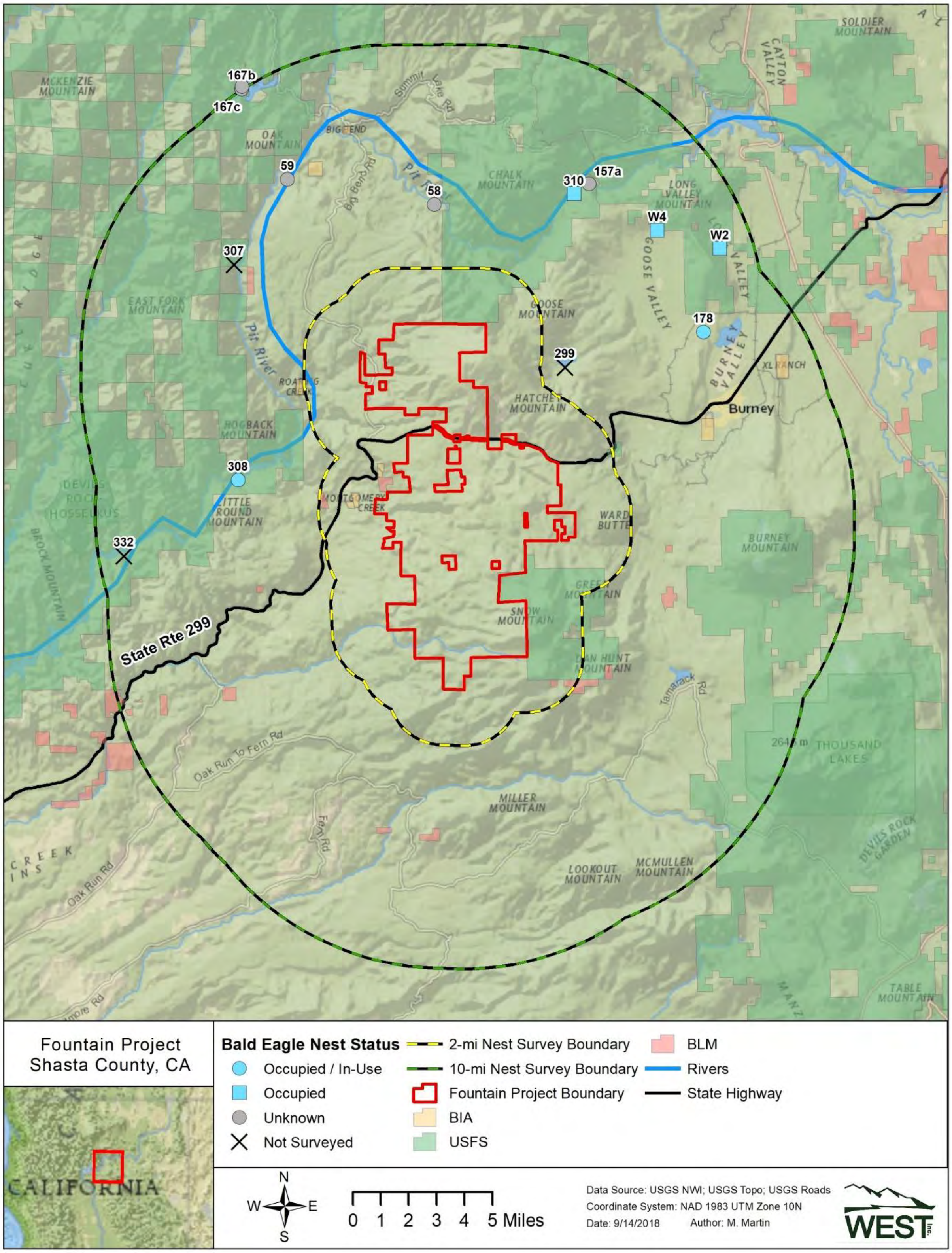

Figure 1. Summary of the 2018 eagle nest status survey results for the Fountain Wind Project, Shasta County, California. (BIA = Bureau of Indian Affairs, BLM = Bureau of Land Management, USFS = U.S. Forest Service)

Table 1. Summary of the 2018 bald eagle nest status surveys conducted within a 10-mile buffer of the Fountain Wind Project, Shasta County, California. Additional details on 2017 nest status surveys are available in the 2017 nest survey report (WEST 2018).

Nest ID[1]	Species	2017 Nest Status[2]	2018 Nest Status[2]	2018 Survey Date	Comments
310	Bald eagle	Occupied / In-use	Occupied	April 19	Two adults observed perched in nest tree, but not on nest
W4	Bald eagle	Occupied / In-use	Occupied	April 22	Adult observed landing on nest, but not confirmed as incubating/brooding/tending young
W2	Bald eagle	Occupied	Occupied	April 21	Adults seen in nest tree, but not on the nest
178	Bald eagle	Occupied / In-use	Occupied / In use	April 21	Adult(s) observed, two nestlings
308	Bald eagle	Unoccupied	Occupied / In use	April 19	Adult(s) in incubating/brooding position
58	Bald eagle	Occupied / In-use	Unknown	April 19	No activity observed during 4-hour survey
59	Bald eagle	Occupied / In-use	Unknown	April 25	Nest not visually located, but no activity observed in area during 4-hour survey
157	Bald eagle	Occupied / In-use	Unknown	April 18	Pair observed flying in the area, but no adults visited the nest or nest tree during the 4-hour survey
167b	Bald eagle	Occupied	Unknown	April 23	Nest not visually located; Nest is close to Nest 167c; Pair of adults observed flying on one occasion, but no activity observed at nest location during 6-hour survey
167c	Bald eagle	Unoccupied	Unknown	April 23	Nest not visually located; Nest is close to Nest 167b; Pair of adults observed flying on one occasion, but no activity observed at nest location during 6-hour survey
307	Bald eagle	Occupied / In-use	Not surveyed / Unknown	not surveyed	Not accessible
332	Bald eagle	Occupied / In-use	Not surveyed / Unknown	not surveyed	Not accessible
299	Bald eagle	Occupied / In-use	Not surveyed / Unknown	not surveyed	Not accessible

[1] IDs preceded by W indicate nests newly discovered by WEST during surveys. All other IDs are consistent with historical IDs provided by California Department of Fish and Wildlife.
[2] Highest level of reproductive status determined for a breeding season: **Occupied** = contained eggs, young, or an incubating eagle, or had a pair of eagles on or near it, or had been recently repaired or decorated. **In-use** = an occupied nest in which eggs were laid, as evidenced by the presence of an incubating bird, eggs, young, or any other indication that eggs had been laid in the current year. **Unoccupied** = no sign of nesting or territory occupancy in the current nesting season, based on at least two visits. **Unknown** = nest was not located or status as occupied/unoccupied could not be confirmed as defined herein (e.g., only a single visit in 2018).

REFERENCES

Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance. US Fish and Wildlife Service (USFWS). February 2010. Available online at: http://steinadlerschutz.lbv.de/fileadmin/www.steinadlerschutz.de/terimGoldenEagleTechnicalGuidanceProtocols25March2010_1_.pdf

Steenhof, K. M.N. Kochert, C.L. McIntyre, and J.L. Brown. 2017. Coming to Terms about Describing Golden Eagle Production. Journal of Raptor Research, 51(3):378-390.

US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. US Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. Executive Summary and frontmatter + 103 pp. Available online at: https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf

Western EcoSystems Technology, Inc. (WEST). 2018. 2017 Raptor Nest Survey Report for the Fountain Wind Project, California. Technical Memorandum - Prepared for Pacific Wind Development LLC. Prepared by WEST, Inc. September 14, 2018.

Appendix A: Photographs of Occupied Bald Eagle Nests Documented During Nest Status Surveys Conducted in 2018 at the Fountain Wind Project, Shasta County, California.

Nest 308, located approximately 5.0 mi (8.0 km) west of the Fountain Wind Project, Shasta County, California.

Nest 310, located approximately 5.6 mi (9.0 km) northeast of the Fountain Wind Project, Shasta County, California.

Nest 178, located approximately 7.8 miles (12.6 km) east of the Fountain Wind Project, Shasta County, California.

Nest W4, located approximately 7.0 mi (11.3 km) northeast of the Fountain Wind Project, Shasta County, California.

Nest W2, located approximately 8.8 mi (14.2 km) northeast of the Fountain Wind Project, Shasta County, California.

C13. Golden Eagle Clarification

Andrea Chatfield <achatfield@west-inc.com>

Fwd: Eagle Info for N. Cal Survey Area

2 messages

Joel Thompson <jthompson@west-inc.com> Mon, Jan 7, 2019 at 11:28 AM
To: Andrea Chatfield <achatfield@west-inc.com>

GOEA info email

---------- Forwarded message ---------
From: **Keiser, Kate@Wildlife** <Kate.Keiser@wildlife.ca.gov>
Date: Thu, Mar 16, 2017 at 11:24 AM
Subject: RE: Eagle Info for N. Cal Survey Area
To: Joel Thompson <jthompson@west-inc.com>, Battistone, Carie@Wildlife <Carie.Battistone@wildlife.ca.gov>

Hi Joel,

I've attached a zipped shapefile for the GOEA data. There are only 3 records so if you find anything be sure to let us know!

As for BAEA, you could also check Unprocessed Data from CNDDB Online Field Survey Form (ds1002) in the BIOS Viewer. It contains information that has been submitted but not yet entered into the CNDDB.

Kate

Kate Whitney Keiser

Environmental Scientist

California Department of Fish and Wildlife

Biogeographic Data Branch

(916) 445-5006, FAX (916) 324-0475

Mailing Address:

1416 9th Street, Suite 1266

Sacramento, CA 95814

Kate.Keiser@wildlife.ca.gov

From: Joel Thompson [mailto:jthompson@west-inc.com]
Sent: Thursday, March 16, 2017 9:11 AM
To: Battistone, Carie@Wildlife <Carie.Battistone@wildlife.ca.gov>
Cc: Keiser, Kate@Wildlife <Kate.Keiser@wildlife.ca.gov>
Subject: Re: Eagle Info for N. Cal Survey Area

Thanks Carie. That may/may not be. The heli was available Tues/Wed, so if we get it by then we'll be OK. Also looks like a fair chance that weather could play in and post-pone us, so it might be fine either way. Regardless, we'd be flying a second round later so even if we don't have all the dots for this one, we could make sure we check all them on the second. Hopefully we'd find them all anyway, but big timber country can be challenging. Also, there are a number of BAEA sites we have from CNDDB, but I'm guessing they could be old and there's better current info. We don't have any GOEA info from CNDDB so that will be a great to have.

Thank you much for the help.

Joel

On Thu, Mar 16, 2017 at 8:52 AM, Battistone, Carie@Wildlife <Carie.Battistone@wildlife.ca.gov> wrote:

> Hi Joel,
>
> Kate will be sending you something for GOEA. I will work on BAEA for you, but it requires me working with staff that are out of the office until next week. Is that too late?
>
> Carie

From: Joel Thompson [mailto:jthompson@west-inc.com]
Sent: Wednesday, March 15, 2017 10:09 AM
To: Battistone, Carie@Wildlife; Keiser, Kate@Wildlife
Subject: Eagle Info for N. Cal Survey Area

Hello Carie and Kate

I have a last minute request (seems like the usual in this day and age) for info on GOEA/BAEA nests in a survey area in N. Cal that we need to fly ASAP (just got a go to fly next Tues/Wed). Any chance you might be able to provide nest site info for BAEA and GOEA in the area by then? Attached is the survey area of interest. We have data from CNDDB, but any updates to that would be greatly appreciated.

Thanks so much.

Joel

--

Joel Thompson

Wildlife Biologist / Project Manager

Environmental & Statistical Consultants

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GoldenEagleExport.zip
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Joel Thompson <jthompson@west-inc.com> Mon, Jan 7, 2019 at 11:29 AM
To: Andrea Chatfield <achatfield@west-inc.com>

the BAEA correspondence

---------- Forwarded message ---------
From: **Battistone, Carie@Wildlife** <Carie.Battistone@wildlife.ca.gov>
Date: Mon, Apr 3, 2017 at 1:29 PM
Subject: RE: Eagle Info for N. Cal Survey Area
To: Joel Thompson <jthompson@west-inc.com>
Cc: McIntyre, Patrick@Wildlife <Patrick.McIntyre@wildlife.ca.gov>

Hello Joel,

I apologize for the delay. The bald eagle database is in draft form right now and I took some time to go through. Attached is a map of the bald eagle locations from CNDDB and from the bald eagle database (points called "Data Provided" in attached). The location data in the bald eagle database has not been cleaned up. Some of the points may be off, or they may be duplicate of what is in CNDDB. This is the best we can do at this point. I hope this helps you in your surveys! If you detect any nests (new of old) please do let us know.

Thanks,

Carie

From: Joel Thompson [mailto:jthompson@west-inc.com]
Sent: Wednesday, March 15, 2017 10:09 AM
To: Battistone, Carie@Wildlife; Keiser, Kate@Wildlife
Subject: Eagle Info for N. Cal Survey Area

Hello Carie and Kate

I have a last minute request (seems like the usual in this day and age) for info on GOEA/BAEA nests in a survey area in N. Cal that we need to fly ASAP (just got a go to fly next Tues/Wed). Any chance you might be able to provide nest site info for BAEA and GOEA in the area by then? Attached is the survey area of interest. We have data from CNDDB, but any updates to that would be greatly appreciated.

Thanks so much.

Joel

--

Joel Thompson

Wildlife Biologist / Project Manager

WEST Inc.

Environmental & Statistical Consultants

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Draft BAEA locations.pdf
1180K

C14. Response to Informal Consultation Request for Use Permit 16-007

ENVIRONMENTAL & STATISTICAL CONSULTANTS

2725 NW Walnut Boulevard, Corvallis, OR 97330
Phone: 575-802-3959 ◆ www.west-inc.com

6 November 2018

To: Lio Salizar
Planning Division
Shasta County Department of Resource Management
1855 Placer Street, Suite 103
Redding, CA 96001

Re: Response to Informal Consultation Request for Use Permit 16-007, Fountain Wind Project, Shasta County

To Whom It May Concern:

Western EcoSystems Technology, Inc. (WEST) was contracted by Pacific Wind Development LLC (Pacific Wind) to perform a variety of biological resource studies in support of the proposed Fountain Wind Project (Project) in Shasta County, CA. This letter addresses comments and recommendations provided by the California Department of Fish and Wildlife (CDFW) in a letter to the Shasta County Planning Division, Department of Resource Management, dated 2 March 2018 (Letter) as they pertain to biological studies of interest.

A summary matrix of the biological comments provided by CDFW in their Letter and responses provided by WEST and Pacific Wind is provided in Table 1, with additional details and discussion provided later in this response letter, as applicable. A number of desktop analyses and field studies have been completed as of the writing of this letter (Site Characterization Study, great gray owl habitat assessment, nocturnal migration assessment, fixed-point bird use surveys, raptor nest surveys, acoustic bat surveys, rare plant surveys, northern goshawk surveys, willow-flycatcher surveys, foothill yellow-legged frog surveys). Recently finalized reports are provided along with and in support of this response letter. Remaining reports associated with surveys currently underway or to be completed in 2019 will be provided to the County and CDFW as they become available. While additional field studies are ongoing at the Project, survey guidelines (e.g., CEC 2007, USFWS 2012) only recommend one year of surveys for most biological surveys at projects, with two or more survey years generally recommended in areas with high potential for annual variation (e.g., California Central Valley). Biological studies conducted to date have already achieved some of these minimum requirements (e.g., one year of avian use, raptor nest, and acoustic bat surveys). While CDFW recommended that all biological surveys be completed and reports provided in advance of the draft Environmental Impacts Report (EIR), there is little support from past studies to suggest that risk to biological resources will change substantially with the addition of a second year of data, and any minor changes to risk could readily be addressed prior to release of the final EIR or through stipulations attached to the County Permit.

Table 1. Matrix of California Department of Fish and Wildlife (CDFW) biological comments to the Shasta County Planning Division, Department of Resource Management in a letter March 2, 2018 and responses from Pacific Wind Development LLC and Western EcoSystems Technology, Inc. (WEST).

CDFW Comment Section	Pacific Wind / WEST Response	Report Reference
Biological Resources Work Plan	WEST and Pacific Wind expanded and/or implemented additional surveys at the Project in response to CDFW comments on the Work Plan. Methods and results of all additional studies can be found in the accompanying reports.	• Methods and results of additional/expanded studies in response to CDFW comments are available in the accompanying reports.
Special Status Species and Habitat Surveys	Flora and fauna within the Project area have been/are being addressed through a combination of desktop analyses (Site Characterization Study and species-specific habitat analyses) and field studies (rare plant and habitat survey, wetland delineations, willow flycatcher surveys, foothill yellow-legged frog surveys, northern goshawk surveys, fixed-point avian use surveys, and acoustic bat surveys).	• Site Characterization Study (January 2017) • Rare Plant and Natural Vegetation Community Survey Report (October 2018) • Avian Use Survey and Risk Assessment Report (November 2018) • Bat Acoustic Surveys Report (October 2018) • 2017 and 2018 Raptor Nest Surveys (September 2018) • Yellow-legged Frog Survey Report (October 2018) • Willow Flycatcher Assessment and Survey Report (October 2018) • Northern Goshawk Survey Report (October 2018)
CESA-Listed Species		
Foothill Yellow-legged Frog and Cascades Frog	Habitat assessment and initial field surveys completed in 2018. Future coordination with CDFW on need for additional surveys.	• Yellow-legged Frog Survey Report (October 2018)
Willow Flycatcher (WIFL)	Desktop assessments of potential habitat and WIFL surveys completed in 2018.	• Willow Flycatcher Assessment and Survey Report (October 2018)
Northern spotted owl (NSO)	Project is >4 mi from NSO range therefore no surveys are required or planned.	• Not applicable. See additional details later in this response letter.
Great gray owl (GGOW)	Desktop and field assessment of potential great gray owl habitat conducted in 2018. No suitable habitat was identified that would necessitate surveys.	• Great Gray Owl Habitat Assessment Memo (October 2018)

Gray Wolf	Wolves and/or evidence of wolves traveling through or adjacent to the Project area have been documented (WEST 2018, CDFW 2013, 2018); therefore, there is potential for additional use of Project area in the future. However, gray wolf specific surveys are not planned.	• Not applicable; see additional details later in this response letter.
State Listed and Fully Protected Avian Species	Fixed-point large bird use surveys are being conducted for two consecutive years throughout the project area, which will be used to assess the potential for impacts to the state-listed bald eagle and sandhill crane.	• Year 1 Avian Survey and Risk Assessment Report (November 2018)
Fully Protected Species	Potential occurrence of Fully Protected species is addressed in the SCS. Fixed-point large bird use surveys are being conducted for two consecutive years throughout the project area. While a second year of data is being collected, an avian risk assessment has been prepared to address impacts to these species based on the first year of data, which is consistent with agency guidelines. While additional data could influence the risk assessment to some extent, substantial changes to the potential for impacts to Fully Protected avian species are not anticipated. Should the second year of data indicated substantial changes in risk to Fully Protected species, such changes will clearly be identified in an updated risk assessment .	• Site Characterization Study (January 2017) • Year 1 Avian Survey and Risk Assessment Report (November 2018) • 2017 and 2018 Raptor Nest Surveys (September 2018)
Species of Special Concern (SSC)	A number of SSC were identified in the SCS as having some potential to occur in the Project area during some time of the year, although habitat for many species is restricted (e.g., ponds, streams, meadows, riparian thickets) and impacts avoided through project design. Species-specific surveys have been conducted for some species (e.g., northern goshawk). Others will be addressed based on the standardized fixed-point avian use surveys and associated risk assessments.	• Site Characterization Study (January 2017) • Year 1 Avian Survey and Risk Assessment Report (November 2018) • Northern Goshawk Survey Report (October 2018)

Northern goshawk	Surveys conducted in historical occurrence areas in 2018. Limited nesting habitat in areas of potential impacts. Additional surveys dependent on final project layouts.	• Northern Goshawk Survey Report (September 2018) • Year 1 Avian Survey and Risk Assessment Report (November 2018)
Avian point count surveys	Avian point count surveys are being conducted year round within the Project area to assess risk to avian species.	• Year 1 Avian Survey and Risk Assessment Report (November 2018)
Eagle / Large Bird Use Surveys	Eagle / large bird use surveys are being conducted year round within the Project area to assess risk to eagles and other large bird species.	• Year 1 Avian Survey and Risk Assessment Report (November 2018)
Nocturnal avian surveys	Collision mortality of nocturnal migrant birds has generally been low at wind energy facilities, particularly in the western US, and multi-bird fatality events are extremely rare. This is consistent with data from the nearby Hatchet Ridge Wind Project. Nocturnal radar studies at proposed wind energy projects have been implemented as a method to characterize migration patterns and potential exposure levels for nocturnal migrants, but no correlation has been found between radar-measured passage rates of avian targets and post-construction fatality rates, indicating that preconstruction radar studies are not an effective tool for assessing risk to migrating birds at wind energy facilities. Nocturnal migration (i.e., radar) surveys are not planned.	• Nocturnal Radar Synthesis / Summary Report (October 2018)
Bat monitoring	Acoustic bat monitoring was conducted in 2017 within the Project area, including additional detectors placed in the field following meetings with CDFW in 2017.	• Bat Acoustic Surveys Report (October 2018)
Wildlife Movement Study	The project will not impede wildlife movement via installation of fencing or other physical impediments. No specific wildlife movement studies are planned.	• See additional discussion in later in this letter.
Deer Habitat.	Development of the Project is not expected to result in levels of activity that exceed what regularly occurs at the Project during timber harvest operations or associated activities	• See additional discussion in later in this letter.

	including road maintenance or construction. No deer-specific surveys are planned.	
Rare Plants and Natural Communities	Rare plant surveys and mapping of Natural Vegetation Communities was completed in 2018. No rare plants were documented and no Sensitive Natural Vegetation Communities were identified.	• Rare Plant and Natural Vegetation Community Survey Report (October 2018)
Invasive Species	Invasive plant species were documented during rare plant surveys in 2018 and are discussed in the rare plant report.	• Rare Plant and Natural Vegetation Community Survey Report (October 2018)
Proposed Survey Corridors	Survey Corridors were utilized and incorporated various buffers to guide surveys for taxa and habitats most vulnerable to ground disturbance activities (e.g., rare plants, yellow-legged frog, and willow flycatcher). Much more broad areas were used to guide survey efforts for taxa (e.g., large and small birds) that are more at risk of collision impacts from turbines.	• See additional discussion later in this letter.

Biological Resources Work Plan

Summary of Comments and Recommendations:

CDFW requested an updated Biological Resources Work Plan which addresses issues documented in their Letter.

Response:

Based on discussions with CDFW and USFWS in 2017 regarding the initial study plan, WEST and Pacific Wind expanded several studies (e.g., moved to year-round small bird surveys) and added a number of additional survey efforts (e.g., willow flycatcher, foothill yellow-legged frog). Because most all surveys that were added or expanded in response to agency comments have been completed (in whole or in part), the methods and results are provided in the accompanying survey reports. Table 1 and this response letter provide a summary of how WEST and Pacific Wind addressed concerns over the initial work plan and provides a reference for all studies completed to date and/or planned at Fountain. Given that study methods (and results) are available in the accompanying survey reports, a revised Work Plan has not been prepared.

Special-Status Species and Habitat Surveys

Summary of Comments and Recommendations:

CDFW recommended completion of a comprehensive baseline survey including a complete assessment of the flora and fauna within and adjacent to the Project area, with emphasis on special-status species.

Response:

Flora and fauna within the Project area have been/are being addressed through a combination of desktop analyses and field studies to provide a comprehensive baseline of species occurrence within the Project area. Prior to initiation of biological resource studies at the Project, WEST drafted a desktop Site Characterization Study utilizing publicly available resources. The overall purpose of the Site Characterization Study was to identify the biotic and abiotic environmental characteristics of the Project and surrounding Evaluation Areas, evaluate potential impacts to these resources from wind energy development, and inform whether additional environmental resource surveys or assessments were warranted. The Site Characterization Study focused on the potential occurrence of special-status plant and animal species, and the habitats that support special-status species, including landcover/vegetation maps. In addition, WEST has conducted surveys for birds and bats (e.g., fixed-point avian use surveys and acoustic bat survey) to document use by special-status birds and bats, as well as species-specific surveys for several special status species with predicted possible occurrence in the Project area (e.g., willow flycatcher, northern goshawk, foothill yellow-legged frog, and rare plants). Results of surveys conducted to date are available in the various reports (see Table 1 and the following sections).

CESA-Listed Species

Candidate Amphibian Species – Foothill Yellow-legged Frog and Cascades Frog

Summary of Comments and Recommendations:

Foothill yellow-legged frog (*Rana boylii*) habitat and Cascades frog (*R. cascadae*) habitat occurs at the Project; the Department recommended completion of a habitat assessment and subsequent focused surveys for these species in all area of the Project where species' habitat may be impacted.

Response:

WEST conducted a desktop assessment for foothill yellow-legged frog habitat at the Project and confirmed that models predict the possible occurrence of habitat for this species. In 2018, WEST conducted initial visual encounter surveys (i.e., sub-adult) for foothill yellow-legged frog in modelled potential habitat areas potentially at risk of disturbance through Project development. While surveys in 2018 did not meet full protocol (e.g., surveys during multiple life stages), surveys were conducted following methods for conducting visual encounter surveys as described in *Considerations for Conserving the Foothill Yellow-legged Frog* (CDFW 2018a). Suitable habitat was limited within the Project area and no foothill yellow-legged frogs were detected. Survey results and methodologies are detailed in a stand-alone survey report. The data available from historical work in support of timber management activities within the Project area, and 2018 habitat assessments and surveys for foothill yellow-legged frog, suggest that foothill yellow-legged frog do not currently occur in, nor will they likely colonize the generally low-quality habitats present in the Project Survey Corridors (i.e., areas of potential disturbance based on possible project layouts). Therefore, no impacts to foothill yellow-legged frog are expected as a result of the Project. The need, scope, and timing of additional surveys for this species will be determined in coordination with CDFW.

The Project Survey Corridors have been located entirely outside the occupied range of Cascades frog and the modeled low-quality potential habitat that does occur within the larger Project area was confirmed as non-suitable; therefore, species-specific surveys are not warranted. Cascades frog habitat is distinctly different from foothill yellow-legged frog; Cascades frog prefers lentic waterbodies and associated meadows and wetlands. Based on range maps, the current range of Cascades frog overlaps with only a small area at the southern extent of the Project area, while all Survey Corridors are located more than two mi from the known range. According to the California Natural Diversity Database (CDFW 2018b), no known occurrences of Cascades frog have been documented within the Project area and the closest known occurrence are approximately 1.2 mi (1.9 km) southeast of the Project area boundary and 6.3 mi (10.1 km) north of the Project area boundary. A desktop analysis of the California Wildlife Habitat Relationships (CWHR; CDFW 2018c) database indicated approximately 75 acres (30 hectares) of low quality habitat potentially exists in the southern portion of the Project area, more than two miles south of the Project Survey Corridors. Results from field-based habitat mapping of this area verified that this predicted low quality habitat does not currently include the habitat elements necessary to support Cascades frog (e.g., ponds or wet meadows).

Because the Project Survey Corridors are entirely outside the Cascades frog range and the modeled low-quality potential habitat that does occur within the larger Project area was confirmed as non-suitable, formal surveys for Cascades frog are not warranted.

Willow Flycatcher Protocol Surveys

Summary of Comments and Recommendations:

CDFW commented that they were aware of known breeding occurrences of willow flycatcher (*Empidonax traillii*) on or near the Project, and potential habitat may occur at the Project based on the CDFW willow flycatcher habitat model. CDFW recommended that a qualified biologist conduct willow flycatcher habitat delineation and field surveys at the Project to determine site occupancy.

Response:

WEST conducted a desktop assessment of willow flycatcher occurrences and potentially suitable habitat at the Project, followed by field surveys that resulted in no willow flycatcher detections. According to the California Natural Diversity Database (CDFW 2018b) the closest occurrences of willow flycatcher are approximately 20 miles (mi) northeast of the Project. Habitat models (Timossi et al. 1995) predict that potentially suitable habitat occurs at the Project in several areas. A qualified WEST biologist conducted a reconnaissance-level site visit to evaluate modelled habitat for potential suitability in June 2018. Following this field assessment, willow flycatcher surveys were conducted at the Project in areas of modelled and field-confirmed potentially suitable habitat during the 2018 breeding season. Protocol-level surveys were conducted following recommendations in *A Willow Flycatcher Survey Protocol for California* (Bombay et al. 2003) by a biologist experienced in conducting surveys for this species in California. No willow flycatchers were detected at the Project during these surveys. Survey results and details on the survey methodology are detailed in a stand-alone survey report.

Northern Spotted Owl Protocol Surveys

Summary of Comments and Recommendations:

CDFW recommended surveys for northern spotted owls (*Strix occidentalis caurina*) because designated critical habitat for this species and known northern spotted owl territories are located in close proximity to the Project.

Response:

The Project is located outside the range of the northern spotted owl and based on survey protocols, surveys are not warranted. The Project is more than 4.3 mi south of the Pit River, which is the established southern boundary for the northern spotted owl range in California (Gutierrez and Barrowclough 2005). The California Forest Practice Rules require surveys for northern spotted owls only in suitable habitat, and require habitat protection up to 1.3 mi from a known activity center. Because the project is outside of the northern spotted owl range and the distance to any potentially occupied northern spotted owl activity centers far exceeds the 1.3 mi habitat protection buffer, no northern spotted owl surveys are proposed for the Project.

Great Gray Owl

Summary of Comments and Recommendations:

CDFW recommended a habitat assessment and surveys for great gray owl (*Strix nebulosi*) be conducted as habitat is modeled within and near the Project.

Response:

WEST conducted a desktop assessment of potential great gray owl occurrences and habitats in the Project area, which indicated that no suitable great gray owl nesting habitat existed within the Project area and that no documented records of great gray owl exist in or near the Project area (CDFW 2018b); therefore, species-specific surveys for great gray owl were not warranted. CDFW's Great Gray Owl Habitat Model (CDFW 2011) indicated that potentially suitable foraging and nesting habitat was located within the Project area; however, based on a field assessment of the modelled potentially suitable habitats , it was determined that habitat conditions were not suitable for great gray owl. Consistent with the CDFW Model, criteria for inclusion as potential foraging habitat included the following Wildlife Habitat Relationship (WHR) types: wet meadows, annual grasslands, and perennial grasslands; criteria for inclusion as potential nesting habitat included trees of WHR size 4M (11-24 inches diameter at breast height, 12-24 foot (ft) crowns, and 40-59% canopy cover) and larger/denser (CDFW 2011, CDFW 2014). The CDFW Model nesting habitat criteria are generally consistent with criteria identified in the survey protocol for great gray owl within the Northwest Forest Plan (NWFP) Area (Huff and Godwin 2016), which indicates that suitable nesting habitat must include mature or old-growth conifer stands with greater than 50% canopy cover containing potential nest trees (broken-top snags greater than 16-in diameter at breast height, trees containing pre-existing stick nests from hawks, ravens, or squirrels; or mistletoe brooms). Suitable nesting habitat for great gray owl needs to be adjacent to suitable foraging habitat (i.e., meadows greater than 10 acres; Huff and Goodwin 2016). Based on desktop and field reviews of potentially suitable habitats, these conditions do not occur within the Project area. In addition, there are no known occurrences of great gray owl within or adjacent to the Project (CDFW 2018b), and great gray owl has not been detected by biologists conducting a variety of surveys at the Project over the past approximately 18 months. The closest occurrence of great gray owl documented in the California Natural Diversity Database (CDFW 2018b) is approximately 85 mi northeast of the Project. Due to the absence of suitable habitat or great gray owl presence, no further great gray owl habitat assessments or surveys are proposed at the Project. Additional details on the habitat assessment are available in a stand-alone memo.

Gray Wolf

Summary of CDFW Comments and Recommendations:

No localized gray wolf (*Canis lupus*) activity is currently known from within or near the Project area, although wolves have been detected in California, including western Lassen and eastern Siskiyou counties. If gray wolf activity is detected during Project surveys, the Project proponent should consult with CDFW.

Response:

The Project area comprises a working commercial forest landscape, with active timber harvest operations, and numerous well-maintained and well-traveled roads, which results in a landscape unlikely to be used for establishing dens or rendezvous sites by gray wolves, relative to other less disturbed landscapes in the region (e.g., National Forests and National Park lands). Because wolves are highly mobile, particularly dispersing individuals, the species may traverse the Project area and records indicate that some transient individuals may have passed through the Project area in the past (CDFW 2018d), and WEST documented what appeared to be tracks of a single wolf in the snow in the Project area in late winter 2018. Should wolves begin to use the Project area with any regularity as populations increase, such use would be expected to be compatible with current surface uses, which includes high levels of habitat fragmentation and high levels of vehicle and human activity during some seasons. If future wolf activity at the Project is confirmed through visual or auditory detections, or other definitive means, Pacific Wind will report such information to CDFW.

State Listed and Fully Protected Avian Species

Summary of CDFW Comments and Recommendations

Bald eagle (*Haliaeetus leucocephalus;* State Endangered) and greater sandhill crane (*Grus canadensis;* State Threatened) are both listed pursuant to CESA and are Fully Protected under FGC section 3511; therefore the Department is not authorized to issue permits for their incidental take as discussed below.

Response:

WEST and Pacific Wind acknowledge the status of these two state listed and Fully Protected species and the lack of available permits for their incidental take. Fixed-point large bird use surveys are being conducted for two consecutive years throughout the project area, which will provide the data necessary to assess the potential for impacts to the state-listed bald eagle and greater sandhill crane. Additional discussion related to these two species is provided in the following sections.

Fully Protected Species

Summary of CDFW Comments and Recommendations:

Fully protected avian species, including but not limited to bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), greater sandhill crane (*Grus canadensis*), and American peregrine falcon (*Falco peregrinus anatum*) may be impacted by the Project. Project-related impacts on these species and all other fully protected species identified during the environmental review process should be mitigated to a less than significant level.

Response:

WEST conducted a comprehensive Site Characterization Study intended to identify special status species that may occur or are known to occur on the Project and may be at risk from Project development, and is currently conducting a variety of biological studies that aim to identify occurrence of wildlife species, including fully protected species, at the Project. Surveys have been and are still being conducted to assess risk to fully protected species. These surveys include two years of large bird use surveys to address risk to large birds, including eagles, sandhill cranes, and peregrine falcon, along with other raptor and large bird species. Raptor nest surveys were also conducted to gain additional information on the potential risk to both bald and golden eagles, as well as other raptors. Additional information on Fully Protected species can be found in the Site Characterization Study and survey-specific reports (e.g., 2017 and 2018 raptor nest surveys and the year 1 avian study report).

Species of Special Concern

Summary of CDFW Comments and Recommendations:

The Project has the potential to impact a number of Species of Special Concern (SSC); additional research, including database queries, is necessary to identify the full list of SSC with potential to occur on the Project. Additional surveys will be necessary to identify impacts to these species.

Response:

WEST conducted a comprehensive Site Characterization Study intended to identify special status species that may occur or are known to occur on the Project and may be at risk from Project development, and is currently conducting a variety of biological studies that aim to identify occurrence of wildlife species, including SSC, at the Project. Fixed-point avian use surveys are the primary field survey being implemented to address impacts to avian species and are being conducted for two years, which will address impacts to avian SSC potentially resulting from collision with turbines. In addition, species-specific surveys were conducted for northern goshawk to assess the potential presence of historical nests within the Project area. While avian SSC are being addressed through specific surveys (e.g., fixed-point avian and/or species specific surveys), most other SSC are largely confined to habitats unlikely to be significantly impacted by Project development (e.g., aquatic species such as western pond turtle [*Emys marmorata*] and Pacific tailed frog [*Ascaphus truei*]) or are highly mobile and more likely to be transient through the Project area (e.g., fisher [*Pekania pennanti*]). Additional information on SSC can be found in survey specific reports (e.g., Site Characterization Study; year 1 avian study report, and northern goshawk nest survey report). No additional species-specific surveys are planned to assess risk to SSC.

Northern Goshawk Protocol Surveys

Summary of CDFW Comments and Recommendations:

Northern goshawk (*Accipiter gentilis*) occurrences are documented on and near the Project. CDFW requests completion of focused protocol-level northern goshawk surveys following the *Northern Goshawk Inventory and Monitoring Technical Guide*.

Response:

WEST conducted goshawk nest surveys in the four historical goshawk occurrence areas identified within the Project area to assess the potential for occupancy in 2018. Surveys were consistent with techniques described in the Northern Goshawk Inventory and Monitoring Technical Guide (Woodbridge and Hargis 2006). Surveys included two separate methods implemented during the two most vocal stages in the breeding chronology of this species. Dawn acoustical surveys were conducted during the courtship/nest-building stage (February – April), and broadcast acoustical surveys were conducted during the nestling/fledging stage (June – July; Woodbridge and Hargis 2006). No evidence of nesting northern goshawks was documented, which is consistent with the findings reported in Cedar Boots Timber Harvest Plan (THP-2-16-077-SHA; CDF 2018), which indicated a lack of goshawk activity in the vicinity of three of the occurrence areas in recent years (the fourth area was not assessed in the THP). Survey results and details on the survey methodology are detailed in a stand-alone survey report. In addition to the nest surveys, the first year of comprehensive avian use study at the Project has been completed, with year 2 of that study ongoing. As of September 2018 (17 months of surveys), six northern goshawk observations have been recorded during fixed-point avian use surveys (4 observations) or incidentally (2 observations). Information related to northern goshawks observed during those surveys is, or will be available in the applicable avian use reports.

Avian Point Count Surveys

Summary of CDFW Comments and Recommendations:

Bird Use Counts (BUC) are intended to provide baseline data on avian species richness and relative abundance and to estimate the spatial and temporal use of the Project by all birds. The Department requests that a protocol for BUC be developed and addressed in the Work Plan, which should, at a minimum, meet the requirements outlined in the CEC/CDFG Guidelines.

Response:

Agency guidelines regarding the study of wildlife and how to assess potential impacts of wind energy on wildlife have evolved over the past 10 years, with the most current agency guidance provided by the USFWS in the Land-based Wind Energy Guidelines (WEG; USFWS 2012) and Eagle Conservation Plan Guidance (ECPG; USFWS 2013). Avian use surveys at the Project were designed to address the questions posed under Tier 3 of the WEG (USFWS 2012) and Stage 2 of the ECPG (USFWS 2013), while also collecting data comparable to what is recommended in the more dated California Wind Energy Guidelines (CEC Guidelines; CEC and CDFG 2007). Similar to the WEG, the CEC Guidelines identify modified point counts surveys (i.e., bird use counts) as the primary survey technique to collect data on bird species composition, relative abundance, and bird behavior that might influence vulnerability to collisions with wind turbines (see top of page 44 of the CEC Guidelines). Recommendations in the WEG, ECPG, and CEC Guidelines all result in data sufficient to document species composition, relative abundance, and behavior; therefore, to reconcile the differing protocols as presented in the various guidelines, implementation of the more current ECPG (and WEG) were given precedent over strict interpretation of the CEC Guidelines. WEST is currently conducting a comprehensive avian use study at the Project, including focused small bird and large bird surveys, which adhere to the best available science regarding survey and/or monitoring techniques for wind energy project development as provided in the WEG and ECPG, while also collecting data to satisfy the intent of the older CEC Guidelines. The comprehensive avian use study is intended to provide baseline data on avian species richness and relative abundance at the Project and to estimate the spatial and temporal use of the Project by avian species.

Surveys are being conducted at all 39 plot locations once per month, year-round (to the extent practicable), for a total of two full years. Survey locations were selected to survey representative habitats and topography within the Project, while achieving relatively even spatial coverage, as possible and practicable. The avian use study includes separate surveys for small birds and large birds, with focused small bird surveys conducted immediately prior to large bird surveys at a given survey plot location. In total, the two years of avian use survey will result in more than 1,200 hours of survey effort. The final report for the first year of avian use surveys was finalized in October 2018 and has been provided for review along with this letter. The second year of surveys will be completed in June 2019, with a final report to follow in summer 2019.

Eagle/Large Bird Use Surveys

Summary of CDFW Comments and Recommendations:

The Department requested information as to how large bird use of the Project will be documented in addition to the proposed surveys for eagle and raptor nests and commented that the initial study plan indicated surveys did not meet CEC/CDFG guidelines.

Response:

WEST is currently conducting a comprehensive avian use study at the Project, including focused small bird and large bird surveys, which adhere to the best available science regarding survey and/or monitoring techniques for wind energy project development as provided in the WEG (USFWS 2012) and/or ECPG (USFWS 2013), while also collecting data to satisfy the intent of the more dated CEC Guidelines (CEC and CDFG 2007). The large bird / eagle use surveys were specifically designed to address the needs of the ECPG, while also collecting data to satisfy the intent of the CEC guidelines, which is to collect data on bird species composition, relative abundance, and bird behavior that might influence vulnerability to collisions with wind turbines (see top of page 44 of the CEC Guidelines). Recommendations in the 2013 ECPG and the 2007 CEC guidelines both result in data sufficient to document species composition, relative abundance, and behavior; therefore, to reconcile the two slightly differing protocols for eagles/raptors/large birds as presented in the various guidelines, implementation of the more current ECPG were given precedent over strict interpretation of the older CEC recommendations. Surveys under the ECPG (60-min duration) are twice as long as those recommended by the CEC guidelines (30-min), thereby providing twice the survey effort per survey. Additionally, while all survey points are not surveyed weekly, surveyors are on site weekly conducting surveys (1-2 days a week depending on number of technicians) at approximately 9-10 points per week. The survey schedule ensures surveys are spread across the entire survey year and that extended periods of time do not go unsurveyed. Surveys are being conducted for two full years, which further aids in satisfying the intent of the CEC guidelines. The survey design being implemented will result in approximately 1,000 hours of survey effort for large birds specifically during the 2-year survey period (about 500 hours each year).

The final report for the first year of avian use surveys, which includes the large bird use surveys, was finalized in October 2018 and has been provided for review along with this letter. The second year of surveys will be completed in June 2019, with a final report to follow in summer 2019.

Nocturnal Avian Surveys

Summary of CDFW Comments and Recommendations:

The Department recommends utilizing multiple survey methods to conduct a nocturnal migration survey at the Project. The Department also recommends the completion of focused nocturnal owl surveys, designed to detect all species of owls potentially present within the Project.

Response:

Although nocturnal radar studies at proposed wind energy projects have been implemented as a method to characterize migration patterns and potential exposure levels for nocturnal migrants, no correlation has been found between radar-measured passage rates of avian targets and post-construction fatality rates, indicating that preconstruction radar studies are not an effective tool for assessing risk to migrating birds at wind energy facilities (Tidhar et al. 2012, Stantec 2017). As such, nocturnal radar studies at Fountain are unlikely to inform risk at the Project and are unwarranted. Collision mortality of nocturnal migrant birds has generally been low at wind energy facilities, particularly in the western U.S., and multi-bird fatality events are extremely rare. This trend is supported by the results of the 3-year fatality study at Hatchet Ridge (Tetra Tech 2014), located adjacent to the Project and on the highest ridgeline in the immediately surrounding area, where nocturnal migrant fatality rates have been very low. Relatively large numbers of nocturnal migrant fatalities, such as those found at communication towers, have not been documented at wind energy facilities (Kerlinger et al. 2010), likely due to the use of a different type of lighting. Even at facilities within a well-defined migration corridor, such as along the Texas Gulf Coast, migrant fatalities were relatively low and not quantitatively different from facilities further inland in the region (Erickson et al. 2016). While nocturnal migration studies at Fountain would provide data on nocturnally migrating birds and bats, the data would not be informative in predicting post-construction mortality risk at the Project; therefore, nocturnal migration surveys are not planned. WEST has prepared an analysis of peer-reviewed studies and state of the science surrounding nocturnal avian migration studies related to wind energy development, which has been provided to Pacific Wind in support of this conclusion.

In regard to CDFWs recommendation of conducting nocturnal owl surveys, in lieu of conducting nocturnal owl surveys throughout the Project area, we assume that some owl species occur in the Project area (the Site Characterization Study notes nine owls as likely to occur). To date, two species of owl (great-horned owl [*Bubo virginianus*] and northern pygmy-owl [*Glaucidium gnoma*]) have been detected within the Project area during avian use surveys and/or incidentally, and it is assumed that other species of owl likely also occur in the Project area (e.g., western screech owl [*Megascops kennicottii],* long-eared owl *[Asio otus],* and northern saw-whet owl *[Aegolius acadicus]).* However, most all of the owls likely present in the Project are forest species that spend most of their time below the rotor-swept-zone of modern wind turbines, either in the forest canopy or foraging/traveling in open areas at low flight heights. While nocturnal surveys could confirm presence of some of the owl species likely occurring in the Project area, the surveys would provide no means of assessing risk to these species.

Consistent with the assumed low risk to owls from turbine collision, no owls were documented among fatalities during the three years of fatality monitoring at the adjacent Hatchet Ridge Wind Project (Tetra Tech 2014).

Bat Monitoring

Summary of CDFW Comments and Recommendations:

The Department recommends the placement of additional bat detectors at the Project in order to provide broader coverage of the Project area. The Department also recommends completion of year-round bat surveys at the Project.

Response:

At the request of CDFW, additional acoustic detectors were deployed during the 2017 bat acoustic surveys to expand the spatial coverage of areas representative of future turbine locations within the Project area. The bat acoustic study was conducted during the known period of highest bat activity in the region (spring through late fall), and data from the study shows that bat activity at the Project declined markedly in the late fall, near completion of the survey effort. This trend in documented activity at the Project is consistent with fatality monitoring results at the adjacent Hatchet Ridge Wind Project (Tetra Tech 2014), which documented 58 bat fatalities during three full years of surveys, none of which were found during the winter period of mid-December through mid-March, and demonstrates the adequacy of temporal coverage during the bat acoustic study effort and that year-round acoustic studies are not warranted in this part of California. Furthermore, acoustic bat detectors are not designed or intended to function in snow or in extended periods of below-freezing temperatures, and bats are rarely active in such conditions, making year-round surveys both difficult and uninformative in predicting post-construction risk. A comprehensive report on the bat acoustic study conducted at the Project, including a detailed discussion of survey methodology (e.g., spatial and temporal coverage) and associated analyses has been prepared and provided to Pacific Wind.

Wildlife Movement Study

Summary of CDFW Comments and Recommendations:

The Department recommends the completion of a focused wildlife movement study to document movement corridors within the Project.

Response:

No evidence exists suggesting that the Project serves as a significant movement corridor for wildlife species. WEST is currently conducting a suite of biological resource studies at the Project, including documentation of incidental wildlife observations, as possible and practicable. Most available data indicate that big game, such as pronghorn and elk, are not significantly impacted by wind energy projects and continue to utilize habitats within and move through operational wind farms (Piorkowski and Diamond 2016, Taylor 2014, Walter et al. 2006, Johnson et al. 2000). Furthermore, the Project area comprises a working forest landscape, with active timber harvest operations, and numerous maintained and well-traveled roads, suggesting that resident big game, or big game that move through this area are likely accustomed to relatively high levels of disturbance. Fencing or other physical barriers that may impede wildlife movements will be extremely limited (i.e., fencing around O&M building or other secure structures) and should have limited impacts on terrestrial species. Should any evidence suggesting the Project area is serving as a significant wildlife corridor or movement area be discovered, WEST will provide this information to Pacific Wind and CDFW as appropriate.

Deer Habitat

Summary of CDFW Comments and Recommendations:

The Project is located within deer fawning habitat; impacts to deer should be identified in subsequent documents, including impacts from fencing, construction, noise and/or lighting.

Response:

Deer occur at the Project, and have persisted in the Project area despite the working forest nature of the area. Development of the Project, including construction and operation, is not expected to exceed levels of activity that regularly occur at the Project during timber harvest operations or associated activities such as road maintenance or construction. Fencing or other physical barriers that may impede deer movements will be extremely limited (i.e., fencing around O&M building or other secure structures). Given the historical management of the timberlands on which the Project is located, long term impacts to deer or deer fawning habitats are not expected. Should impacts occur as a result of Project construction (e.g., due to disturbance resulting from increased activity), the impacts should be of short duration and limited to the construction phase of the Project.

Rare Plants and Sensitive Natural Communities

Summary of CDFW Comments and Recommendations:

Rare plant surveys should be conducted following the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* at the Project. Surveys should cover CESA and California Rare Plant Rank 1, 2 and 3 species, and should occur at the appropriate time of year and under the correct conditions to identify species with potential to occupy the Project. Surveys should also identify any natural communities with a rank of S1-S3.

Response:

Comprehensive and seasonally appropriate rare plant surveys were conducted at the Project in 2018 following *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018e). No rare plants (i.e., Rank 1, 2 and 3 species) were documented in Survey Corridors at the Project or within appropriate buffer distances of Survey Corridors during these surveys. Natural vegetation communities were also mapped; of which none were considered to be Sensitive (i.e., having a ranking of S1-S3). A comprehensive report on rare plant surveys conducted at the Project has been provided to Pacific Wind.

Invasive Species

Summary of CDFW Comments and Recommendations:

The Department recommends completion of invasive plant species mapping in order to document locations of invasive species and avoid or minimize the potential spread of invasive species during Project construction. Invasive species control measures should be developed, including post-construction monitoring to ensure that invasive species are not spread or introduced during construction activities.

Response:

During the rare plant survey effort described above, a complete floristic inventory was maintained, as possible and practicable, including occurrence of invasive species. Comprehensive and seasonally appropriate rare plant surveys were conducted at the Project in 2018 following protocol provided in *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018e). The Project is a working forest and timber-harvest operations across the Project are ongoing. As such, the Project should be considered a high disturbance area, and construction activities related to development of wind facilities at the Project are not expected to exceed levels of disturbance which currently occur. The comprehensive report on plant surveys conducted at the Project includes documentation of invasive species.

Proposed Survey Corridors

Summary of CDFW Comments and Recommendations:

The Department requests additional information regarding the use of Survey Corridors, including the width of the corridors, location of corridors in relation to Project activities, and the surveys proposed to be conducted within these corridors.

Response:

Where appropriate, WEST utilized Survey Corridors provided by Pacific Wind to guide some species- and taxa-specific surveys. Details on the use of corridors are contained in the various survey reports provided to Pacific Wind. Corridors were primarily used to guide surveys for non-mobile taxa (e.g., plants) or for species-specific surveys where impacts were most likely to result from ground clearance activities (e.g., habitat assessments, nest surveys). For the broader based survey efforts (e.g., avian and bats), surveys were not confined to corridors and were more widely dispersed to assess avian and bat use throughout a broader Project area. If Project impacts expand beyond the Survey Corridors or larger Project area due to future changes in Project layout, additional field studies would be implemented to address those changes.

Additional Concerns

Additional issues raised in the Letter are beyond the purview of WEST's involvement in the Project, and as such, have not been addressed here.

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C15. California Spotted Owl Risk Assessment

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TECHNICAL MEMORANDUM

DATE: February 24, 2020

TO: John Kuba, ConnectGen Operating LLC

FROM: Kori Hutchison and Andrea Chatfield, WEST, Inc.

RE: California Spotted Owl Risk Assessment for the Proposed Fountain Wind Project, Shasta County, California

INTRODUCTION

Fountain Wind LLC (Fountain Wind) contracted Western EcoSystems Technology, Inc. (WEST) to provide biological study support for Shasta County in its review of the proposed Fountain Wind Project (Project) in Shasta County, California, under the California Environmental Quality Act (CEQA). The proposed Project falls within the range of the California spotted owl (*Strix occidentalis occidentalis*; CSO) which is designated as a Species of Special Concern (SCC) in California by the California Department of Fish and Wildlife (CDFW; 2019). While the CSO was recently petitioned for listing at the federal level, the US Fish and Wildlife Service (USFWS) determined that the listing was not warranted in a 12-month finding released on November 8, 2019 (USFWS 2019). This finding was based on a thorough review of the best available scientific and commercial information regarding the past, present, and future threats to the CSO (USFWS 2019). In their assessment, the USFWS found that the primary threats to the CSO are large-scale, high-severity fire, increased tree mortality, drought, effects of climate change, and the barred owl (*Strix varia*) invasion (USFWS 2019). The following memorandum provides an assessment of the potential risk to CSO posed by development and operation of the proposed Project.

PROJECT SITE

The Project Site, defined as all areas where Project facilities could be sited, encompasses approximately 4,463 acres (ac; 1,806 hectares [ha]]) of privately-owned commercial timberlands within Shasta County in northern California (Figure 1). The Project is located west of the community of Burney and northeast of the larger community of Redding. The east-west running California State Route 299 bisects the northern portion of the Project Site, and the Hatchet Ridge Wind Farm (Hatchet Ridge), in operation since 2010, is located immediately to the northeast (Figure 1). The Lassen National Forest is located to the southeast of the Project and the Shasta-

Trinity National Forest is located to the north and west. The majority of the remaining areas surrounding the Project Site are privately-owned lands managed for commercial timber harvest.

The dominant vegetation type in and around the Project Site is mixed coniferous forest (both post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape with no large tracts of undisturbed wildlife habitat across much of the area. Commercial timber operations currently and will continue to alter the landscape within and surrounding the Project Site, with areas of older forest being harvested and replanted with conifer seedlings that eventually transition from a scrub-shrub cover type to densely treed early-seral forest over 10-20 years. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*). Topography within the Project Site is characterized by gently rolling hills that transition to relatively steep, low mountains, with elevations ranging from approximately 3,700 feet (ft; 1,128 meters [m]) on the western extent of the Project Site to 5,400 ft (1,646 m) near Snow Mountain in the southeast (Figure 2).

In late August, 1992, the Fountain Fire burned approximately 64,000 ac (25,900 ha) in and around the Project Site, including an area encompassing the northern two-thirds of the Project Site (Figure 1). Post-fire management included salvage logging, site preparation, and planting in the year following the fire. In the 27 years since the fire, the previously burned areas within the Project Site are now predominantly covered by dense stands of regenerating, early-seral mixed conifer forest. Management activities in the burned areas is primarily restricted to pre-commercial thinning, while commercial timber harvest operations are currently being conducted only within the southeastern third of the Project Site.

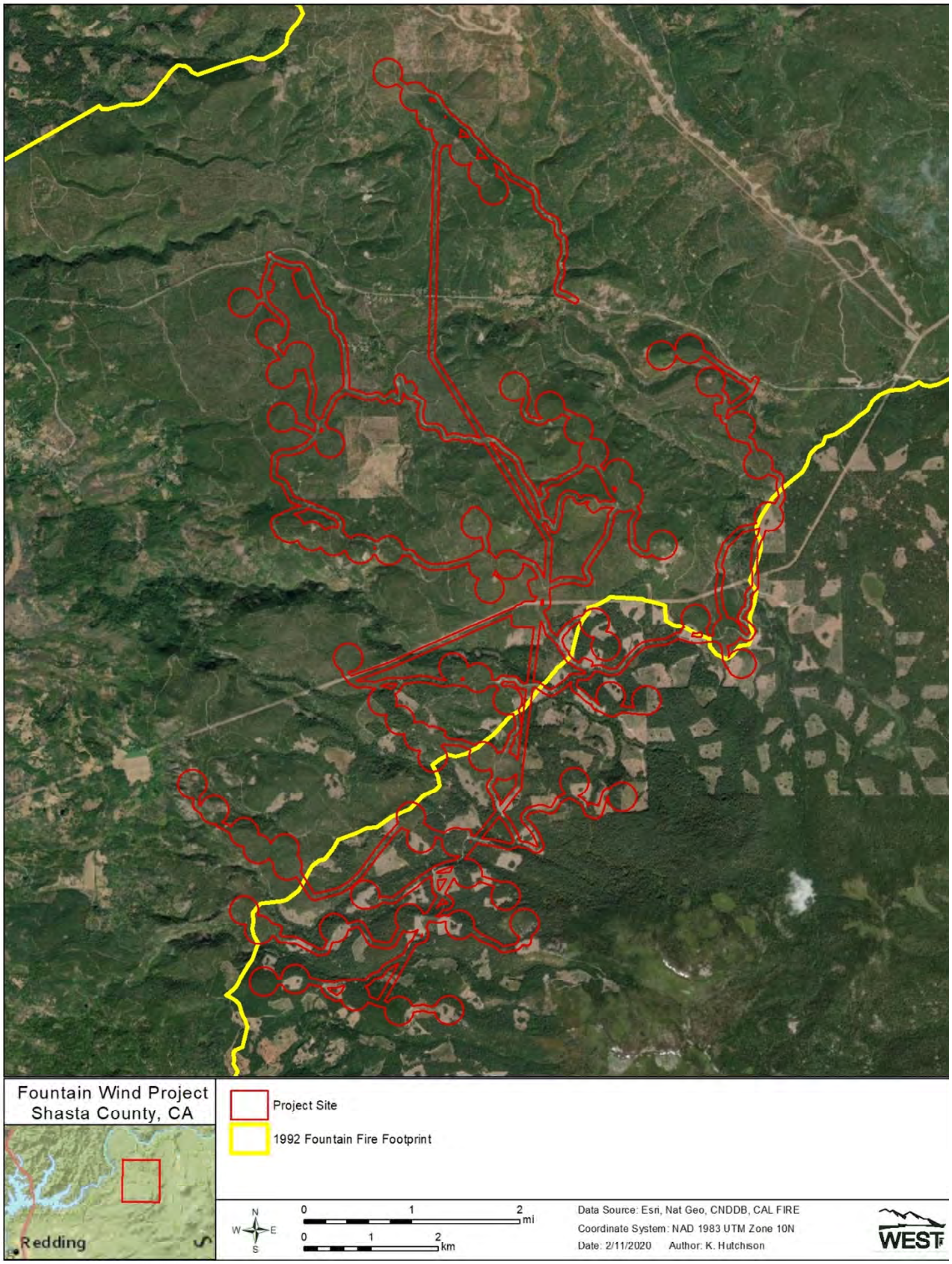

Figure 1. Proposed Fountain Wind Project Site in Shasta County, California.

SPECIES BACKGROUND

Spotted owls are large, brown-eyed owls that inhabit mature forests of western North America. The CSO is one of three subspecies of spotted owl and occurs in the Sierra Nevada mountain range in California and Nevada; in the Coastal, Transverse, and Peninsular mountain ranges in southern and coastal California; and in Sierra San Pedro Martir in Baja California Norte, Mexico (USFWS 2019). For purposes of owl management and conservation, the Pitt River in Shasta County is recognized as the dividing line between the CSO range to the south and the state and federally listed northern spotted owl (*Strix occidentalis caurina*; NSO) to the north (Gutiérrez and Barrowclough 2005). At its closest point, the Pitt River runs approximately 4.7 miles (mi; 7.6 kilometers [km]) north of the Project Site. The majority of CSOs in the Sierra Nevada are found in mid-elevation ponderosa pine, white fir, and mixed-conifer forest types (USFWS 2019). Using various criteria to define a core area (i.e., the area of concentrated use around a nest or roost location), researchers have estimated CSO core areas of between 347 and 2,009 ac (140 and 813 hectares [ha]; Bingham and Noon 1997; Seamans and Guitérrez 2007, Tempel et al. 2014, Berigan et al. 2012). Suitable nesting/roosting habitat for CSO includes areas of complex-structured/multi-layered forest, high canopy cover, and the presence of old and decadent trees, large snags, and coarse downed woody debris (Gutiérrez et al. 2017). The CSO forages in forested habitats generally similar to nesting/roosting habitat, where their primary prey items are medium-sized small mammals, particularly woodrats (*Neotoma* spp.) and flying squirrels *(Glaucomys sabrinus*; Verner et al. 1992). The species tends to avoid crossing brushy and clearcut forest areas, although they may hunt along the edges (Ward 1990).

Historical Occurrence in the Project Site Vicinity

According to the California Natural Diversity Database (CNDDB), several occurrences of CSO have been documented in the vicinity of the Project (CDFW 2020b). Three historical activity centers are located within 2.0 mi (3.2 km) southeast of the Project Site (SHA0046, SHA0051, and SHA0124), and one historical activity center is located near the center of the Project Site (SHA0063; Figure 2). The last known positive detections associated with SHA0046 and SHA0051 were individual birds observed in 1994 and 1990, respectively (CDFW 2020b). The last known active nest at SHA0046 was documented in 1992, when a female CSO was observed with two young. No juvenile birds were ever observed at the SHA0051 activity center; however, a pair was observed in 1987. The most recent positive detection near the Project (SHA0124) was an incidental observation of an adult bird with two young reported by a Sierra Pacific Industries forester in 2008, approximately 1.2 mi (1.9 km) southeast of the Project Site between Ward Butte and Green Mountain (CDFW 2020b; Figure 2).

The SHA0063 activity center, located near the center of the Project Site, was based on a 1990 observation of an individual bird of unknown age and sex reported by Roseburg Forest Products (CDFW 2020b); however, this activity center was completely burned in the 1992 Fountain Fire. During a site visit in 2018, a WEST biologist field-verified that there is no remaining suitable habitat for CSO at that location.

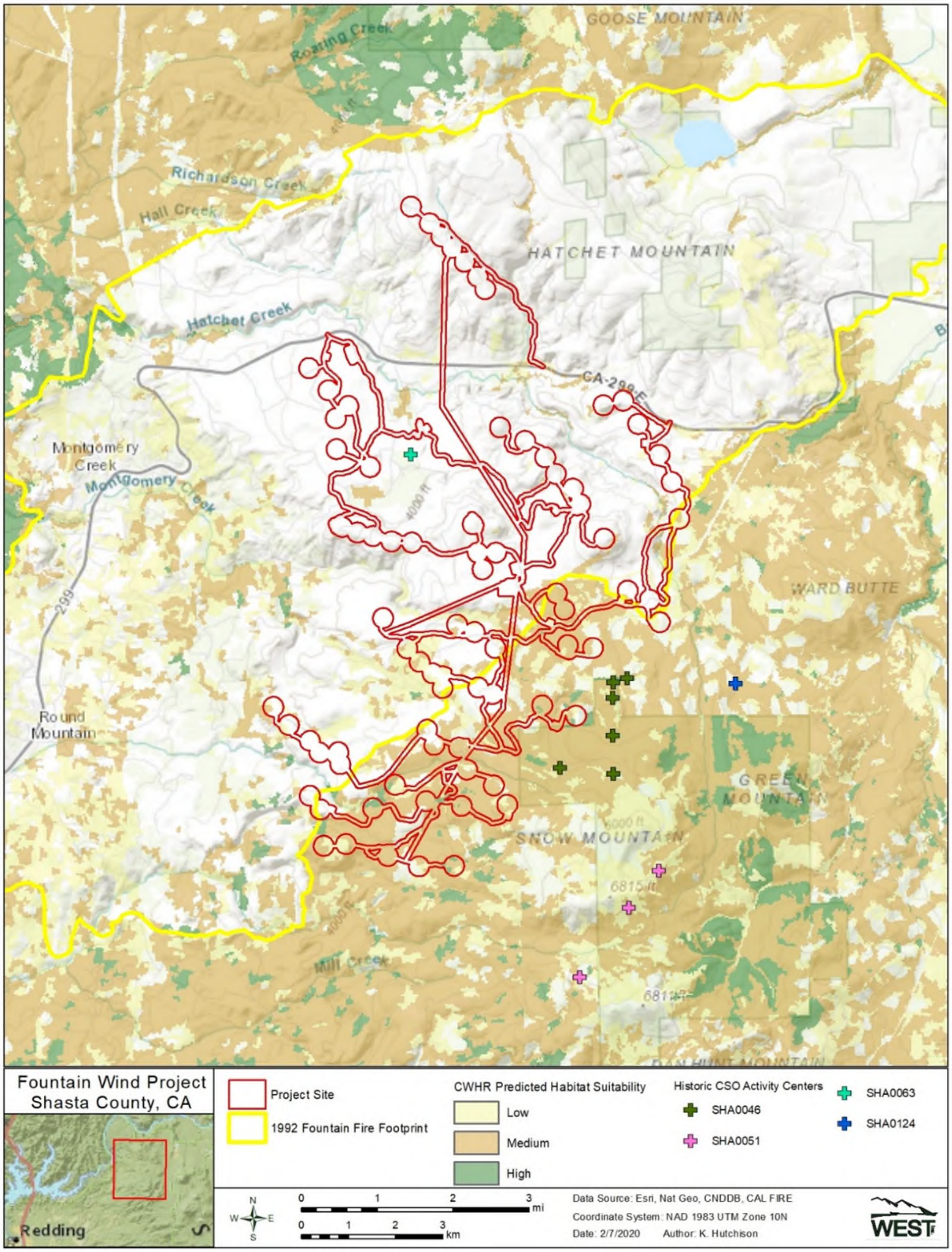

Figure 2. Historic California spotted owl (CSO) occurrences and predicted suitable spotted owl habitat in the vicinity of the Fountain Wind Project in Shasta County, California, as obtained from the California Natural Diversity Database (CNDDB) and California Wildlife Habitat Relationships (CWHR).

RISK ASSESSMENT

Habitat Suitability and Potential for Occurrence

The Project Site lies on the northern edge of the CSO range, in the transition zone between the CSO and NSO subspecies ranges. Geographic information system (GIS) data from the California Wildlife Habitat Relationships (CWHR) Predicted Habitat Suitability dataset (CDFW 2020a) and examination of aerial imagery were used to conduct a desktop review of potential CSO habitat overlap with the Project. The CWHR's GIS-based habitat model analyzes and compiles several remotely sensed GIS coverages to predict habitat suitability. The majority of the Project Site (about 3,300 ac [1,335 ha]; 73.9%) falls within the Fountain Fire footprint, which is predominantly classified as non-habitat for CSO in the CWHR dataset (Figures 1 and 2). The southeastern portion of the Project Site, outside of the fire perimeter, does include areas of predicted moderate to high suitability habitat. Based on the CWHR model, approximately 945 ac (382 ha) of the Project Site (21.2%) are classified as having moderate suitability for CSO, with much smaller, isolated patches of high suitability habitat interspersed (Figure 2). These small patches of predicted high suitability habitat amount to only 50 ac (20 ha), or 1.1 % of the total Project Site (Figure 2). While the Project Site overlaps approximately 995 ac (403 ha) of moderate to high suitability CSO habitat, this is a conservative estimate of the amount of habitat that could potentially be removed during Project development as the Project Site encompasses a larger area than that typically required for road and turbine construction to allow for greater flexibility in micrositing.

Based on historical spotted owl occurrence data from the CNDDB, the most recent spotted owl detections within 2.0 mi of the Project Site date back to 2008, with the spotted owl detections closest to the Project Site last reported in the early 1990s prior to the Fountain Fire (CDFW 2020b). While historical CSO detections are absent from the unburned portions of the Project Site, it is important to note that focused surveys for CSO have likely not been conducted within Project Site. Given the Project's proximity to much larger and contiguous areas of high suitability habitat on protected public lands (Lassen National Forest to the southeast and Shasta Trinity National Forest to the north and west; Figure 2), it is unlikely that CSOs would select the less suitable habitats within the heavily managed timberlands present within the Project Site.

Potential for Turbine Collisions

Few collision fatalities of forest-dwelling owl species have been documented at wind energy facilities in North America (AWWI 2019, WEST 2019). Because operational wind energy projects are sparse within the range of spotted owls, the potential susceptibility of spotted owls to collisions with turbines was evaluated for the congeneric barred owl, which occurs in similar forested habitats but occupies a much larger range across North America. In a review of publicly available mortality data from 482 studies conducted at 221 North American wind energy facilities between 2014 and 2018, only four barred owl fatalities were documented, out of a total 20,168 avian fatalities (WEST 2019). Two of these barred owl fatalities occurred at facilities in Maine, one occurred at a facility on the border of Oregon and Washington, and one occurred in west-central California (WEST 2019). Other forest-dwelling owl species found as fatalities at North American wind energy facilities included two flammulated owls (*Psiloscops flammeolus*), two western screech owls (*Megascops kennicottii*), one eastern screech owl (*M. asio*), and one northern saw-whet owl (*Aegolius acadicus*; WEST 2019). Based on AWWI's (2019) recent analysis of 193 post-construction monitoring studies at 130 wind energy facilities in the US between 2002 and 2017, owls compose approximately 1.2% of unadjusted bird fatality incidents; however, the majority of these are barn owls (*Tyto alba*), great horned owls (*Bubo virginianus*), and short-eared owls (*Asio flammeus*; 69 fatality incidents composing 1.0% of overall avian mortality; AWWI 2019). The only forest owl fatality in the AWWI dataset is a single flammulated owl (AWWI 2019). Those species that have been most at risk of turbine collisions (e.g., red-tailed hawk [*Buteo jamaicensis*], American kestrel [*Falco sparverius*], golden eagle [*Aquila chrysaetos*]) are often observed flying within the rotor swept height, or the height of the turbine blades. Spotted owls conduct almost all of their flights within or below the canopy of forests, and tend to avoid flying over large brushy or clearcut areas (Ward 1990). Regardless, there is at least some potential for CSOs to collide with turbine blades while moving between habitat patches, particularly in areas of older forest where the minimum rotor swept height (ranging from 46 to124 ft [14 to 38 m] depending on turbine model selected) overlaps with the height of the adjacent forest canopy. However, given the generally low quality and fragmented nature of forest habitat present within and immediately adjacent the Project Site, as well as the low documented occurrence of CSO in the Project vicinity, the risk of collision is considered to be low.

CONCLUSION

The majority (about 75%) of the Project Site contains vegetation communities unsuitable, or of low suitability, for CSO. Areas of the Project Site containing moderate to high suitability habitat are present only within the southeastern third of the Project Site, with approximately 945 ac classified as having moderate suitability for CSO and only 50 ac classified as having high suitability for CSO. Furthermore, these areas of predicted high suitability, more suitable for nesting and roosting, are present in very small, isolated patches in the Project Site which may limit the potential for these areas to support CSO roosts or nests. Compared to the Project Site, protected public lands to the north, west, and southeast contain much larger areas of predicted high and moderate suitability habitat for CSO. Although approximately 995 ac of moderate to high suitability CSO habitat occurs within the Project Site, only a portion of this area may need to be cleared for the construction and operation of the Project. The loss of this potential habitat is not likely to have a significant impact to spotted owls in the region. This is supported by the lack of recent (since mid-1990's) CSO detections in areas within or surrounding the Project Site. Given the low anticipated use of the Project site by CSO, the limited extent of mature, complex-structured forest stands within and adjacent to the Project Site, the flight behavior of spotted owls, and the low number of collision fatalities of forest-dwelling owl species documented at wind energy facilities to date, potential impacts to CSO resulting from collision with Project turbines is anticipated to be low.

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C16. 2018 Willow Flycatcher Survey Results

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TECHNICAL MEMORANDUM

DATE: October 17, 2018

TO: Kristen Goland, Pacific Wind Development LLC

FROM: Joel Thompson, Andrea Chatfield, and Kori Hutchison, WEST, Inc.

RE: 2018 Willow Flycatcher Survey Results, Fountain Wind Project, CA

Introduction

Pacific Wind Development LLC contracted Western EcoSystems Technology, Inc. (WEST) to provide biological survey support for the development of the proposed Fountain Wind Project (Project). Willow flycatcher (*Empidonax traillii*) is currently designated as endangered by the state of California (California Department of Fish and Wildlife [CDFW] 2018). While once considered common, willow flycatcher is now considered rare to locally uncommon across its breeding range (Craig and Williams 1998). Willow flycatcher breeding habitat consists of dense deciduous riparian shrub and willow thickets (Bombay et al. 2003). According to the California Natural Diversity Database (CNDDB), there are no known occurrences of willow flycatcher within or immediately adjacent to the Project; the nearest known occupied territories are located approximately 20 miles (mi; 32.2 kilometers [km]) to the northeast of the Project (CDFW 2018). However, while CNDDB data does not indicate any known occurrences of nesting willow flycatcher within the Project area, an assessment of potential willow flycatcher habitat and surveys of the most suitable habitat were conducted at the request of CDFW. This memorandum describes the methods and results of willow flycatcher surveys conducted at the Project during the 2018 nesting season.

Survey Area

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project is mixed coniferous forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*).

For the purpose of assessing willow flycatcher habitat and conducting field surveys, survey corridors were provided in a Geographic Information System (GIS) format by Pacific Wind (Figure 1). The surveys corridors included areas that could be subject to direct impacts during Project construction. The survey corridors varied in size and included buffers of all areas of proposed infrastructure that may be subject to ground disturbance (e.g., newly proposed roads, roads that may be expanded, turbine pads, and underground collection lines).

Methods

CDFW's Willow Flycatcher Habitat Model and examination of aerial imagery were used to conduct a desktop review of potential willow flycatcher habitat within the Project area. This GIS-based model analyzes and compiles several remotely sensed GIS coverages to predict habitat suitability. Areas of modeled habitat occurring in the Project area were then buffered by 300 feet (ft; 91 meters [m]) to ensure that the habitat assessment and any surveys covered any potential territories located within 300 ft of the survey corridors. The 300 ft provided coverage that exceeds the average territory size (roughly 164 by 262 ft [50 by 80 m) of willow flycatchers in northern California (Bombay et al. 2003). Buffered habitat areas were then reviewed on aerial imagery to eliminate areas that were unsuitable (e.g., areas of early seral conifer forest away from streams). The remaining areas of modeled habitat considered potentially suitable were then overlaid on the Project survey corridors in a GIS, which resulted in the identification of several areas of potential willow flycatcher breeding habitat within or adjacent to the survey corridors. A WEST biologist with prior experience assessing willow flycatcher habitat suitability then performed a field reconnaissance at the Project to evaluate the areas of potentially suitable habitat that overlapped the survey corridors and to identify areas of potential habitat not predicted by the model. Criteria for inclusion as potential habitat as defined by the CDFW model included cover component (i.e., primary vegetative cover type), distance to perennial water, and species range (i.e., known species occurrences; Timossi et al. 1995). Based on the desktop review and field reconnaissance, two areas of predicted habitat and one additional field-identified area met the criteria for suitable willow flycatcher habitat. Two of the areas (Survey Areas 1 and 2) were of lower quality, both being small (less than 1.5 ac [0.6ha] each) and having limited or sparse willow components compared to Survey Area 3 (approximate 3.0 ac [1.2 ha]; Figure 1).

Protocol-level presence/absence surveys were conducted at each of the three identified potential willow flycatcher habitat areas (Survey Areas 1-3; Figures 2-4). Surveys were conducted by a WEST biologist with prior experience conducting willow flycatcher surveys. Surveys followed the CDFW-recommended protocol (Bombay et al. 2003), which requires a minimum of two separate field surveys at each site during the breeding season; one during survey period 2 (June 15-25) and one during either survey period 1 (June 1-14), or survey period 3 (June 26-July 15). Consistent with this requirement, an initial survey was conducted during survey period 2 and a follow-up survey was conducted during survey period 3, with successive surveys conducted at least five days apart.

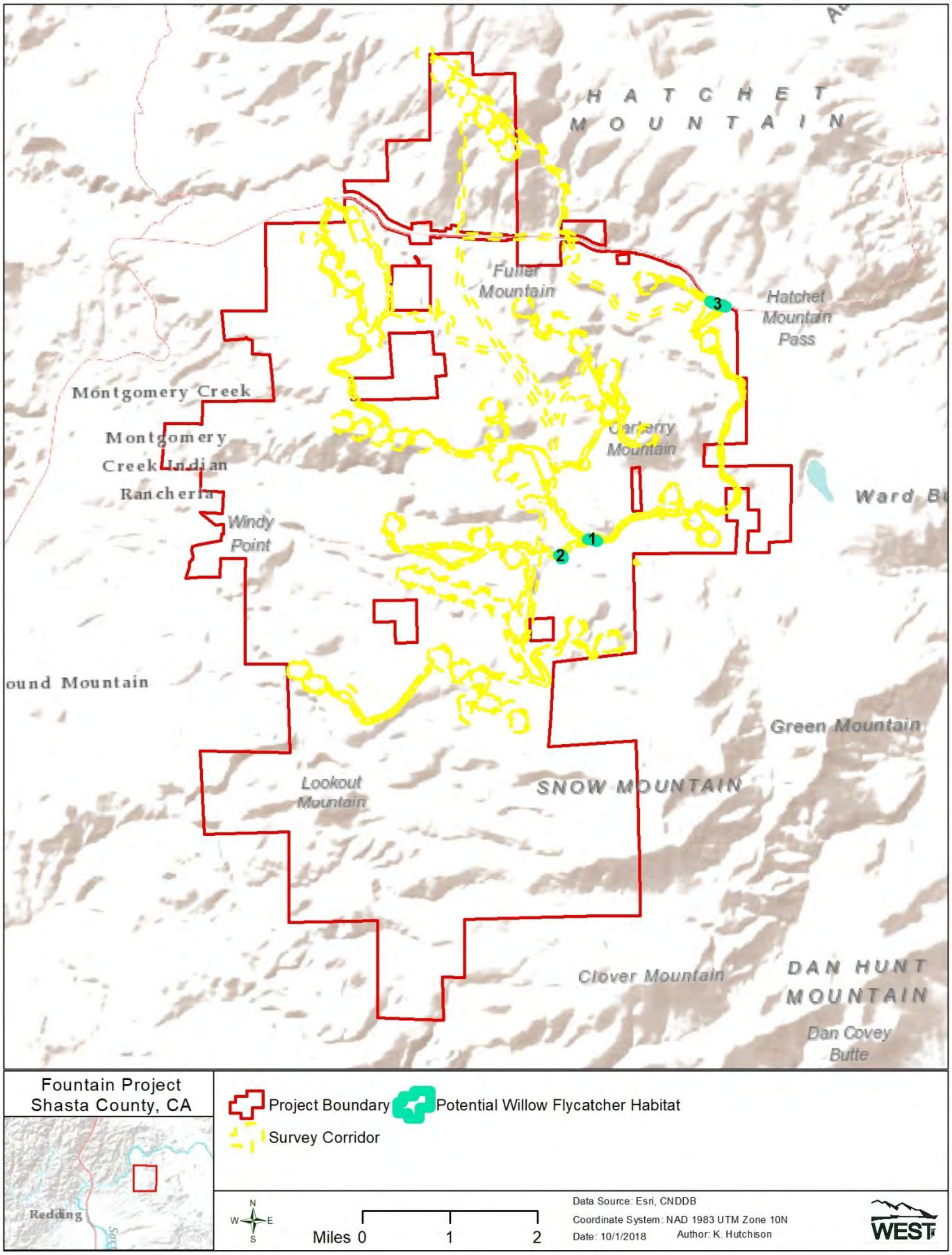

Figure 1. Survey corridors and areas of potential willow flycatcher habitat as provided by the California Natural Diversity Database and verified by field reconnaissance within the Fountain Wind Project, Shasta County, California.

Seventeen survey stations were established within the three survey areas: four in Survey Area 1 (Figure 2), six in Survey Area 2 (Figure 3) and seven in Survey Area 3 (Figure 4). Survey stations were established within suitable willow flycatcher habitat no more than 98 ft (30 m) apart in dense vegetation, and 164 ft (50 m) apart in open vegetation in order to ensure adequate coverage (Bombay et al. 2003). Ten-minute listening periods to document spontaneous singing were conducted at each survey area prior to initiating broadcast surveys. Following the listening period, recorded willow flycatcher songs were broadcast while the observer listened for responses for a minimum of six minutes (Bombay et al. 2003).

Results

Two rounds of willow flycatcher surveys were completed in the three survey areas on June 23-24 and July 6, for a total of 34 surveys (Table 1). Surveys on June 23-24 corresponded to survey period 2 and surveys on July 6 corresponded to survey period 3, as defined in the survey protocol. No willow flycatchers were detected during surveys (Table 1).

Table 1. Results of willow flycatcher surveys conducted in June and July 2018, during survey periods 2 and 3, at the Fountain Wind Project, Shasta County, California.

Survey Area	Survey Date	Number of Survey Points	Detections
	Survey Period 2		
1	23 June	4	0
2	23 June	6	0
3	24 June	7	0
	Survey Period 3		
1	6 July	4	0
2	6 July	6	0
3	6 July	7	0

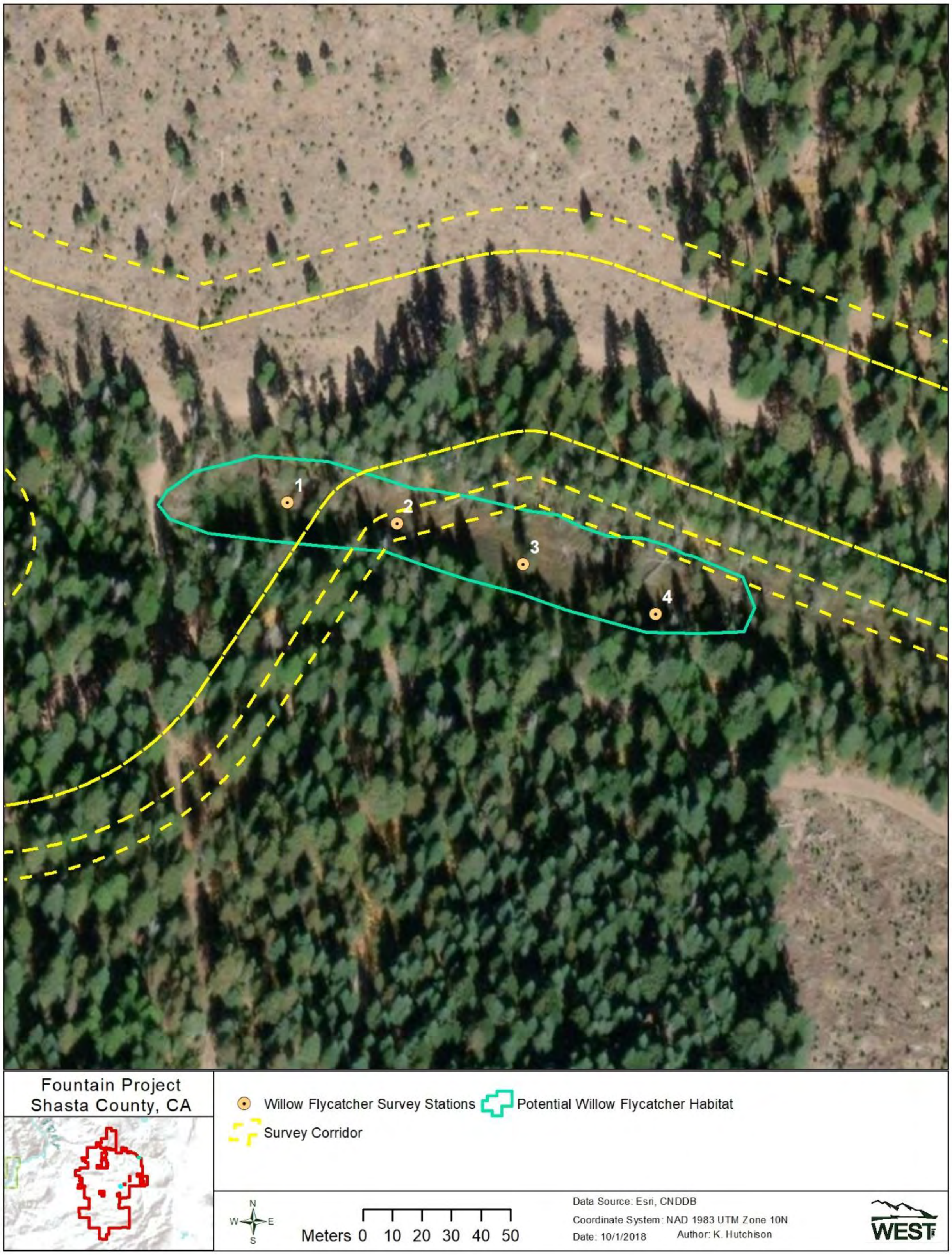

Figure 2. Willow flycatcher survey stations within Survey Area 1 at the Fountain Wind Project, Shasta County, California.

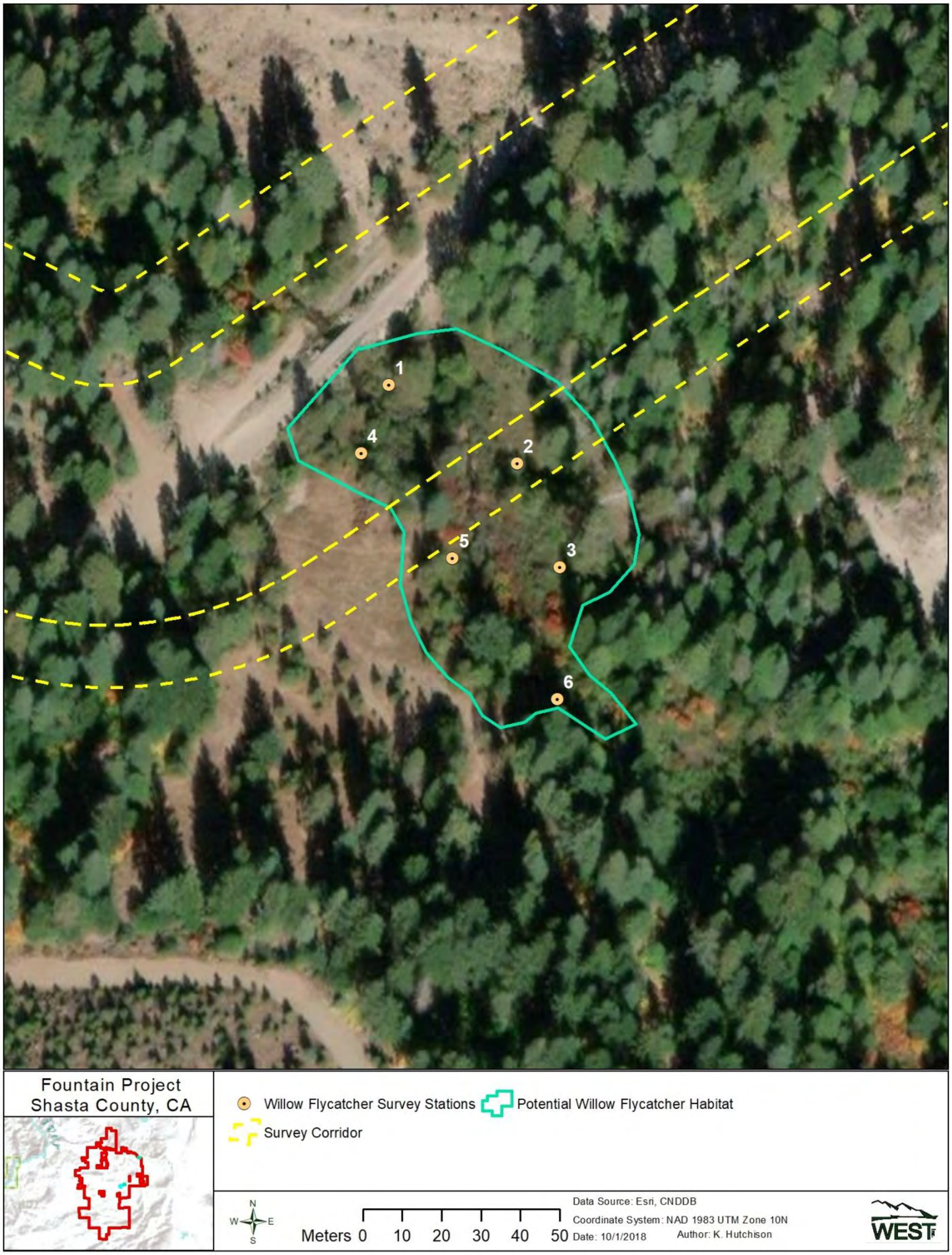

Figure 3. Willow flycatcher survey stations within Survey Area 2 at the Fountain Wind Project, Shasta County, California.

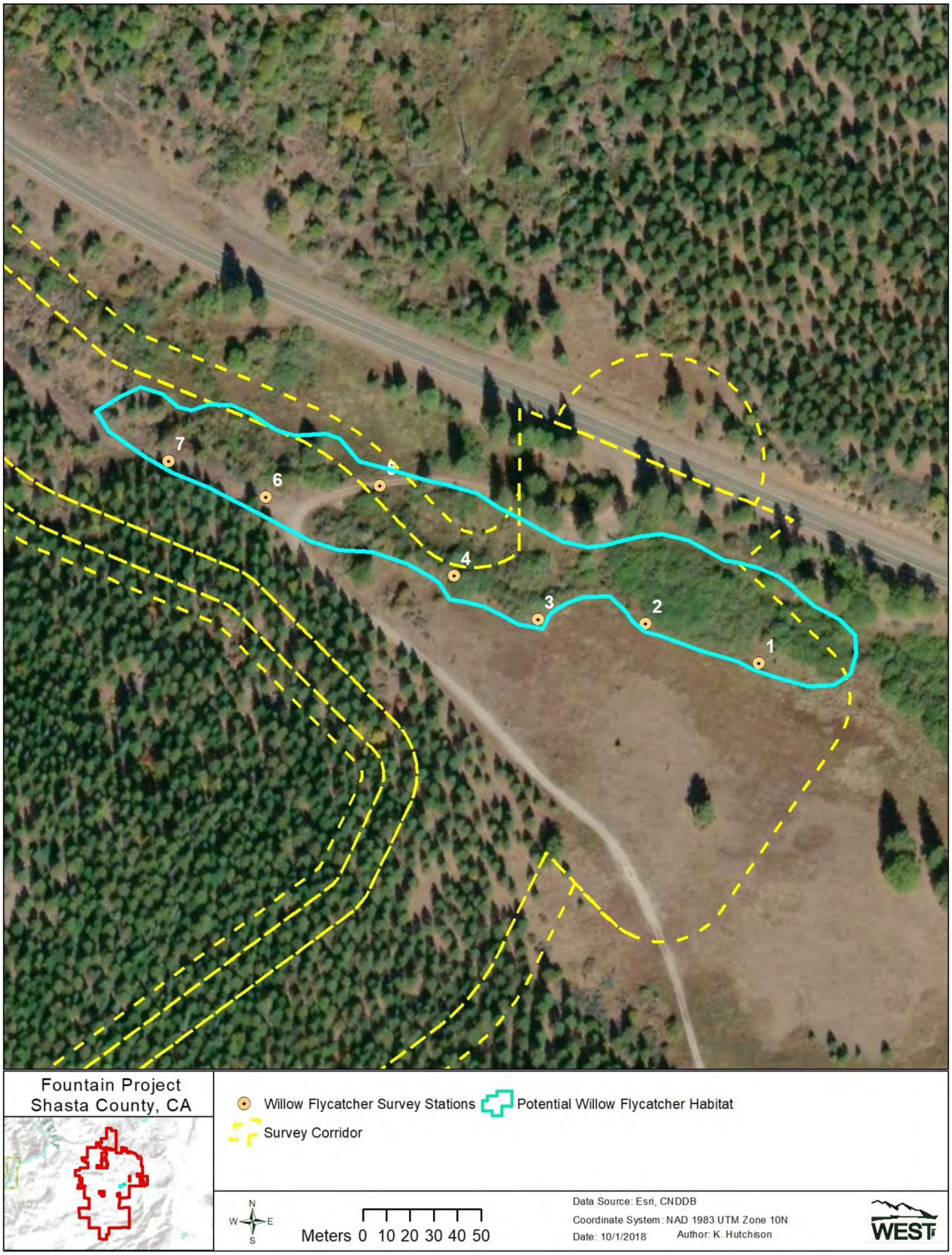

Figure 4. Willow flycatcher survey stations within Survey Area 3 at the Fountain Wind Project, Shasta County, California.

Discussion and Conclusions

The absence of willow flycatcher detections within the three potentially suitable willow flycatcher habitat areas indicates that these areas were not occupied during the 2018 nesting season. In general, habitat for willow flycatcher in Survey Areas 1 and 2 was of lower quality than in area 3. It is unlikely that these two areas could support breeding willow flycatcher in future years. Survey Area 3 contained more extensive patches of dense vegetation (willow) and had a greater potential to support breeding willow flycatchers. Although the survey corridors (i.e., area of potential impact) depicted in Figure 4 encompass the majority of identified willow flycatcher habitat in Survey Area 3, recent updates to the Project layout indicate that this area may not be used as an access point to Highway 299. As such, the riparian habitat associated with Survey Area 3 may not be directly impacted by construction or operation of the Project and would remain intact and available for use by willow flycatcher. Additionally, given the location of this habitat patch immediately adjacent of State Route 299 (within 30 m [98 ft] in places), as well as the existing logging road running through the habitat, disturbance related impacts from vehicle traffic within the Project should be minimal relative to ongoing disturbance to this habitat patch resulting from vehicle activity on State Route 299 and permitted logging activities.

Although willow flycatcher was not detected within the Project during the 2018 breeding season surveys, willow flycatchers may fly over the Project during migration and may use patches of riparian/wetland and meadow habitat as stopover habitat in spring and fall, such as those identified during this survey effort. In general, willow flycatchers are not expected to have a high risk of collision with wind turbines. In their breeding and stopover habitats, willow flycatcher are not expected to fly at rotor-swept heights (i.e., above 30 m [98 feet]), preferring to stick close to willow thickets and other brushy areas where they perch on the edge or top of shrubs and low trees and fly out from their perch to catch insects, or flit between willows and other shrubs in the understory (Sedgwick 2000). In a comprehensive analysis of small-passerine fatalities resulting from collisions with turbines during 116 studies conducted at 71 wind energy facilities in the US and Canada, Erickson et al. (2014) found no willow flycatcher fatalities among the 3,110 small-passerine fatalities documented. Of the more than 3,000 small-passerine fatalities, just 79 (1.6%) were flycatchers (family=Tyrannidae), and of these, only 25 (0.8%) were *Empidonax* flycatchers (Erickson et al. 2014).

If construction activities have the potential to directly impact areas of potential willow flycatcher habitat within the Project area, additional protocol-level breeding surveys may be warranted if construction is to occur during the breeding season (approximately June 15 to September 15). If areas of potentially suitable habitat will not be directly impacted during Project construction, then no further willow flycatcher surveys are likely warranted.

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C17. 2018/2019 Foothill Yellow-legged Frog Assessment

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TECHNICAL MEMORANDUM

DATE: October 22, 2018

TO: Kristen Goland, Pacific Wind Development LLC.

FROM: Joel Thompson, WEST, Inc.

RE: 2018 Foothill yellow-legged frog and Cascades frog habitat assessments and surveys, Fountain Wind Project, CA

INTRODUCTION

Pacific Wind Development LLC (Pacific Wind) has contracted Western EcoSystems Technology, Inc. (WEST) to provide biological support for development of the proposed Fountain Wind Project (Project). Foothill yellow-legged frog (FYLF; *Rana boylii*) and Cascades Frog (CF; *Rana cascadae*) are currently listed as candidates for listing under the California Endangered Species Act (CESA), and have been petitioned for listing under the Federal Endangered Species Act (ESA). Although neither species has been documented within the Project area, the California Wildlife Habitat Relationships (CWHR) database, maintained by the California Department of Fish and Wildlife (CDFW), indicates that potential habitat for both species may be present within the Project area, with the Project area defined in this report as all lands within the Project area boundary. As such, and at the request of CDFW, WEST conducted desktop assessments of potentially suitable habitat for both species and conducted visual encounter surveys (VES) for subadult FYLF in 2018 in the most suitable habitats identified within the Project area. This memorandum describes the methods and results of the habitat suitability assessments and the VES conducted in 2018.

PROJECT AND SURVEY AREAS

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project is mixed coniferous forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*).

Vegetation communities identified during rare plant and vegetation community mapping efforts (Flaig et al. 2018) and considered potentially suitable for occurrence of special status FYLF in the Project area include mixed montane riparian forest (MMRF) and mixed montane riparian scrub (MMRS; Flaig et al. 2018). The MMRF community was documented primarily in the southern half of the Project area along perennial streams, but also occurred along intermittent streams in some locales. Plant species within the MMRF community included a variety of mid-story species such as bigleaf maple (*Acer macrophyllum*) and thinleaf alder (*Alnus incana* ssp. *tenuifolia*), with a shaded, woody understory of Rocky Mountain maple (*Acer glabrum*), vine maple (*Acer circinatum*), and other species. The MMRS community was primarily mapped throughout the northern half of the Project. Similar to the MMRF community type it occurred along perennial and intermittent drainages, but was distinguished from MMRF by the absence of a tree-dominated canopy and the presence of a shrub-dominated canopy that included several willow species (*Salix* spp.). Riparian species commonly observed along the immediate channel included arroyo willow (*Salix lasiolepis*), shining willow (*S. lucida*), scouler willow (*S. scouleriana*), thinleaf alder, and mountain dogwood (*Cornus nuttallii*).

An additional vegetation community identified in the Project area and considered potentially suitable for occurrence of special status amphibians was wet montane meadow (WMM). The majority of WMM communities identified were associated with streams, though a few areas were mapped adjacent to small ponds, springs, or seeps with high water tables. The WMM community was composed of a diversity of hydrophytic plant species including grasses, sedges, rushes, and perennial forbs (Flaig et al. 2018).

For the purpose of assessing FYLF and CF habitat and conducting field surveys, construction corridors were provided in a Geographic Information System (GIS) format by Pacific Wind (Figure 1). The construction corridors included areas within the larger Project area that could be subject to direct impacts during Project construction. The corridors varied in size and included buffers of all areas of proposed infrastructure that may be subject to ground disturbance (e.g., newly proposed roads, roads that may be expanded, turbine pads, and underground and overhead collection lines) to provide for some flexibility in final project design. The corridors provided by Pacific Wind were buffered by WEST by an additional 500 feet (ft; 152 meters [m]) to generate Survey Corridors used in the assessment of FYLF and CF habitat suitability and to guide field surveys efforts. The 500-ft buffer was used as van Hattem and Mantor (2018) recommend that surveys associated with disturbance projects be conducted within the project area (assumed to be the area of disturbance) and at least 500 ft upstream and downstream.

Foothill Yellow-legged Frog Survey Area

Foothill yellow-legged frog occur in the coast ranges of Oregon and California, as well as the more interior Sierra Nevada and Cascades ranges, where the species occupies riparian habitats immediately adjacent to perennial, flowing water with rocky substrates. The species has been documented at elevations up to approximately 6,300 feet (ft; 1,920 meters [m]; Hayes et al.

2016). According to the California Natural Diversity Database (CNDDB), there are no known occurrences of FYLF within or immediately adjacent to the Project; the closest known occurrences of FYLF are approximately 4.0 mi (6.4 km) to the north and south of the Project (CDFW 2018a; Figure 1). The CWHR includes information on both habitat suitability (i.e., predicted habitat; Figure 1) and habitat modeled as potentially important for connectivity (i.e., connectivity habitat; Figure 2) for FYLF (CDFW 2018b). Although the large majority of FYLF habitat within the Project area is classified as low likelihood of occurrence using the CWHR predicted habitat model, some locations are classified as medium to higher suitability for potential habitat connectivity (Figure 2). The predicted habitat and habitat connectivity models overlap with the Survey Corridors in some locations. Because the FYLF is most commonly associated with moving waters, stream corridors within areas of higher rated habitat connectivity that overlapped with Survey Corridors were the focus of FYLF habitat assessments and field surveys in 2018 (Figure 2).

Cascades Frog Survey Area

Cascades frog occupies mountain lakes, ponds, and adjacent wet meadows at elevations up to 8,200 ft (2,500 m) in the mountains of northern California and southern Oregon. Reproduction by CF occurs in shallow, still-water habitats that become exposed by snowmelt early in the spring and retain water long enough for egg and tadpole development (about three to four months; Pope et al. 2014). These habitats include shallow alcoves of lakes, ponds, potholes, flooded areas in meadows, and occasionally slow-moving streams or stream backwaters (Pope et al. 2014). Cascades frog has disappeared from much of its historical range due to predation from non-native and/or introduced fish species, and other threats (Pope et al. 2014).

Based on CWHR data, the southern Project area boundary is at the edge of the current range of CF, with all Survey Corridors located more than two mi from the known range (CDFW 2018b). The closest known occurrence of CF is approximately 1.2 mi (1.9 km) southeast of the Project area boundary; an additional known occurrence is approximately 6.3 mi (10.1 km) north of the Project (Figure 3, CDFW 2018a). No known occurrences of CF have been documented within the Project area (CDFW 2018a). The CWHR model of habitat suitability for CF indicates that only a small portion of low quality CF habitat is predicted to occur in the southernmost portion of the Project area (CDFW 2018b), well south of the construction corridors provided by Pacific Wind. This area of overlap was the focus of desktop and field evaluations of CF habitat in 2018.

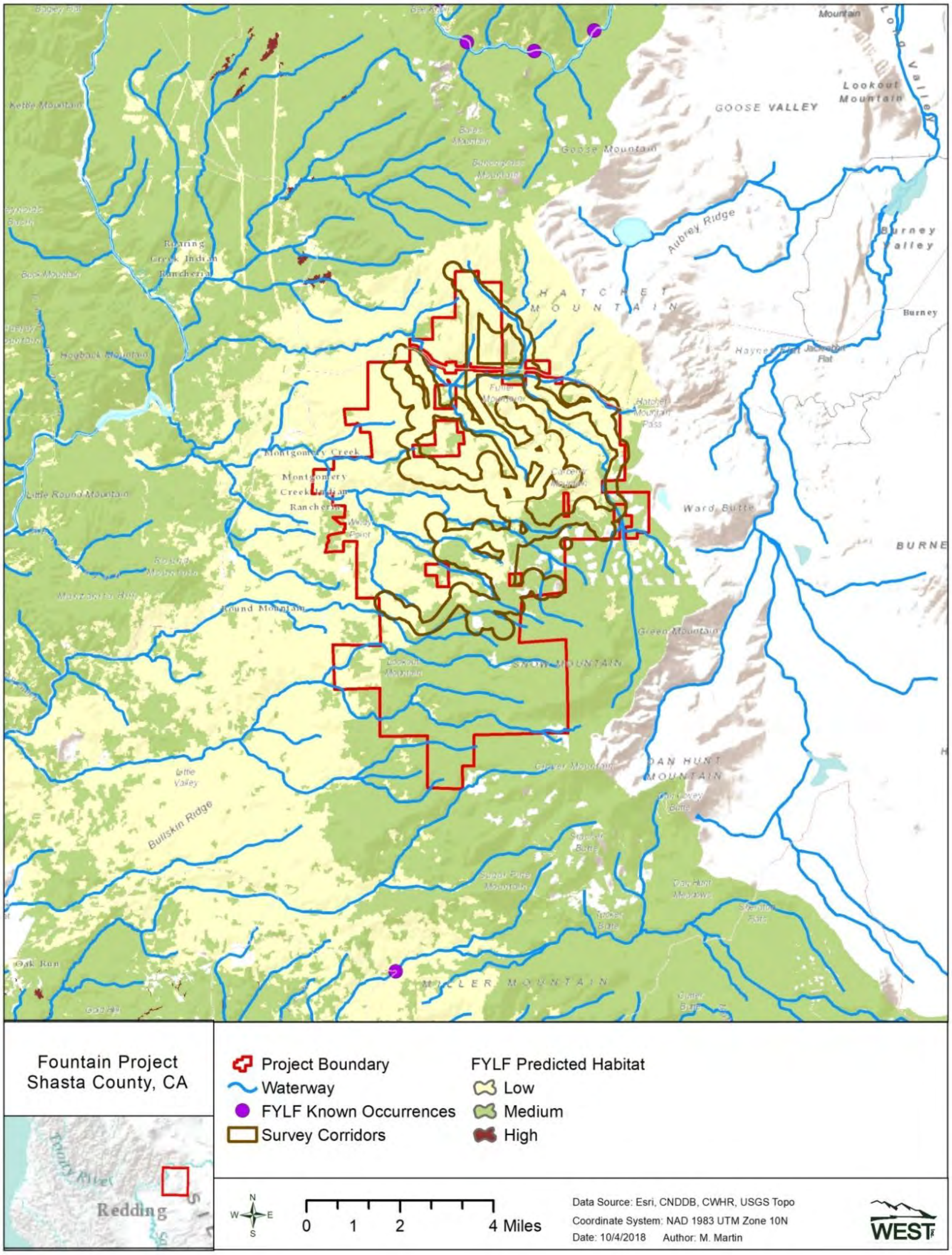

Figure 1. Foothill yellow-legged frog known occurrences and areas of predicted habitat as provided by the California Natural Diversity Database (CNDDB) and California Wildlife Habitat Relationships (CWHR) within the Fountain Wind Project area, Shasta County, California.

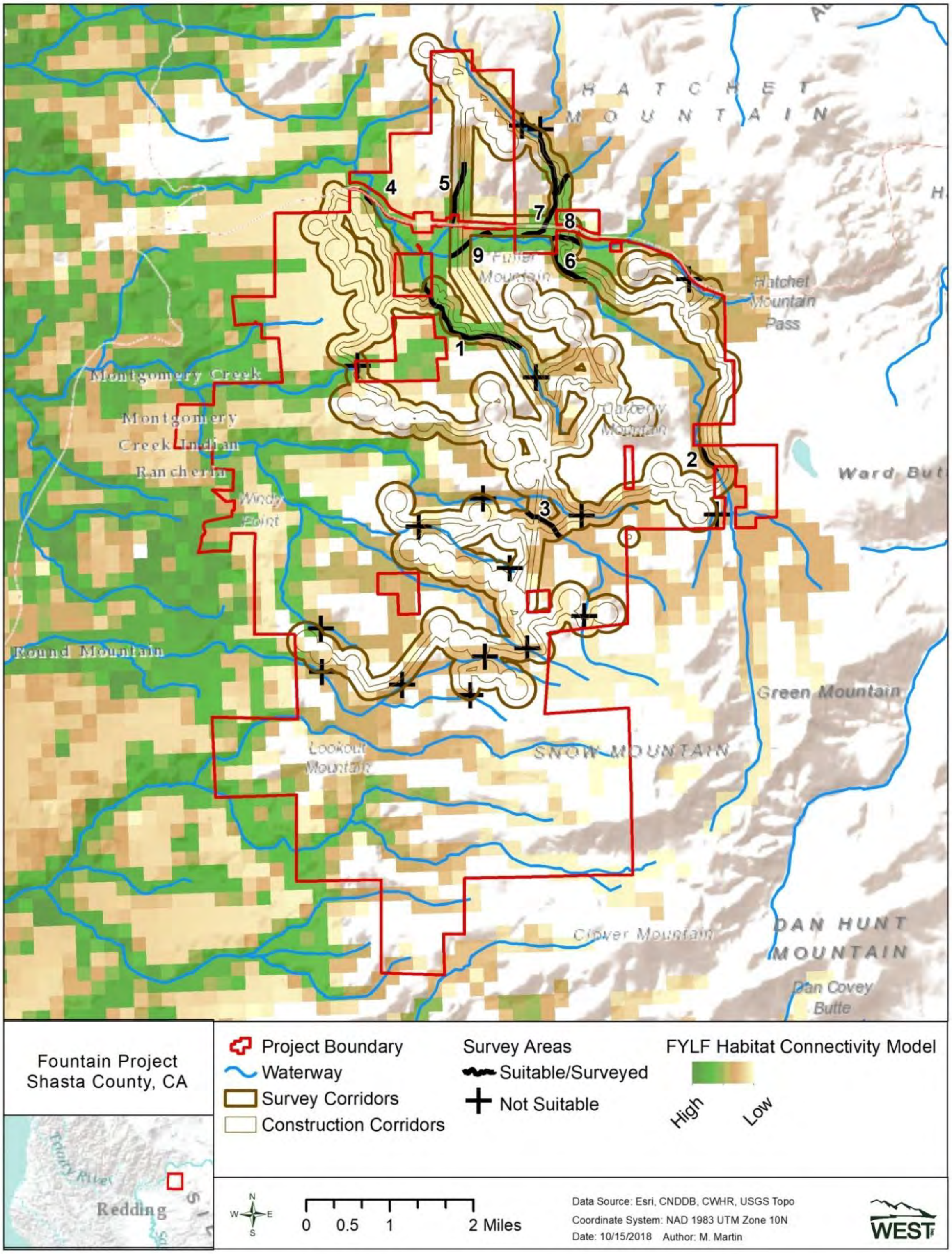

Figure 2. Foothill yellow-legged frog habitat assessment and survey areas within the Fountain Wind Project, Shasta County, California, based on modelled connectivity habitat obtained from the California Natural Diversity Database (CNDDB) and California Wildlife Habitat Relationships (CWHR).

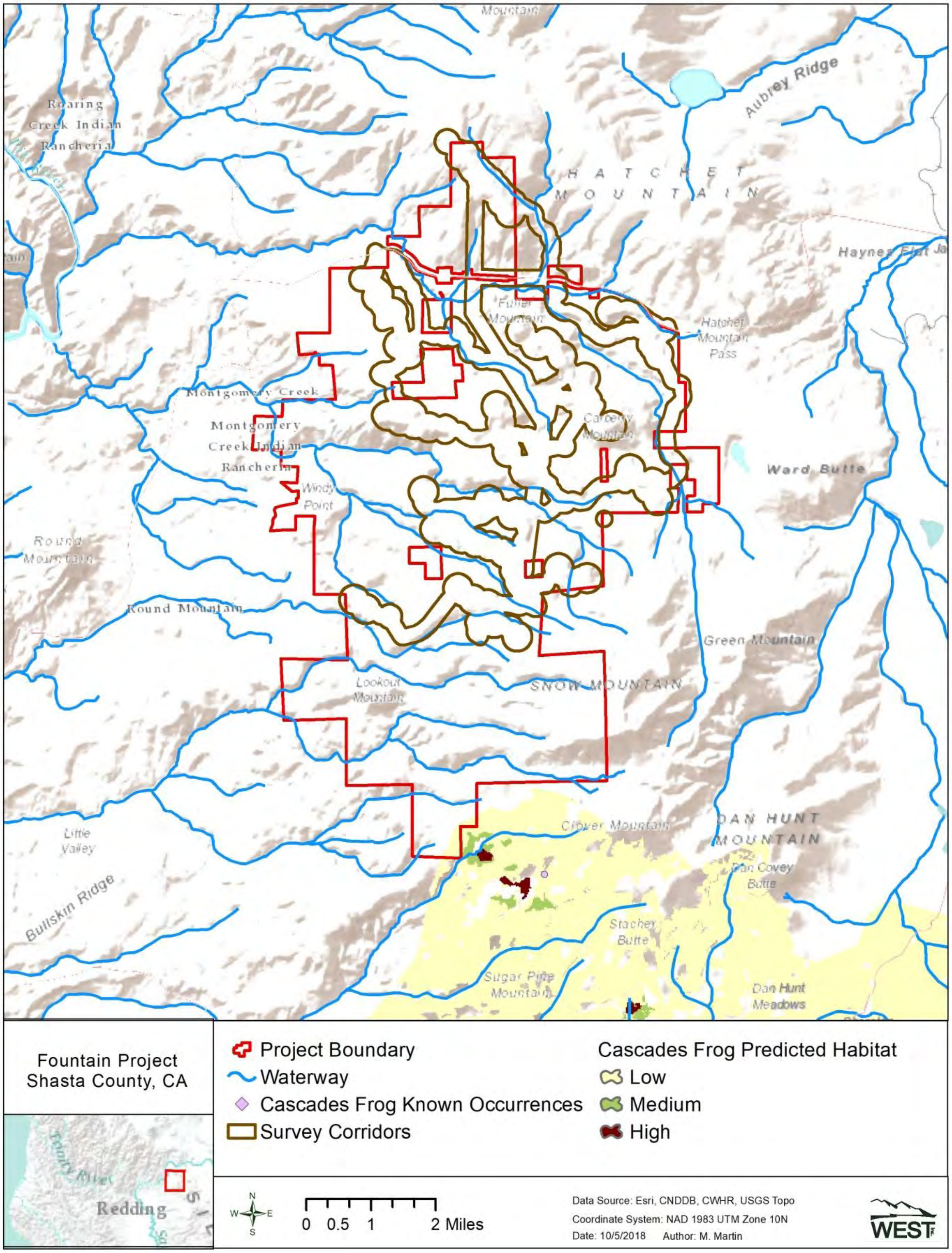

Figure 3. Cascades frog known occurrences and areas of predicted habitat as provided by the California Natural Diversity Database (CNDDB) and California Wildlife Habitat Relationships (CWHR) within the Fountain Wind Project, Shasta County, California.

METHODS

Foothill Yellow-legged Frog

Geographic information system (GIS) data from the CWHR and examination of aerial imagery were used to conduct a desktop review of potential FYLF habitat overlap with the Survey Corridors. The CWHR's GIS-based habitat model analyzes and compiles several remotely sensed GIS coverages to predict habitat suitability. A WEST biologist with training in FYLF survey methods conducted a field assessment of modeled FYLF habitat at the Project to verify habitat suitability and identify potential FYLF habitat not predicted by CWHR models. During the field assessment, the biologist visited areas of modelled habitat that overlapped with the Survey Corridors. Criteria considered during the field assessment for consideration as potential habitat, as defined by the CWHR models, included cover component (i.e., vegetation canopy closure from 20 - 90%), proximity to water (i.e., FYLF typically occur within 40 ft [12 m] of flowing, low-gradient perennial streams), elevation (below 6,562 ft [2,000 m]) and species range (i.e., known species occurrences; Hayes et al. 2016).

VES for FYLF were conducted in areas identified as suitable FYLF habitat in early September 2018. VES conducted in late summer have a high probability of detecting FYLF and are often the easiest method for determining FYLF presence, as subadult (and sometimes adults) FYLF are often observed along stream margins (van Hattem and Mantor 2018). VES were completed by walking all stretches of suitable habitat identified during the field assessment. The field surveyor walked up one side of the stream in stretches of suitable habitat visually searching for subadult and adult frogs, then returned on the opposite bank while continuing to visually search for FYLF. Each stretch of suitable habitat was given a survey area identifier and the date, survey time, air and water temperature, and vegetative cover were recorded for each survey. Survey routes were mapped with a handheld geographic positioning system unit and transferred to a GIS for later reference.

Cascades Frog

A desktop review for CF habitat suitability and occurrences within the Survey Corridors was conducted using a combination of range maps, CNDDB known occurrence data, CWHR predicted suitable habitat, and aerial imagery. These data were used in combination with site-specific field data collected during rare plant surveys (Flaig et al. 2019), to determine the likelihood of occurrence of suitable CF habitat within the Survey Corridors.

RESULTS AND DISCUSSION

Foothill Yellow-legged Frog

Results from a desktop analysis of potential habitat within the Survey Corridors yielded 15 areas where FYLF had potential to occur. Field assessments of habitat suitability within the 15 areas resulted in nine stream reaches that appeared to be suitable for FYLF. Habitat characteristics were identified as unsuitable for FYLF at 16 other stream crossings (see Figure 2). VES for subadult and adult FYLF were conducted from September 1-4 in the nine areas identified as potentially suitable habitat.

No FYLF were detected during 2018 subadult VES (Table 1). In general, habitat for FYLF within the Survey Corridors was marginal due to limited or nonexistent surface water and/or excessive vegetative cover that greatly limited sun exposure.

Table 1. Results of visual encounter surveys conducted for Foothill yellow-legged frogs from September 1 – 4, 2018 at the Fountain Wind Project, Shasta County, California.

Survey Area	Survey Date	Survey Time (minutes)	Air Temp (°F)	Water Temp (°F)	Vegetation Cover		Detections
					Right Bank (%)	Left Bank (%)	
1	9/1/18	246	52	58	98	100	0
2	9/1/18	65	70	54	90	90	0
3	9/1/18	56	67	48	90	95	0
4	9/1/18	34	86	58	97	95	0
5	9/1/18	154	94	54	98	98	0
6	9/2/18	131	91	56	100	99	0
7	9/3/18	285	79	49	95	100	0
8	9/3/18	97	95	59	95	95	0
9	9/4/18	124	82	60	95	95	0

Cascades Frog

Based on range maps, the current range of CF overlaps with only a small area at the southern extent of the Project area. A desktop analysis of CWHR's potentially suitable CF habitat indicated approximately 75 acres (30 hectares) of low quality habitat potentially exists in the southern portion of the Project area (see Figure 3; CDFW 2018b). Results from field-based habitat mapping of this area verified that this predicted low quality habitat does not currently include the habitat components necessary to support CF (e.g., ponds or wet meadows; Flaig et al. 2018). Because the Survey Corridors are entirely outside the CF range and the modeled low-quality potential habitat that occurs within the larger Project area was confirmed as non-suitable, no formal surveys for CF were conducted.

CONCLUSION

VES for subadult FYLF conducted in late summer (i.e., late August to early October), immediately following the breeding season, yield the highest likelihood of detection for FYLF as both adults and subadults should be active during this period (van Hattem and Mantor 2018). However, no FYLF were detected during 2018 subadult VES conducted within the best habitats present within the Survey Corridors. The lack of FYLF detections during the 2018 VES surveys was consistent with results of past stream surveys conducted (primarily for fish) in support of timber management activities within the Project area by the landowners (R. Klug, Resource Planning Manager, LandVest Timberlands, personal communication).

Although some areas within the Survey Corridors were modeled as medium suitability for FYLF and some areas as having moderate to high connectivity, several of these areas were field-verified to be marginal or unsuitable habitat based on FLYF preferred habitat characteristics. Areas deemed marginal or unsuitable were either dry and/or the vegetative cover was inappropriate (i.e., too much canopy cover precluding sun exposure; Table 1). Based on the generally poor quality of FYLF habitat identified in the Survey Corridors, the lack of FLYF detections during VES conducted in 2018 in the highest quality habitats identified, and lack of historical FYLF detections documented by landowners during past stream surveys, it is unlikely that FYLF occur in the Project area. Additionally, according to the CWHR habitat connectivity model, connectivity between the closest known FYLF occurrence locations and the Project area are essentially non-existent (see Figure 2), suggesting that FYLF are not likely to immigrate into the Project area from other known occurrence areas. The data available from historical work in support of timber management activities within the Project area, and 2018 habitat assessments and surveys for FYLF, suggest that FYLF do not currently occur in, nor will they likely colonize the generally low-quality habitats present in the Project Survey Corridors; therefore, no impacts to FYLF are expected as a result of the Project.

Results from the desktop review of potential CF habitat at the Project indicated that the Project is largely outside the range of CF and only limited low quality habitat could potentially exist at the southern edge of the Project area. Habitat mapping conducted in this area during rare plant and natural community survey efforts (Flaig et al. 2018) indicated a lack of suitable habitat for CF (i.e., lack of WMM) in this area. Because this was the only area identified as potentially suitable habitat based on the CWHR model, but was identified as non-habitat during field surveys and did not overlap the Survey Corridors, no formal surveys were conducted for CF. Given the lack of habitat within the range of the CF and the lack of overlap among construction corridors and CF range, it is unlikely that CF occurs in areas that will be disturbed during Project construction; therefore no impacts to CF are expected as a result of the Project.

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TECHNICAL MEMORANDUM

DATE: December 20, 2019

TO: John Kuba, ConnectGen Operating LLC

FROM: Andrea Chatfield and Kori Hutchison, WEST, Inc.

RE: 2018/2019 Foothill Yellow-legged Frog Assessment for the Fountain Wind Project, Shasta County, California

INTRODUCTION

In September 2018, at the request of the California Department of Fish and Wildlife (CDFW), Western EcoSystems Technology, Inc. (WEST) performed an assessment of potential foothill yellow-legged frog (FYLF; *Rana boylii*) habitat, and conducted visual encounter surveys (VES) in the most suitable habitats located on lands leased for the development of the proposed Fountain Wind Project (Project). The 2018 habitat assessment and subsequent surveys were conducted within development corridors[1] provided by the Project proponent in May 2018 (Figure 1). In May 2019, the Project layout was amended, adding areas of proposed development that were not covered by the 2018 FYLF habitat assessment and VES (Figure 1). As a result, in June 2019, WEST performed a supplemental desktop review and field verification of potential FYLF habitat. VES were conducted in potentially suitable habitats within these newly added development corridors, as well as within suitable breeding habitats previously surveyed in 2018. The following memorandum summarizes WEST's efforts to assess the potential for FYLF to occur within the development corridors, based on desktop assessments and field verification of potentially suitable habitat, VES conducted in 2018 and 2019, and consultation with CDFW biologists and herpetologists.

SPECIES BACKGROUND

Foothill yellow-legged frog (FYLF; *Rana boylii*) was designated as a candidate for listing as threatened at the species level under the California Endangered Species Act (CESA) on July 7,

[1] The development corridors represent all project facilities included in the site plan and an appropriate buffer to capture any areas where potential disturbance could occur. As the Project progressed, the development corridors were iteratively refined to form the most current iteration of the project referred to as the Project Site.

2017, and is currently under review for possible listing as threatened or endangered under the federal Endangered Species Act (ESA). In a status review submitted to the California Fish and Game Commission on September 20, 2019, CDFW recommended listing 5 of 6 genetically distinct clades as threatened or endangered: East/Southern Sierra, West/Central Coast, and Southwest/South Coast clades as endangered; Northeast/Northern Sierra and Feather River clades as threatened (CDFW 2019c). The CDFW recommended that a listing for the Northwest/North Coast clade, which is the only clade to occur within or adjacent to the Project, was not warranted at this time, as this clade has the most robust populations and greatest genetic diversity (CDFW 2019c). In December 2019, the California Fish and Game Commission adopted CDFW's listing recommendation as proposed. .

According to the California Natural Diversity Database (CNDDB), several known occurrences of FYLF have been documented in the vicinity of the Project. These include a single specimen collected in 1953 with an approximate location of between 0.5 and 1.5 miles (mi; 0.8 to 2.4 kilometers [km]) northwest of the Project, likely on Hatchet Creek; several detections of all life stages documented as recently as 2018, approximately 4.0 mi (6.4 km) north of the Project along the Pit River; and a single observation of two adult FYLF documented in 2001 approximately 4.0 mi (6.4 km) south of the May 2019 development corridors (CDFW 2019b). Although the species has not been documented within the development corridors, and the Project is on the edge of the species range (Figure 1), the California Wildlife Habitat Relationships (CWHR) database, maintained by CDFW (2019a), indicates that potential habitat for FYLF may be present within the Project development corridors.

PROJECT AND SURVEY AREA

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project is mixed coniferous forest (both post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*).

For the purpose of assessing FYLF habitat and conducting field surveys, development corridors were provided in a Geographic Information System (GIS) format by the Project proponents in May 2018 and May 2019 (Figure 1). The development corridors include all project facilities and adjacent areas where potential permanent and temporary disturbance could occur. The development corridors varied in size and included buffers of all areas of proposed infrastructure that may be subject to ground disturbance (e.g., newly proposed roads, roads that may be expanded, turbine pads, and underground collection lines) to provide for some flexibility in final project design. For the purpose of assessing FYLF habitat for the May 2019 Project layout, the 2019 development corridors were overlain onto the development corridors used in the 2018 habitat assessment to identify new areas of proposed development requiring additional evaluation

(Figure 1). The May 2019 Project layout includes approximately 1,746 acres (707 hectares) which fall outside of the 2018 development corridors and were, therefore, not evaluated during the 2018 assessment (see Figure 1). WEST buffered the 2018 and 2019 development corridors by an additional 500 feet (ft; 152 meters [m]) to delineate survey areas used in the assessment of FYLF habitat suitability and to guide field surveys efforts. The 500-ft buffer was used as van Hattem and Mantor (2018) recommend that surveys are conducted 500 ft upstream and downstream of disturbance projects.

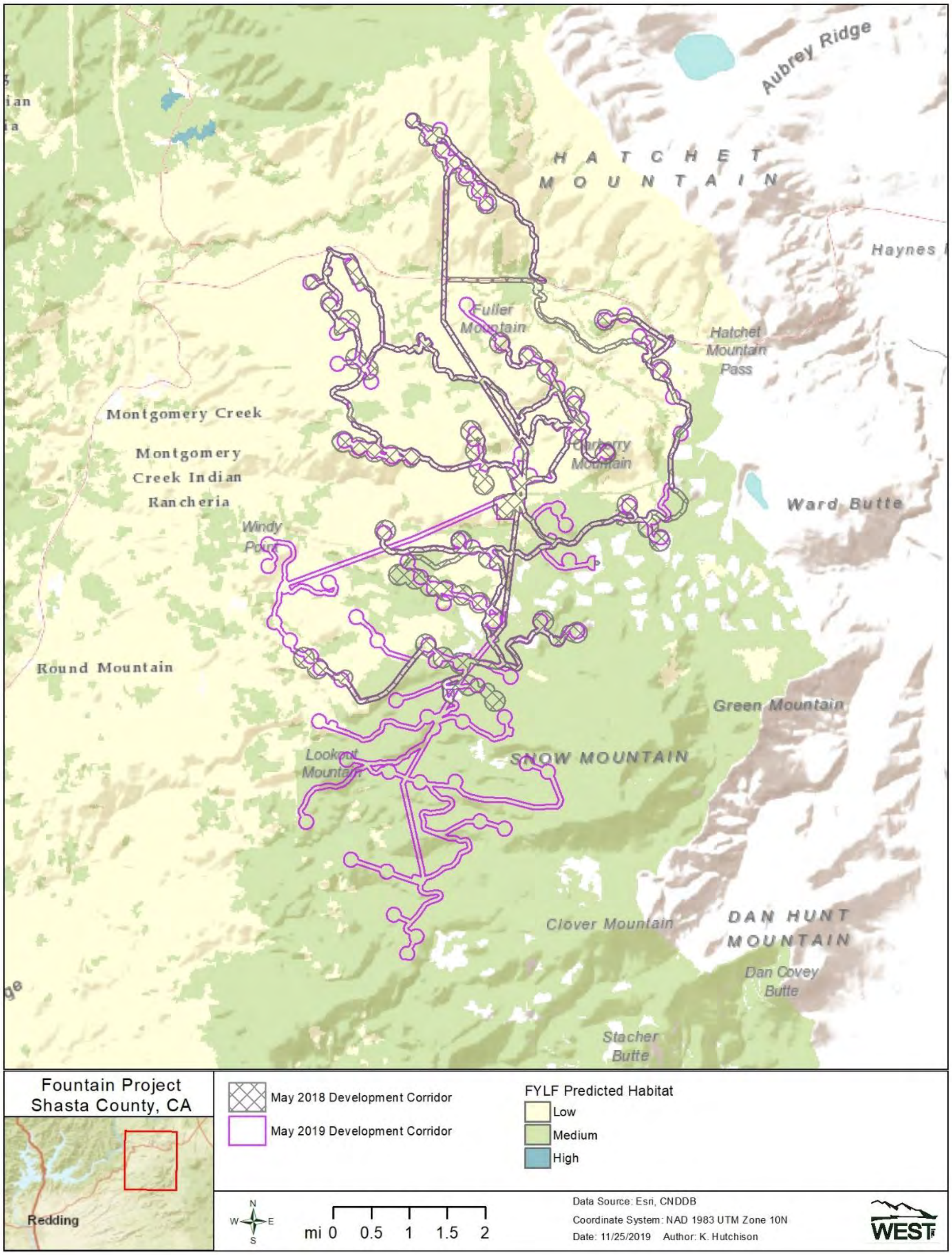

Figure 1. Proposed development corridors for the Fountain Wind Project as provided by the Project proponent in May 2018 and May 2019 and foothill yellow-legged frog areas of predicted habitat as provided by the California Wildlife Habitat Relationships (CWHR).

METHODS

Habitat Assessment

Geographic information system (GIS) data from the CWHR, United States Geological Survey (USGS) National Hydrography Dataset (NHD; USGS 2019), and examination of aerial imagery were used to conduct a desktop review of potential FYLF habitat overlap with development corridors. The CWHR's GIS-based habitat model analyzes and compiles several remotely sensed GIS coverages to predict habitat suitability. The CWHR includes information on both habitat suitability (i.e., predicted habitat; Figure 1) and habitat modeled as potentially important for connectivity (i.e., connectivity habitat; Figure 2) for FYLF (CDFW 2019a). An initial desktop assessment was completed in 2018 and, following revision to the Project layout in May 2019, a supplemental assessment was completed for newly added development corridors. Following both the 2018 and 2019 desktop habitat assessments, a WEST biologist with training in FYLF survey methods conducted a field assessment to determine suitability of 1) CWHR modeled FYLF habitat near stream crossings of the Project Layout, and 2) potential FYLF habitat at crossings not predicted by CWHR models. During the field assessment, the biologist visited areas of modeled habitat that overlapped with the development corridors. Criteria considered during the field assessment for consideration as potential habitat, as defined by the CWHR models, included cover component (i.e., vegetation canopy closure from 20 - 90%), proximity to water (i.e., FYLF typically occur within 40 ft [12 m] of flowing, low-gradient perennial streams), elevation (below 6,562 ft [2,000 m]) and species range (i.e., known species occurrences; Hayes et al. 2016).

Visual Encounter Surveys

VES for FYLF were conducted in areas identified as potentially suitable FYLF habitat in early September 2018. VES conducted in late summer have a high probability of detecting FYLF and are often the easiest method for determining FYLF presence, as subadult (and sometimes adult) FYLF are often observed along stream margins (van Hattem and Mantor 2018). VES were completed by walking all stretches of potentially suitable habitat identified during the habitat assessment. The field surveyor walked up one side of the stream in stretches of suitable habitat visually searching for subadult and adult frogs, then returned on the opposite bank while continuing to visually search for FYLF. Each stretch of suitable habitat was given a survey area identifier and the date, survey time, air and water temperature, and vegetative cover were recorded for each survey. Survey routes were mapped with a handheld geographic positioning system unit and transferred to a GIS for later reference.

In June of 2019, after consultation with CDFW, additional VES were conducted for egg masses and adult FYLF within stream sections that qualified as suitable breeding habitat. Survey methodology was consistent between the two years, with a focus on protected stream edges with low flow velocity, as these sites are more suitable for egg mass attachment (van Hattem and Mantor 2018).

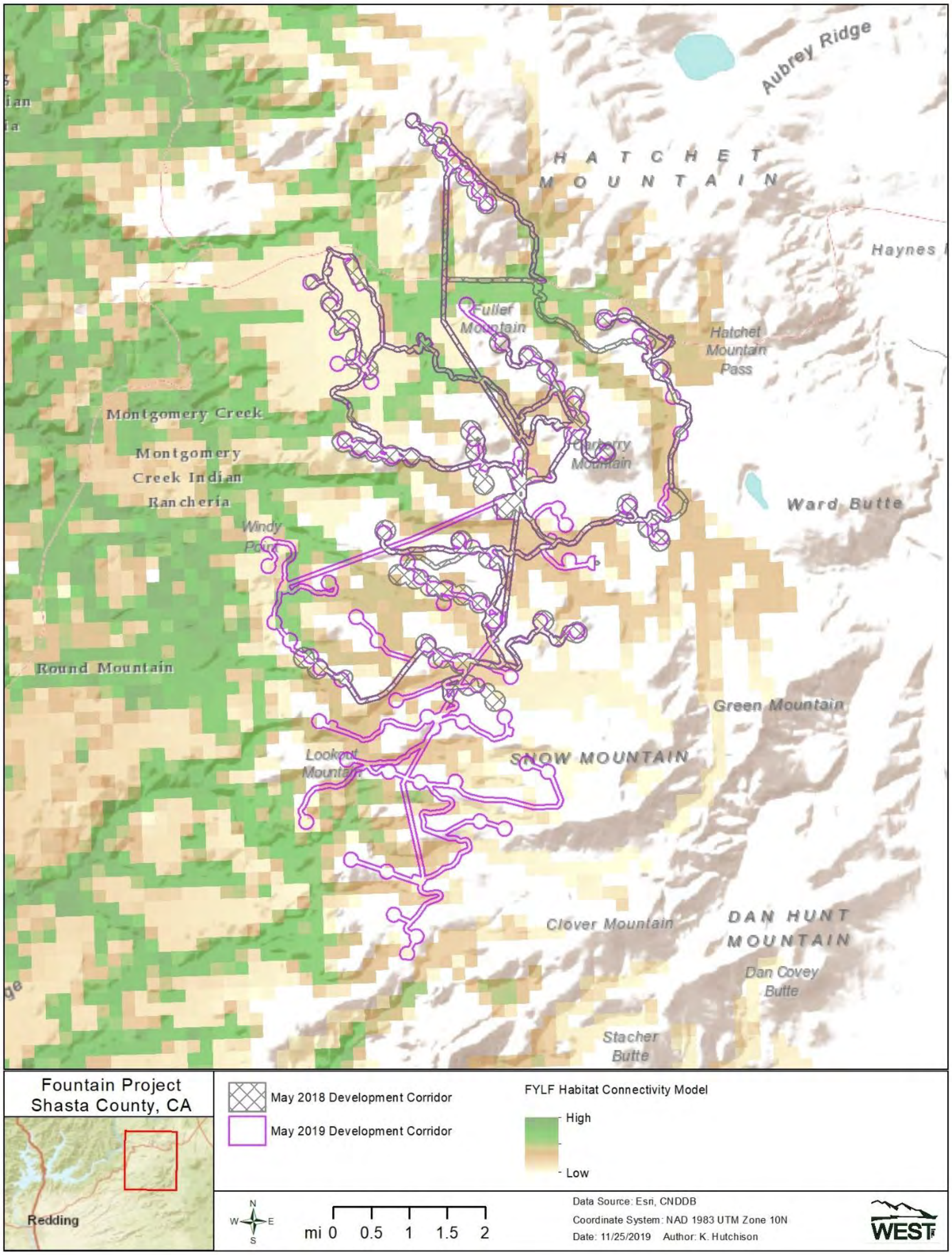

Figure 2. Modelled connectivity habitat for foothill yellow-legged frog within the Fountain Wind Project as obtained from the California Natural Diversity Database (CNDDB) and California Wildlife Habitat Relationships (CWHR).

RESULTS AND DISCUSSION

Habitat Assessement

Although the large majority of FYLF habitat within the development corridors is classified as low likelihood of occurrence using the CWHR predicted habitat model (Figure 1), some locations are classified as medium to higher suitability for potential habitat connectivity (Figure 2). The predicted habitat and habitat connectivity models overlap with the development corridors in some locations. Because the FYLF is most commonly associated with moving waters, stream corridors within areas of higher rated habitat connectivity that overlapped with development corridors were the focus of FYLF habitat assessments and field surveys in 2018 and 2019 (Figure 3).

Results from a desktop analysis of potentially suitable habitat within the 2018 development corridors yielded 15 areas where FYLF had the highest potential to occur. These 15 areas were assessed in the field for FYLF habitat suitability in September 2018. During the field assessment, nine areas were identified as containing potentially suitable habitat for FYLF (see Figure 3). Based on the 2019 desktop assessment and field verification, five additional areas were identified as containing potentially suitable FYLF habitat within the newly added (i.e., 2019) development corridors (Figure 3).

Visual Encounter Surveys

VES for subadult and adult FYLF were conducted September 1-4, 2018 in the nine areas identified as potentially suitable habitat during the 2018 habitat assessment (Figure 3). VES for egg masses and adults were again conducted June 18-22 and 29-30, 2019 within areas identified as potential FLYF breeding habitat during both the 2018 and 2019 assessments (Figure 3). No life stages of FYLF or any sensitive amphibian species were detected during September 2018 subadult/adult VES or June 2019 egg mass/adult VES. In general, habitat for FYLF within the development corridors was marginal due to limited or nonexistent surface water and/or excessive vegetative cover that greatly limited sun exposure.

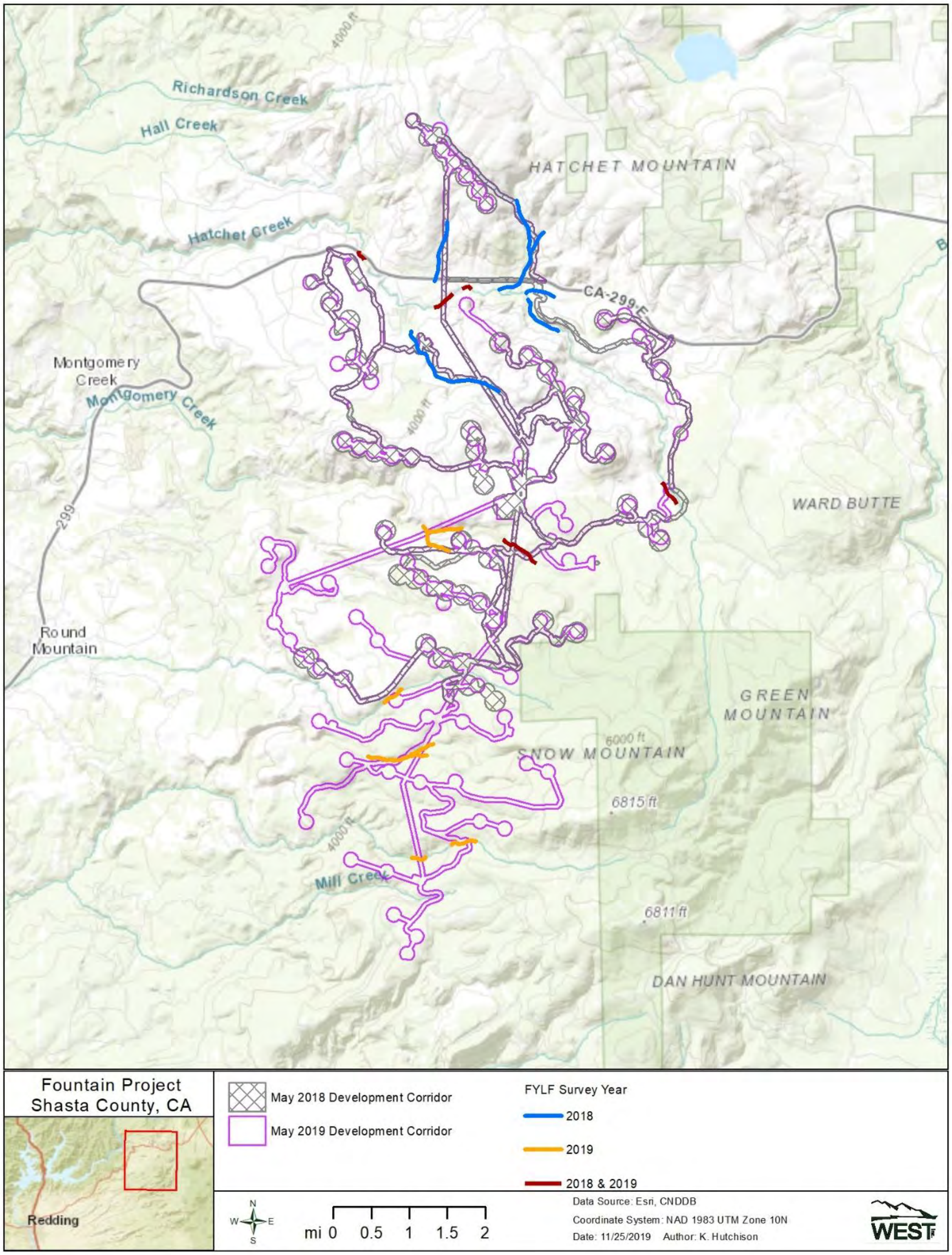

Figure 3. Foothill yellow-legged frog habitat assessment and survey areas within the Fountain Wind Project, Shasta County, California.

Agency Consultation and Site Visit

Consultation with CDFW and US Fish and Wildlife (USFWS) biologists was initiated early in the Project planning phase and has continued throughout the early development phase. In-person meetings with agency personnel included meetings with USFWS and CDFW on July 15, 2017 and February 12, 2019, and a site visit with CDFW on July 23, 2019. Additionally, WEST has had multiple phone conversations and email correspondence with CDFW biologists throughout the spring and summer of 2019, specifically with regard to FYLF. In particular, correspondence involved discussion of the best approach for continued FYLF surveys given the difficulty of surveying areas with excessive vegetative cover. Mike van Hattem, herpetologist with CDFW, expressed hesitation to skip surveys in these habitats altogether, as these streams could potentially be used for dispersal even though the streams are not able to support most life stages of FYLF (M. van Hatterm, CDFW, pers. comm.). Because dispersal is most likely to occur in the fall after the breeding season survey period, WEST coordinated with CDFW to focus surveys on suitable breeding habitat. Therefore those areas that met qualifications for suitable breeding habitat for FYLF would be surveyed for egg masses and adults during the 2019 breeding season.

During the July 2019 site visit, a WEST biologist showed CDFW examples of each category of FYLF habitat surveyed in 2018 (i.e., low-quality, medium-quality, high-quality), and the majority of the breeding habitats surveyed in 2019. The group conducted VES surveys out to 500 ft in two of the survey areas, and in areas immediately adjacent to crossings at the rest of the suitable breeding habitat visited that day. No life stages of FYLF or any sensitive amphibian species were detected during the site visit. During the July 2019 site visit, CDFW biologists agreed that it was less effective to conduct standard VES at the lower quality habitats, and that habitats identified as potentially suitable breeding habitat for FYLF were unlikely to be able to support egg mass attachment during the breeding period due to high flow velocities and low temps (≤10 degrees Celsius) into early July (M. van Hattem, CDFW, pers. comm.). CDFW biologists recommended environmental DNA (eDNA) as an alternative methodology and the group agreed that this would be a more effective option of determining presence/absence of FYLF at the Project.

CONCLUSION

Surveys for FYLF conducted during and immediately following the breeding season are considered most effective (van Hattem and Mantor 2018); however, no FYLF were detected during 2018 or 2019 VES conducted within the best habitats present within the development corridors. The lack of FYLF detections during the VES was consistent with results of past stream surveys conducted (primarily for fish) in support of timber management activities within the leasehold area by the landowners (R. Klug, Resource Planning Manager, LandVest Timberlands, pers. comm.).

Although some areas within the development corridors were modeled as medium suitability for FYLF and some areas as having moderate to high connectivity, several of these areas were field-verified by a WEST biologist to be marginal or unsuitable habitat based on FLYF preferred habitat characteristics. Areas deemed marginal or unsuitable were either dry and/or the vegetative cover was inappropriate (i.e., too much canopy cover precluding sun exposure). Based on the generally poor quality of FYLF habitat identified at the Project's stream crossings, the lack of FLYF detections during VES conducted in 2018 and 2019 in the highest quality habitats identified, and lack of historical FYLF detections documented by landowners during past stream surveys, it is unlikely that FYLF occur at the Project. Additionally, according to the CWHR habitat connectivity model, connectivity between the closest known FYLF occurrence locations and the development corridors are essentially non-existent (see Figure 2), suggesting that FYLF are not likely to immigrate into the area from other known occurrence areas. The data available from historical work in support of timber management activities within the leasehold area, and 2018/2019 habitat assessments and surveys for FYLF, suggest that FYLF do not currently occur in, nor will they likely colonize the generally low-quality habitats present in the Project's development corridors; therefore, no impacts to FYLF are expected as a result of the Project.

This assessment is supported by early and ongoing communication with CDFW biologists and herpetologists concerning the potential for FYLF to occur in the development corridors and recommendations for surveys. Based on a site visit, CDFW confirmed that the likelihood of breeding habitat supporting egg masses is low, largely because of the late snow melt typical of the region. Additionally, dense vegetation along streams make VES more difficult and potentially less effective than surveys conducted along more open waterways. In consideration of these factors, CDFW biologists suggested presence/absence surveys using eDNA methodology to further supplement the VES surveys. WEST performed eDNA surveys on the Project Site in September 2019; no positive detections of FYLF were encountered. A detailed discussion of the methodology and survey results are included in a separate report titled, "2019 eDNA Surveys for Foothill Yellow-legged Frog at the Fountain Wind Project, Shasta County, California".

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