

Appendix C-2

## **Biological Assessment**



DRAFT

BIOLOGICAL ASSESSMENT  
ENDANGERED, THREATENED, PROPOSED &  
CANDIDATE SPECIES

Hatchet Ridge Wind LLC  
Hatchet Ridge Wind Project  
Shasta County, California

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## 1.0 INTRODUCTION

The purpose of this Biological Assessment (BA) is to determine if the proposed Hatchet Ridge Wind, LLC (HRW) Hatch Ridge Wind Power Project will adversely affect threatened and endangered species potentially occurring in the project area. Also, the BA will determine if the project will jeopardize the continued existence of candidate species or species proposed for listing under the Endangered Species Act (ESA). The ESA requires preparation of a BA for major construction projects proposed under Federal authority. While there is currently no federal nexus with the proposed project, HRW chose to voluntarily evaluate the effects of the proposed project on species protected under the ESA. The BA was the format chosen for the evaluation.

The actions being evaluated under this BA are the proposed construction, maintenance, and operation of a 100 megawatt (MW) wind power project in Shasta County, California, approximately 6 miles west of the town of Burney. HRW plans to construct, operate, and maintain up to 50 wind turbines on approximately 3000 acres of leased private land north and west of Hatchet Mountain Pass (Figure 1). The BA provides a summary of the available information regarding listed species in the area and a thorough effects analysis of the proposed project on the listed species.

### 1.1 Species Lists

A species list for the project area was generated online December 4, 2006 (Appendix A). The request area for information included all of the 1:24,000 USGS quad boundaries that intersected a two mile buffer of the project area. This approach resulted in inclusion of area as far as 8 miles from the project boundary within the search for listed species potentially occurring in the project area. Thirteen (13) endangered or threatened species or designated critical habitat for listed species are considered by the USFWS as potentially occurring in or affected by the proposed project (Table 1). In addition, two species that are candidates for listing as endangered or threatened may also be affected by the project.

**Table 1. A list of species described by the USFWS as potentially occurring near, or potentially affected by, the proposed project.**

Common Name	Scientific Name	Status	Critical Habitat?
Conservancy fairy shrimp	<i>Branchinecta conservation</i>	Endangered	No
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Threatened	No
Shasta crayfish	<i>Pacifastacus fortis</i>	Endangered	No
Delta smelt	<i>Hypomesus transpacificus</i>	Threatened	No
Central Valley steelhead	<i>Oncorhynchus mykiss</i>	Threatened	No
Central Valley spring-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	No
Winter-run Chinook Salmon, Sacramento River	<i>Oncorhynchus tshawytscha</i>	Endangered	No
California red-legged frog	<i>Rana aurora draytonii</i>	Threatened	No
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	No
Northern Spotted Owl	<i>Strix occidentalis caurina</i>	Threatened	Yes
Slender Orcutt Grass	<i>Orcuttia tenuis</i>	Threatened	Yes
Central Valley fall / late fall-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	Candidate	N/A
Fisher	<i>Martes pennanti</i>	Candidate	N/A

This BA addresses potential impacts from the project to these species. Prior to initiation of any construction, the species list will be confirmed and the biological assessment may be revised (or amended) if: (1) the scope of work changes significantly so as to create potential effects to listed species not previously considered; (2) new information or research reveals effects of the proposed project may impact listed species in a manner not considered in this BA; or (3) a new species is listed or critical habitat designated that may be affected by the project.

## 1.2 Proposed and Candidate Species

Proposed species are those for which the USFWS has formally proposed to list as threatened or endangered. Once proposed, there is typically a status review period (often 12 months) where the USFWS reviews all existing information, data, and threats to the species and makes a listing decision. Species proposed for listing receive protection under the ESA in that proposed projects may not jeopardize the continued existence of these species. According to the USFWS, there are no species proposed for listing that may be present in the project area. Therefore, construction, maintenance, and operation of the proposed wind power project will not jeopardize any proposed species.

The USFWS maintains a list of candidate species for listing as threatened or endangered. Candidate species are those for which the USFWS has sufficient information on their status and threats to propose them as endangered or threatened, but for which proposed listing is precluded by other higher priority species or actions (USFWS 2000a). While candidate species receive no protection under the ESA, the USFWS encourages actions that conserve these species. Based on the USFWS, two candidate species, the Central Valley fall / late fall-run chinook salmon and fisher, may be present near, or affected by, the project area.

### *Central Valley Fall /Late Fall-run Chinook Salmon*

The Central Valley Fall /Late Fall-run Chinook Salmon was proposed for listing as threatened under the ESA, however, the USFWS and the National Marine Fisheries Service (NMFS) found the listing was not warranted. Spawning habitat loss and degradation was the primary threat to the species, however, long term trends indicate a stable or increasing population. The NMFS and USFWS consider this species a candidate species and continues to monitor the population's status (NMFS 1999).

The proposed project area is located on a ridge, and no streams are present. The project area lacks habitat for this population of Chinook salmon. Some ephemeral drainages begin on Hatchet ridge that connect to perennial streams that may eventually provide habitat for this population of Chinook Salmon. Construction activities have some potential to increase erosion and degrade water quality. Construction impacts are temporary in nature, and downstream effects from construction will be minimized by adhering to Best Management Practices and other construction standards preventing runoff and erosion, including those specified in the project NPDES permit and associated Stormwater Pollution Prevention Plan (SWPPP). The proposed project will not affect Central Valley Fall /Late Fall-run Chinook Salmon or its habitat.

### *Fisher*

The fisher, a large mustelid that occupies mature coniferous forest habitat, was found to be warranted for listing under the ESA, but precluded due to higher priority species or actions (USFWS 2004). Fishers historically occurred throughout much of the forested regions in Canada and the northern ½ of the U.S. Fishers were extirpated from portions of their range due to a variety of causes, including over-harvesting through trapping and changes in forest management. In California, fishers are generally thought to occur

in two population segments in northern and southern California. The proposed project area occurs within the potential range of the northern population segment (USFWS 2004).

Based on Zielenski et al. 1995, the proposed project area occurs near the southern limit of the northern population of Fishers in California. The California Natural Diversity Database (CNDB) has two records of fishers from 1973 occurring approximately 6-7 miles southeast of the proposed project area. The proposed project occurs in a managed forest that has the structural characteristics of a young clearcut (Figure 2). Areas of second growth and mature forest are scattered around the project but are not found within the area proposed for development. Fishers prefer mature forested areas with high canopy closure and structural diversity, and generally do not utilize forest openings. The proposed project area generally lacks the structural characteristics preferred by fishers, however, suitable habitat characteristics are present within two miles of the project area. Assuming fishers are present where suitable habitat exists, there is a slight potential for fishers to cross the project area while dispersing between patches of suitable habitat. However, this is expected to be a rare occurrence, based on the low density of fisher populations in the area, and the location of the project area on the southern edge of the population. The potential for impacts is expected to be minimal and essentially immeasurable, due to the location of the project in largely unsuitable habitat. The proposed project is not expected to affect fisher, and will not result in a loss of habitat, population viability, or result in a trend toward listing.

### 1.3 Critical Habitat

Critical habitat for threatened or endangered species is defined by the Endangered Species Act as the specific area(s) within the geographical range of a species where physical or biological features are found that are essential to the conservation of the species and which may require special management consideration or protection. Critical habitat is specific geographic area(s) designated by the USFWS for a particular species. Under the ESA, it is unlawful to adversely modify designated critical habitat. According to the USFWS letter, critical habitat for the northern spotted owl and slender orcutt grass is present in the general vicinity of the project area. However, the actual boundaries of critical habitat are located outside of the project area. Specifically, northern spotted owl critical habitat is located approximately ½ mile north of the project area (see below), and slender orcutt grass habitat is located two miles northeast of the project area. Due to the distance of critical habitat from the project area, construction, maintenance, and operation of the proposed wind power project will not affect or adversely modify critical habitat for endangered or threatened species.

### 1.4 No Effect

For most of the threatened and endangered species identified, the project should have no effect. Resource information indicated that the conservancy fairy shrimp, valley elderberry longhorn beetle, Shasta crayfish, delta smelt, Central valley steelhead, Central Valley spring-run Chinook salmon, Central Valley winter-run Chinook salmon, California red-legged frog, and slender orcutt grass are not likely to occur or only accidentally occur in the project area and that essential habitat for these species is lacking within the project area.

#### *Conservancy Fairy Shrimp*

The Conservancy fairy shrimp is listed as endangered under the ESA. The Conservancy fairy shrimp is a small crustacean that inhabits cool water vernal pools. The decline of the Conservancy fairy shrimp can be directly linked to the loss of vernal pool habitat to development and agriculture (USFWS 2005b). The proposed project is located on a mountain ridge, and no vernal pools are present. The proposed project will have no impact on water sources that could be linked to vernal pools, and no impacts to Conservancy fairy shrimp will occur.



*Valley Elderberry Longhorn Beetle*

The Valley Elderberry longhorn beetle is listed a threatened species under the ESA. The beetle occurs in elderberry shrubs, primarily in riparian forests within the Central Valley in California. The proposed project occurs on a mountain ridgetop, and suitable habitat for the Valley Elderberry longhorn beetle is not present. The proposed project will not affect the Valley Elderberry longhorn beetle.

*Shasta Crawfish*

The Shasta crawfish is listed as an endangered species by the USFWS. The Shasta crawfish is a small crayfish that occurs only in the Pit River, Fall Creek, and Hat Creek drainages. The Shasta crayfish occurs in cool, clear spring fed lakes, streams and rivers, and usually occur near where spring sources enter waterbodies. Primary threats to Shasta crayfish populations include water diversions, competition with other species, and predation (USFWS 1998).

The proposed project is located approximately 10 miles west of the known population of Shasta crayfish at Crystal and Bauman Lakes. No primary habitat for the Shasta crawfish occurs in the project area. A few natural springs are located on the sides of Hatchet Ridge, however, these do not provide enough water to provide habitat for the crayfish. Some ephemeral drainages that begin on the side of Hatchet Ridge eventually connect to drainages where the crayfish occur, at least 10 miles from the project area. The proposed project will have no direct impacts to the Shasta crayfish or their habitat. It is expected that water sources will be used during construction for dust control and for mixing concrete. Water sources have yet to be identified, but will not be located in areas where the Shasta crayfish are known to occur. The water used during construction will be a temporary withdrawal, and will not cause reductions in water available to the Shasta crayfish. The proposed project will not impact the Shasta crayfish.

*Delta smelt, Central valley steelhead, Central Valley spring-run Chinook salmon, and Central Valley winter-run Chinook salmon*

The fish species or populations listed above are all listed as threatened or endangered under the ESA. The delta smelt resides in brackish water associated with estuaries, slough, or rivers near the ocean in Contra Costa, Sacramento, San Joaquin, Solano and Yolo Counties (USFWS 2006). The steelhead and various runs of Chinook Salmon reside in the ocean, but migrate up rivers and streams in to the mountains to spawn. Some rivers and streams are located approximately 10 miles from the project, such as the Pit River or Hat Creek, that could provide spawning habitat for the salmon and steelhead species, or are connected to streams and rivers that do provide habitat. Throughout their range all of these species have been negatively impacted by changes in land use and activities that change water flows and stream characteristics. The proposed project is located on a mountain ridge, and no perennial streams, rivers or lakes are present. Some ephemeral drainages begin on the side of Hatchet Ridge that eventually reach rivers or streams where these species may spawn. The potential exists for erosion to increase during construction activities that could reach ephemeral drainages on the side of Hatchet Ridge. It is unlikely that any erosion would reach waters where protected fish species reside. Adherence to Best Management Practices and other protective measures during construction will minimize any impacts to ephemeral drainages near the project, including those practices referenced in the project's NPDES and related SWPPP. It is expected that water sources will be used during construction for dust control and for mixing concrete. Water sources have yet to be identified. The water used during construction will be a temporary withdrawal, and the amount of water utilized is not expected to reduce the amount of water available to protected fish.

### *California red-legged frog*

The California red-legged frog is listed as threatened under the ESA. The frog historically occurred along much of the coast of California, as well as inland in to Shasta County. However, no sightings have been recorded in Shasta County since 1985 (USFWS 2002). The frog occurs primarily in aquatic habitats such as wetlands, and will utilize uplands adjacent to aquatic habitats. The upper elevation limit of the species appears to be 5200', with most documented sightings occurring below 3500' (USFWS 2002). The Hatchet Ridge project is located at an approximate elevation of 5000', and is located outside of the current known range of the frog. The project is located on a mountain ridge with few wetlands and no aquatic habitats. A few springs are present on the side of Hatchet Ridge that could potentially provide suitable habitat for the frog. However, these habitats will not be affected by the proposed project. Best Management Practices and erosion control measures will minimize indirect impacts to springs and ephemeral drainages in the project area. Based on the very low potential for occurrence, and the lack of impacts to primary habitats, the proposed project will not affect the California red-legged frog.

### *Slender Orcutt Grass*

The slender orcutt grass is listed as threatened under the ESA. The grass grows primarily on volcanic substrates and within wetland habitats, such as vernal pools, or wetlands associated with riparian areas, lakes or stock ponds. The grass is documented as occurring within Shasta County, and critical habitat for the species is present approximately two miles northeast of the project area (USFWS 2005a). The proposed project is located on a mountain ridge and lacks wetland habitats. A few springs are present on the side of Hatchet Ridge that could potentially provide wetland habitats. However, these habitats will not be directly affected by the proposed project. Best Management Practices and erosion control measures will minimize indirect impacts to springs and ephemeral drainages in the project area. Based on the lack of habitat within the project area, the proposed project will not impact the slender orcutt grass.

## **1.5 Methods**

Based on the presence of suitable habitat and documented occurrences near the project area, the proposed project has some potential to affect the bald eagle and northern spotted owl. The BA provides a description of the proposed action (project), a summary of species biology and distribution, and a description of the environmental baseline for the project including the status and distribution of these species in the project area based on our current knowledge. Finally, the BA provides an assessment of the potential effects of the project on bald eagle and northern spotted owl species and a determination about adverse effects based on this information.

The BA is based largely on available information, however, some primary data was collected from the site through habitat mapping, avian use surveys, and a raptor nest survey within and surrounding the project area (Young *et al.* 2007). Sources of available information included published literature (including internet resources); a search of the California Natural Diversity Database (CNDB) maintained by the California Department of Fish and Game; data available from the USFWS; and communication and interviews with resource experts and agency personnel. The searches of the CNDB database included the 1:24,000 quadrangle boundaries that intersected the project area and a two mile buffer. Agency information was gained primarily from publicly available sources on the internet.

The information gathered for both species focused on, but was not limited to:

- establishing the current status, use, and behavior of the species in the project area,
- establishing the current distribution of important habitat in the project area for the species,

- determining the direct, indirect, and cumulative effects (as defined by the ESA) on the species within the project area,
- determining the likelihood of the project adversely affecting the species,
- identifying conservation measures (mitigation) that may be implemented to avoid and minimize adverse impacts to the species, and
- determining the expected status of the species within the project area after project completion.

Descriptions of the project are based on information provided by HRW. Descriptions of the project area and habitat are based on site visits, examination of aerial photographs and topographic maps, and results of the ecological baseline studies conducted for the project. Descriptions of potential habitat, natural history, and behaviors are based mainly on published literature and communications with resource experts. The occurrence and status of bald eagle and northern spotted owl in California and the project area are based on the available information, communication with agency personnel, and data collected from the project area. Species observations and information were mapped in ArcView.

Primary data collected from the site included weekly point counts from six fixed point survey stations established across the study area, a habitat mapping effort, a raptor nest survey and incidental or in-transit observations made outside defined survey periods. The studies were initiated as part of a baseline avian study to evaluate potential impacts from the proposed wind plant.

#### *Weekly Fixed-point Surveys*

Point count surveys were conducted weekly on site at six survey stations between November 15, 2005 and November 9, 2006. Each survey plot consisted of a fixed-point (observation point) and the area encompassed by an 800-m radius circle centered on the observation point location (Figure 3). Observations of birds beyond the 800 m radius were also recorded, but not included in the analyses of avian use of the site. Survey periods lasted for 20 minutes per point count. Additional details of the survey methods and results can be found in the final technical report prepared for the baseline studies (Young *et al.* 2007). Results from the surveys as they pertain to both species are reported below (see Section 4.0 Environmental Baseline).

#### *Raptor Nest Survey*

The objective of the raptor nest survey was to locate nests that may be subjected to disturbance and/or displacement effects from wind plant construction and/or operation. The nest survey area included the development area and a two mile buffer. The raptor nest survey was conducted via helicopter in April 2006 when buteos (red-shouldered hawk, red-tailed hawk), golden eagles, and bald eagles were actively incubating eggs or brooding/attending young. GPS coordinates were recorded for all nests located of all raptors or other large bird species (e.g., heron rookeries) and mapped on a GIS ArcView project utilizing USGS topographic maps (1:24000 scale) as the base. A follow up survey was conducted in late May 2006 to visit located nests and look for evidence of nest success (e.g., fledged young nearby, full grown chicks in the nest). Locations of inactive nests were also recorded for future reference.

#### *Habitat Mapping*

The objectives of the vegetation mapping were to identify the vegetation types (communities) that may be directly impacted by the project and characterize the habitat suitability of the study area for the listed species. The vegetation of the project area was mapped on 1:24,000 scale aerial photos. Ground and aerial observations made during other study components (e.g., aerial survey for raptor nests) were used to identify the vegetation type signature on the aerial photos and confirm polygon boundaries or transitions

to other types. Information from the vegetation mapping was used to describe habitat used by wildlife species observed and determine the need for additional surveys for species of concern (e.g., rare plants, federal and state listed wildlife). The vegetation mapping study area included the project area and a 2-mile buffer around the site to identify potential spotted owl habitat nearby.

### *Incidental/In-transit Observations*

All wildlife species of concern, including bald eagles and other raptors, and uncommon species observed while field observers were traveling between survey stations were recorded on incidental/in-transit data sheets. Other incidental observations made during other surveys or visits to the sites were also recorded. These observations were recorded in a similar fashion to those recorded during the fixed-point surveys.

## **2.0 PROJECT DESCRIPTION**

The proposed Project would consist of the installation, operation, maintenance, and eventual decommissioning of approximately 100 MW of turbines and supporting facilities. The power would be sold to one or more regional utilities for delivery to regional consumers. The turbine model and size has not been finalized at this time. The most likely turbine type that would be utilized would have a capacity between 2.0 and 2.4 MW each with a rotor diameter of approximately 87 - 104 m. The turbines would be mounted on 70 - 100 m tubular towers, for a range of heights of approximately 122 - 154 m from the ground to the tip of a blade at the highest point. Wind turbines would be primarily in a single string along the primary Hatchet Ridge ridgeline with a short second string of turbines located on the far northwest portion of the project area. Each turbine will be connected to adjacent turbines by an underground collector system.

The electrical output of each turbine string would be connected to the project substation by a combination of overhead and underground 34.5-kV transmission lines. The substation would be connected to a 230 kV transmission line located adjacent to the substation site. The project would be monitored and controlled from an operations and maintenance (O&M) building located within the project area. Existing roads would be improved, and some new graveled roads would be constructed to provide access to the wind turbine locations during construction and for O&M. Wind speeds will be monitored by one permanent meteorological (met) towers.

While the final wind project layout will determine total loss of vegetation impacts it is anticipated that total acres of impacted habitat will be relatively small. Less than 100 acres (40 ha) would be permanently disturbed (occupied by roads, turbines and other infrastructure) and up to 150 acres (55 ha) would be temporarily disturbed during construction. Because of the existing road traversing the length of the project area little new road composed of spurs to individual turbines of turbine strings would be needed. It is estimated that less than 2 miles (3.2 km) of new roads would be constructed, and approximately 6 miles (10 km) of existing roads would be improved and widened to 12 ft (3.6 m).

### **2.1 Operation and Maintenance**

Once constructed, there will be a permanent staff of O&M personnel responsible for upkeep of the wind project. Approximately 6-10 persons would be on site on a daily basis and there would be periodic traffic on the roads associated with O&M activity. During the first 3-6 months of wind plant operation, maintenance activity would likely be higher than normal while the wind turbines are commissioned and the project becomes fully operational.

## 3.0 SPECIES DESCRIPTION AND HABITAT REQUIREMENTS

### 3.1 Bald Eagle

In 1978, the USFWS listed bald eagle throughout the lower 48 States as endangered except in Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it was listed as threatened (USFWS 1978). In 1995, bald eagle was reclassified from endangered to threatened in all of the lower 48 states (USFWS 1995). In July 1999, the USFWS proposed de-listing bald eagle (USFWS 1999), however to date, bald eagle has not been removed from the list of threatened species. The species has been doubling its breeding population every 6-7 years in the lower 48 states since the late 1970's (USFWS 1995). In 1963, a National Audubon Society survey reported only 417 active nests in the lower 48 states, with an average of 0.59 young produced per active nest. In 1994, about 4,450 occupied breeding areas were reported with an estimated average young per occupied territory (for 4,110 territories) of 1.17 (USFWS 1995).

#### 3.1.1 Life History and Characteristics

The nesting chronology of bald eagles is variable based on latitude and altitude. Along the Pit River in California, courtship begins in January and eggs are laid in March and young fledge by July. In higher altitude areas the breeding cycle can be delayed and young eagles may not fledge until August (Jackman and Jenkins 2004). Nest production is usually between 1-3 young per year. Little is known of post-fledging behavior, however bald eagles do not reach sexual maturity until 4-5 years and may live up to 20-30 years (Buehler 2000).

Bald eagles in California are found primarily near large reservoirs and open water. During migration and at wintering sites, eagles that concentrate on locally abundant food tend to roost communally. Roost sites form important habitat for wintering birds (Buehler 2000) with some roosts used regularly by large numbers of eagles. Bald eagle migration varies by populations and may extend over several months (Buehler 2000). In the Pacific Northwest, bald eagle migrations coincide with salmon migrations and both immature and adult bald eagles will migrate north in the late summer to take advantage of fall run salmon as far north as southern Alaska. These birds and more northern birds will then move back south over the fall, arriving on the wintering grounds in November and December (Hodges *et al.* 1987, Hansen *et al.* 1986). Open water and food availability dictate areas of use throughout the winter months. Upland areas may receive considerable use when carrion is available. Important prey includes waterfowl, salmonids, carrion, and small mammals. During the breeding season along the Pit River, fish comprised 88% of bald eagle diets, with the dominant prey fish species being Sacramento sucker (*Catostomus occidentalis*) (Hunt *et al.* 1992b).

#### 3.1.2 Habitat Requirements

Generally, bald eagles require areas in the proximity of water for nesting, and areas with abundant readily available food sources and good roost sites during winter (Harmata 1989, Buehler 2000). Bald eagles nest in stands of mature or over-mature timber with old growth characteristics near (generally within one mile) significant water bodies with adequate food supplies. Most nests trees are located in timber stands three acres or larger with canopy closure of less than 80 percent and on flat to moderately sloping terrain with northern aspects. In California, nest trees most often selected are live ponderosa pine or sugar pine (Jackman and Jenkins 2004). Cottonwoods and cliffs have also been utilized as nesting substrate. Most nests are in mature or over-mature dominant or co-dominant trees with open crowns and sturdy horizontal limbs in line of sight to a lake or reservoir greater than 80 acres in size, or fourth order or larger stream (Buehler 2000).

Wintering bald eagles tend to congregate near bodies of water where they feed on fish, carrion, and waterfowl (Buehler 2000). Major river drainages and large lakes constitute the majority of winter habitat



use. Roosts consist of old large trees or snags where visibility is good and which have sturdy lateral limbs near the crown to provide easy entry and exit (USFS 1977, Green 1985). Communal roosts are usually located in stands of mature old-growth conifer or cottonwoods, and roosts may be several miles from feeding sites.

Important bald eagle habitat includes major water bodies, salmonid spawning streams, ungulate winter ranges, spring green-up areas, and wetlands where open water occurs. Bald eagles have varying tolerances to human disturbance. Disturbance near winter roosts or at the nest site during egg-laying and incubation may result in abandonment of the roost or nest. However, some eagles develop considerable tolerance to human activity and several have been known to nest in the Seattle city limits (Smith *et al.* 1997).

### 3.1.3 Range and Distribution

Historically, bald eagles occurred over most of North America in a variety of habitats. In California, bald eagles are found throughout much of the state where suitable habitat is present, but are more numerous in northern California. Rivers and lakes within Shasta County provide suitable habitat for nesting and wintering bald eagles.

## 3.2 Northern Spotted Owl

The northern spotted owl is currently listed as threatened under the ESA. The northern spotted owl was originally listed under the ESA on June 26, 1990, and critical habitat for the species was designated on January 15, 1992. A five year status review of the species conducted in 2004 recommended the northern spotted owl remain listed as threatened under the ESA. The primary reason for decline of northern spotted owls is habitat loss, degradation and fragmentation due primarily to old growth timber harvest (USFWS 1990). Increases in distribution of competitors, such as the barred owl, have also been implicated as contributing to population declines (Courtney *et al.* 2004).

### 3.2.1 Life History and Characteristics

The northern spotted owl is a member of the genus *Strix*. Two members of this genus occur in North America: spotted owl and barred owl. Hybridization between the two species has been known to occur and potentially results in an additional threat to the species as barred owls invade northern spotted owl range (Sibley 2000, Courtney *et al.* 2004).

The northern spotted owl is a relatively long lived species that generally do not breed every year, and produce from 0.33 – 0.93 young per pair, depending on the amount of suitable habitat present. The number of young produced per pair increases with the age of the nesting female presumably due to increased breeding experience in older individuals. The percentage of females successfully rearing young ranged from 35 – 47 % in northern California. Juvenile survival rates are generally low, while adult survival rates are generally high. In Oregon, a number of banded birds have survived 16-17 years (Courtney *et al.* 2004).

The northern spotted owl is monogamous and pairs defend territories against other pairs of spotted owls, as well as other raptor species. Northern spotted owls are residents and generally occupy their territories year round (Gutiérrez *et al.* 1995). Northern spotted owls do not construct their own nests, rather they utilize naturally occurring platforms, nests of other raptors, and cavities. Males begin to select nest sites and begin courtship from February – April. Eggs are typically laid in late March and April, and eggs are incubated by females approximately 30 days. The female primary role is to incubate eggs and defend the nest, while the male role is generally limited to providing food for the female and himself. Young are

mostly fed by the female and occasionally the male. Young leave the nest between 24-36 days after hatching (Gutiérrez *et al.* 1995).

Northern spotted owls are nocturnal predators and prey selected varies by geographic location and habitats. Northern flying squirrels are the dominant prey in the northern portion of their range, while dusky-footed wood rats are the primary prey in the southern range, including northern California. Northern spotted owls also capture a variety of other small mammals, and occasionally birds, amphibians and insects (Gutiérrez *et al.* 1995).

### **3.2.2 Habitat Requirements**

Northern spotted owls are thought to require old-growth forests and dense canopies to avoid heat stress. Spotted owl habitat consists of four components: nesting, roosting, foraging, and dispersal (AFWO 2001). Northern spotted owls generally require extensive tracts of coniferous forest, usually Douglas fir or spruce/cedar/hemlock for nesting and for juvenile dispersal. They nest almost exclusively in mature or old-growth coniferous forest tracts greater than 1,200 acres in size with dense canopy cover (Gutiérrez *et al.* 1995). Nesting and roosting habitat consists of dense mature coniferous forest with multiple canopy layers and an abundance of large trees. Spotted owls generally select mature forests in greater proportions than their availability for foraging, but they will also utilize younger and fragmented forests for foraging depending on the characteristics of their home range (AFWO 2001, Courtney *et al.* 2004). The use of younger stands for foraging may be related to prey densities in some areas. Dispersal habitat consists of varied forest stands with generally more mature and old growth tree, based on their availability (Courtney *et al.* 2004).

### **3.2.3 Range and Distribution**

Northern spotted owls historically occurred throughout the Pacific Northwest from northern California north into southern British Columbia (USFWS 1990). The northern spotted owl still occupies much of the extent of the former range, however, breeding densities have been reduced. Northern spotted owl is one of three sub-species of spotted owl (*Strix occidentalis*) that occur in North America. The California spotted owl (*Strix occidentalis occidentalis*) occurs from the southern edge of the northern subspecies range in northern California south in to central California. The Mexican spotted owl (*Strix occidentalis lucida*) occurs in southern Colorado and Utah, south in to Texas, Arizona, New Mexico and Mexico (Gutiérrez *et al.* 1995).

## **4.0 ENVIRONMENTAL BASELINE**

### **4.1 Area of Effect**

For the effects assessment, the area of affect from the project was assumed to be the construction zone or development corridors for the turbine strings, all associated construction permit areas, construction staging areas, plant sites, and any areas requiring reclamation post construction (e.g., disturbed areas) and a buffer zone of approximately ½ mile (approximately 800 m) around these areas. The potentials area of affect for the species was assumed to be the area extending out to at least 2 miles from the project area. That is, individuals that occupied the area within the 2-mile buffer could potentially be affected by the project.

### **4.2 Project Area**

Hatchet Mountain is situated along the southern edge of the Cascade Range, in Shasta County, California. It is located approximately 40 miles northeast of Redding and 5 miles west of Burney, California. The Hatchet Ridge project site includes a long, broad ridge that comprises a portion of Hatchet Mountain,

extending north from State Highway 299. The site boundary extends approximately 6 miles along the ridge, and ranges between one-half mile and one mile wide. The project site occurs entirely on private land owned by Sierra Pacific Industries and the Fruit Growers Supply Company. The site has been managed as a tree plantation. In August 1992, the project site was burned in the Fountain Fire. It was subsequently replanted with predominantly white fir and ponderosa pine. Tree height in the project area generally ranges from 6-20 feet.

Elevations on site range from 5,470 feet, in the northwestern portion of the site near a radio tower facility, to approximately 4,300 feet, in the southern portion of the site near Hatchet Mountain Pass along State Highway 299. The regional climate is sub-humid, featuring warm dry summers and cold moist winters. Average annual precipitation in the area is 50 inches and average annual temperature is 42°F. Sierran mixed conifer is the dominant vegetation community in the area. Structure and composition of this habitat type vary greatly with slope, aspect, elevation, and disturbance (including timber management). Dominant overstory species typically include a combination of white fir, incense cedar, sugar pine, ponderosa pine, Douglas-fir, and black oak. Topography on site ranges from relatively flat, on top of the broad ridge, to steep (30-50%), along the side slopes. The majority of the project site is underlain with soils of the obie-mounthat complex. These gravelly, sandy loam soils are formed in material weathered from andesite and ash. They are moderately-deep to deep, well drained soils.

### **4.3 Species Data and Occurrence**

#### **4.3.1 California**

##### *Bald Eagle*

Bald eagles occur in California year round. Breeding bald eagles are most abundant in northern California, but also occur along major river drainages or reservoirs in the southern portions of the state. The bald eagle population in California has been increasing since the early 1980's. Between 1977 and 1999, the number of known breeding pairs in California increased from 27 to 150 (CDFG 2001).

In winter, California experiences a significant influx of bald eagles from Canada and the northern United States. Satellite telemetry studies of birds wintering in Central California have documented birds migrating to northern Canada to breed (Linthicum et al. 2006). Juvenile and adult bald eagles from California have been documented to migrate to salmon spawning runs in British Columbia and Alaska in the fall post breeding season (Hunt et al. 1992a).

##### *Northern Spotted Owl*

Spotted owls (northern and California subspecies) are resident (non-migratory) throughout much of California. Generally speaking the Pit River is considered the boundary between the two subspecies. The bulk of the population of northern spotted owl occurs in northern California along the coastal ranges and the more interior Sierra Nevada. The California spotted owl occurs though the Sierra Nevada south of the Pit River (Gutiérrez et al. 1995).

#### **4.3.2 Pit River Drainage**

##### *Bald Eagle*

The Pit River drainage and associated reservoirs are considered one of the most important bald eagle breeding areas in the state of California (Pit River Bald Eagle Management Plan 1986). Pacific Gas and Electric (PGE) has conducted studies of bald eagles along the Pit River over the last 10 years as part of a compliance strategy under the ESA for potential impacts. Between 1994 and 2004, the number of wintering eagles documented along the Pit River has ranged from 27 to 61 with generally a wintering population of near 50. During 2004, 10 of 11 territories were occupied along the Pit River, and 10 of 17



territories were occupied in adjacent areas (PGE 2005). The Pit River Management Plan delineated areas of essential bald eagle habitat along the Pit River and associated reservoirs. The proposed Hatchet Ridge wind project is located within the same watershed as the Pit River, and is approximately two miles south of the Pit River at the closest location. The project is located outside of areas delineated as essential bald eagle habitat in the Pit River Management plan.

#### *Northern Spotted Owl*

For regulatory purposes, the USFWS considered the Pit River in Shasta County as the dividing line between the northern and California spotted owl, with areas south of the river being regulated as the California spotted owl (Federal Register 55:26114). However, there is a mixing of subpopulations along this divide (Courtney et al. 2004), and critical habitat for the northern spotted owl has been designated south of the Pit River in Shasta County to approximately ½ mile north of the proposed project area (Figure 5). Foraging and nesting habitat have been mapped within ½ mile of the northern border of the project area within the critical habitat designation (Figure 4 and 5). A probability of use map that includes a portion of the project area indicates a very low probability of use for the northern portion of the project (Figure 6).

### **4.3.3 Project Area**

#### *Bald Eagle*

Eleven observations of bald eagles consisting of 12 total individuals were recorded during avian use surveys in the project area. All observations were of flying birds. Seven of the 11 observations were recorded as flying within the height of turbine blades. All observations were between the months of November and April (winter period) with three observations during November, four in December, two in January, one in March and one in April. Six of the observations were of adult birds, three were of sub-adult birds, and age was unknown for two birds. Birds were observed flying along and crossing Hatchet Ridge.

Three bald eagles were observed incidentally or while the observer was in-transit between standard surveys on site. All three birds were observed flying, with two of them flying within the height of turbine blades. All three observations were of adults seen in the winter (December, January and February). Two of the birds observed were conducting courtship displays.

One active bald eagle nest and one alternate nest site were documented during surveys in 2006. The active nest site had one incubating bird on March 21, 2006, however, the nest was empty on April 21, 2006. It is assumed that the nest attempt failed. The active nest site was located approximately 1.75 miles east of the project area adjacent to Lake Margaret. The alternate bald eagle nest was also adjacent to Lake Margaret and approximately one mile from the proposed project area (Figure 7).

#### *Northern Spotted Owl*

No observations of northern spotted owls were recorded during the standardized point counts or incidentally during the baseline study. However, northern spotted owls are nocturnal and would not be expected during diurnal surveys. No nests of northern spotted owls were found during the aerial survey, however, the methods utilized were not designed for detecting spotted owls.

## **5.0 EFFECTS OF THE ACTION**

Potential effects associated with major construction projects on threatened and endangered species (and wildlife in general) include both direct and indirect effects. Direct effects are results of the proposed action and would include effects such as loss of habitat and mortality of individuals. Indirect effects are

those caused by the proposed action that are reasonably certain to occur and may include effects such as disturbance and/or displacement of individuals, and change in habitat suitability or habitat degradation. Effects may be temporary (short-term), for example the life of the construction, or long-term, such as effects arising from long-term operation and maintenance of the facility (Table 3). Also, effects may be cumulative, arising from the total impact of development, management, and use of the surrounding land.

**Table 2. Potential impacts to threatened and endangered species from the project.**

Impact Duration	Impact Type	
	Direct	Indirect
Short-Term (e.g., during construction)	Loss of habitat from construction permit areas that will be reclaimed.	Prohibiting or altering (displacement) movement through an area due to construction activity.
	Potential mortality from construction or related activity.	Altering or disturbing species behavior patterns due to construction activity.
Long-Term	Permanent loss of habitat to wind plant.	Prohibiting or altering (displacement) movement through an area due to the wind plant.
	Potential mortality due to wind plant operation.	Altering or disturbing species behavior patterns due to wind plant operation.

## 5.1 Effects to Bald Eagles

### 5.1.1 Direct Effects

Direct effects to bald eagles from the project may include loss of habitat (temporary and long-term) and potential mortality (temporary due to construction or long-term due to operation of wind plant).

#### *Loss of Habitat*

The proposed project area is composed primarily of second growth forests that have been utilized as tree plantations, and have experienced fires in the last 15 years. The project site is dominated by conifers ranging from 6-20 feet in height. A few smaller patches of mature mixed conifer forest are present scattered in the project area that could potentially provide suitable nesting or roosting substrates for bald eagles. However, no nest or roost sites were observed during surveys in these portions of the project area and they do not occur near large bodies of water which is typical of bald eagle nest sites. Suitable nesting habitat is present near Lake Margaret, where two nests are present. The closest nest is located approximately one mile from the project area but is considered an alternate nest to the primary nest for the Lake Margaret territory. The project construction will not affect either of the known nests and it is unlikely that the project construction would cause disturbance related effects resulting in a temporary loss of habitat due to the distance of the nests from the site. No direct or indirect impacts are expected from the project on bald eagle habitat.

#### *Potential Mortality*

The possibility of short-term (i.e., due to construction activity) mortality effects from the project is considered negligible and very unlikely to occur. Bald eagles in the area during the construction period are unlikely to occur within the construction zones due to disturbances, and therefore are unlikely to be at risk of construction related mortality.

Once the wind plant is constructed and operational, bald eagles in the area may be at risk of collision with turbines or meteorological towers. Avian (including raptors) casualties due to collision with wind turbines and meteorological towers have been documented at most wind power projects (see Erickson *et al.* 2001). Raptor mortality has been documented at many wind plants, although raptor mortality at the newer generation wind plants is estimated at 3-7 times less than the wind plant at Altamont Pass in California, which has many older generation wind turbines (Young *et al.* 2002). Golden eagles also appear to be more susceptible to collision mortality than many other raptors (Erickson *et al.* 2001). Despite the apparent susceptibility of golden eagles and some raptors to some wind turbines, there have been no documented bald eagle fatalities to date at wind plants (Erickson *et al.* 2001, WEST Unpublished Data). However, most wind power projects where post-construction mortality monitoring studies have been conducted have relatively low levels of bald eagle use.

Estimates of bird mortality from wind projects may be based on bird use of a site and the propensity for that species to fly within the rotor swept area or zone of risk. Seven of the 11 bald eagle observations within the project area observed during the avian point counts were within the zone of risk, thus some potential exists for bald eagles to collide with turbines. However, overall use of the site by bald eagles was low relative to other raptors species. The use of the project throughout the year by bald eagles was estimated to be 0.039 birds per 20 minute survey. The overall raptor use was 1.028 per 20 minute survey, thus bald eagles comprised approximately 4 % of the raptor use at the project site.

Assuming use is related to mortality, it can be surmised that 4% of the raptor mortality associated with the project would be comprised of bald eagles. Based on monitoring studies from other wind projects it could be expected that between 0 and 0.1 raptor fatality per MW of capacity would occur. Under this assumption and provided a 100MW project is constructed between 0 and 10 raptor fatalities could occur

per year. If 4% of these fatalities were bald eagles then 0.4 bald eagle fatalities would occur each year or approximately one bald eagle ever 2-3 years. Under these assumptions, this level of impact would be considered insignificant because it is unlikely to occur and would essentially be immeasurable.

### **5.1.2 Indirect Effects**

Indirect effects from the project may include disturbance and displacement related effects from construction (short-term) as well as operation (long-term) of the wind plant.

#### *Disturbance*

Construction of the project will create short-term (life of construction) disturbances that could affect bald eagles in the area. In addition, operation of the wind plant (actual turning turbines) may create disturbances which also affect eagles in the area. Bald eagles have been shown to be susceptible to human disturbance or development while nesting, roosting, perching and foraging. Bald eagles have also been shown to avoid areas near human development (Buehler 2000). The proposed project area generally lacks suitable nesting, perching, roosting or foraging habitat, however, bald eagles fly over the project area while traveling within home ranges, migrating, or possibly traveling to foraging areas. No researchers have examined the effects of human disturbance on flying bald eagles. However, birds moving through their home range are expected to be less susceptible to disturbance than nesting, roosting or foraging birds. The nearest known nest site is located one mile from the proposed project area, and no communal winter roost sites are known to occur in or near the project area. Fraser et al. (1985) found that the average flushing distance for nesting bald eagles to humans on foot was 500 m. Many agencies typically recommend no disturbance buffers of between ½ and one mile around nest sites to avoid disturbances to nesting birds. The proposed project is located one mile from the nearest known nest site, and no disturbance impacts should occur to bald eagles at nest sites.

#### *Displacement and Altered Movement Patterns*

If bald eagles flying through their home range are disturbed by construction activities or the presence of wind turbines, then the potential exists for some displacement or altered movement patterns to occur. However, no important habitat features such as foraging habitat, roosting areas or nesting area are present within the project area. The nearest important habitat feature is Lake Margaret and the associated nest sites approximately one mile east of the project area. The project is located outside of the buffer zone typically recommended by state and federal wildlife agencies for bald eagle nests, and bald eagles are not expected to be displaced from the nest site due to construction activities or the presence of wind turbines.

### **5.1.3 Cumulative Effects**

Cumulative effects under the ESA are effects of future non-federal actions/activities that are reasonably certain to occur in the foreseeable future. These types of actions include:

- population growth,
- new housing developments and subdivisions,
- increased infrastructure to accommodate population growth,
- increased utilities/pipelines due to increased development,
- increased gravel/materials mining to accommodate development and roads,
- increased energy development including other wind projects,
- logging of federal and private forests,
- future agriculture practices on private land including livestock grazing.

The proposed project is not expected to contribute to population growth and associated development activities such as new housing, but is designed to accommodate energy demands precipitated by regional

growth. In addition, due to the windy nature of the area, future wind energy development may occur in Shasta County. Further development may contribute cumulative effects to bald eagles by creating more disturbances, reducing foraging and secluded sheltering opportunities, altering land management regimes, and creating more collision hazards.

Other cumulative effects associated with increased development, such as increased infrastructure, increased human presence and disturbance, and reductions in the historic land uses, may also effect bald eagles simply by using more space that could be utilized by bald eagles and creating more disturbances. Bald eagles are large avian predators capable of wide ranging movements. While some bald eagles can and do become accustomed to human activity, they are also generally sensitive to human encroachment. Future non-federal activities listed above would be expected to affect bald eagles, especially as they allow more human use of areas occupied by eagles. Additional use of open and secluded spaces by humans would be expected to cause some habitat degradation or limit use by bald eagles as they avoid humans. Also, more human activity in the area will lead to more disturbance, displacement, and contribute to other environmental impacts, for example, water quality degradation. The impacts would depend, in part, on where human activities occur, particularly in relation to rivers and lakes.

The magnitude of cumulative effects on bald eagles is difficult to measure. While cumulative effects to bald eagles are likely occurring from increased development and human population growth of the area, the project itself is not expected to substantially contribute to the cumulative effects because of the temporary nature of the construction project and the relatively low numbers of bald eagle fatalities potentially arising from the project. Operation of the wind plant could lead to displacement of bald eagle moving through the area, but no important habitat elements, such as nesting, roosting, or foraging habitat, are present within the project area. The nearest habitat area is Lake Marguerite and adjacent stands of mature trees located approximately one mile from the project. Operation of the wind plant may lead to a small level of bald eagle mortality if any eagles collide with turbines; however, this low level of mortality is unlikely to have a measurable effect on the growing bald eagle population in California. In addition, the presence of the wind project itself may preclude some additional development such as houses and subdivisions and associated disturbance impacts.

#### **5.1.4 Conservation Measures**

The following measures incorporated into the Project construction stipulations could minimize potential short-term (construction) effects on bald eagles from the Project:

- maintain best management practices within the construction zones to minimize adjacent habitat disturbance;
- establish and enforce reasonable driving speed in the Project to minimize wildlife or livestock roadkills that could attract a foraging eagle;
- adhere to the NPDES permit stipulations, including erosion control measures to minimize off-site impacts to water quality;
- reclaim disturbed areas as soon as practical following construction to minimize potential off-site impacts to water quality;
- establish and adhere to a fire prevention plan for the construction zone to minimize potential off-site impacts to nearby habitat (e.g., nesting habitat around Lake Margaret).

The following measures incorporated into the Project management could minimize potential long-term (operational) effects from the Project:

- establish and enforce reasonable driving speed limits within the wind plant to minimize the potential for road killed wildlife or livestock which may attract foraging bald eagles;
- remove and disposed of all carcasses of livestock, big game, and other wildlife from within the wind plant that may attract foraging bald eagles;

- install bird flight diverters on all guy wires associated with met towers;
- install raptor perch guards on all power poles constructed for the wind plant.

## 5.2 Effects to Northern Spotted Owls

For regulatory purposes, the USFWS considers the Pit River in Shasta County as the dividing line between California and Northern spotted owl populations. Populations south of the Pit River are considered the California Spotted Owl. The proposed project is located approximately 2.5 miles south of the Pit River. However, in reality, the proposed project is located within a genetic “mixing” zone of the two subspecies. It is likely that the following potential impacts to spotted owls, a resident non-migratory species would occur on California spotted owls or hybrids between the two subspecies based on the USFWS designation; however, for the purposes of the impacts descriptions it is assumed that the impacts could occur on northern spotted owls.

### 5.2.1 Direct Effects

Direct effects to northern spotted owls from the project may include loss of habitat (temporary and long-term) and potential mortality (temporary due to construction or long-term due to operation of wind plant).

#### *Loss of Habitat*

The majority of the proposed project area is dominated by sapling forests that have been utilized as tree plantations, and have experienced fires in the last 15 years. Tree height in most of the project area ranges from 6-20 feet. A few small patches of mature mixed-conifer habitats are present within the project area. The only area where these habitats will be directly impacted is the northern end of the project, where one turbine occurs within mature forest. Trees in this location are larger and could potentially support northern spotted owls. Currently only one turbine is planned for the border of this area and it is likely that less than 1 acre will need to be cleared for turbine construction. It is not known if northern spotted owls nest within the area where trees will be cleared. Areas mapped as suitable nesting habitat are present approximately ½ mile north of the project boundary in the Lassen National Forest within the area mapped as critical habitat. The presence of mixed-conifer forest also provided potentially suitable foraging and roosting habitat for spotted owls. Based on a map of probability of use, a very low potential exists for northern spotted owls to utilize this area (Figure 6) and it is not expected that loss of 1 acre would adversely affect northern spotted owls.

Spotted owls are not expected to utilize the majority of the project area that is dominated by sapling conifers. This area lacks canopy cover and structure that spotted owls generally use while foraging. No loss of habitat impacts associated with the remainder of the project will occur on northern spotted owl.

#### *Potential Mortality*

The possibility of short-term (i.e., due to construction activity) mortality effects from the project is considered negligible and very unlikely to occur. Spotted owls are unlikely to occur within the construction zones due to disturbances and a lack of habitat, and therefore are unlikely to be at risk of construction related mortality. The one exception is the area of mixed-conifer forests that will be removed for the northern most turbine location. It is not known if spotted owls nest at this location but it is highly unlikely based on the probability of use (see Figure 6). If a nest is present, and trees are removed during the breeding season, construction activities could result in the mortality of eggs or flightless young. However, the project is located south of the Pit River, and these populations are considered California spotted owls by the USFWS so there would be no potential mortality to northern spotted owl.



Avian species, including some raptor species, are documented casualties due to collision with wind turbines and meteorological towers (see Erickson *et al.* 2001). Those species that have been most at risk of turbine collisions are often observed flying within the same height as the turbine blades. Once the wind plant is constructed and operational, spotted owls are considered to have a very low risk of collision with turbines or meteorological towers. Northern spotted owls on territories conduct almost all of their flights below the canopy of forests, which would likely be below the lowest height of a turbine blade. Northern spotted owls may fly within the height of turbine blades during dispersal events, however, no one has documented if northern spotted owls fly above or below the canopy while dispersing (Gutiérrez *et al.* 1995). The offspring of adults have never been documented to settle within their parent's home range, thus most northern spotted young conduct dispersal events. It is impossible to measure the extent of risk the proposed project poses to dispersing individuals, due to the lack of knowledge of flight characteristics of dispersing juveniles. In general, it is expected that dispersing spotted owls would fly within the canopy or suitable forested habitat and not be at risk of collision. In addition, few forest owls have been recorded fatalities at wind projects (see Erickson *et al.* 2001), presumably because their behavior puts them at low risk of collision. No mortality impacts to northern spotted owls are expected from the proposed wind project.

### **5.2.2 Indirect Effects**

Indirect effects from the project may include disturbance and displacement related effects from construction (short-term) as well as operation (long-term) of the wind plant.

#### *Disturbance*

Construction of the project will create short-term (life of construction) disturbances that could affect spotted owls in the area. In addition, operation of the wind plant (actual turning turbines) may create disturbances which could also affect spotted owls in the area. The proposed project contains only a small amount of potentially suitable habitat for spotted owls, and the area has a low potential for use. Due to the lack of habitat and low potential for use, the overall potential for disturbance is considered very low and would essentially be immeasurable and insignificant.

#### *Displacement and Altered Movement Patterns*

Spotted owls are not expected to occur in the majority of the project area due to a lack of habitat. However, some potential exists for dispersing spotted owls to fly through the project area. Little is known about the routes used by spotted owls during dispersal events. If spotted owls avoid crossing Hatchet Ridge due to the presence of turbines, then the potential exists for the project to displace or alter the movements of dispersing spotted owls. However, because of the lack of habitat on the site, dispersing spotted owls are not expected to cross the ridge and thus would not be affected by the project.

### **5.2.3 Cumulative Effects**

Cumulative effects under the ESA are effects of future non-federal actions/activities that are reasonably certain to occur in the foreseeable future, such as those listed for bald eagles above. The proposed project is not expected to contribute to population growth and associated development activities such as new housing, but is designed to accommodate future power needs associated with population growth and development. The primary cumulative effect to spotted owls is associated with logging activity of old growth forests. Under ESA guidance, logging of private or state lands would be considered cumulative effects. Since the project is not likely to contribute to substantial removal of suitable spotted owl habitat, it is not expected to contribute to cumulative effects on spotted owls. Additionally, the project is not expected to result in mortality effects on spotted owls and thus would not contribute to cumulative populations declines.

## 5.2.4 Conservation Measures

Due to the limited possibility of the project affecting northern spotted owl, potential conservation measures that could be into the project design to minimize potential short-term (construction) or long-term effects would be minimization of mature forest patch clearing in the northern part of the project to accommodate project facilities. Additional measures that would minimize potential adverse impacts would include installing bird flight diverters on all guy wires associated with met towers and raptor perch guards on all power poles constructed for the wind plant to minimize potential electrocution hazards.

## 6.0 DETERMINATION

### 6.1 Adverse Effects

Under the ESA, effects are classified as those “not likely to adversely affect” or those “likely to adversely affect” a listed species. Not likely to adversely affect is the appropriate conclusion when effects are expected to be discountable, insignificant, or beneficial. Discountable effects are those which are extremely unlikely to occur and are essentially not expected to occur. Insignificant effects refer to the size and/or magnitude of the effect, and are those effects which should never reach a scale where take occurs. Insignificant effects are effects which can not be detected, measured, or evaluated to any meaningful degree. Beneficial effects are positive effects to a species which occur without any associated adverse effects.

The ESA (Section 3) defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct”. The USFWS further defines harm as “significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering”. The USFWS defines harass as “actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering”.

#### *Disturbance and Displacement*

The project may conceivably result in short-term and long-term disturbance and/or displacement effects to bald eagles flying along Hatchet Ridge from construction and operation of the wind plant. However, based on the on-site surveys and available information about bald eagle use of the area, the seasonal and spatial use of the site by bald eagles is relatively low. The project site lacks nesting, foraging or roosting habitat for bald eagles. The potential for disturbance and displacement to occur which result in adverse effects is considered discountable (i.e., extremely unlikely to occur and essentially not expected to occur) and insignificant (i.e., will not reach a scale where take occurs). That is, the project is not expected disturb or displace bald eagles to the point where harm or harassment (as defined above by the USFWS for listed species) occurs.

The project is located south of the Pit River, and for regulatory purposes, the USFWS considers owls in this area to be of the California spotted owl subpopulation. The project is not likely to result in short-term and long-term disturbance and/or displacement effects to northern spotted owls from construction and operation of the wind plant. The vast majority of the project site lacks suitable habitat for the species. One turbine is located within potentially suitable habitat. Based on the map showing probability of use by northern spotted owls, the potential for displacement in the project area is considered very low. The potential for disturbance and displacement to occur which result in adverse effects is considered discountable (i.e., extremely unlikely to occur and essentially not expected to occur) and insignificant (i.e., will not reach a scale where take occurs). That is, the project is not expected disturb or displace northern spotted owls to the point where harm or harassment (as defined above by the USFWS for listed



species) occurs.

### *Potential Mortality*

Construction of the wind plant is unlikely to result in the death of a bald eagle; however, operation of the wind plant may put bald eagles in the area at risk of collision with turbines or met towers. The death of a bald eagle from the wind plant would be considered take and therefore an adverse effect. To date there have been no reported (known) bald eagle fatalities associated with wind plants in the U.S. (see Erickson *et al.* 2001, WEST unpublished data), however, the potential still exists for a bald eagle fatality to occur at a wind project. While use of the project site by bald eagles does occur, it is relatively low. Bald eagle use of the site appears to be primarily related to eagles traveling within home ranges or moving across the site during migration. Based on monitoring studies at other wind project and the bald eagle use estimates from the baseline studies it may be expected that a bald eagle fatality could occur every 2-3 year period. This level of mortality is considered essentially immeasurable and therefore insignificant. Site management measures for the Project are intended to minimize foraging opportunities for bald eagles within the wind plant and further minimize the potential for creating collision risks. Livestock and wildlife carcasses found will be removed and disposed of to minimize attracting bald eagles to the site and thus minimize the risk of collision related fatalities. Because the potential for adverse effects is considered insignificant, operation of the wind plant is not likely to adversely affect bald eagles.

Construction and operation of the wind project is unlikely to result in the death of a northern spotted owl. Northern spotted owls are not expected to occur in the project area based on habitat and range and thus potential impacts would be considered discountable (i.e., extremely unlikely to occur and essentially not expected to occur) and insignificant (i.e., will not reach a scale where take occurs). Operation of the project is not likely to adversely affect northern spotted owls.

## **6.2 Future Status of Species**

The status of bald eagle in the project area and range wide is not expected to change due to the project. Bald eagle is well on the way to recovery and the USFWS has proposed the species for delisting (USFWS 1999). The bald eagle populations in California and throughout North America will continue to increase during and after the project is constructed.

Due to the lack of suitable habitat and potential for adverse effects, the proposed project will not affect the future status of the northern spotted owl.

## **7.0 REFERENCES**

### **7.1 Literature Cited**

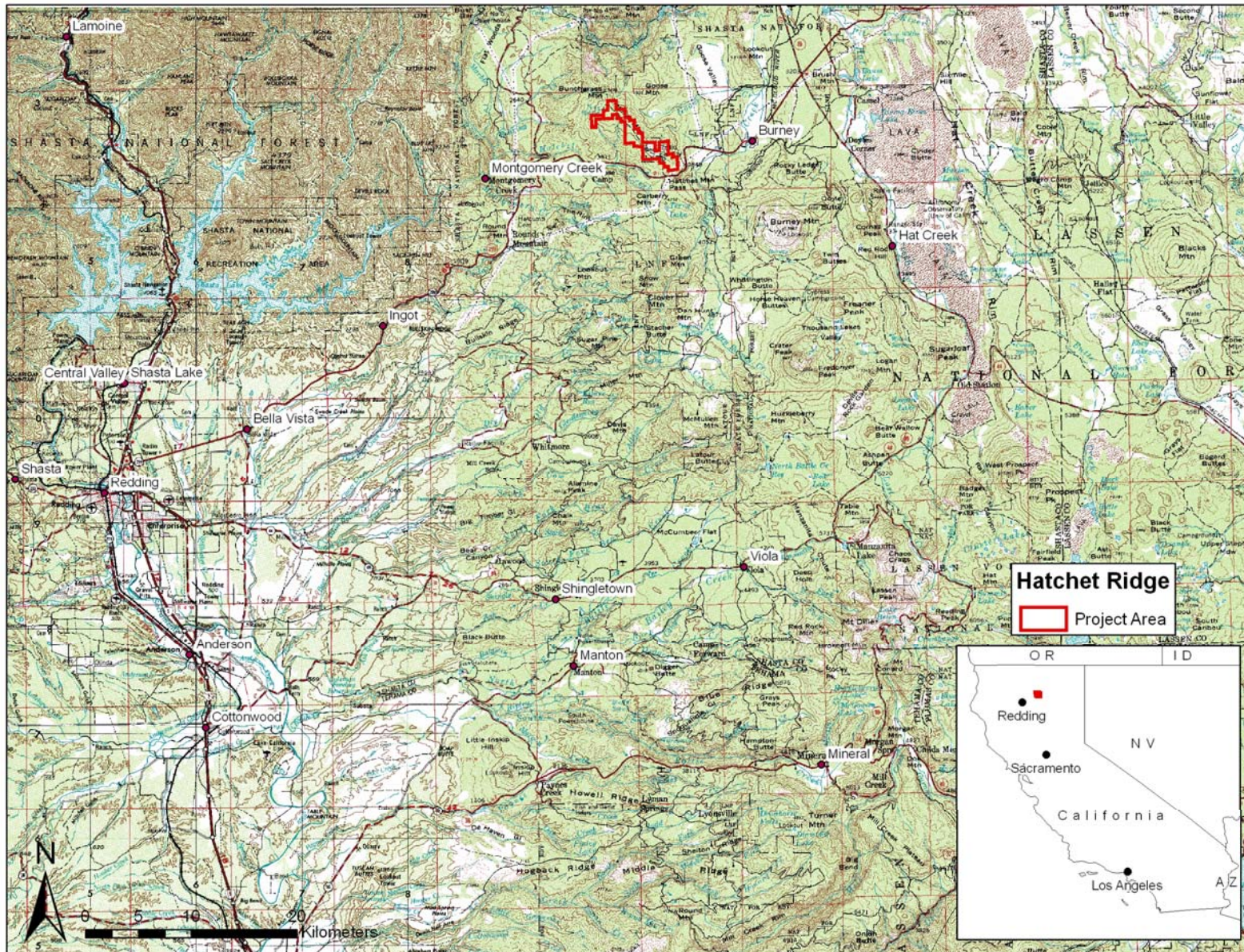
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Figure 1. Proposed Hatchet Ridge Wind project location.





**Figure 2. Vegetation types within two miles of the project area.**

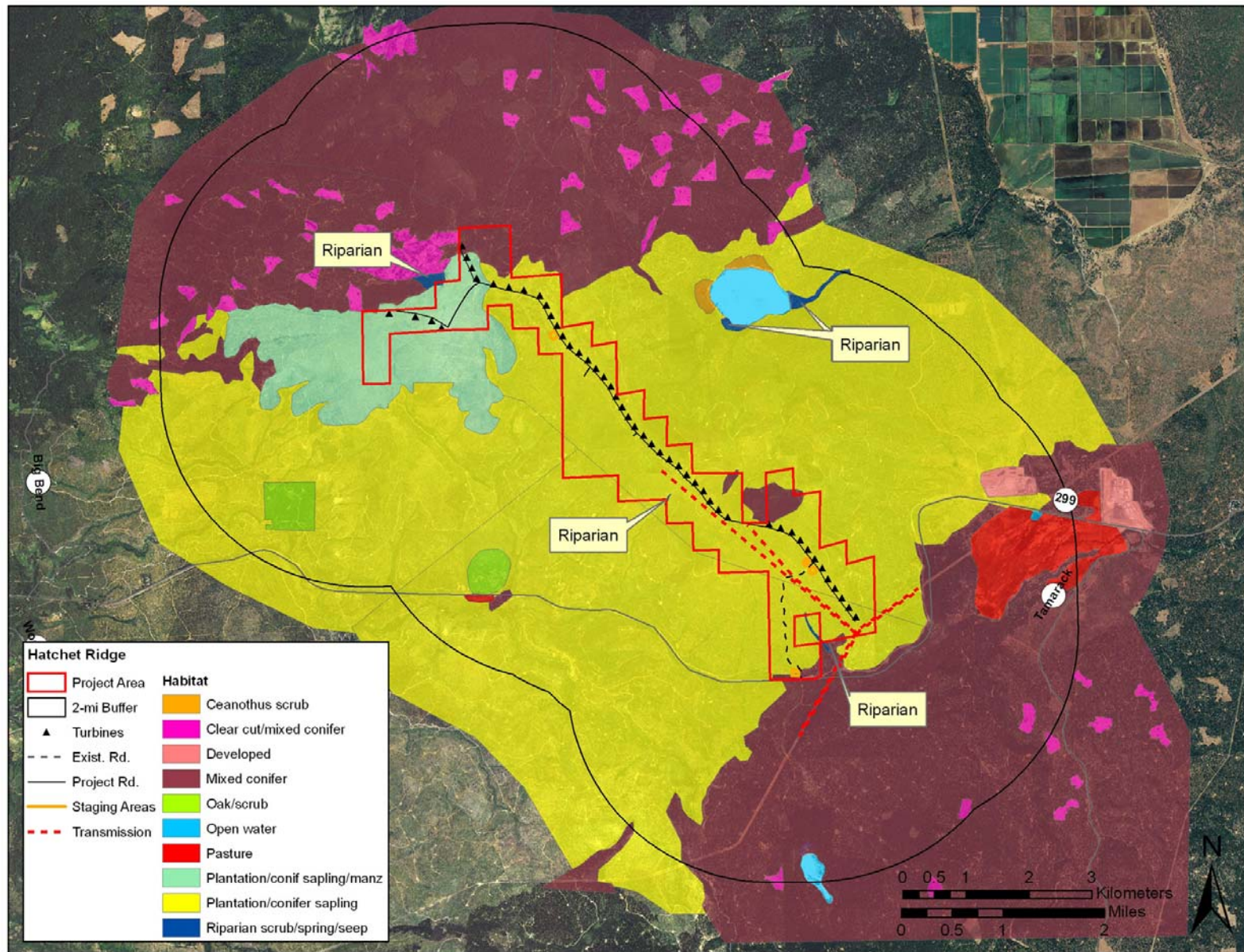
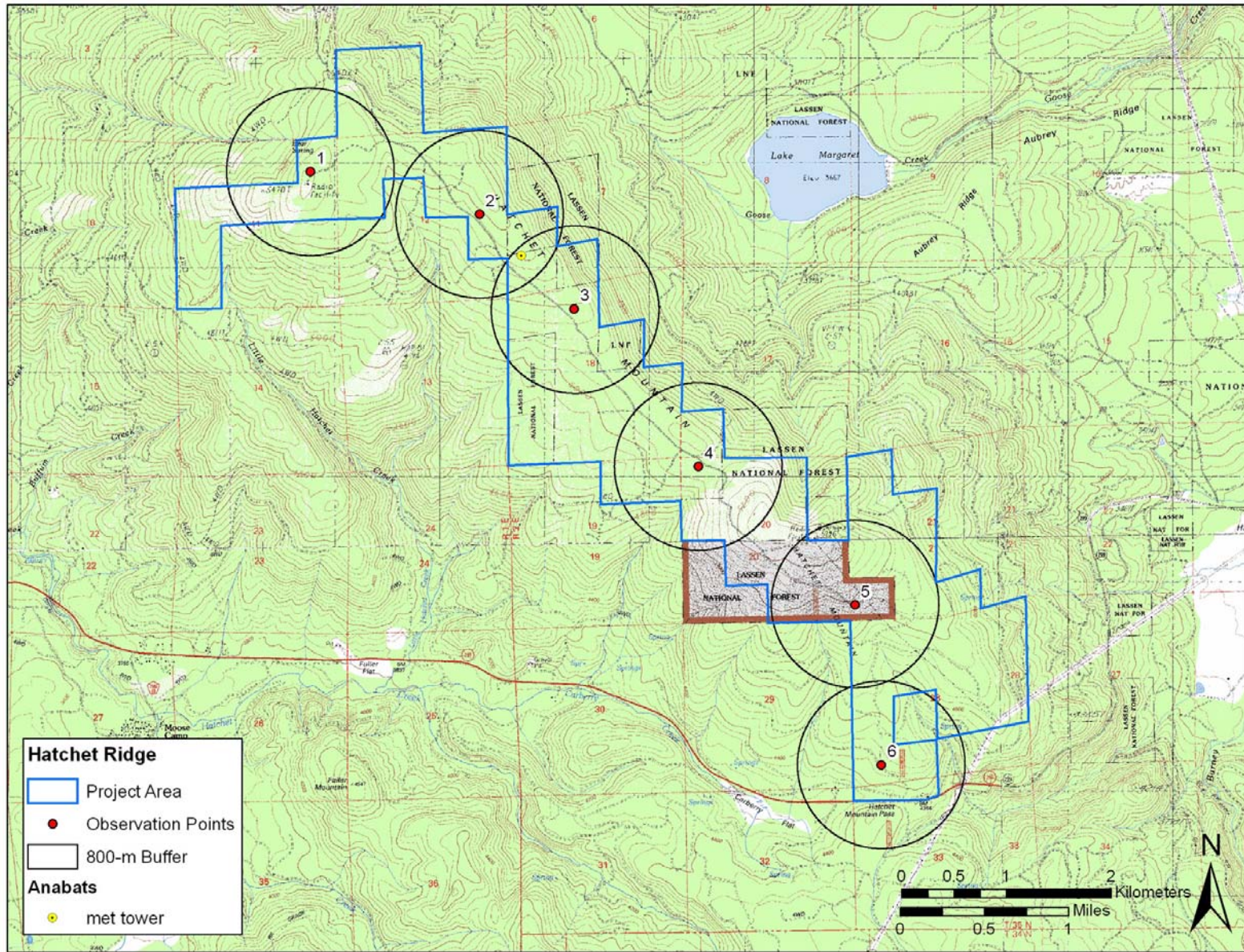


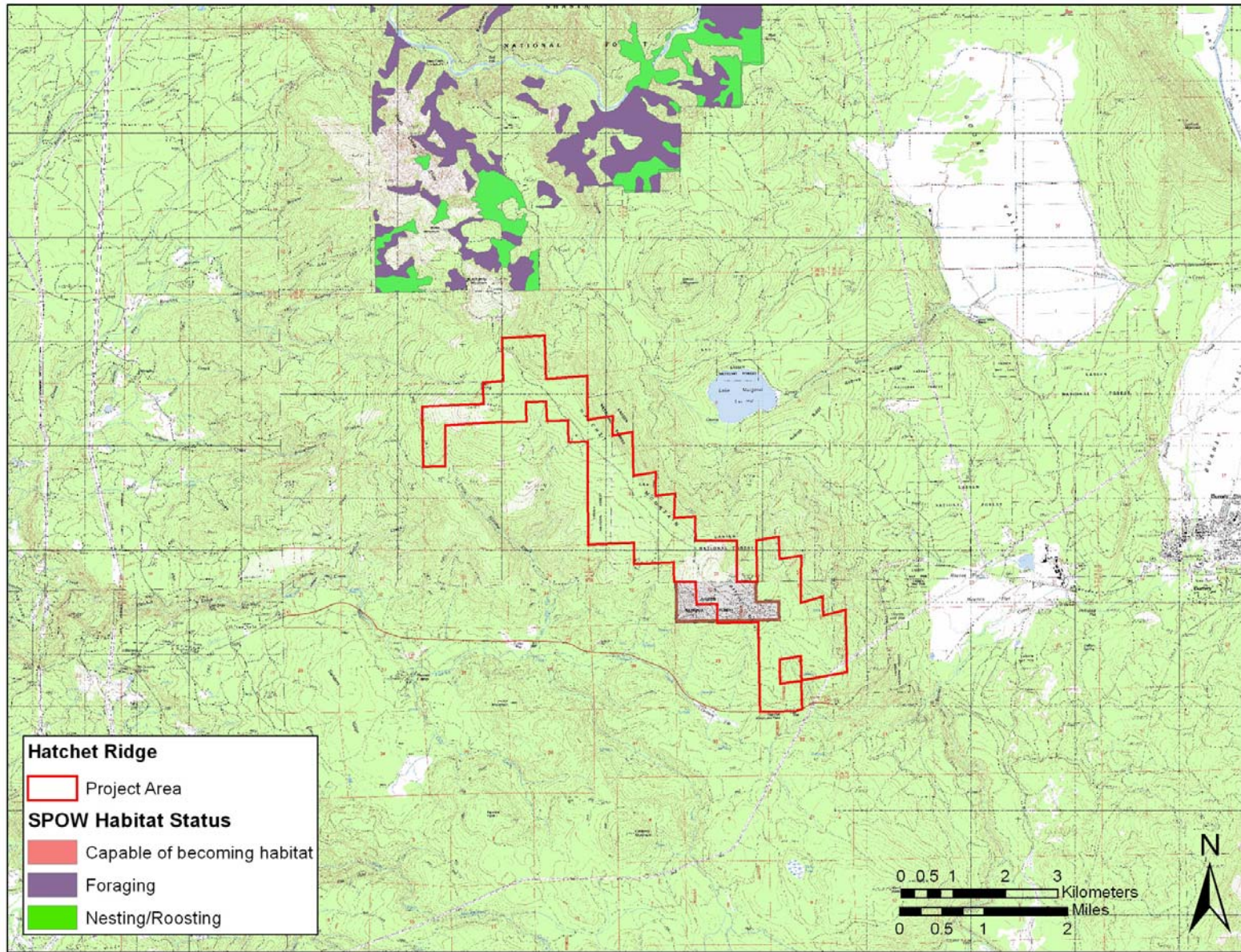


Figure 3. Avian use survey locations at Hatchet Ridge.



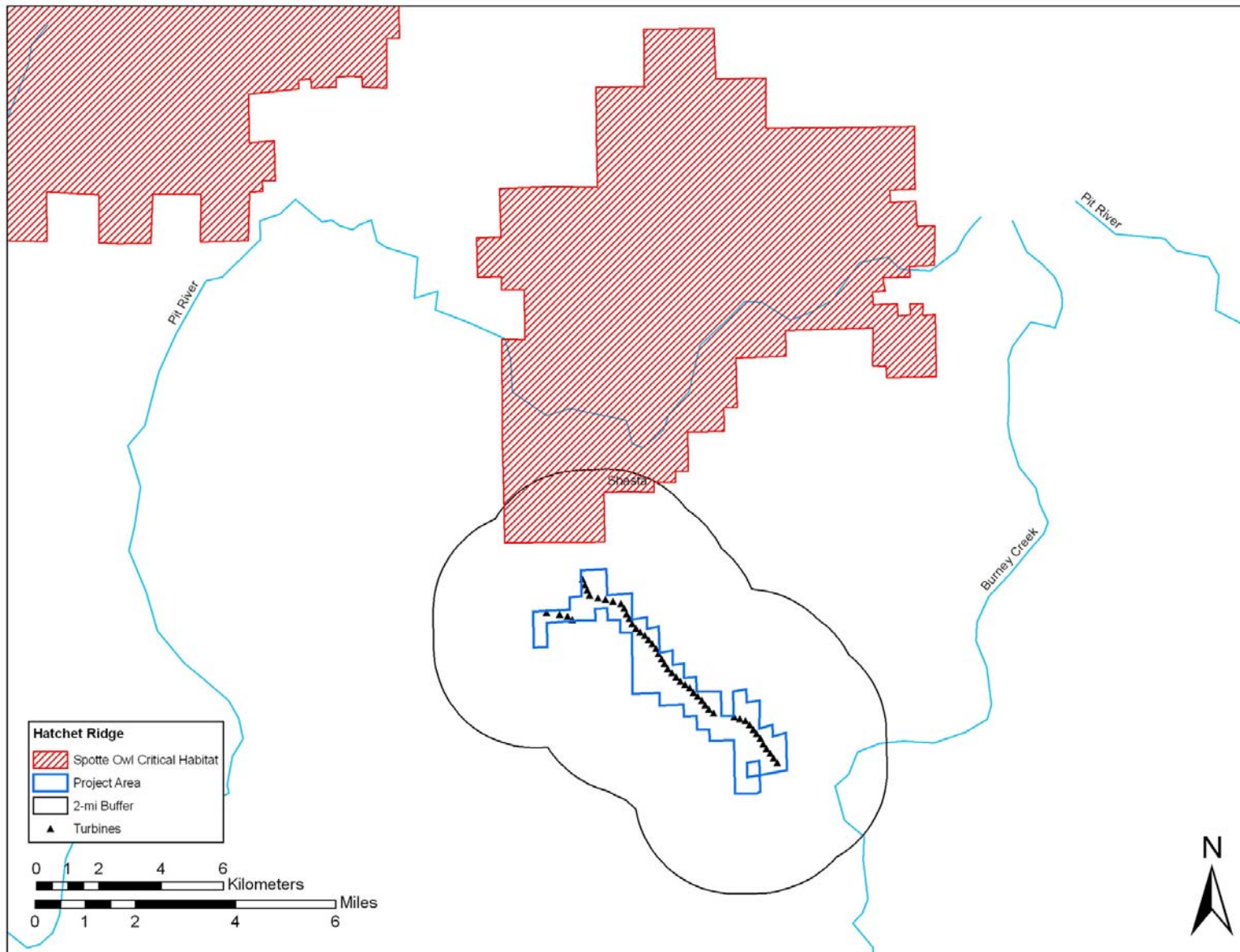


**Figure 4. Spotted owl habitat locations within the Lassen National Forest.**



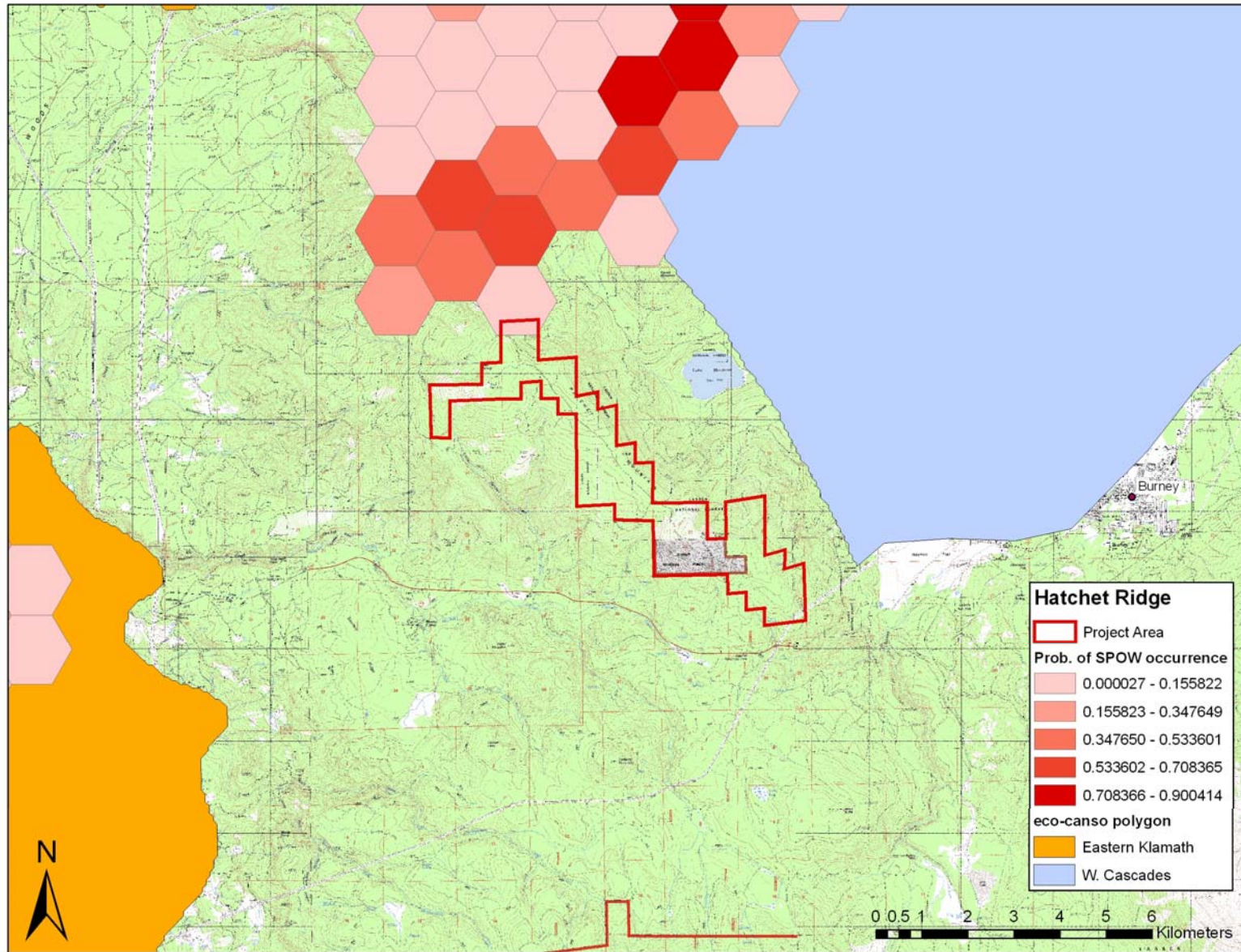


**Figure 5. Critical habitat areas for the northern spotted owl near Hatchet Ridge.**



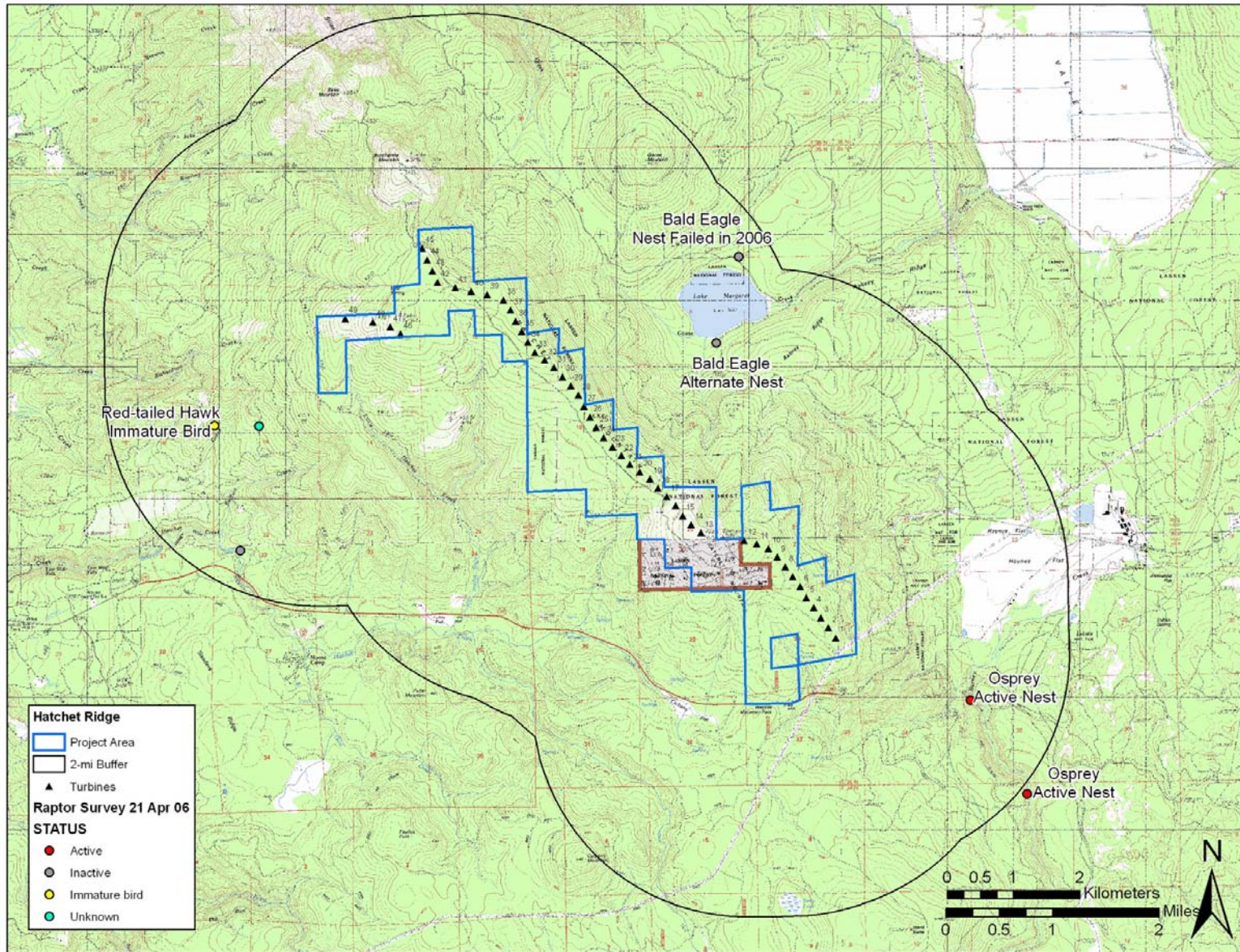


**Figure 6. Northern spotted owl probability of occurrence for the Lassen National Forest.**





**Figure 7. Locations of raptor nests within two miles of Hatchet Ridge.**



APPENDIX A – U.S. FISH AND WILDLIFE SERVICE SPECIES LIST





## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office  
2800 Cottage Way, Room W-2605  
Sacramento, California 95825



December 4, 2006

Document Number: 061204125735

Rhett E. Good  
WEST  
2003 Central Avenue  
Cheyenne, WY 82001

Subject: Species List for Hatchet Ridge Wind Project

Dear: Mr. Good

We are sending this official species list in response to your December 4, 2006 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be March 04, 2007.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found at [www.fws.gov/sacramento/es/branches.htm](http://www.fws.gov/sacramento/es/branches.htm).

**Endangered Species Division**



Federal Endangered and Threatened Species that Occur in  
or may be Affected by Projects in the Counties and/or  
U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 061204010209

Database Last Updated: December 1, 2006

**Species of Concern** - The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. See [www.fws.gov/sacramento/es/spp\\_concern.htm](http://www.fws.gov/sacramento/es/spp_concern.htm) for more information and links to these sensitive species lists.

**Red-Legged Frog Critical Habitat** - The Service has designated final critical habitat for the California red-legged frog. The designation became final on May 15, 2006. See our [map index](#).

## Species

### Listed Species

#### Invertebrates

*Branchinecta conservatio*

Conservancy fairy shrimp (E)

*Desmocerus californicus dimorphus*

valley elderberry longhorn beetle (T)

*Pacifastacus fortis*

Shasta crayfish (E)

#### Fish

*Hypomesus transpacificus*

delta smelt (T)

*Oncorhynchus mykiss*

Central Valley steelhead (T) (NMFS)

*Oncorhynchus tshawytscha*

Central Valley spring-run chinook salmon (T) (NMFS)

winter-run chinook salmon, Sacramento River (E) (NMFS)

#### Amphibians

*Rana aurora draytonii*

California red-legged frog (T)

#### Birds

*Haliaeetus leucocephalus*

bald eagle (T)

*Strix occidentalis caurina*

Critical habitat, northern spotted owl (X)

northern spotted owl (T)

**Plants**

*Orcuttia tenuis*

Critical habitat, slender Orcutt grass (X)

slender Orcutt grass (T)

**Candidate Species**

**Fish**

*Oncorhynchus tshawytscha*

Central Valley fall/late fall-run chinook salmon (C) (NMFS)

**Mammals**

*Martes pennanti*

fisher (C)

**Selected Quads**

BURNEY (662B) BURNEY MTN. WEST (662C) CHALK MTN. (663A) ROARING CREEK (663B) HATCHET MTN. PASS (663D)

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**County Lists**

**Shasta County**

**Listed Species**

*Invertebrates*

*Branchinecta lynchi*

Critical habitat, vernal pool fairy shrimp (X)

vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*

valley elderberry longhorn beetle (T)

*Lepidurus packardi*

Critical habitat, vernal pool tadpole shrimp (X)

vernal pool tadpole shrimp (E)

*Pacifastacus fortis*

Shasta crayfish (E)

*Fish*

*Hypomesus transpacificus*

delta smelt (T)

*Oncorhynchus mykiss*

Central Valley steelhead (T) (NMFS)

Critical habitat, Central Valley steelhead (X) (NMFS)

*Oncorhynchus tshawytscha*

Central Valley spring-run chinook salmon (T) (NMFS)

Critical Habitat, Central Valley spring-run chinook (X) (NMFS)

Critical habitat, winter-run chinook salmon (X) (NMFS)  
winter-run chinook salmon, Sacramento River (E) (NMFS)

#### **Amphibians**

*Rana aurora draytonii*  
California red-legged frog (T)

#### **Birds**

*Haliaeetus leucocephalus*  
bald eagle (T)

*Strix occidentalis caurina*  
Critical habitat, northern spotted owl (X)  
northern spotted owl (T)

#### **Plants**

*Orcuttia tenuis*  
Critical habitat, slender Orcutt grass (X)  
slender Orcutt grass (T)

*Tuctoria greenei*  
Critical habitat, Greene's tuctoria (=Orcutt grass) (X)  
Greene's tuctoria (=Orcutt grass) (E)

### **Candidate Species**

#### **Fish**

*Oncorhynchus tshawytscha*  
Central Valley fall/late fall-run chinook salmon (C) (NMFS)  
Critical habitat, Central Valley fall/late fall-run chinook (C) (NMFS)

#### **Birds**

*Coccyzus americanus occidentalis*  
Western yellow-billed cuckoo (C)

#### **Mammals**

*Martes pennanti*  
fisher (C)

#### **Key:**

- (E) *Endangered* - Listed as being in danger of extinction.
- (T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
- (P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the [National Oceanic & Atmospheric Administration Fisheries Service](#). Consult with them directly about these species.
- Critical Habitat* - Area essential to the conservation of a species.
- (PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
- (C) *Candidate* - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

## Important Information About Your Species List

### How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey [7½ minute quads](#). The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

### Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the nine surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

### Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environmental documents prepared for your project.

### Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

### Take incidental to an otherwise lawful activity may be authorized by or of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal [consultation](#) with the Service.

During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed proposed species. The opinion may authorize a limited level of incidental take.



- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

### **Critical Habitat**

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our [critical habitat page](#) for maps.

### **Candidate Species**

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

### **Wetlands**

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield at this office at (916) 414-6580.

### **Updates**

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be March 04, 2007.