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SITE CHARACTERIZATION STUDY REPORT

Fountain Wind Project
Shasta County, California

Prepared for:

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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.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

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.

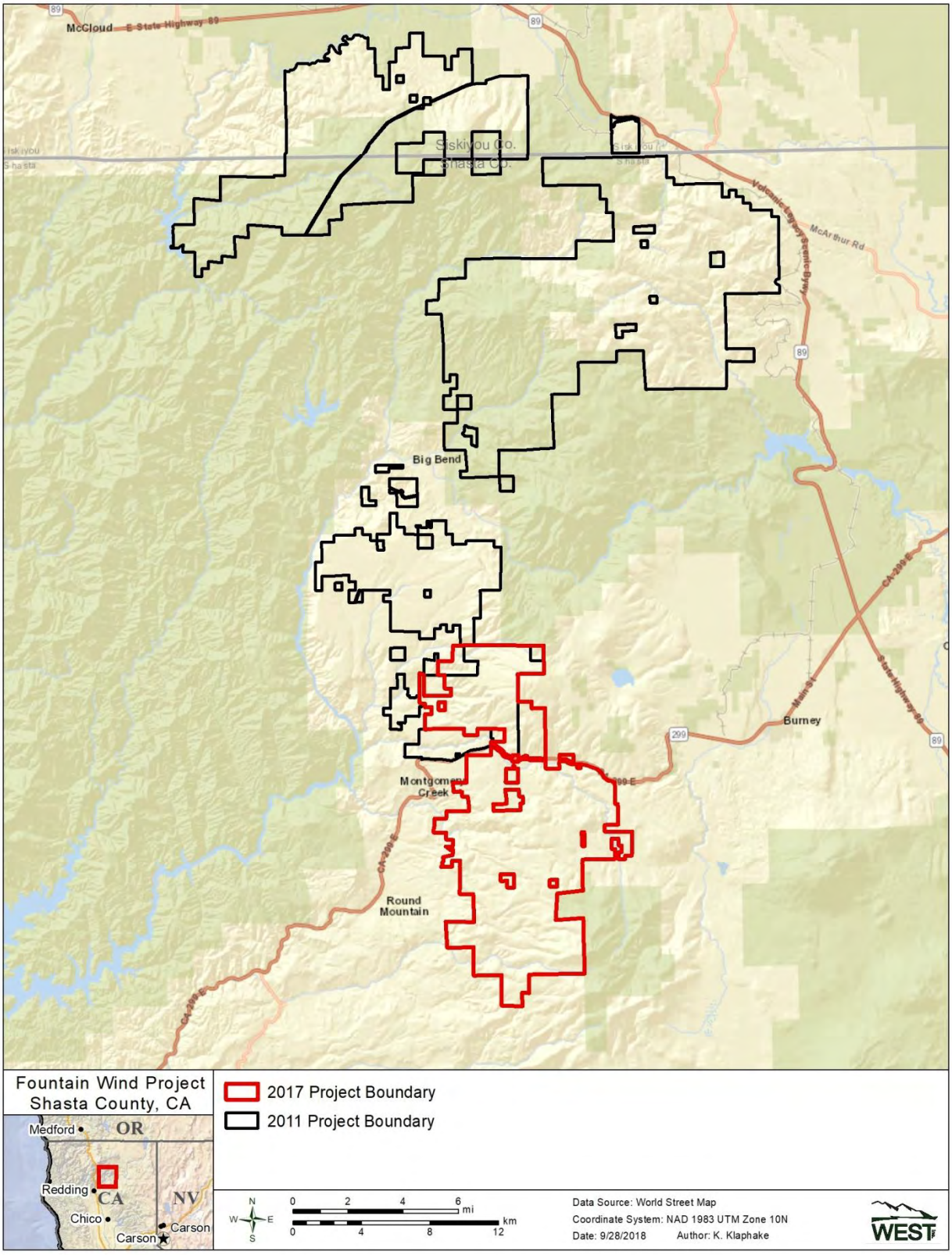

Figure 1. Location of the Fountain Wind Project in relation to the original 2011 project boundary (previously referred to as the McCloud Wind Resource Area).

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).

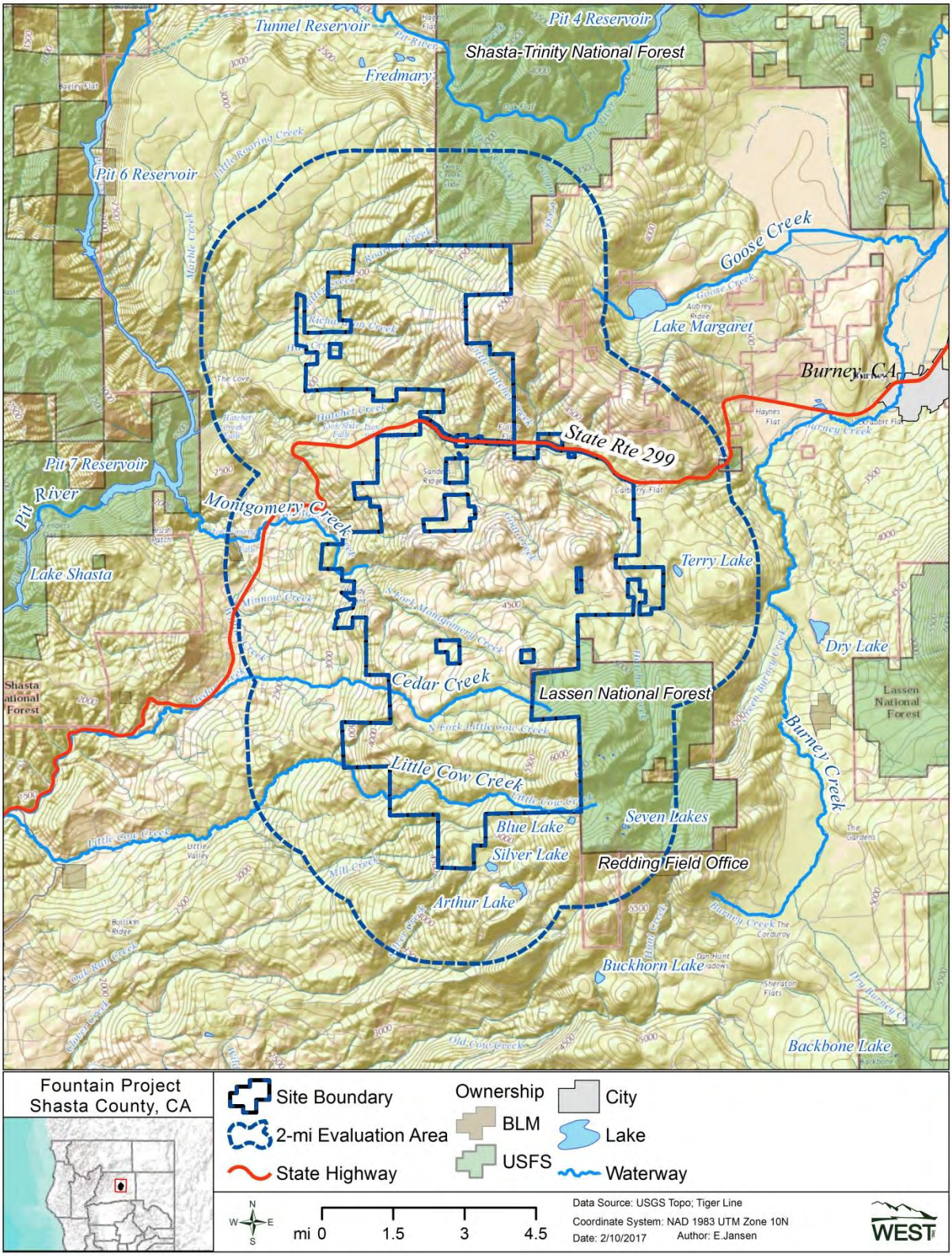

Figure 2. Overview of the Fountain Wind Project Area and surrounding Evaluation Area.

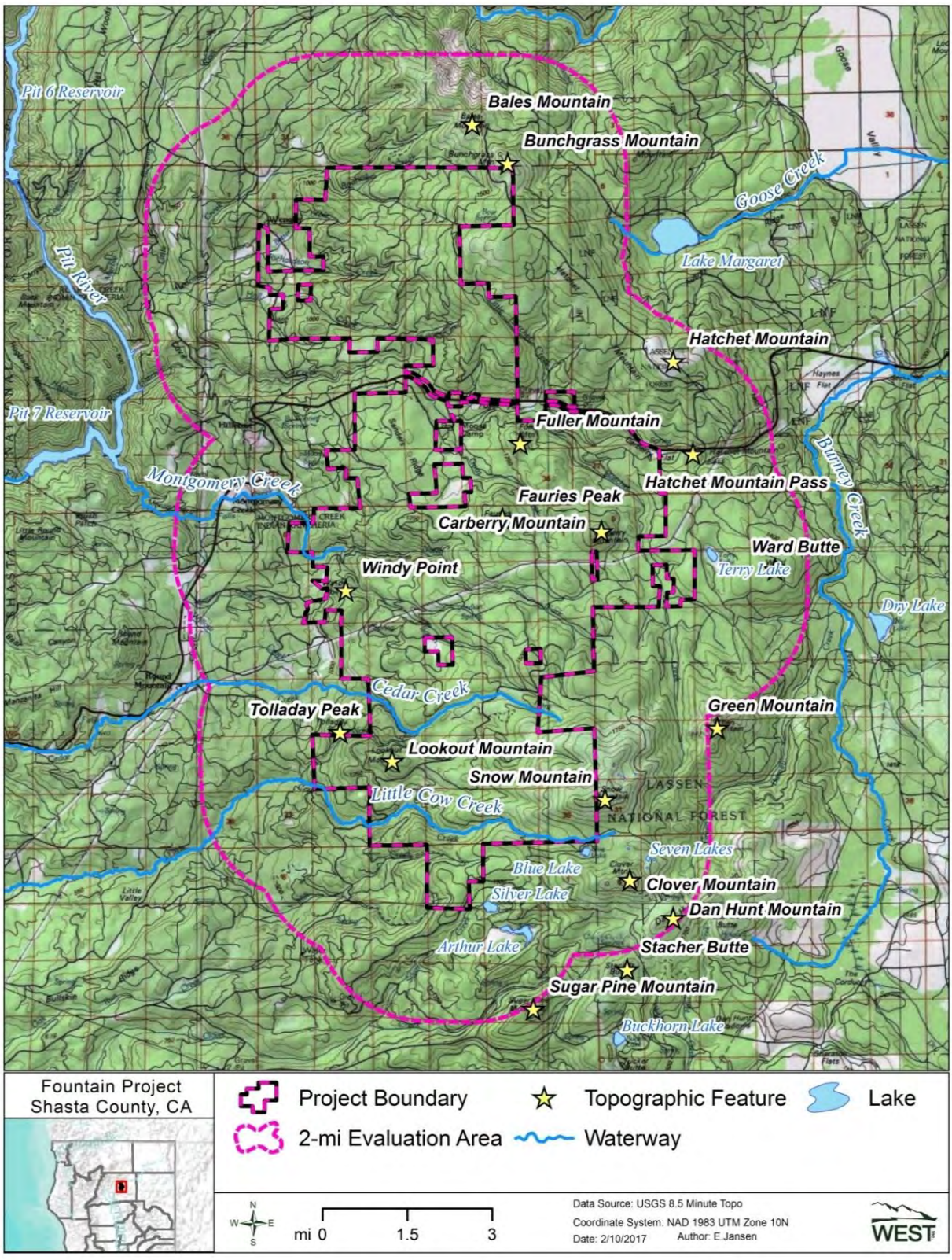

Figure 3. Major topographic and water features within the Fountain Wind Project Area and surrounding Evaluation Area.

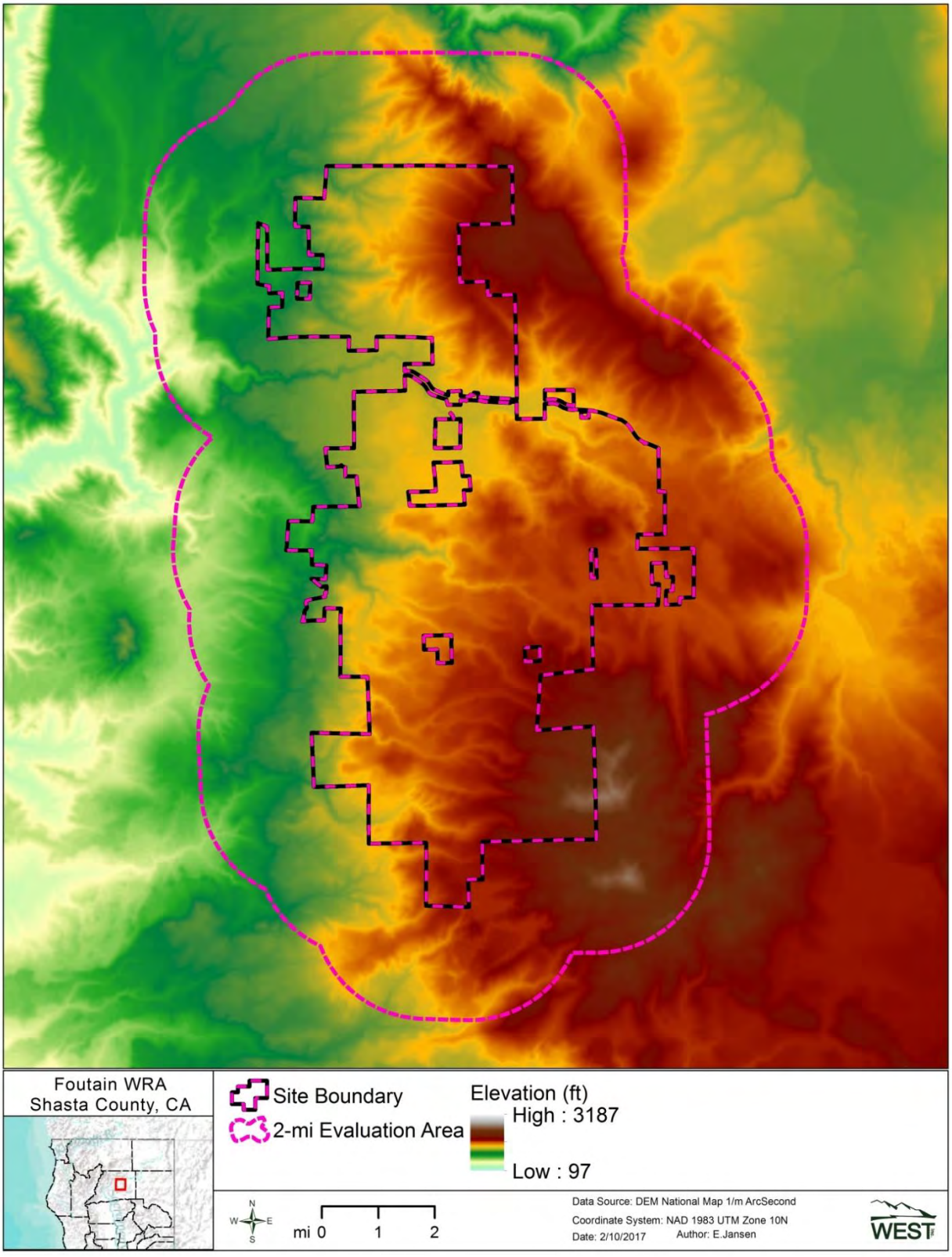

Figure 4. Digital elevation model of the Fountain Wind Project Area and surrounding Evaluation Area.

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.

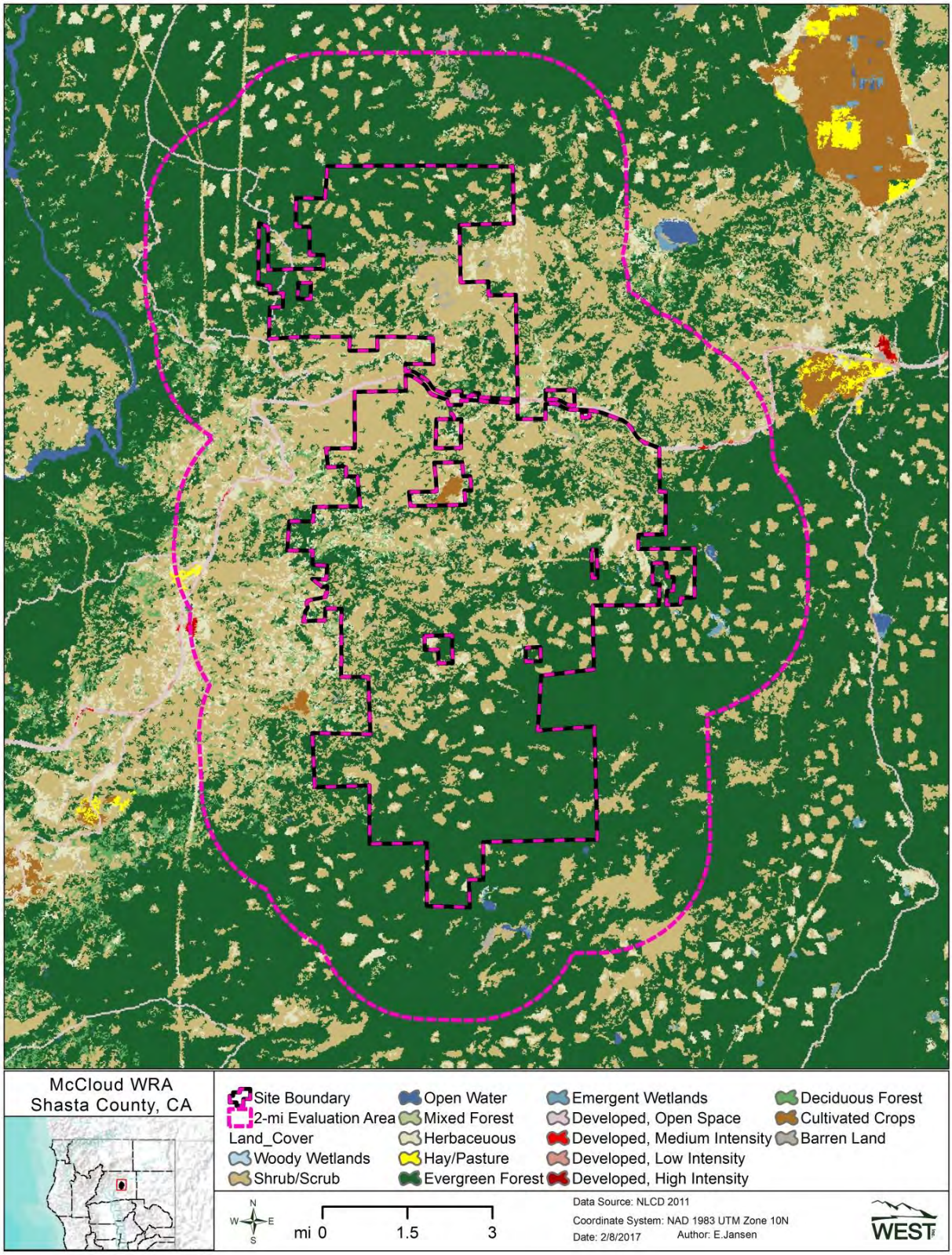

Figure 5. Land cover within the Fountain Wind Project Area and Evaluation Area (USGS NLCD 2011).

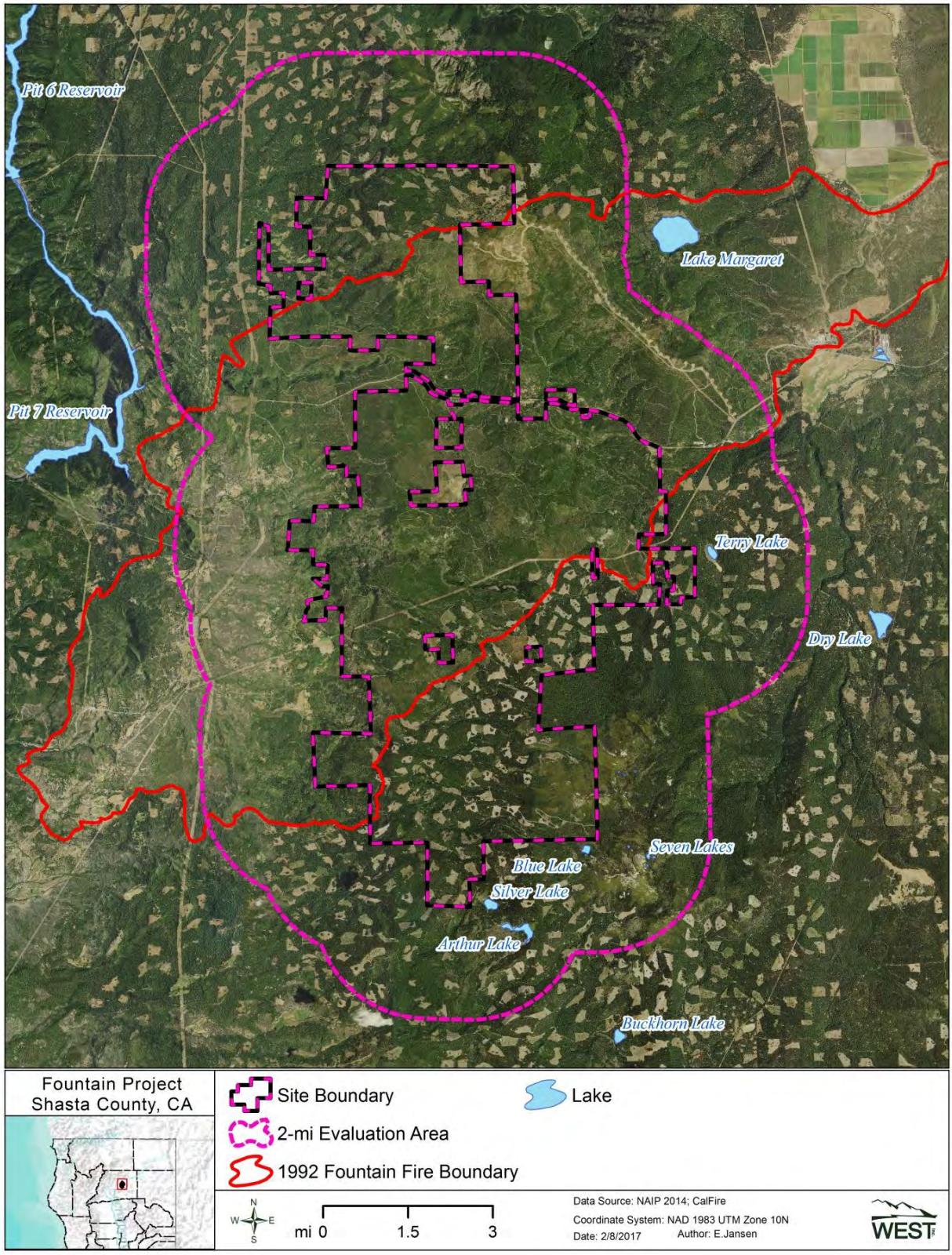

Figure 6. Aerial photograph of the Fountain Wind Project Area and Evaluation Area with 1992 Fountain Fire boundary.

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.

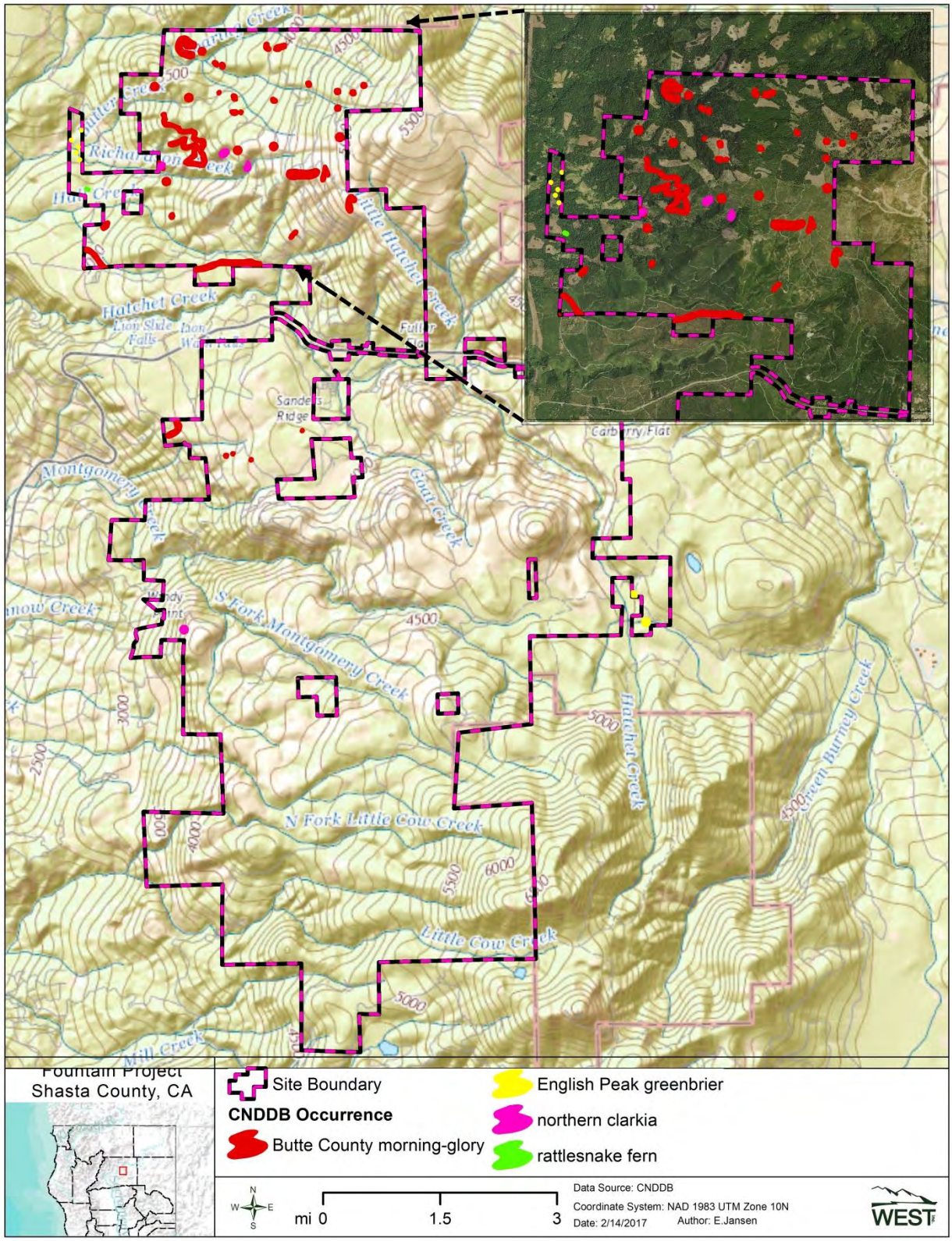

Figure 7. Records of previously-documented state sensitive plant species within the Fountain Wind Project.

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).

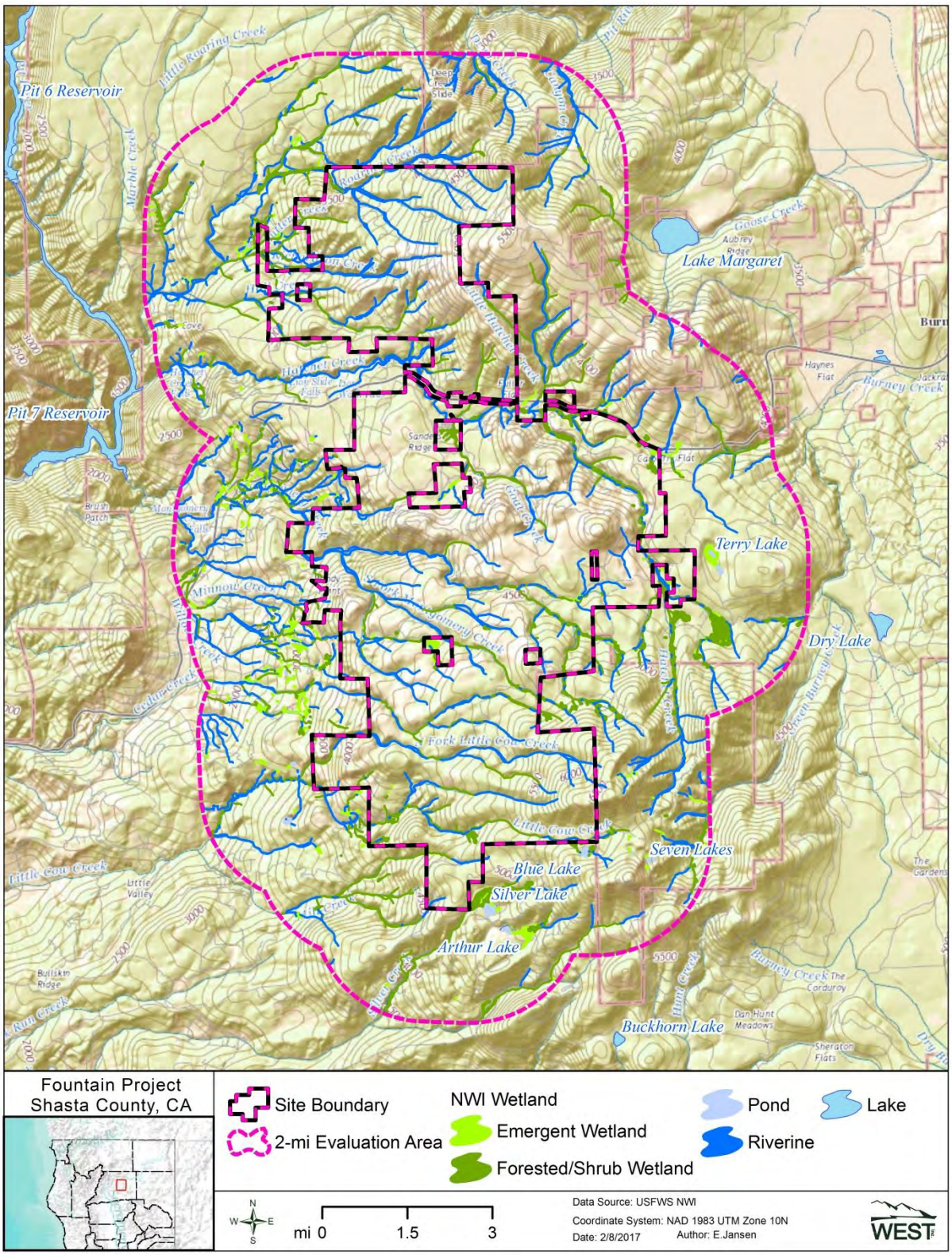

Figure 8. National Wetland Inventory map of the Fountain Wind Project Area and Evaluation Area (USFWS NWI 2016).

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.

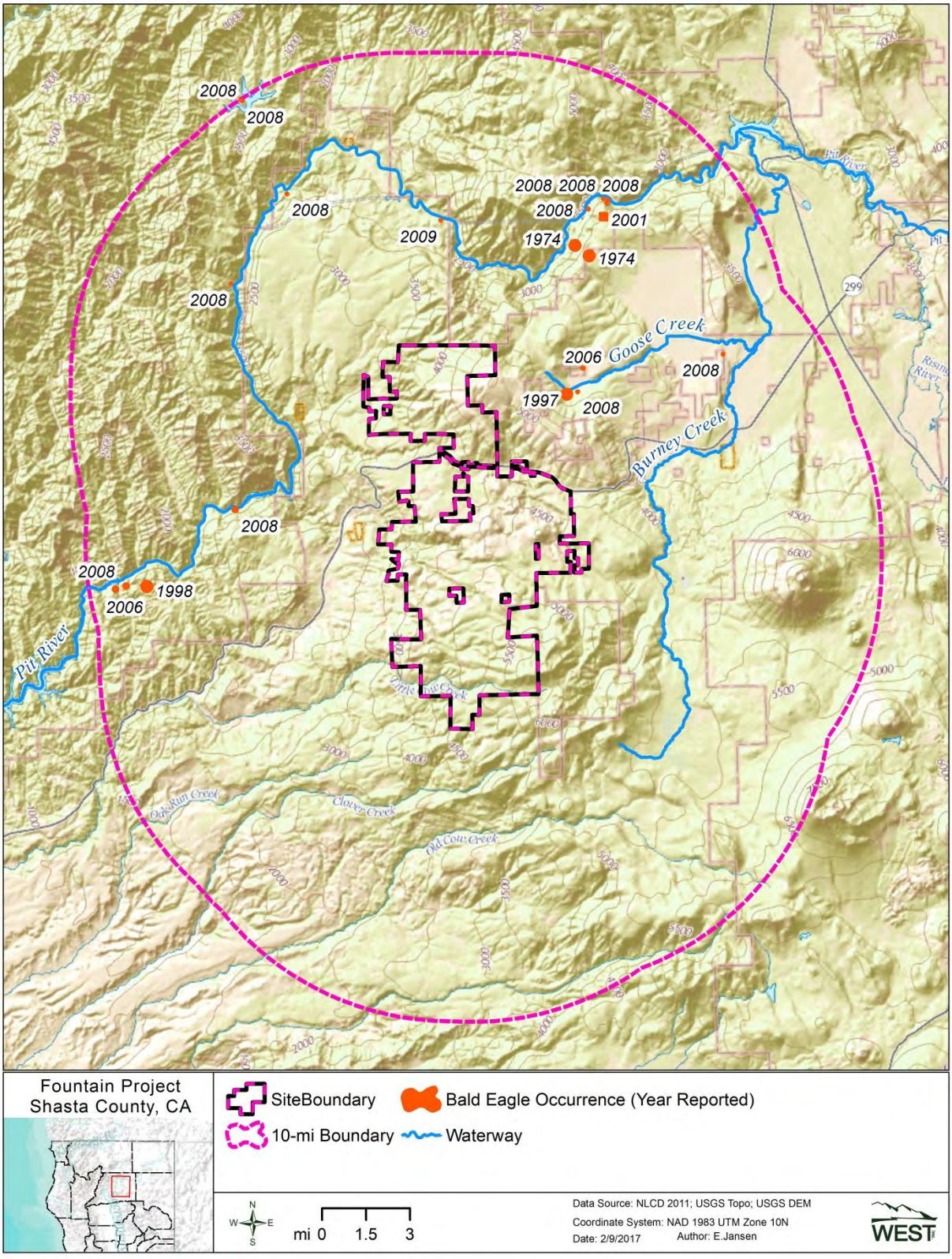

Figure 9. Bald eagle records within 10 miles of the Fountain Wind Project (CNDDB 2017).

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).

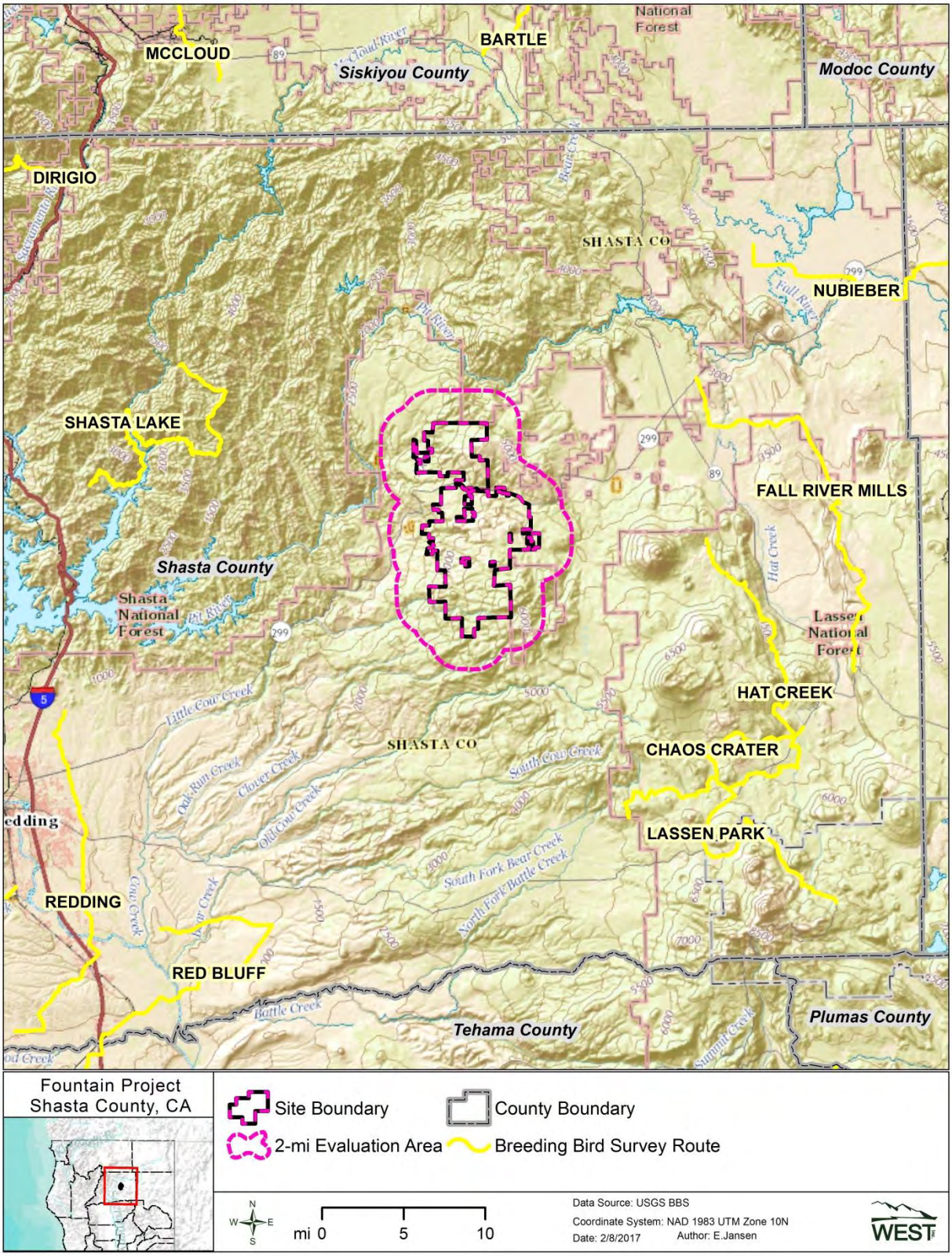

Figure 10. Breeding Bird Survey (BBS) routes closest to Fountain Wind Project.

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

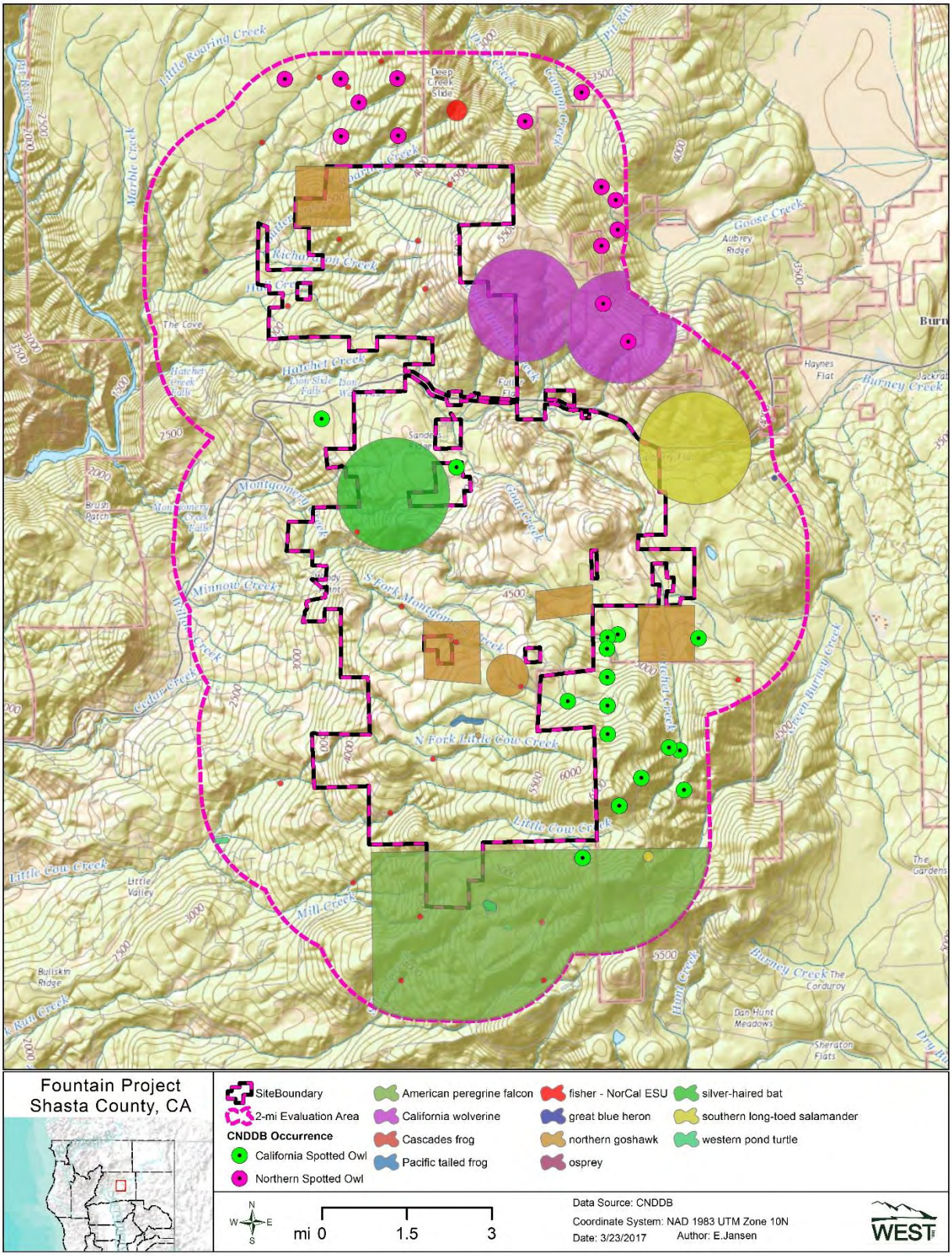

Figure 11. Records of previously documented state sensitive wildlife species within the Fountain Wind Project and surrounding Evaluation Area.

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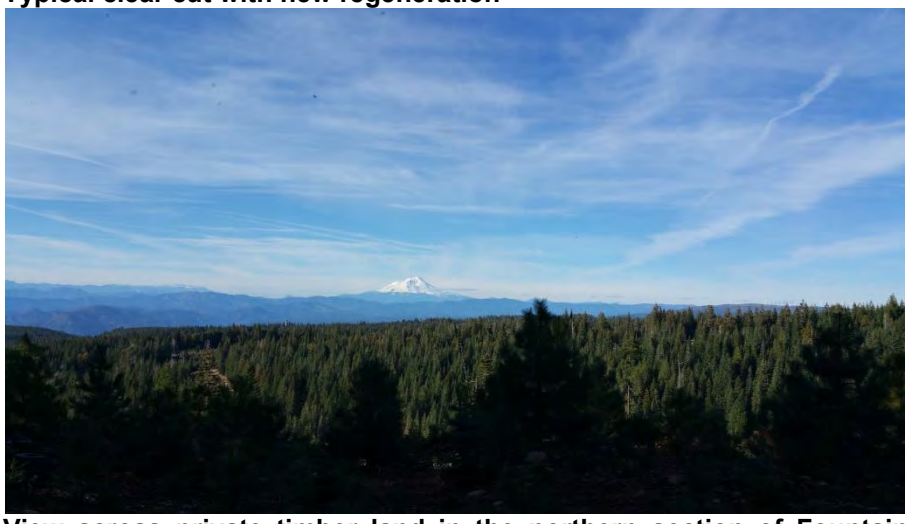
Appendix A. Photographs Taken During the Preliminary Site Visit to the Fountain Wind Project in October 2016

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.