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RARE PLANT SURVEYS

Fountain Wind Project
Shasta County, California

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REPORT REFERENCE

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INTRODUCTION

Western EcoSystems Technology, Inc. (WEST) performed rare plant surveys at the proposed Fountain Wind Project (Project) in Shasta County, California in spring and summer of 2018 and 2019. The methods and results of the 2018 and 2019 surveys were presented in Flaig et al. (2018 and 2019). In anticipation of initiating Project construction prior to the 2022 growing season, additional rare plant surveys were conducted in 2021 where Project modifications resulted in areas of potential disturbance that were not covered during the 2018/2019 surveys. The following memorandum describes the methods and results of rare plant surveys conducted in previously unsurveyed areas of the Project during the 2021 growing season. The primary purpose of these surveys was to determine the presence or absence of rare plant species that may be subject to impacts resulting from ground disturbing activities during Project construction.

SURVEY AREA

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project is early seral mixed coniferous forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of ponderosa pine (*Pinus ponderosa*), white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense-cedar (*Calocedrus decurrens*), and sugar pine (*Pinus lambertiana*). Additional details regarding the survey area can be found in Flaig et al. (2018 and 2019).

For the purpose of conducting rare plant surveys, development corridors were provided in Global Information System (GIS) format by the Project proponent. Rare plant surveys have been conducted over multiple years to ensure complete coverage of potential disturbance areas as development corridors have changed. Initial surveys were performed in 2018 within development corridors provided by the project proponent on May 11, 2018. Supplemental surveys performed in 2019 were conducted within newly added development corridors provided by the project proponent on May 20, 2019. Additional Project modifications resulted in some areas of potential ground disturbance, based on buffers of all proposed infrastructure that may be subject to ground disturbance (e.g., newly proposed roads, roads that may be expanded, turbine pads, and underground collection lines), that were not surveyed in 2018 or 2019. These unsurveyed areas were the focus of the 2021 rare plant surveys, varied in size, and were dispersed throughout the Project area (Figure 1).

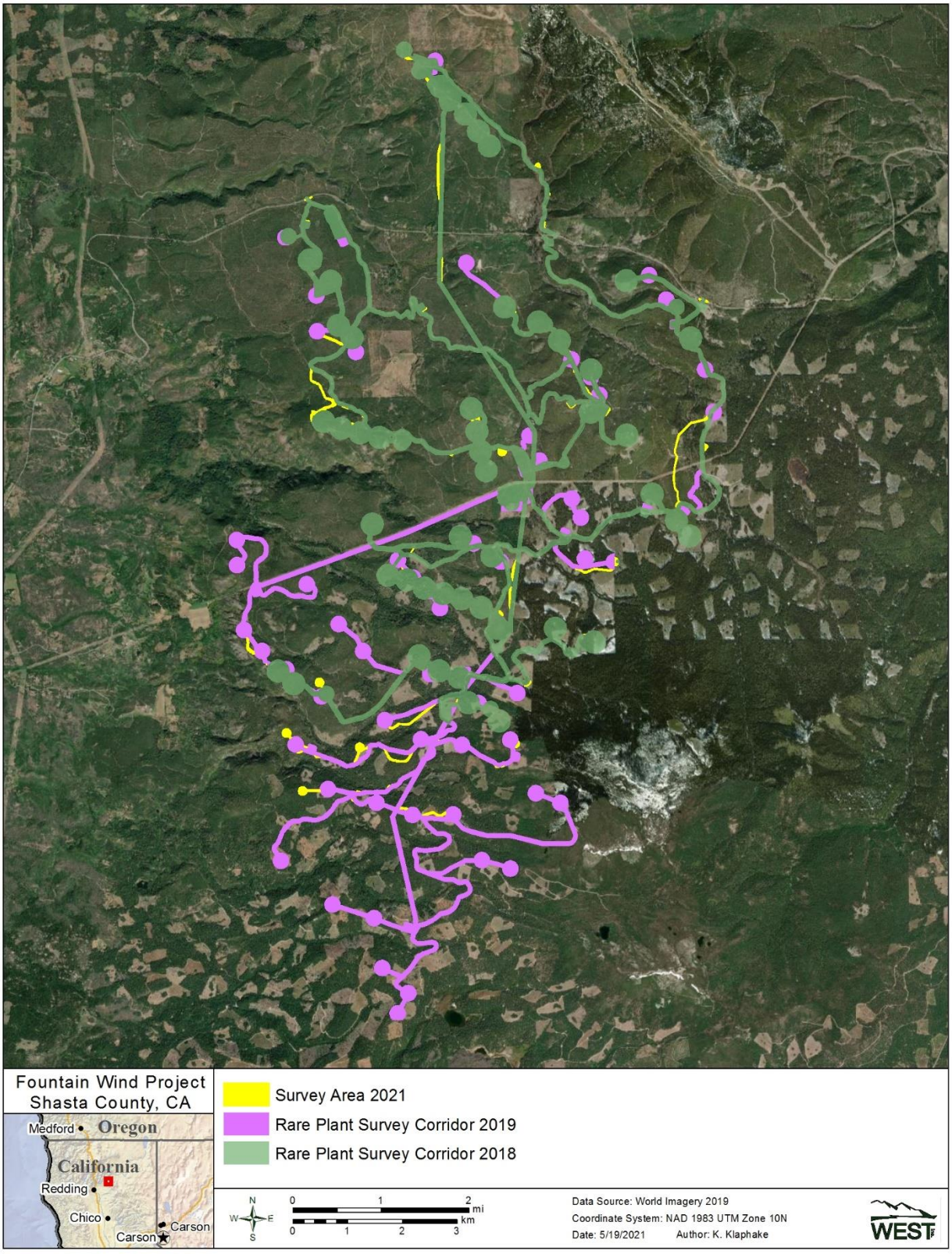

Figure 1. Survey corridors associated with 2018 and 2019 rare plant surveys, along with unsurveyed areas (in yellow) that were the focus of rare plant surveys conducted in 2021 at the Fountain Wind Project, Shasta County, California.

METHODS

Rare Plant Surveys

Prior to initiating the 2018 surveys, WEST conducted a query of the California Natural Diversity Database (CNDDB), an inventory of the status and locations of rare plants, rare plant communities, and animals in California managed by the California Department of Fish and Wildlife (CDFW; CNDDB 2017), and searched the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2017) to compile a list of special status plant species and sensitive natural vegetation communities that may have potential to occur within the evaluation area. The CNDDB query was limited to an area within a 10-mile radius of the Project and the CNPS search was focused on Shasta County. Additional special status plant species were identified by CDFW personnel and were added to the list, resulting in 69 rare plants to be assessed for potential occurrence at the Project (Appendix A).

A pre-field-survey review was conducted that involved a review of species descriptions, habitat requirements, and photographs of all 69 species identified in the initial list of plants with potential for occurrence. Based on further review of the habitat requirements of the 69 species and knowledge of the natural vegetation communities known to occur within the evaluation area (based on previous WEST surveys in the region), WEST botanists determined that potentially suitable habitat was present for 47 of the 69 rare plant species (identified as "Possible" in Appendix A). These 47 species were targeted for rare plant surveys within the Project area. WEST determined that suitable habitat was not present within the Project area for 22 of the original 69 rare plant species (identified as "Unlikely" in Appendix A). Rationales for exclusion included absence of suitable habitat within the Project (e.g., vernal pools) and absence of appropriate substrates (e.g., ultramafic soils, granitic crevices). Two of the 69 species on the initial list were federally-listed, including slender Orcutt grass (*Orcuttia tenuis*; Threatened) and Greene's tuctoria (*Tuctoria greenei*; Endangered). However, both of these plant species are endemic to vernal pool habitats which are absent from the survey corridors. Slender orcutt grass is also state-listed as endangered. The status of species on this list was reviewed in 2021 (CNDDB 2021, CNPS 2021) and any updates included in Appendix A.

Focused surveys to determine presence or absence of target species in areas of potential disturbance not surveyed in 2018 or 2019 were conducted in 2021. Surveys were conducted over two survey periods, May 24 – 25 and July 27 – 28, 2021. The 2021 survey period was consistent with the timing of prior surveys, which occurred from May 21 – 29 and July 30 – August 3 in 2018, and from May 29 – June 3 and July 30 – August 2, 2019. While the 2018 surveys focused on the northern portion of the Project area, and the 2019 surveys primarily focused on the southern portion of the Project area, surveys in 2021 occurred throughout the Project area in areas where small infrastructure realignments resulted in potential disturbance areas not yet surveyed (Figure 1). The two survey periods were selected to capture the range of flowering and fruiting periods for the 47 target species.

Surveys were conducted by an experienced WEST botanist with prior experience working in the Project area; qualifications of the surveyor are included in Appendix B. Survey corridors and unsurveyed areas were uploaded to a Global Positioning System unit for use in guiding field surveys. Pedestrian transect surveys were conducted within unsurveyed portions of the Project corridors, with special attention given to areas that might provide suitable habitat for rare plant species, in accordance with the 2018 *CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018). A list of all vascular plant species encountered during the rare plant surveys was maintained. Plant species were identified to the highest taxonomic level possible when encountered using *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012).

Invasive Plant Species

WEST recorded non-native invasive plant species encountered during the 2021 rare plant surveys, to supplement data gathered during 2018 and 2019 surveys. Mapping was primarily focused on roadsides within the 2021 survey areas. Mapping of non-native invasive species was conducted by estimating the number of individuals of non-native invasive species observed. Non-native plant species for which mapping was conducted included all species identified by the California Invasive Plant Council (CAL-IPC) as "high" (i.e., species that have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure), "moderate" (i.e., species that have substantial and apparent, but generally not severe ecological impacts on physical processes, plant and animal communities, and vegetation structure), and "limited" (i.e., species that are invasive, but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score). Survey areas in which invasive species were encountered in 2021 were mapped. Non-native invasive plant species-level distributions were rated as "Abundant" (A: over one thousand plants), "Common" (C: 200-1,000 individuals), or "Infrequent" (I: less than 200 individuals).

RESULTS AND DISCUSSION

Rare Plant Surveys

As was the case in 2018 and 2019, none of the 47 rare plant species identified as possibly occurring were encountered during the 2021 surveys. Given the lack of rare plants identified in the survey corridors to date, impacts to rare plants are not anticipated during Project construction. A comprehensive list of plant species encountered during the 2018, 2019, and 2021 surveys is provided in Appendix C.

Invasive Plant Species

The most common invasive plant species observed within the Project evaluation area during 2018, 2019, and 2021 surveys included common mullein (*Verbascum Thapsus;* CAL-IPC ranked "limited"), bull thistle (*Cirsium vulgare;* CAL-IPC ranked "moderate"), Klamath weed (*Hypericum perforatum;* CAL-IPC ranked "limited"), and houndstongue (*Cynoglossum officinale*; CAL-IPC "moderate"; Figures 2 and 3). As noted in Flaig et al. (2018 and 2019), mullein, bull thistle, and Klamath weed are widespread within all logged and recently logged areas within the evaluation

area. Three invasive plant species ranked “high” by CAL-IPC, including Himalayan blackberry (*Rubus armeniacus*), yellow star thistle (*Centaurea solstitialis*), and medusahead (*Elymus caput-medusae*), were observed in the evaluation area during 2018/2019 surveys (Figure 2). Two of these, Himalayan blackberry and yellow star thistle, were observed during the 2021 surveys (Figure 3).

Based on the data collected during 2018, 2019, and 2021 rare plant surveys, a number of invasive plant species are present within proposed development corridors. These results are not unexpected given the primary land use (i.e., commercial timber production), which results in recurring disturbance throughout the area and relatively high traffic volumes resulting from timber harvest activities. Many of the invasive species are actively managed by the landowners to minimize competition with conifer seedlings and enhance timber growth. Many disturbances related to Project construction will be similar to those which occur in the Project area already (e.g., harvest of trees, road construction and widening, seasonal/temporary increases in vehicle traffic). While Project construction will create some additional disturbance to the landscape, once construction is complete, the Project is expected to have minimal influence on the future distribution of invasive species relative to the influence of ongoing commercial timber operations.

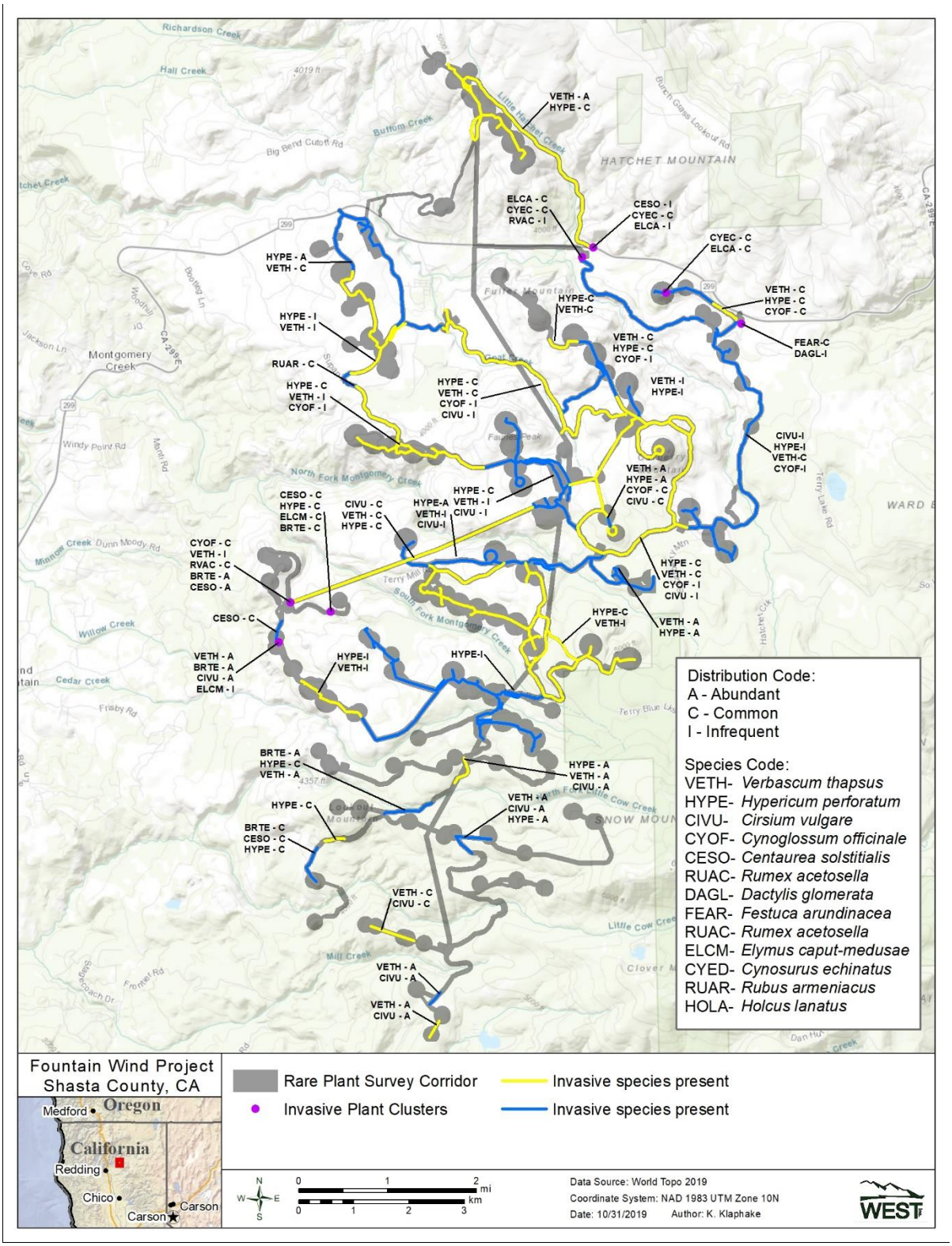

Figure 2. Non-native invasive plant species mapped during 2018 and 2019 plant surveys within the Fountain Wind Project, Shasta County, California. To differentiate adjacent survey segments in which invasive species were encountered, alternating blue and yellow lines with accompanying notations as to the species present (4-letter species codes) and relative distribution (1-letter distribution code) were used.

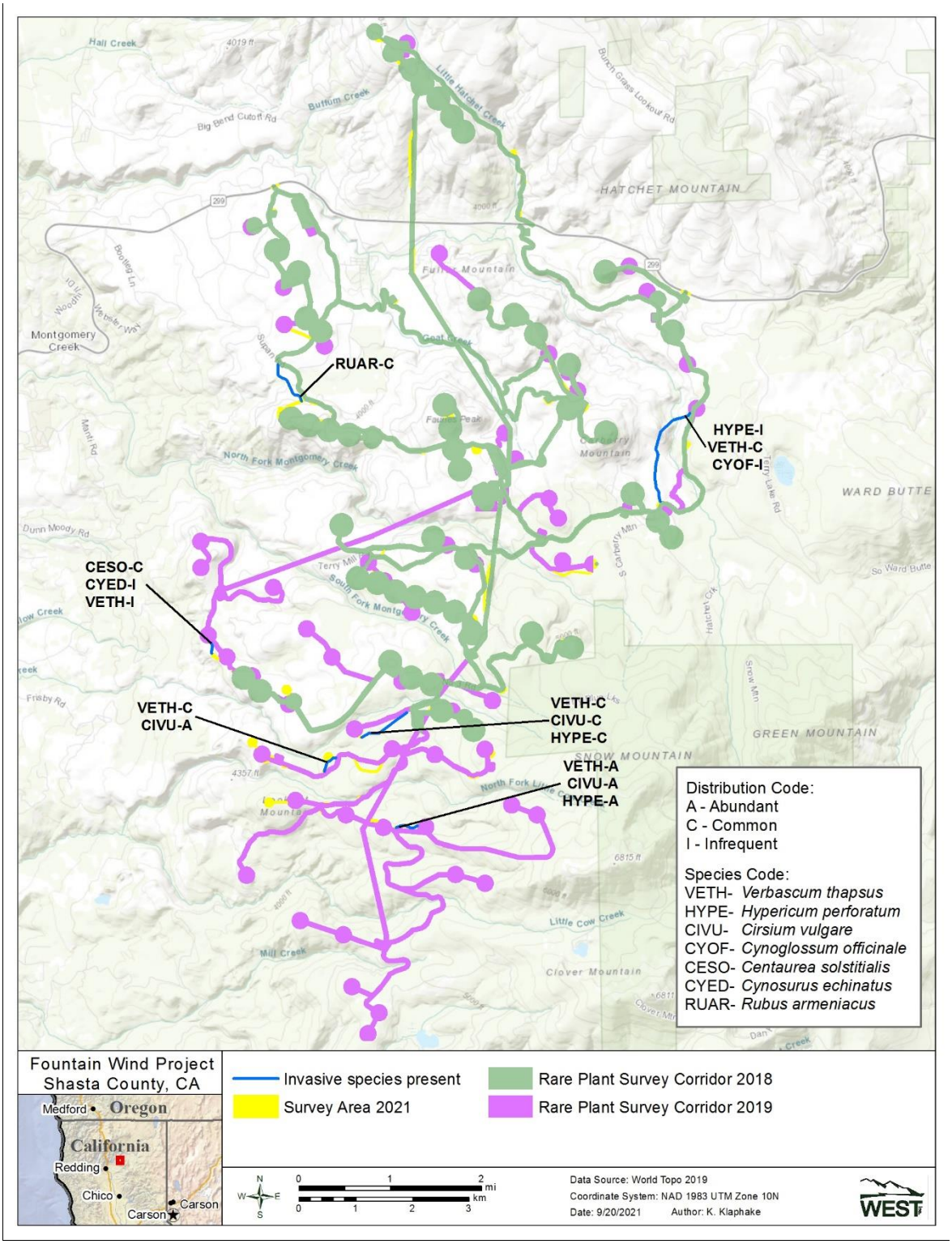

Figure 3. Non-native invasive plant species mapped during 2021 plant surveys within the Fountain Wind Project, Shasta County, California. Blue lines with accompanying notations as to the species present (4-letter species codes) and relative distribution (1-letter distribution code) indicate areas where invasive were mapped in 2021, in addition to those mapped during prior surveys (Figure 2).

REFERENCES

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (eds.). 2012. *The Jepson Manual: Vascular Plants of California*, second edition. University of California Press, Berkley.

California Native Plant Society (CNPS). 2017. Inventory of Rare and Endangered Plants. (online edition, v8-02). Accessed January 2017. California Native Plant Society. Sacramento, California. Online at: http://www.rareplants.cnps.org

California Natural Diversity Database (CNDDB). 2017. Inventory of the Status and Location of Rare Plants and Animals in California. State of California, Natural Resources Agency, Department of Fish and Wildlife (CDFW), Biogeographic Data Branch, CNDDB. Accessed January 2017. Available online at: https://www.wildlife.ca.gov/Data/CNDDB

California Native Plant Society (CNPS) Rare Plant Program. 2021. Inventory of Rare and Endangered Plants of California (Online Edition, V8-0. 0.39). Accessed: September 2021. Information online: http://www.rareplants.cnps.org

California Natural Diversity Database (CNDDB). 2021. Inventory of the Status and Location of Rare Plants and Animals in California. State of California, Natural Resources Agency, Department of Fish and Wildlife (CDFW), Biogeographic Data Branch, CNDDB. Accessed September 2021. Available online at: https://www.wildlife.ca.gov/Data/CNDDB

California Department of Fish and Wildlife (CDFW). 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. March 20, 2018. State of California Natural Resources Agency Department of Fish and Wildlife.

ESRI. 2019. World Imagery and Aerial Photos. ArcGIS Resource Center. Environmental Systems Research Institute (ESRI), producers of ArcGIS software. Redlands, California. Information online: http://www.arcgis.com/home/webmap/viewer.html?useExisting=1

Flaig, K., Q. Hays, and J. Thompson. 2018. Rare Plant Surveys and Natural Vegetation Community Mapping, Fountain Wind Project, Shasta County, California. Prepared for Pacific Wind Development LLC; Portland, OR. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon.

Flaig, K., Q. Hays, and J. Thompson. 2019. Rare Plant Surveys and Natural Vegetation Community Mapping, Fountain Wind Project, Shasta County, California. Prepared for Pacific Wind Development LLC; Portland, OR. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon.

Flaig, K., A. Chatfield, and J. Thompson. 2019. Rare Plant Surveys and Natural Vegetation Community Mapping, Fountain Wind Project, Shasta County, California. Prepared for ConnectGen Operating LLC, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. October 31, 2019.

North American Datum (NAD). 1983. NAD83 Geodetic Datum.

US Fish and Wildlife Service (USFWS). 2017. Critical Habitat Portal. USFWS Critical Habitat for Threatened and Endangered Species: Online Mapper. Accessed February 2017. Online at: http://ecos.fws.gov/crithab/

Appendix A. Federally listed, State-listed, and California Native Plant Society Rare Plant Species and Their Potential for Occurrence within the Fountain Wind Project

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS** Status	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Shasta ageratina *Ageratina shastensis*		1B.2	June-Oct	Rocky, often carbonate sites; lower montane coniferous forest	**Possible.** Although uncommon, suitable habitat may be present within the Project
Scabrid alpine tarplant *Anisocarpus scabridus*		1B.3	June-Sept	Open ridges or slopes on metamorphics	**Possible.** Suitable habitat may be present within the Project
Slender silver-moss *Anomobryum julaceum*		4.2		Rocky, moist (bryophyte-moss)	**Possible.** Although far from its known range, suitable habitat may be present within the Project
vanilla-grass *Anthoxanthum nitens* ssp. *nitens*		2B.3	Apr-July	Meadows and seeps	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Klamath manzanita *Arctostaphylos klamathensis*		1B.2	May-Aug	Chaparral and upper montane and subalpine coniferous forests; rocky outcrops and slopes	**Possible.** Although uncommon, suitable habitat may be present within the Project; CNDDB documents only 2 occurrences in Shasta County
marbled wild-ginger *Asarum marmoratum*		2B.3	Apr-Aug	Understory of lower montane coniferous forests	**Possible.** Suitable habitat may be present within the site
northern spleenwort *Asplenium septentrionale*		2B.3	July-Aug	Chaparral and montane coniferous forests; form grass-like tufts in granitic rock crevices	**Unlikely.** No granitic rock crevices present within the survey corridors
upswept moonwort *Botrychium ascendens*		2B.3	July-Aug	Lower montane coniferous forests; grassy fields and woodlands near springs and creeks	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
scalloped moonwort *Botrychium crenulatum*		2B.2	June-Sept	Lower montane coniferous forests; moist meadows near creeks; marshes	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
mingan moonwort *Botrychium minganense*		2B.2	July-Sept	Creek banks in mixed conifer forests	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
western goblin *Botrychium montanum*		2B.1	July-Sept	Creek banks in old-growth coniferous forests	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS** Status	Survey period	Habitat Requirements	Potential for Occurrence within the Project
northwestern moonwort *Botrychium pinnatum*		2B.3	July-Oct	Montane coniferous forests; in meadows or along creek banks	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
rattlesnake fern *Botrypus virginianus*		2B.2	June	Streams; bogs and fens; lower montane coniferous forest; meadows and seeps	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
Watershield *Brasenia schreberi*		2B.3	Apr-Oct	Freshwater marshes and swamps	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
long-haired star-tulip *Calochortus longebarbatus* var. *longebarbatus*		1B.2	June-Aug	Clay, mesic sites in Great Basin scrub, lower montane coniferous forest openings, meadows and seeps	**Possible.** Suitable habitat may be present within the Project
Callahan's mariposa lily *Calochortus syntrophus*		1B.1	May-June	Cismontane woodland; vernally mesic valley and foothill grassland	**Possible.** Suitable habitat may be present within the Project
Butte County morning-glory *Calystegia atriplicifolia* ssp. *buttensis*		4.2	May-July	Dry, rocky places in open forest, chaparral	**Possible.** Suitable habitat may be present within the Project
Castle Crags harebell *Campanula shetleri*		1B.3	June-Sept	In protected rock crevices in granite; lower montane coniferous forests	**Unlikely.** No granitic rock outcrops present within the survey corridors
bristly sedge *Carex comosa*		2B.1	May-Sept	Marshes and swamps (lake margins); valley and foothill grasslands	**Possible.** Although limited, suitable wetland habitat may be present within the Project
woolly-fruited sedge *Carex lasiocarpa*		2B.3	June-July	Bogs and fens; freshwater marshes and swamps, lake margins	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Lassen paintbrush *Castilleja lassenensis*		1B.3	June-Sept	Meadows and seeps; subalpine forest (volcanic)	**Unlikely.** Known occurrences restricted to flanks of Lassen and granite substrates in the Sierras

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS** Status	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Shasta clarkia *Clarkia borealis* ssp. *arida*		1B.1	June-Aug	Cismontane woodlands	**Possible.** Suitable habitat may be present within the Project
northern clarkia *Clarkia borealis* ssp*. borealis*		4.3	June-Sept	Cismontane woodland; lower montane coniferous forest	**Possible.** Suitable habitat may be present within the Project
silky cryptantha *Cryptantha crinita*		1B.2	April-May	Gravelly streambeds of cismontane woodlands, valley foothill grasslands, lower montane coniferous forests, and riparian forests	**Possible.** Although limited, suitable streambed habitat may be present within the Project
Jepson's dodder *Cuscuta jepsonii*		1B.2	July-Sept	Broadleafed upland forest, lower and upper montane coniferous forest (host spp. are *Ceanothus diversifolius* and *C. prostratus*)	**Possible.** Suitable habitat may be present within the Project
English sundew *Drosera anglica*		2B.3	June-Sept	Bogs and fens; meadows	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
Oregon fireweed *Epilobium oreganum*		1B.2	June-Sept	Montane coniferous forests; in and near springs and bogs; sometimes on serpentine	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Tracy's eriastrum *Eriastrum tracyi*		3.2	June-July	Open areas on shale or alluvium	**Possible.** Suitable habitat may be present within the Project
blushing wild buckwheat *Eriogonum ursinum var. erubescens*		1B.3	June-Sept	Rocky sites within lower montane coniferous forest and montane chaparral	**Possible.** Suitable habitat may be present within the Project
Shasta limestone monkeyflower *Erythranthe taylorii*		1B.1	April-May	Openings, carbonate crevices and rocky outcrops of cismontane woodlands and lower montane coniferous forest	**Unlikely.** Suitable carbonate habitat not present within survey corridors
Shasta fawn lily *Erythronium shastense*		1B.2	March-April	Usually carbonate, rocky, north-facing or shaded slopes in cismontane woodland and lower montane coniferous forest	**Unlikely.** No suitable carbonate habitats present within the survey corridors

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS** Status	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Butte County fritillary *Fritillaria eastwoodiae*		3.2	March-June	Dry benches, slopes of yellow pine forest, chaparral	**Possible.** Suitable habitat may be present within the Project
Boggs Lake hedge hyssop *Gratiola heterosepala*		1B.2	April-Aug	Freshwater marshes and swamps, vernal pools; clay soils	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
Stebbins' harmonia *Harmonia stebbinsii*		1B.2	May-June	Chaparral and lower montane coniferous forests; in ultramafic soils, often along roads	**Unlikely.** No ultramafic substrates present within the Project
little hulsea *Hulsea nana*		2B.3	July-Aug	Alpine boulder and rock fields, subalpine coniferous forests; volcanic substrates	**Unlikely.** Suitable habitat not present within the Project
Baker's globe mallow *Iliamna bakeri*		4.2	June-Sept	Chaparral, juniper woodland	**Possible.** Suitable habitat may be present within the Project
Castle Crags ivesia *Ivesia longibracteata*		1B.3	June	Crevices in granitic cliffs; lower montane coniferous forests	**Unlikely**. No granitic cliff habitat present within the survey corridors
Finger rush *Juncus digitatus*		1B.1	May-June	Vernal pools, swales, volcanic seeps	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*		1B.1	March-May	Vernally mesic meadows and seeps; valley and foothill grassland; vernal pools	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Santa Lucia dwarf rush *Juncus luciensis*		1B.2	April-July	Vernal pools, ephemeral drainages, wet meadows habitats and streamsides	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Cantelow's lewisia *Lewisia cantelovii*		1B.2	May-Oct	Mesic, granite; lower montane coniferous forest; cismontane woodland	**Unlikely.** Suitable granitic or serpentine seeps not present within the Project
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*		1B.2	April-June	Mesic; cismontane woodland; meadows and seeps	**Possible.** Although limited, suitable wetland habitat may be present within the Project
tufted loosestrife *Lysimachia thyrsiflora*		2B.3	May-Aug	Meadows and seeps; mesic; upper montane coniferous forest	**Possible.** Although limited, suitable wetland habitat may be present within the Project

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS** Status	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Three-ranked hump-moss *Meesia triquetra*		4.2	July	Wetlands (fens)	**Possible.** Although extremely limited, suitable wetland habitat may be present within the Project
broad-nerved hump-moss *Meesia uliginosa*		2B.2	July, Oct	Moss on damp soil within meadows and seeps, bogs and fens, upper montane coniferous forest, and subalpine coniferous forest	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Shasta snow-wreath *Neviusia cliftonii*		1B.2	May-June	Lower montane coniferous forests, riparian woodlands; shady, north-facing or sheltered canyons	**Possible.** Although limited, suitable habitats may be present within the Project
slender Orcutt grass *Orcuttia tenuis*	T	1B.1	May-Oct	Vernal pools	**Unlikely.** No vernal pool habitat present within the survey corridors
Cascade grass of Parnassus *Parnassia cirrata* var. *intermedia*		2B.2	Aug-Sept	Rock serpentine soils; montane coniferous forests, meadows and seeps, bogs and fens	**Unlikely.** Suitable habitat absent from the survey corridors; nearest occurrence approximately 30 miles northwest of site
thread leaved beardtongue *Penstemon filiformis*		4.2	May-Aug	Cismontane woodlands and lower montane coniferous forests; dry stony sites, grassy openings, and meadows	**Possible.** Suitable habitat may be present within the Project
Engelmann spruce *Picea engelmannii*		2B.2	May-June	Upper montane coniferous forest	**Possible.** Suitable habitat may be present within the Project
Sierra blue grass *Poa sierrae*		1B.3	April-June	Lower montane coniferous forests; shady, moist, rock slopes; often in canyons	**Possible.** Suitable habitat may be present within the Project
Profuse flowered pogogyne *Pogogyne floribunda*		4.2	May-Sept	Vernal pools, seasonal lakes	**Unlikely.** No suitable habitat present within the survey corridors
Modoc county knotweed *Polygonum polygaloides* ssp. *esotericum*		1B.3	May-Sept	Mesic; lower montane coniferous forest (vernal pools)	**Unlikely.** No vernal pool habitat present within the survey corridors

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS** Status	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Eel grass pondweed *Potamogeton zosteriformis*		2B.2	June-July	Freshwater marsh	**Unlikely.** No suitable habitat present within the survey corridors
Newberry's cinquefoil *Potentilla newberryi*		2B.3	May-Aug	Receding shorelines	**Unlikely.** No suitable habitat present within the survey corridors
Pacific fuzz wort *Ptilidium californicum*		4.3	May-Aug	Bark of standing mature or recently fallen logs	**Possible.** Although limited, suitable wetland habitat may be present within the Project
marsh sckullcap *Scutellaria galericulata*		2B.2	June-Sept	Meadows and freshwater marshes of lower montane coniferous forests	**Possible.** Although limited, suitable wetland habitat may be present within the Project
Canyon creek stonecrop *Sedum obtusatum* ssp. *paradisum*		1B.3	May-June	In crevices of exposed granite; chaparral and coniferous forests	**Unlikely.** No exposed granite habitat present within the survey corridors
long-stiped campion *Silene occidentalis* ssp. *longistipitata*		1B.2	July-Aug	Lower and upper montane coniferous forest	**Possible.** Suitable habitat may be present within the Project
Klamath Mountain catchfly *Silene salmonacea*		1B.2	June-July	Openings, usually serpentine, within lower montane coniferous forest	**Unlikely.** Potential suitable habitat likely absent within the survey corridors
English Peak greenbriar *Smilax jamesii*		4.2	May-July	Riparian, streambanks, lake margins	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
hairy marsh hedgenettle *Stachys pilosa*		2B.3	June-Sept	Mesic sites in Great Basin scrub	**Unlikely.** Suitable scrub habitat not present within the survey corridors
Long leaved starwort *Stellaria longifolia*		2B.2	May-July	Meadows and seeps, riparian woodlands	**Possible.** Although limited, suitable wetland/riparian habitat may be present within the Project
Fineleaf pondweed *Stuckenia filiformis* ssp. *alpina*		2B.2	May-July	Shallow, clear water of lakes, drainage channels	**Unlikely.** Potential suitable habitat absent from the survey corridors
Piorkowski's clover *Trifolium piorkowski*		1B.2	April-May	Chaparral, cismontane woodland, lower montane coniferous forest (volcanic clay)	**Unlikely.** Potential suitable habitat likely absent within site; nearest occurrence over 30 miles north of site

Appendix A. Federally listed and California Native Plant Society- (CNPS) listed rare plant species and their potential for occurrence within the Fountain Wind Project.

Species	Federal Status*	CNPS** Status	Survey period	Habitat Requirements	Potential for Occurrence within the Project
Siskiyou clover *Trifolium siskiyouense*		1B.1	June-July	Wet mountain meadows	**Unlikely.** Potential suitable habitat likely absent from the survey corridors; nearest occurrence on volcanic plateau approximately 30 miles south of Project
Greene's tuctoria *Tuctoria greenei*	E	1B.1	May-July	Vernal pools	**Unlikely.** No vernal pool habitat present within the survey corridors
Shasta huckleberry *Vaccinium shastense* ssp. *shastense*		1B.3	Dec-May	Acidic, mesic site; often on streambanks; sometimes on rocky outcrops, seeps, roadsides, and disturbed areas (chaparral, lower montane and subalpine coniferous forest, and riparian forest)	**Possible.** Although limited, suitable habitat may be present within the Project
oval-leaved viburnum *Viburnum ellipticum*		2B.3	May-June	Chaparral, cismontane woodlands, and lower montane coniferous forests	**Possible.** Suitable habitat may be present within the Project

Information from CNPS 2021, California Natural Diversity Database 2021, US Fish and Wildlife Service 2017.

*E: Federally listed endangered species; T: Federally listed threatened species

**CNPS: California Rare Plant Ranks (CNPS 2021):

CNPS 1A: Plants presumed extirpated in California and either rare or extinct elsewhere.

CNPS 1B: Plants rare, threatened, or endangered in California and elsewhere.

CNPS 2A: Plants presumed extirpated in California, but common elsewhere.

CNPS 2B: Plants rare, threatened, or endangered in California, but more common elsewhere.

CNPS 3: Plants about which more information is needed – a review list.

CNPS 4: Plants of limited distribution – a watch list.

Threat Ranks

- 0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat).
- 0.2 − Moderately threatened in California (20-80% of occurrences threatened/moderate degree and immediacy of threat).
- 0.3 – Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known).

Appendix B. Botanical Field Surveyor Qualifications

Appendix C. Plant Species Encountered within the Fountain Wind Project

Appendix C. Plant Species Encountered within the Fountain Wind Project During the 2018, 2019, and 2021 Rare Plant Surveys.

Family	Scientific Name*	Common Name
ALLIACEAE	***Allium* spp.**	onion
ANACARDIACEAE	***Toxicodendron diversilobum***	poison oak
APIACEAE	***Lomatium* spp.**	lomatium
	Osmorhiza berteroi	sweet cicely
ARISTOLOCHIACEAE	***Asarum hartwegii***	Hartweg's wild ginger
ASCLEPIADACEAE	***Asclepias cordifolia***	heart leaf milkweed
	Asclepias speciosa	showy milkweed
ASTERACEAE	***Achillea millefolium***	common yarrow
	Agoseris grandiflora	giant mountain dandelion
	Centaurea solstitialis	yellow star thistle
	Cichorium intybus	chicory
	Cirsium vulgare	bull thistle
	***Erigeron* spp.**	fleabane
	Helenium bigelovii	Bigelow's sneezeweed
	Helianthella californica	California helianthella
	Lactuca serriola	prickly lettuce
	Madia glomerata	mountain tarweed
	Taraxacum officinale	common dandelion
	Wyethia mollis	mountain mule ear
BERBERIDACEAE	***Mahonia repens***	creeping barberry
BETULACEAE	***Alnus incana* ssp. *tenuifolia***	mountain alder
BORAGINACEAE	*Cynoglossum officinale*	houndstongue
	Eriodictyon californicum	California yerba santa
BRASSICACEAE	***Nasturtium officinale***	watercress
CAMPANULACEAE	***Asyneuma prenanthoides***	California harebell
CAPRIFOLIACEAE	***Symphoricarpos mollis***	creeping snowberry
CELASTRACEAE	***Paxistima myrsinites***	Oregon boxleaf
CONVOLVULACEAE	*Convolvulus* spp.	morning glory
CORNACEAE	***Cornus nuttallii***	mountain dogwood
CUPRESSACEAE	***Calocedrus decurrens***	Incense-cedar
CYPERACEAE	***Carex inops* ssp. *inops***	long-stoloned sedge
	Carex nebrascensis	Nebraska sedge
	Carex praegracilis	field sedge
	Carex utriculata	beaked sedge
	Carex spp.	sedge
	Cyperus acuminatus	tapertip flatsedge
	Eleocharis acicularis	needle spikerush
	Eleocharis macrostachya	common spikerush
	Schoenoplectus acutus	tule
DENNSTAEDTIACEAE	***Pteridium aquilinum* var. *pubescens***	Western brackenfern
EQUISETACEAE	***Equisetum arvense***	common horsetail
	Equisetum hymale	Scouring-rush horsetail
ERICACEAE	***Arctostaphylos patula***	greenleaf manzanita
	Chimaphila menziesii	pipsissewa
	Pterospora andromedea	pinedrops
	Pyrola picta	whiteveined shinleaf
FABACEAE	***Lathyrus lanszwertii***	Nevada pea
	Lupinus argenteus	silvery lupine
	Trifolium pratense	red clover
FAGACEAE	***Chrysolepis sempervirens***	chinquapin
	Quercus kelloggii	California black oak
GROSSULARIACEAE	***Ribes roezlii***	Sierra gooseberry

Appendix C. Plant Species Encountered within the Fountain Wind Project During the 2018, 2019, and 2021 Rare Plant Surveys.

Family	Scientific Name*	Common Name
	Ribes divaricatum	spreading gooseberry
HYPERICACEAE	*Hypericum perforatum*	Klamath weed
IRIDACEAE	***Iris tenuissima***	slender iris
JUNCACEAE	***Juncus balticus***	Baltic rush
	Juncus ensifolius	swordleaved rush
	Juncus tenuis	slender rush
LAMIACEAE	***Mentha arvensis***	field mint
	Monardella odoratissima	mountain monardella
	Prunella vulgaris	self-heal
LILIACEAE	***Lilium pardalinum***	leopard lily
	Zigadenus venenosus	death camas
MELANTHIACEAE	***Trillium ovatum***	Pacific trillium
	Veratrum californicum	California corn lily
MYRSINACEAE	***Lysimachia latifolia***	Pacific starflower
OLEACEAE	***Fraxinus latifolia***	Oregon ash
ONOGRACEAE	***Epilobium angustifolium***	fireweed
	Epilobium brachycarpum	tall annual willowherb
	Epilobium ciliatum	fringed willowherb
ORCHIDACEAE	***Corallorhiza maculata***	spotted coralroot
	Platanthera dilitata* var. *leucostachys	Sierra bog orchid
	Spiranthes romanzoffiana	hooded lady's tresses
OROBANCHACEAE	***Boschniakia strobilacea***	California groundcone
	Pedicularis densiflora	Indian warrior
PAPAVERACEAE	***Dicentra formosa***	bleeding heart
PINACEAE	***Abies concolor***	white fir
	Pinus lambertiana	sugar pine
	Pinus jeffreyi	Jeffrey pine
	Pinus ponderosa	ponderosa pine
	Pseudotsuga menziesii	Douglas fir
PLANTAGINACEAE	***Veronica anagallis-aquatica***	water speedwell
PHRYMACEAE	***Mimulus guttatus***	seep monkeyflower
POACEAE	*Agrostis stolonifera*	bent grass
	Alopecurus aequalis	shortawn foxtail
	Bromus carinatus	mountain brome
	Bromus tectorum	cheatgrass
	Cynosurus echinatus	annual dogtail grass
	Danthonia californica	California oatgrass
	Deschampsia cespitosa	tufted hairgrass
	Elymus trachycaulus	slender wheatgrass
	Glyceria borealis	Northern mannagrass
	Phleum pratense	Timothy
	Poa secunda	Sandberg bluegrass
	Stipa lemmonii	Lemmon's needlegrass
	Stipa nelsonii	mountain needle grass
POLEMONIACEAE	***Gilia aggregata***	scarlet gilia
	Navarretia divaricata	mountain navarretia
POLYGONACEAE	***Eriogonum lobbii***	Lobb's wild buckwheat
	Eriogonum nudum	naked buckwheat
	Eriogonum vimineum	wickerstem buckwheat
RANUNCULACEAE	***Aconitum columbianum***	monkshood
	Ranunculus aquatilis	White water crowfoot
	Thalictrum fendleri	meadow-rue

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Family	Scientific Name*	Common Name
RHAMNACEAE	***Ceanothus cordulatus***	mountain whitethorn
	Ceanothus cuneatus	buckbrush
	Ceanothus prostratus* var. *prostratus	Mahala mat
	Ceanothus velutinus	tobacco brush
	Frangula californica	California coffeeberry
ROSACEAE	***Fragaria virginiana***	mountain strawberry
	Potentilla gracilis	Northwest cinquefoil
	Prunus emarginata	bitter cherry
	Rosa woodsii	interior rose
	Rubus armeniacus	Himalayan blackberry
	Rubus parviflorus	thimbleberry
RUBIACEAE	***Galium aparine***	common bedstraw
RUSCACEAE	***Maianthemeum stellatum***	starry false lily of the valley
SALICACEAE	***Salix scouleriana***	Scouler's willow
SAPINDACEAE	***Acer circinatum***	vine maple
	Acer macrophyllum	bigleaf maple
SCROPHULARIACEAE	***Pedicularis* spp.**	lousewort
	Penstemon neotericus	Plumas County beardtongue
	Verbascum thapsus	common mullein
VERBENACEAE	***Verbena lasiostachys***	western vervain
VIOLACEAE	***Viola glabella***	stream violet

*Native plant species in bold.