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To:	Kaycee Chang	From:	Caitlin Barns
	California Energy Commission		Stantec Consulting Services, Inc.
Project/File:	Fountain Wind Project (23-OPT-01)	Date:	February 5, 2025

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

Fountain Wind, LLC (Project) is proposing to develop the Fountain Wind Project in Shasta County. This memo has been prepared in order to provide evidence related to the significance of Project impacts to the monarch butterfly (specifically, the western populations of the monarch butterfly) under the California Environmental Quality Act (CEQA) Public Resources Code § 21000 *et seq.*

The monarch butterfly is a species of migratory wildlife and a candidate for listing under the federal Endangered Species Act. An analysis of the significance of potential impacts to monarch butterflies under CEQA can be carried out under criteria (a) and (d) in CEQA's Appendix G, concerning substantial adverse effects to candidate species and migratory wildlife corridors, respectively. The discussion below relies on Western Ecosystems Technology, Inc.'s (WEST's) *Monarch Butterfly Risk Assessment*, dated January 9, 2025 and, attached here as **Exhibit A**. This memorandum analyzes the potential Project-related impacts to the western populations of the monarch under criteria (a) and (d) in Appendix G, and concludes that these impacts are **less than significant**.

(a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Appendix G's significance criterion (a) describes a significant environmental impact as "a substantial adverse effect on...any species." According to the Endangered Species Act, "the term 'species' includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." 16 USC § 1532 (16). By referring to substantial adverse effects on "species," impacts under significance criteria (a) are understood to be at a "species" or "population" level rather than at the level of the individual animal or plant.

Both CEQA and the National Environmental Policy Act (NEPA) call for agencies to direct their findings of significant biological impacts from projects to species at the population level, rather than impacts to individuals of the species. Section 21001 of the Public Resources Code indicates that a purpose of CEQA is to "prevent the elimination of fish or wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self-sustaining levels and preserve for future generations representations of all plant and animal communities." CEQA Guidelines § 15065 ("Mandatory Findings of Significance") underscores that significant environmental impacts to species under CEQA are understood at the population level as opposed to impacts to individuals. Specifically, § 15065 calls for a determination of

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

significant effect whenever there is substantial evidence to show that a “wildlife *population* [will] drop below [a] self-sustaining [level],” “threaten to eliminate a plant or animal community,” or “substantially reduce the number or restrict the range of a [listed] species.”

Projected impacts to a small number of individuals is expressly recognized under NEPA, on which CEQA is modeled,¹ *not* to rise to the level of environmental “significance.” See *Western Watersheds Project v. Salazar*, 993 F. Supp. 2d 1126, 1136 (C.D. Cal. 2012) (no significant impact to desert tortoise where juveniles and eggs would be destroyed by solar energy project where species in recovery unit would not be significantly affected; NEPA directs an agency to consider the degree of adverse effect on a species, not the impact on individuals of that species); see also *Environmental Protection Information Center v. U.S. Forest Service*, 451 F.3d 1005 (9th Cir. 2006) (potential harm to northern spotted owl was not significant environmental impact under NEPA based projected take of three nests or pairs of owls; significant impact is determined by the degree of adverse effect on a species, not the impact on individuals of that species); *Native Ecosystems Council v. U.S. Forest Service* (9th Cir. 2005), 428 F.3d 1233 (“[I]t does not follow that the presence of some negative effects necessarily rises to the level of demonstrating a significant effect on the environment.”); *Greater Yellowstone Coalition v. Flowers*, 359 F.3d 1257, 1276 (10th Cir. 2004) (“[I]ssuance of an incidental take statement anticipating the loss of some members of a threatened species does not automatically lead to the requirement to prepare a full EIS.”)

Despite this authority, some agencies have taken to finding a significant impact on the environment under CEQA whenever a project is projected to “take” individuals of a species. This is a misconstruction of the statute. The significance thresholds in Appendix G are not stated in terms of whether a project will result in the “take” one or more individual members of a species. Indeed, the courts have clarified that the purpose of CEQA is not to determine if a project will result in the “take” of individuals of a species. See *Association of Irrigated Residents v. County of Madera* (2003) 107 Cal. App. 4th 1383 (CEQA neither requires a lead agency to reach a legal conclusion regarding “take” of an endangered species nor compels an agency to demand an applicant to obtain an incidental take permit from another agency). To our knowledge, no agency has formally adopted “take” of individual members of a listed species as an environmental standard to establish a threshold of significance. See CEQA Guidelines § 15064.7(d): “Any public agency may adopt or use an environmental standard as a threshold of biological significance” through a formal public review process.”

“Take” of individuals of a species rarely results in the elimination of a species or a drop in population below self-sustaining levels. Indeed, if it did, the California Department of Fish and Wildlife would not routinely issue take permits for harm to individuals of a species since the issuance of take permits depends on the finding that the take will *not* jeopardize the species at a population level. In addition, in the rare instance in which there would a species-level impact from a single project, such an impact would rarely be significant and *unavoidable*, if mitigation for the impact is available.

¹ See *Citizens of Goleta Valley v. Board of Supervisors*, (Cal. 1990) 52 Cal.3d 553, 565, fn. 4: “CEQA was modeled on the National Environmental Policy Act (NEPA)” and “we have consistently treated judicial and administrative interpretation of the latter enactment as persuasive authority in interpreting CEQA.”

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

Typically, for a project to have a population-level impact, the impacts would need to involve a substantial number of individuals and be crucial to breeding or other critical life history phases. For the monarch, the habitat most critical to the continued existence of the species is overwintering sites. As described in Table 1 in Exhibit A, the top five influences on western monarch populations are the availability of milkweed, the availability of other nectar resources (i.e., flowering plants), the use of insecticides, climate change, and the availability of overwintering habitat. Wind energy facilities are not known to impact large numbers of individual monarchs through collision.

Availability of Milkweed

Monarchs are entirely dependent upon milkweed (*Asclepias* sp.) for their early life stages, and will lay eggs only on milkweed plants. Milkweed is also a primary source of nectar for adult butterflies. Therefore, any impacts to concentrations of milkweed have the potential to negatively impact monarch populations. The Project site is not located within a high-priority monarch breeding area, and, though the monarch's milkweed host plant was documented within the Project site, it is expected to occur in low densities. As a result, the Project site could host individual monarchs and support eggs and larvae, but is not likely to host high densities of milkweed such that impacts to onsite milkweed populations would threaten the continued existence of a monarch population. In addition, because milkweed is a plant species which readily germinates along roads and other disturbed areas, ground disturbance and tree removal resulting from Project construction can provide an opportunity for the establishment of milkweed plants (which can be measured and monitored by the Applicant, and enhanced through additional milkweed plantings, as desired, post-construction), thereby improving monarch habitat.

Availability of Flowering Plants

Adult monarchs feed on a variety of flowering plants. Because the Project would disturb only a small area of habitat suitable for the types of flowering plants that monarchs would feed on, construction of the Project would have a very small impact on the availability or diversity of flowering plants within the Project site; furthermore, the removal of trees along roadsides and around Project infrastructure can provide an opportunity for establishment of flowering plants which typically cannot grow in the light-starved environment beneath an evergreen canopy. Construction of the Project would therefore not have a substantial adverse impact on the availability of flowering plants for monarchs.

Use of Insecticides

The Project does not propose to use insecticides and therefore there would be no associated adverse impact.

Climate Change

Climate change is recognized to be one of the chief threats to biodiversity and to potential loss of habitat for species.² When operational, the Project would produce energy with zero air emissions, assisting California in meeting the renewable energy generation targets set in Senate Bill 100 and offset approximately 128,000

² U.S. Fish and Wildlife Service. Climate Change. Available at: <https://www.fws.gov/climate-change>. Accessed January 28, 2025.

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

metric tons of carbon dioxide emissions generated by fossil fuels³. As a result, construction of the Project would contribute to California's efforts to combat climate change, indirectly benefiting habitat for monarch butterflies.

Availability of Overwintering Sites

Monarchs overwinter in select and specific coastal groves of trees in central and southern California, and exhibit strong site fidelity, meaning they return to the same trees year after year. These overwintering sites are critical to individuals' ability to survive the winter and therefore the continued survival of the western populations and the species as a whole. However, because this species is so dependent upon specific groves of trees, they are at great risk if, for example, any of the overwintering groves are removed via human activities, wildfire, or storm. The Project site is not within the overwintering range of this species and would therefore have no impact on the availability of overwintering sites.

The Project would not affect overwintering sites for the western populations of the monarch and would not substantially affect monarch habitat (milkweed and nectar plants), and there is no evidence to suggest that individual monarchs collide with wind turbines, as discussed in **Exhibit A**. Thus, there is no evidence to support a conclusion that the project would have a population-level impact on this species. The Project's impact on this species should be considered less-than-significant under this Appendix G criterion. Further, even if the take of individuals of the species could be considered to be a significant impact under CEQA (which we have demonstrated above is not the case under the significance standards in the statute), mitigation measures are available to reduce that impact to a less than significant level, as discussed below.

Taken in combination, construction of the Project would have little to no negative impacts to monarchs at a population level under this criterion. As a result, the Project would not have a substantial adverse effect on monarch butterfly (identified as a candidate for listing under the Endangered Species Act by U.S. Fish and Wildlife Service [USFWS]). Impacts would be less than significant.

(d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

As a migratory species, potential impacts to monarch butterfly movement, migratory corridors, and nursery sites are analyzed under criterion (d) in Appendix G of the California Environmental Quality Act. As described in **Exhibit A**, monarchs are known for their long migrations to and from overwintering sites on the central and southern California coasts. As described in the preceding analysis under criterion (a), the Project site is not within or close to overwintering sites, and represents dispersed habitat for egg-laying and foraging adults during summer and migratory periods. While the Project site is located within the broad migratory corridors for this species (representing much of the state of California where flowering plants are available), and could serve as stopover habitat for migrating individuals, construction of the Project will not impede monarch movement, eliminate important foraging grounds, or impact the availability of milkweed host plants for early life stages. As previously noted, construction of the Project may actually improve

³ Shasta County. 2020. Draft Environmental Impact Report, Fountain Wind Project. Section 2.3, Project Objectives.

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

monarch habitat onsite by creating opportunities for new grassland establishment and growth of flowering plants and milkweed in areas that had previously been totally covered by tree canopy.

Project turbine collisions are also unlikely to be a source of mortality to a degree that would affect monarchs at a species or population level. Given the Project's location in the monarch's summer breeding range, there is potential for direct impacts to monarchs at the Project site; however, direct impacts are anticipated to be low or very low given the limited amount of suitable habitat present in the Project siting corridors, and the Project's location in a region of more broad scale monarch dispersal, unlike the more highly concentrated presence of monarchs at overwintering sites. As discussed in Exhibit A, no substantial evidence exists that wind turbine collisions interfere with monarch migration.

Construction of the Project will not interfere with monarch movement, impact a migratory corridor, or substantially impede use of host plants for egg-laying or foraging, nor will it remove important overwintering habitats. As a result, impacts to monarch under this criterion are less than significant.

MONARCH PROTECTION MEASURES

The potential for Project-related impacts to the monarch is anticipated to be limited; nevertheless, the Project applicant is willing to commit to avoidance and minimization measures that would minimize impacts to monarchs, suitable breeding and stopover habitat, and nectar plant sources during Project construction and operation.

The Applicant would commit to the following mitigation measures addressing protection of wetland areas (which may provide habitat for the monarch), that would further minimize impacts to monarch individuals during Project construction and operation:

Avoid and Minimize Impacts to Wetlands and Other Waters. The Applicant will avoid and minimize impacts on wetlands and other waters by implementing the following mitigation measures:

- Avoid direct and indirect impacts to wetlands and streams in final siting and design to the maximum extent feasible.
- Design stream crossings, including culverts, to pass a 100-year event without increasing average flow velocity or bed/bank scour potential.
- Monitor stream crossings in burn areas seasonally and maintain culverts and drains, since burned areas may experience sediment and debris loads that could result in clogged or blocked culverts.
- The Applicant shall also submit a site plan showing all aquatic resources and appropriate regulatory buffers or setbacks to the California Energy Commission.
- The Applicant shall assign a qualified wetland scientist to mark all aquatic resources associated with the final project site plan. Temporary high visibility fencing, and signage may be used to help protect these areas. The qualified wetland scientist would also identify corresponding setbacks to aquatic resources, as required by Project permits.

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

- On a continuous basis, a qualified wetland scientist or biological monitor shall be assigned to visually inspect aquatic resources, and surrounding areas, for evidence of hydrologic loss in aquatic areas.
- Develop a Spill Prevention, Control, and Countermeasures (SPCC) Plan to minimize adverse impacts to wetlands.

Compensate for Impacts to Wetlands and other Waters. The Applicant shall implement a Reclamation and Revegetation Plan that includes detailed measures for the compensation, restoration, and/or enhancement of wetlands and other waters on a wetland type per-acre basis. The standard for mitigation shall be no net loss. If restoration is selected as a method of compensatory mitigation, the Applicant shall prepare a wetland mitigation and monitoring plan as part of the Project's reclamation and revegetation plan. Mitigation ratios shall be calculated following U.S. Army Corps of Engineers wetland mitigation procedures and shall be based on the actual impact acreage of final design per as-built construction drawings and the results of the preconstruction surveys. After review and approval by the California Energy Commission and pertinent regulatory agencies, mitigation shall be carried out at a ratio no less than 1:1, or another ratio approved by the appropriate jurisdictional agency, whichever is higher.

Prepare a Wetland Mitigation and Monitoring Plan. The wetland mitigation and monitoring plan shall be written by a qualified biologist and shall include the following elements, at minimum:

- goals of the plan and permitting requirements satisfied;
- wetland restoration activities and locations, including the restoration of temporarily affected wetlands and other waters to preconstruction conditions;
- monitoring and reporting requirements (including monitoring period), and criteria to measure mitigation success;
- remedial measures, should mitigation efforts fall short of established targets.

Restored wetland and riparian habitat shall achieve at least 85 percent survival of individual plants and show progress toward achieving 100 percent of the required mitigation acreage following 5 years of site monitoring and maintenance.

The Applicant shall consult with U.S. Army Corps of Engineers and California Department of Fish and Wildlife about the adequacy of the plan and may consult with other agencies, if the plan aims to fulfill multiple permitting and mitigation requirements.

Water Quality Best Management Practices during Activities in and near Water. To avoid and/or minimize potential impacts on water quality (and jurisdictional waters) during construction- and decommissioning-related project activities that would be conducted near (i.e., within 50 feet), in, or over waterways, the project contractor shall implement the following standard construction BMPs to prevent releases of hazardous materials and to avoid other potential environmental impacts:

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

- In-stream construction shall be scheduled during the summer low-flow season to minimize impacts on aquatic resources. If instream construction takes place during higher flow seasons, the following measures shall be implemented:
- Minimize mechanized equipment use below top of bank of streams;
- Perform activities in accordance with all permit conditions and best practices; and
- Have environmental monitors on-site to monitor instream construction to ensure compliance with permit conditions and best practices.
- All construction material, wastes, debris, sediment, rubbish, trash, etc., shall be removed from the Project Site daily during construction and decommissioning, and thoroughly at the completion of each of these phases. Debris shall be transported to an authorized upland disposal area.
- Consistent with the Project's Hazardous Materials Business Plan (HMBP) and Spill Prevention Control and Countermeasures Plan, construction workers shall receive training prior to construction/ decommissioning and protective measures shall be implemented to prevent accidental discharges of oils, gasoline, or other hazardous materials to jurisdictional waters during fueling, cleaning, and maintenance of equipment, as outlined in the Project's HMBP. Equipment used to perform construction work on the Project Site shall be maintained in accordance with manufacturers' protocols, and, except in the case of failure or breakdown, equipment maintenance shall be performed off-site. Crews shall check heavy equipment daily for leaks; if a leak is discovered, it shall be immediately contained and use of the equipment shall be suspended until repaired. The source of the leak shall be identified, material shall be cleaned up, and the cleaning materials shall be collected and properly disposed.
- Vehicles and equipment shall be serviced off-site, or, if on-site service is necessary, in a designated location a minimum distance of 100 feet from drainage channels and other waterways. Fueling locations shall be inspected after fueling to document that no spills have occurred. Any spills shall be cleaned up immediately.

Additional measures that would specifically address impacts to monarchs that the Applicant would commit to, if needed, include:

Avoidance of Suitable Monarch Habitat. Project construction would prioritize avoidance of direct impacts to suitable monarch habitats (e.g., wetlands and other preferred habitats, such as prairies, meadows, and other open grassland) within the Project site during the summer breeding season when monarchs (adults and caterpillars) are potentially present at the Project site (generally, June through September at Project elevation).

Host Plant Establishment and Monitoring. Following construction, the portions of the staging and laydown area not used for permanent operation and maintenance activities would be restored to preconstruction conditions in accordance with the Project-specific Habitat Restoration Plan. Milkweed and other vegetation suitable for monarch habitat could be planted as part of this restoration process in these areas, as well as along access roadways and other disturbed areas.

Reference: Potential Impacts of the Fountain Wind Project on Western Monarch Butterfly

Prohibition of Insecticides/Monitored Use of Pesticides. The Project does not propose to use insecticides, and places strict conditions on the use of pesticides (including herbicides) for the purpose of fire safety near Project infrastructure. Use of pesticides will be governed by relevant state and federal regulations and best practices and outlined in a Project-specific Vegetation Management Plan.

CONCLUSION

Multiple factors threaten the health of the western monarch populations, including the thousands of non-wind development projects approved and built in California each year. To the extent a different analysis might determine that the Project could result in a significant impact to monarchs under CEQA's population-based criteria, mitigation measures are available that would reduce such impacts to a less than a less than significant level on both a project and a cumulative basis, as demonstrated above. A project has a less than cumulatively considerable impact where the incremental effects of an individual project are not significant when viewed in connection with the effects of past projects, the effects of other current projects and the effects of probable future projects (CEQA Guidelines Section 15065[a][3]). No evidence supports the conclusion that incremental effects of the Fountain Wind Energy Project can be considered "significant" under CEQA significance criteria, in light of other sources of impact to the monarch butterfly.

**Exhibit A. Monarch Butterfly Risk Assessment for the Fountain Wind Project, Shasta County,
California**



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TECHNICAL MEMORANDUM

DATE: January 9, 2025

TO: Christy Herron, Senior Manager for Renewables, Repsol

FROM: Marni Koopman, Kate Tillotson-Chavez, and Joel Thompson, Western EcoSystems Technology, Inc.

RE: Monarch Butterfly Risk Assessment for the Fountain Wind Project, Shasta County, California

INTRODUCTION

Fountain Wind LLC contracted Western EcoSystems Technology, Inc. (WEST) to provide biological study support during the California Energy Commission's review of the proposed Fountain Wind Project (Project) in Shasta County, California, under the California Environmental Quality Act. The proposed Project falls within the migratory range of the monarch butterfly (*Danaus plexippus*). Monarchs were first petitioned for federal listing under the Endangered Species Act (ESA 1973) in 2014 and in 2020, the USFWS found that the listing was warranted but precluded by higher priority actions (U.S. Fish and Wildlife Service [USFWS] 2020a). On December 11, 2024, the USFWS announced its decision to list the monarch as a federally threatened species with 4(d) rule and with critical habitat proposed in Alameda, Marin, Monterey, San Luis Obispo, Santa Barbara, Santa Cruz and Ventura counties in California (USFWS 2024). Currently within California, the monarch has no status under the California Endangered Species Act (CESA) but is listed as an invertebrate of conservation priority with a state rank of S2 (Imperiled; CNDDDB 2024). The following memorandum provides an assessment of the potential risk to monarch butterflies and their breeding and foraging habitat posed by development and operation of the Project.

PROJECT SITE

The Project's Siting Corridors include all areas of potential disturbance associated with Project infrastructure (e.g., roads, underground collection, turbine pads) and encompass approximately 850 acres (ac) of privately-owned commercial timberlands in Shasta County, California (Figure 1). The Project is located west of the unincorporated town of Burney and northeast of the city of Redding. California State Route 299 (SR 299) runs along the northern boundary of the Project and the Hatchet Ridge Wind Farm, in operation since 2010, is located less than two miles (mi) to

the northeast. The Lassen National Forest is located to the southeast of the Project and the Shasta-Trinity National Forest is located to the north and west. Most of the remaining areas surrounding the Project are privately-owned timberlands.

The dominant vegetation type in and around the Project Siting Corridors is mixed coniferous forest (both post-fire and unburned, with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub (Figure 2). The primary land use in this area is commercial timber production.

In 1992, the Fountain Fire burned approximately 64,000 ac in and around the Project, including an area encompassing the northern two-thirds of the Project Siting Corridors (Figures 1 and 2). Post-fire management included salvage logging, site preparation, and planting in the year following the fire. In the 32 years since the fire, the previously burned areas have become predominantly covered by dense stands of regenerating, early seral mixed conifer forest. Management activities in the burned areas are primarily restricted to pre-commercial thinning, while commercial timber harvest operations are currently being conducted within the southeastern portions of the Project (Figure 2).

SPECIES BACKGROUND AND OCCURRENCE

The monarch butterfly is a species in the family Nymphalidae, known for its wide-ranging migration and iconic orange and black markings. Monarch butterflies are native to North America and the Caribbean. They have been widely introduced and occur in North, Central, and South America, Australia, New Zealand, and the Pacific islands. North American monarchs are subdivided into eastern and western populations based on their differing migratory and overwintering habits and are generally divided by the Rocky Mountains. In addition, non-migratory resident populations of monarchs are found in Florida, the Gulf Coast, and California (USFWS 2020b).

The eastern population occupies more than 70% of the spatial extent of the species' North American range, with individuals in the eastern population flying more than 2,000 mi to reach overwintering sites in Mexico. In contrast, western monarchs migrate from 300–1,000 mi and overwinter in hundreds of groves of trees along the California coast into Baja California, Mexico (Jepsen and Black 2015, Oberhauser and Solensky 2004; Figure 3). In fall, individuals migrate south over many weeks to months to their wintering grounds. In early spring, surviving monarchs mate at western overwintering sites (Leong et al. 1995) and then disperse northward through the breeding grounds where their offspring start the cycle of generational migration over again (Malcolm et al. 1993; Figure 3).

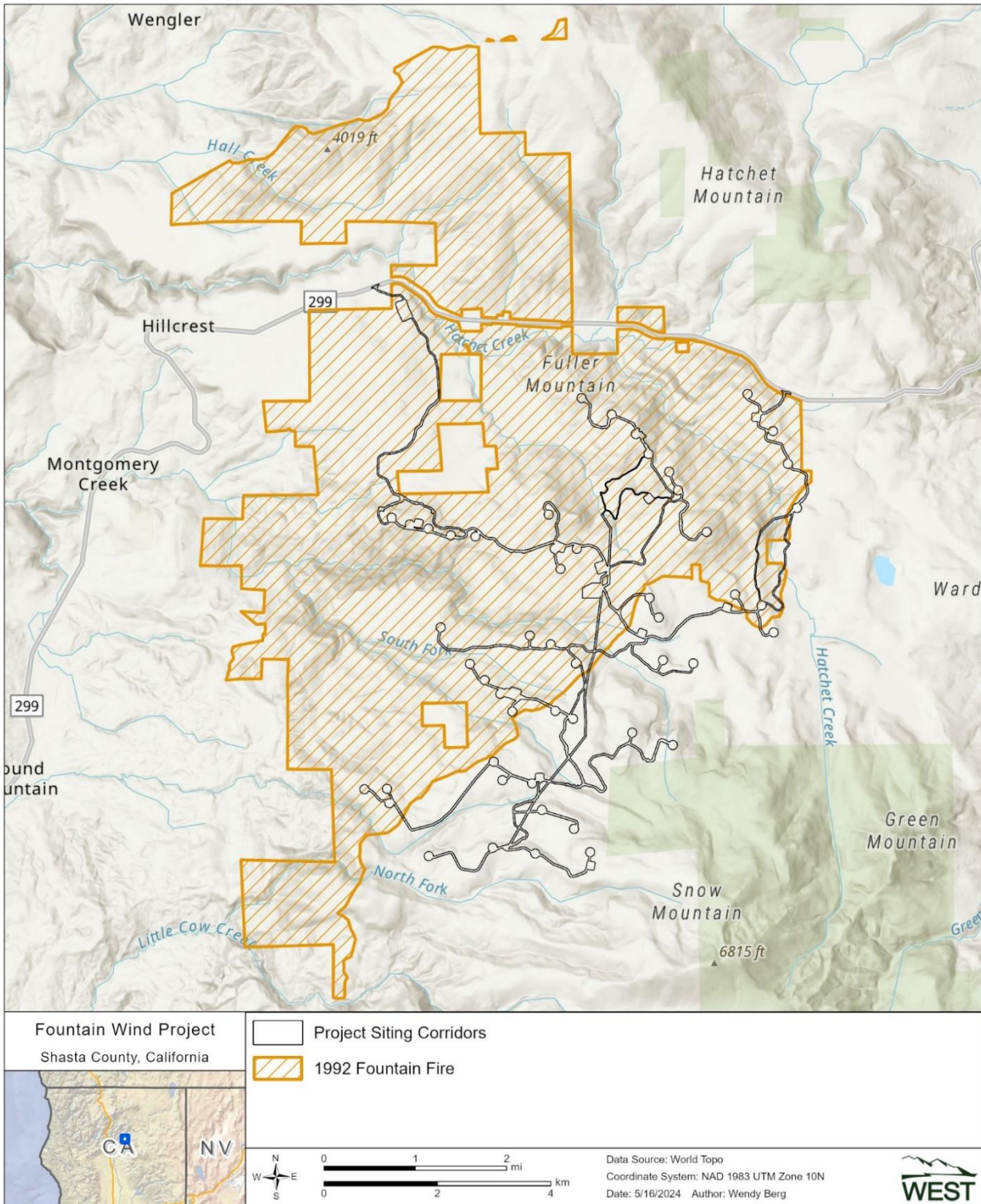


Figure 1. Project Siting Corridors and the 1992 Fountain Fire areal extent (from CAL FIRE 2018) at the Fountain Wind Project in Shasta County, California.

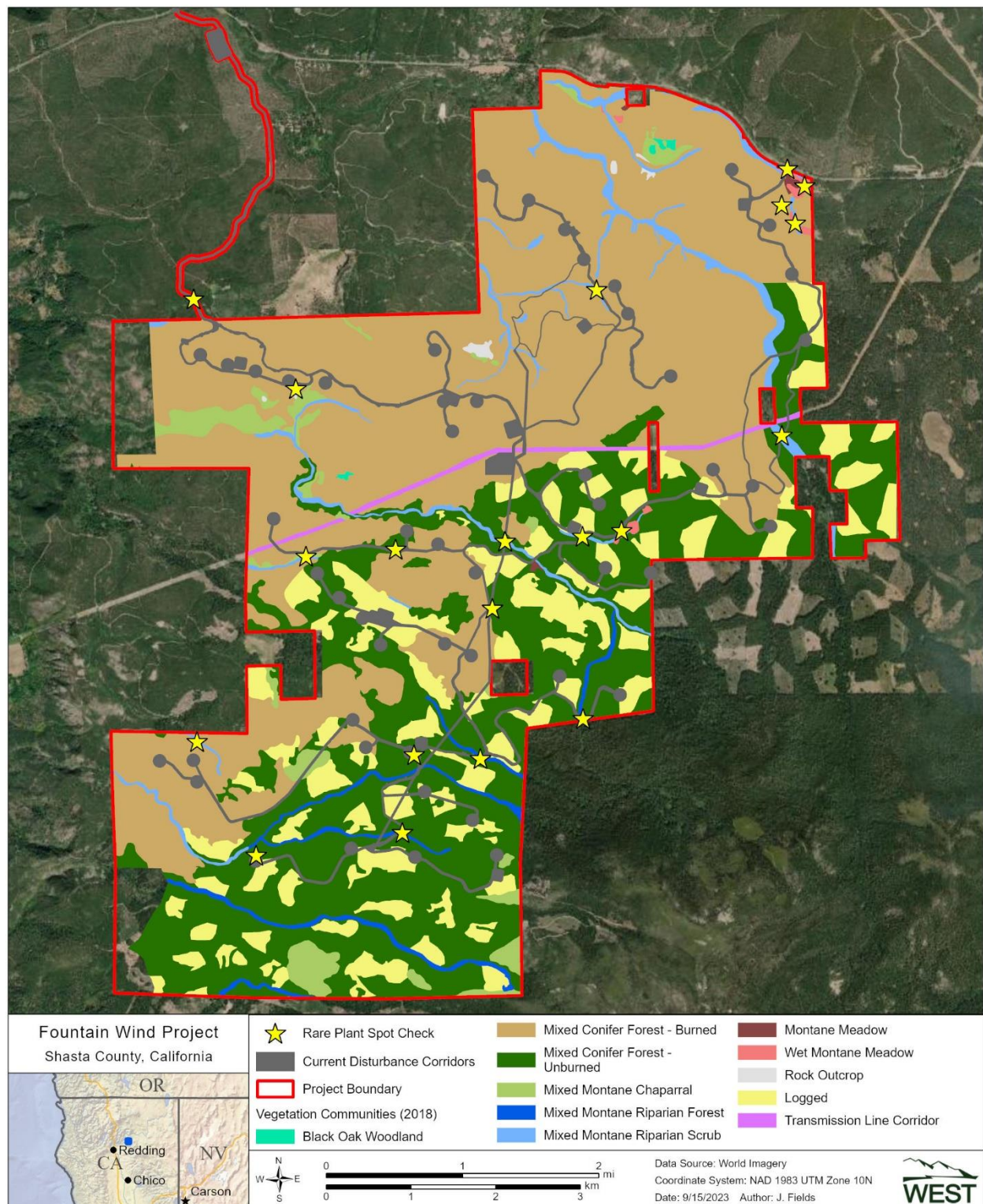


Figure 2. Project Siting Corridors, vegetation communities, and rare plant survey locations within and surrounding the Fountain Wind Project, Shasta County, California.

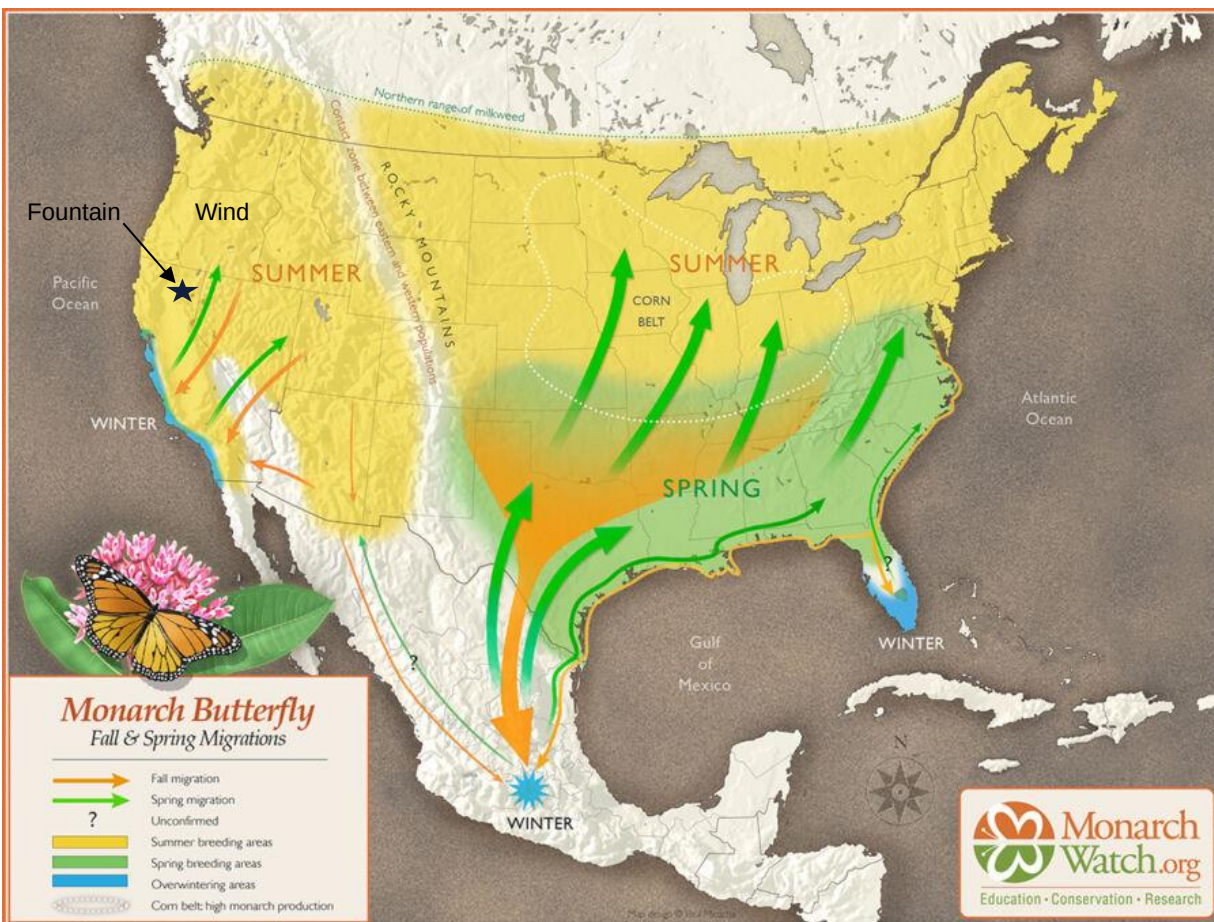


Figure 3. Overview of monarch butterfly seasonal migrations, summer breeding grounds, and overwintering areas relative to the Fountain Wind Project, Shasta County, California. Figure from the Monarch Joint Venture webpage (Monarch Joint Venture 2024).

Adult monarch butterflies exist in a wide variety of habitats and require a diversity of blooming nectar resources, which they feed on throughout their migration routes and breeding grounds in the spring through fall. In addition, species of milkweed (*Asclepias* spp.) act as obligate host plants for both oviposition and larval feeding. The phenology (timing of nectar and milkweed) must align with their migratory season for monarch survival, and anthropogenic climate change may disrupt this timing in ways that are hard to forecast (James 2024).

Western monarch populations overwinter in coastal groves populated with a variety of roost trees that provide ideal habitat including indirect sunlight, moisture, nectar, and a mild climate (Leong et al. 2004). These habitats have historically been degraded or removed (The Xerces Society for Invertebrate Conservation [Xerces Society] 2024a), and the remaining ones have been identified as critical habitat in the proposed monarch listing (USFWS 2024).

Both eastern and western monarch populations have experienced substantial and alarming documented declines since the 1990s (USFWS 2020b). The western monarch butterfly population has been declining since at least 1997, when annual censusing at the overwintering sites of

western North America began. Estimates of millions of western monarch butterflies in the mid-1980s have been made by piecing together past survey data (Schultz et al. 2017). Censuses in 2018 and 2019 revealed alarmingly low numbers of overwintering monarchs, and by 2020 the monarch was considered to have entered the ‘extinction vortex’ of decline. Population counts in 2021 and 2022, however, were surprisingly robust and the species appears to be breeding outside its usual range and season (James 2024).

There are a myriad of influences operating to negatively impact North American monarch butterfly populations. The primary drivers affecting the health of the two North American migratory populations include changes in breeding, migratory, and overwintering habitat (Table 1; USFWS 2020b) due to:

- Conversion of grasslands to agriculture and urban development,
- Widespread use of herbicides and insecticides,
- Unsuitable management of overwintering groves,
- Drought and adverse effects of climate change.

Table 1. Expert-elicited rank and extent of impact (% contribution to the decline from the historical period) of the influences on the western North American monarch butterfly population. % Contribution = median value across experts; the lowest and highest expert judgment among the experts provided in parentheses (Voorhies et al. 2019, USFWS 2020b).

Influence	Rank	% Contribution
Availability, spatial distribution, and quality of milkweed	1	22 (15-25)
Availability, spatial distribution, and quality of nectar resources (breeding)	2	18 (13-20)
Insecticides	3	18 (15-22)
Climate change effects via impacts to habitat	4	17 (10-19)
Availability and quality of overwintering habitat	5	16 (12-18)
Climate change via non-habitat mediated effects	6	8 (3-14)
All others	7	4 (0-7)

A majority of milkweed loss has occurred in agricultural lands, but both milkweed and nectar resources have been lost from the landscape through development and land conversion (USFWS 2020b). Losses of nectar resources during migration have been implicated as a potential key driver in monarch populations declines. Increasing heat, drought, and severe storms associated with climate change negatively impact monarchs, milkweed, and some nectar sources. The severe population declines observed from 2016 to 2019 are thought to be associated with both heat and severe winter storms (James 2024). For example, a heavy 2016 storm killed an estimated 6.2 million butterflies and severely damaged overwintering colonies and monarch habitat (ScienceDaily 2017).

RISK ASSESSMENT

Habitat Suitability and Potential for Occurrence

The dominant land cover within two miles of the Project Siting Corridors is evergreen forest, with small amounts of oak woodland, montane chaparral, riparian and meadow vegetation communities also present (Figure 2). Riparian areas and wet meadows have recently been identified as areas of local importance for the western population of migratory monarchs (McIntyre et. al. 2024). Wet meadows and riparian areas consist of a mix of shrub species and graminoids (Figures 4 and 5) and provide habitat for a diverse array of species, including monarchs, by creating unique transitional zones between surrounding conifer forests. Meadows and other open grassland areas that monarchs may use for breeding or during migration are limited within the Project Siting Corridors and surrounding Project area, with montane meadows, wet montane meadows, and mixed montane riparian scrub and forest comprising less than 19 acres (1.2%) within the Project Siting Corridors (Figure 2).



Figure 4. Montane wet meadow at the Fountain Wind Project, Shasta County, California (Thompson et al. 2023).



Figure 5. Mixed montane riparian scrub at the Fountain Wind Project, Shasta County, California (Thompson et al. 2023).

The western population of monarch butterfly has a very broad migratory range/distribution across western North America and disperses from its overwintering habitat on the coast toward the north and east (see Figure 3). While the Project is over 200 mi from critical overwintering habitat identified by USFWS in Marin County, the entirety of Shasta County, in which the Project occurs, is located within the priority #2 summer breeding zone for western monarchs as designated by The Xerces Society (Figure 6), in conjunction with other stakeholders such as the USFWS, U.S. Forest Service, and the Western Association of Fish and Wildlife Agencies (Xerces Society 2024b). While this designation is non-regulatory, the identification and protection of existing native milkweed and nectar plants are identified as priorities in the priority #2 summer breeding zone (Xerces Society 2024).

Project-Specific Vegetation Surveys

Rare plant surveys were conducted over a three-year period (2018, 2019, and 2021) at the Project and plant species lists were compiled during those surveys (Flaig et al. 2018, 2019; Thompson et al. 2021). While not the focus of the rare plant surveys, plant species suitable for monarch utilization at all life stages were identified during the rare plant surveys. Notably, two milkweed species with differing ecology that monarchs utilize were observed: heart-leaf milkweed (*A. cordifolia*) and showy milkweed (*A. speciosa*). Heart-leaf milkweed establishes in upland dry habitats that include rocky slopes, woodlands, and chaparral and on substrates that include talus and lava flows (Rosatti and Hoffman 2013). Showy milkweed occurs in a wide variety of habitats that include disturbed, wetland and riparian, and grassy areas (Xerces Society 2019).

Priority Action Zones in California for Recovering Western Monarchs

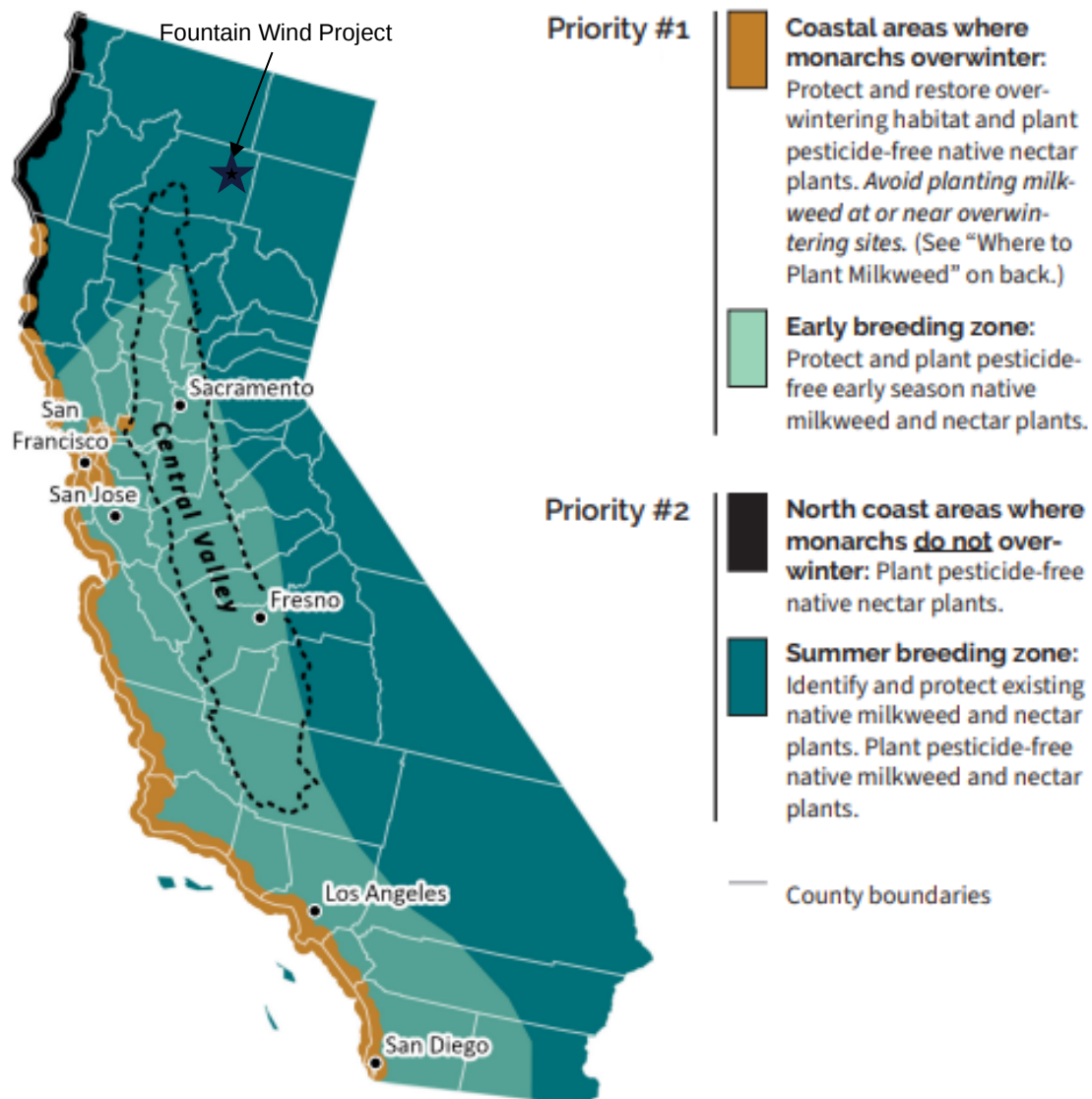


Figure 6. Location of the Fountain Wind Project relative to priority action zones in California for recovering western monarchs as presented by the Xerces Society for Invertebrate Conservation (Xerces Society 2024b).

Native flowering species present in the area surveyed have bloom times that overlap across the four seasons and provide continuous nectar resources for adult monarchs throughout their reproductive and migrating periods (Xerces Society 2019). These include, but are not limited to, common yarrow (*Achillea millefolium*), greenleaf manzanita (*Arcostaphylos patula*), mountain monardella (*Monardella odoratissima*), fleabane (*Erigeron spp.*), and willow (*Salix spp.*). Non-native and invasive flowering plants present at the Project likely compete for resources used by native plant species such as milkweed but may also be used as nectar sources by monarchs (Waterbury et al. 2019). Disturbed areas, such as road rights-of-way and cleared lands created by timber production, are suitable areas for milkweed establishment (Haan and Landis 2019).

Direct impacts to monarchs could include mortality and injury of individual adults, eggs, and larvae, as well as the conversion and disturbance of suitable habitat. Suitable habitat and host plants may be impacted during construction. Additionally, fugitive dust along roadways and disturbance areas could reduce the health and vigor of monarch larvae (Osborne and Longcore 2021). Monarch butterflies depend solely on milkweed plants for completing their life cycle, and milkweed plants were observed on site, though the extent and location of milkweed was not mapped. Milkweed plants in the Project site are expected to be dispersed in low densities along roadways and in open meadows or other cleared areas (K. Flaig, pers. comm.).

Potential for Turbine Collisions

A considerable amount of research has focused on the effects of wind turbine construction and operation on birds and bats. In contrast, little research has been done on the potential direct and indirect impacts of wind farms on butterflies. Monarchs employ soaring flight during their annual fall migrations to their wintering sites, gliding in rising air currents so they can fly long distances with very little expenditure of energy. They have been recorded flying as high as 39,000 feet while soaring in thermals (Gibo 1981), but generally fly between six and 11,000 feet above the ground (USFWS 2020b). Flight heights at the lower end of this range may result in exposure to turbine blades; however, there is currently a lack of data on how siting of wind turbines may impact insect fatalities (Voigt 2020). Anecdotal accounts of monarch take at wind facilities have been documented (Voigt 2020). Given the Project's location in the summer breeding range, there is potential for direct impacts to monarchs at the Project; however, direct impacts are anticipated to be low given the limited amount of suitable habitat likely present in the Project siting corridors, and the Project's location in a region of more broad scale monarch dispersal, unlike the more highly concentrated presence of monarchs at overwintering sites. While potential take of monarchs at wind energy facilities is not addressed in the proposed listing and current 4(d) rule, USFWS is actively taking comments related specifically to take of monarch from energy infrastructure, including mortality from collisions with wind turbines.

CONCLUSION

The Project is not located within a high priority monarch breeding area (Xerces 2024b); however, the monarch's milkweed host plant was documented within the Project site and is expected to occur in low densities, primarily along roads and other disturbed areas. The potential for Project-related impacts to the species is anticipated to be limited; nevertheless, pertinent avoidance and

minimization measures can be implemented to minimize impacts to monarchs, suitable breeding and stopover habitat, and nectar plant sources during Project construction and operation. One measure that may be employed is avoidance of direct impacts to suitable habitats (wetlands and other preferred habitats, such as prairies, meadows, and other open grassland) within the Project site during the summer breeding season when monarchs (adults and caterpillars) are potentially present at the Project site (generally, June through September at Project elevation). Other measures that may be used by the Project are planting and/or re-planting of milkweed and other vegetation suitable for monarch habitat, post-construction; the establishment of compensatory mitigation; and strict limits or prohibitions related to pesticide use. Data regarding direct impacts to monarch butterflies from the operation of wind turbines is still inconclusive, and these impacts are anticipated to be diffuse across large landscapes. Given the uncertainty regarding the type and extent of impacts in the vicinity of the Project, no measures related to collision impacts are currently proposed. While Project related impacts are anticipated to be low, implementation of species-specific mitigation measures, such as those noted above, are expected to further reduce potential impacts. While the take of individuals cannot be ruled out, potential impacts to monarchs from the Project are not expected to be significant at the population level.

The USFWS is currently considering whether to exempt the take of monarchs from transportation and energy infrastructure projects, including mortality from wind turbines. Other opportunities may also exist for the Project to take pre-emptive action to enhance habitat for monarchs and seek protection from incidental take through a Conservation Benefit Agreement (CBA) or Candidate Conservation Agreement with Assurances (CCAA). A CBA would provide assurance that the USFWS will not require any additional or different management activities once monarchs are listed. A Nationwide CCAA for energy and transportation lands was approved in 2020 (Energy Resources Center [ERC] 2020) and provides a means of contributing to monarch conservation while also receiving protection from incidental take if a candidate species is formally listed. Numerous renewable energy companies are currently listed as working group partners on the Nationwide Monarch CCAA (ERC 2020).

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