

DOCKETED	
Docket Number:	23-OPT-01
Project Title:	Fountain Wind Project
TN #:	248305-2
Document Title:	2018-2019 foothill yellow-legged frog surveys
Description:	N/A
Filer:	Caitlin Barns
Organization:	Stantec Consulting Services, Inc.
Submitter Role:	Applicant Consultant
Submission Date:	1/4/2023 10:49:07 AM
Docketed Date:	1/4/2023



TECHNICAL MEMORANDUM

DATE: December 20, 2019

TO: John Kuba, ConnectGen Operating LLC

FROM: Andrea Chatfield and Kori Hutchison, WEST, Inc.

RE: 2018/2019 Foothill Yellow-legged Frog Assessment for the Fountain Wind Project, Shasta County, California

INTRODUCTION

In September 2018, at the request of the California Department of Fish and Wildlife (CDFW), Western EcoSystems Technology, Inc. (WEST) performed an assessment of potential foothill yellow-legged frog (FYLF; *Rana boylei*) habitat, and conducted visual encounter surveys (VES) in the most suitable habitats located on lands leased for the development of the proposed Fountain Wind Project (Project). The 2018 habitat assessment and subsequent surveys were conducted within development corridors¹ provided by the Project proponent in May 2018 (Figure 1). In May 2019, the Project layout was amended, adding areas of proposed development that were not covered by the 2018 FYLF habitat assessment and VES (Figure 1). As a result, in June 2019, WEST performed a supplemental desktop review and field verification of potential FYLF habitat. VES were conducted in potentially suitable habitats within these newly added development corridors, as well as within suitable breeding habitats previously surveyed in 2018. The following memorandum summarizes WEST's efforts to assess the potential for FYLF to occur within the development corridors, based on desktop assessments and field verification of potentially suitable habitat, VES conducted in 2018 and 2019, and consultation with CDFW biologists and herpetologists.

SPECIES BACKGROUND

Foothill yellow-legged frog (FYLF; *Rana boylei*) was designated as a candidate for listing as threatened at the species level under the California Endangered Species Act (CESA) on July 7,

¹ The development corridors represent all project facilities included in the site plan and an appropriate buffer to capture any areas where potential disturbance could occur. As the Project progressed, the development corridors were iteratively refined to form the most current iteration of the project referred to as the Project Site.

2017, and is currently under review for possible listing as threatened or endangered under the federal Endangered Species Act (ESA). In a status review submitted to the California Fish and Game Commission on September 20, 2019, CDFW recommended listing 5 of 6 genetically distinct clades as threatened or endangered: East/Southern Sierra, West/Central Coast, and Southwest/South Coast clades as endangered; Northeast/Northern Sierra and Feather River clades as threatened (CDFW 2019c). The CDFW recommended that a listing for the Northwest/North Coast clade, which is the only clade to occur within or adjacent to the Project, was not warranted at this time, as this clade has the most robust populations and greatest genetic diversity (CDFW 2019c). In December 2019, the California Fish and Game Commission adopted CDFW's listing recommendation as proposed.

According to the California Natural Diversity Database (CNDDDB), several known occurrences of FYLF have been documented in the vicinity of the Project. These include a single specimen collected in 1953 with an approximate location of between 0.5 and 1.5 miles (mi; 0.8 to 2.4 kilometers [km]) northwest of the Project, likely on Hatchet Creek; several detections of all life stages documented as recently as 2018, approximately 4.0 mi (6.4 km) north of the Project along the Pit River; and a single observation of two adult FYLF documented in 2001 approximately 4.0 mi (6.4 km) south of the May 2019 development corridors (CDFW 2019b). Although the species has not been documented within the development corridors, and the Project is on the edge of the species range (Figure 1), the California Wildlife Habitat Relationships (CWHHR) database, maintained by CDFW (2019a), indicates that potential habitat for FYLF may be present within the Project development corridors.

PROJECT AND SURVEY AREA

The Project is located on privately owned commercial timberlands in central Shasta County, California. The dominant vegetation type in and around the Project is mixed coniferous forest (both post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use in this area is commercial timber production, which has resulted in a highly fragmented landscape across much of the area. Dominant overstory species include a combination of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and California black oak (*Quercus kelloggii*).

For the purpose of assessing FYLF habitat and conducting field surveys, development corridors were provided in a Geographic Information System (GIS) format by the Project proponents in May 2018 and May 2019 (Figure 1). The development corridors include all project facilities and adjacent areas where potential permanent and temporary disturbance could occur. The development corridors varied in size and included buffers of all areas of proposed infrastructure that may be subject to ground disturbance (e.g., newly proposed roads, roads that may be expanded, turbine pads, and underground collection lines) to provide for some flexibility in final project design. For the purpose of assessing FYLF habitat for the May 2019 Project layout, the 2019 development corridors were overlain onto the development corridors used in the 2018 habitat assessment to identify new areas of proposed development requiring additional evaluation

(Figure 1). The May 2019 Project layout includes approximately 1,746 acres (707 hectares) which fall outside of the 2018 development corridors and were, therefore, not evaluated during the 2018 assessment (see Figure 1). WEST buffered the 2018 and 2019 development corridors by an additional 500 feet (ft; 152 meters [m]) to delineate survey areas used in the assessment of FYLF habitat suitability and to guide field surveys efforts. The 500-ft buffer was used as van Hattem and Mantor (2018) recommend that surveys are conducted 500 ft upstream and downstream of disturbance projects.

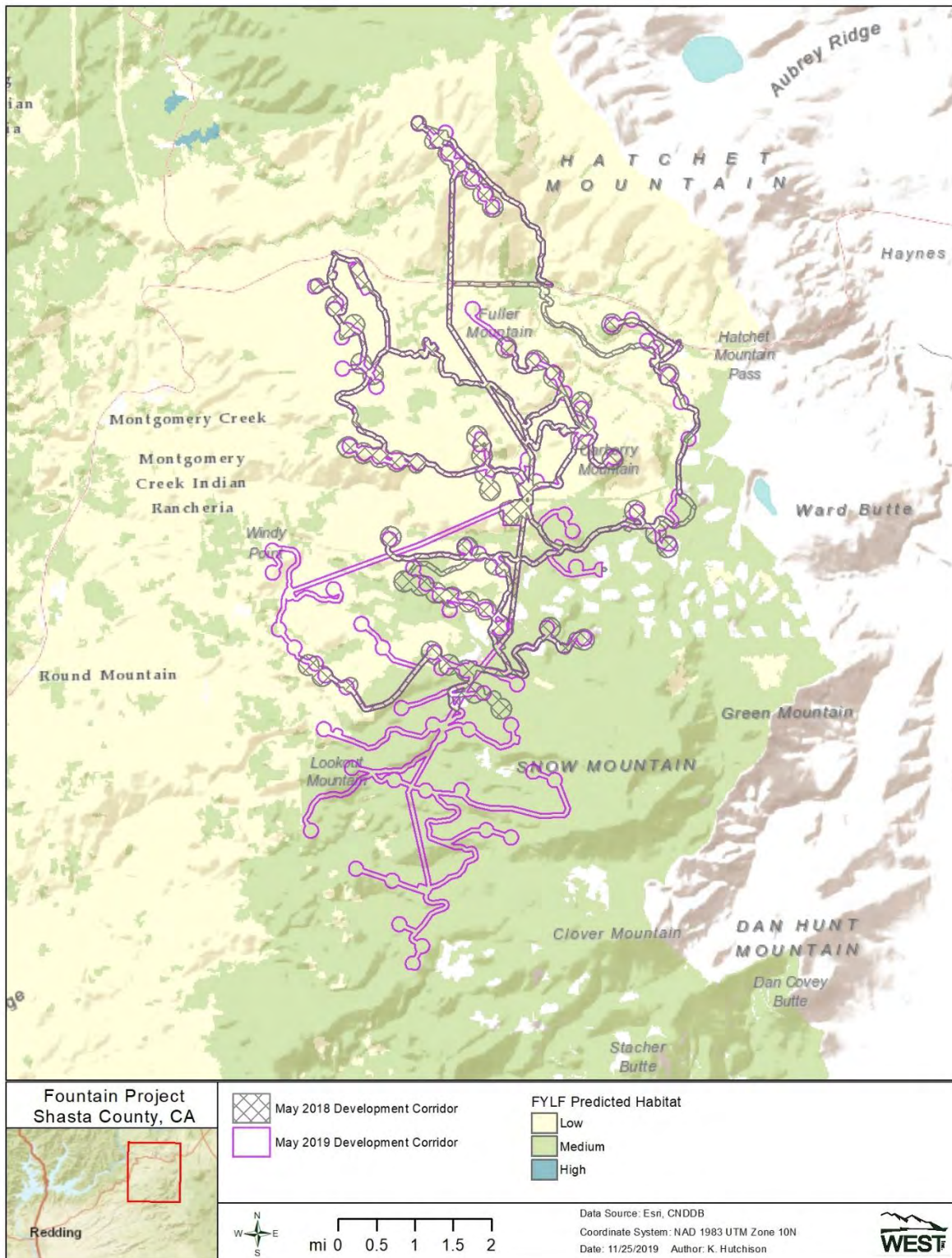


Figure 1. Proposed development corridors for the Fountain Wind Project as provided by the Project proponent in May 2018 and May 2019 and foothill yellow-legged frog areas of predicted habitat as provided by the California Wildlife Habitat Relationships (CWHR).

METHODS

Habitat Assessment

Geographic information system (GIS) data from the CWHR, United States Geological Survey (USGS) National Hydrography Dataset (NHD; USGS 2019), and examination of aerial imagery were used to conduct a desktop review of potential FYLF habitat overlap with development corridors. The CWHR's GIS-based habitat model analyzes and compiles several remotely sensed GIS coverages to predict habitat suitability. The CWHR includes information on both habitat suitability (i.e., predicted habitat; Figure 1) and habitat modeled as potentially important for connectivity (i.e., connectivity habitat; Figure 2) for FYLF (CDFW 2019a). An initial desktop assessment was completed in 2018 and, following revision to the Project layout in May 2019, a supplemental assessment was completed for newly added development corridors. Following both the 2018 and 2019 desktop habitat assessments, a WEST biologist with training in FYLF survey methods conducted a field assessment to determine suitability of 1) CWHR modeled FYLF habitat near stream crossings of the Project Layout, and 2) potential FYLF habitat at crossings not predicted by CWHR models. During the field assessment, the biologist visited areas of modeled habitat that overlapped with the development corridors. Criteria considered during the field assessment for consideration as potential habitat, as defined by the CWHR models, included cover component (i.e., vegetation canopy closure from 20 - 90%), proximity to water (i.e., FYLF typically occur within 40 ft [12 m] of flowing, low-gradient perennial streams), elevation (below 6,562 ft [2,000 m]) and species range (i.e., known species occurrences; Hayes et al. 2016).

Visual Encounter Surveys

VES for FYLF were conducted in areas identified as potentially suitable FYLF habitat in early September 2018. VES conducted in late summer have a high probability of detecting FYLF and are often the easiest method for determining FYLF presence, as subadult (and sometimes adult) FYLF are often observed along stream margins (van Hattem and Mantor 2018). VES were completed by walking all stretches of potentially suitable habitat identified during the habitat assessment. The field surveyor walked up one side of the stream in stretches of suitable habitat visually searching for subadult and adult frogs, then returned on the opposite bank while continuing to visually search for FYLF. Each stretch of suitable habitat was given a survey area identifier and the date, survey time, air and water temperature, and vegetative cover were recorded for each survey. Survey routes were mapped with a handheld geographic positioning system unit and transferred to a GIS for later reference.

In June of 2019, after consultation with CDFW, additional VES were conducted for egg masses and adult FYLF within stream sections that qualified as suitable breeding habitat. Survey methodology was consistent between the two years, with a focus on protected stream edges with low flow velocity, as these sites are more suitable for egg mass attachment (van Hattem and Mantor 2018).

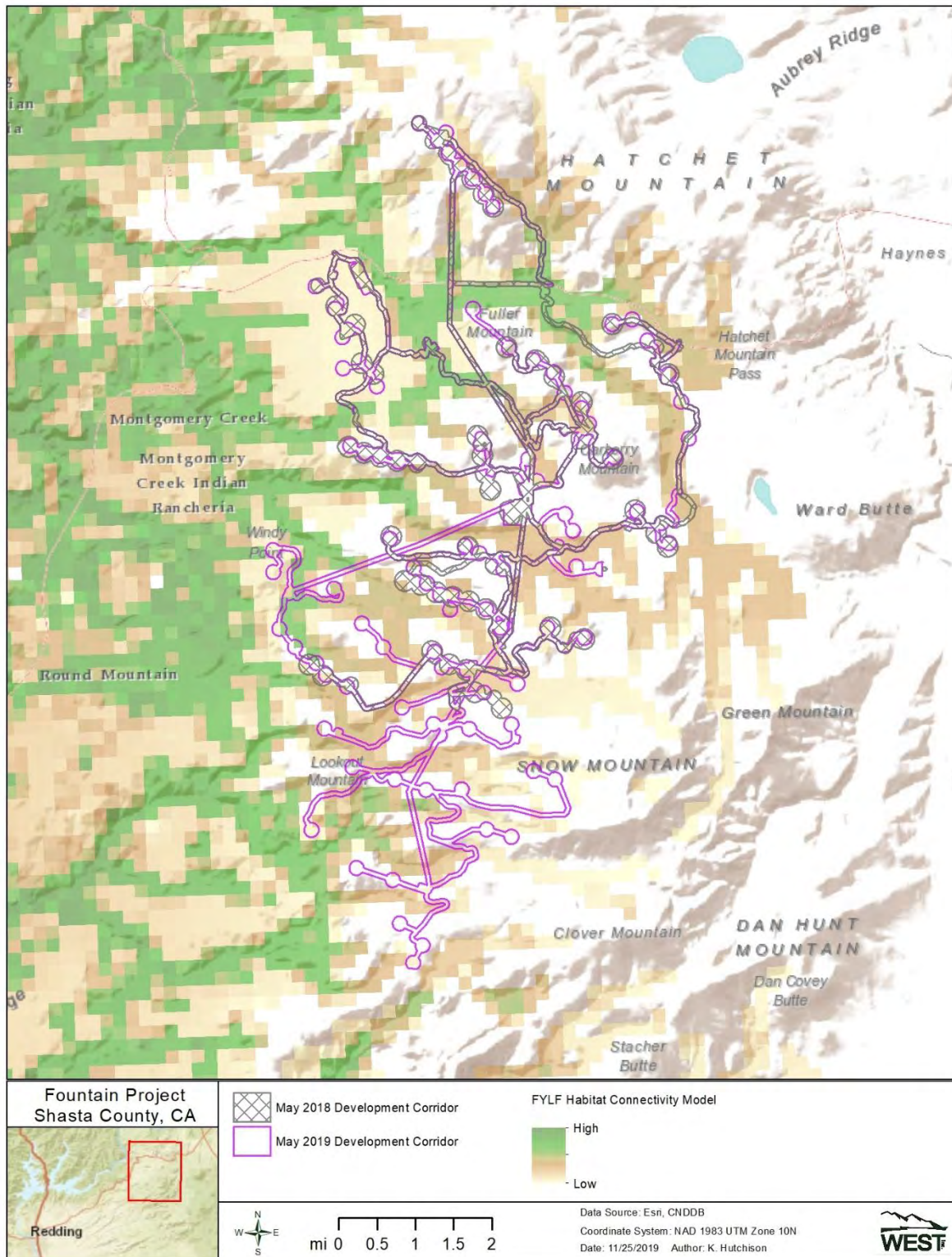


Figure 2. Modelled connectivity habitat for foothill yellow-legged frog within the Fountain Wind Project as obtained from the California Natural Diversity Database (CNDDDB) and California Wildlife Habitat Relationships (CWHHR).

RESULTS AND DISCUSSION

Habitat Assessment

Although the large majority of FYLF habitat within the development corridors is classified as low likelihood of occurrence using the CWHR predicted habitat model (Figure 1), some locations are classified as medium to higher suitability for potential habitat connectivity (Figure 2). The predicted habitat and habitat connectivity models overlap with the development corridors in some locations. Because the FYLF is most commonly associated with moving waters, stream corridors within areas of higher rated habitat connectivity that overlapped with development corridors were the focus of FYLF habitat assessments and field surveys in 2018 and 2019 (Figure 3).

Results from a desktop analysis of potentially suitable habitat within the 2018 development corridors yielded 15 areas where FYLF had the highest potential to occur. These 15 areas were assessed in the field for FYLF habitat suitability in September 2018. During the field assessment, nine areas were identified as containing potentially suitable habitat for FYLF (see Figure 3). Based on the 2019 desktop assessment and field verification, five additional areas were identified as containing potentially suitable FYLF habitat within the newly added (i.e., 2019) development corridors (Figure 3).

Visual Encounter Surveys

VES for subadult and adult FYLF were conducted September 1-4, 2018 in the nine areas identified as potentially suitable habitat during the 2018 habitat assessment (Figure 3). VES for egg masses and adults were again conducted June 18-22 and 29-30, 2019 within areas identified as potential FYLF breeding habitat during both the 2018 and 2019 assessments (Figure 3). No life stages of FYLF or any sensitive amphibian species were detected during September 2018 subadult/adult VES or June 2019 egg mass/adult VES. In general, habitat for FYLF within the development corridors was marginal due to limited or nonexistent surface water and/or excessive vegetative cover that greatly limited sun exposure.

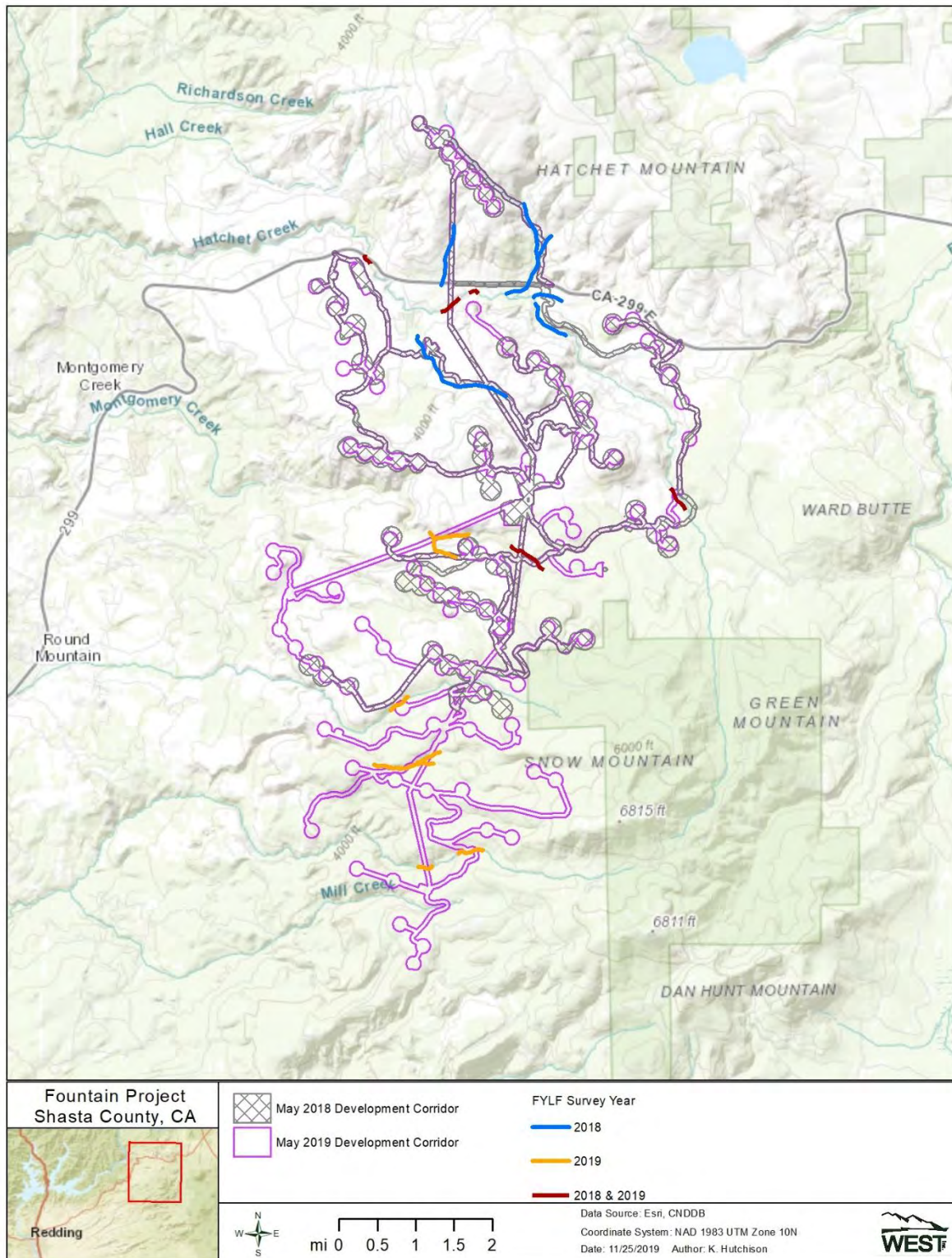


Figure 3. Foothill yellow-legged frog habitat assessment and survey areas within the Fountain Wind Project, Shasta County, California.

Agency Consultation and Site Visit

Consultation with CDFW and US Fish and Wildlife (USFWS) biologists was initiated early in the Project planning phase and has continued throughout the early development phase. In-person meetings with agency personnel included meetings with USFWS and CDFW on July 15, 2017 and February 12, 2019, and a site visit with CDFW on July 23, 2019. Additionally, WEST has had multiple phone conversations and email correspondence with CDFW biologists throughout the spring and summer of 2019, specifically with regard to FYLF. In particular, correspondence involved discussion of the best approach for continued FYLF surveys given the difficulty of surveying areas with excessive vegetative cover. Mike van Hatterm, herpetologist with CDFW, expressed hesitation to skip surveys in these habitats altogether, as these streams could potentially be used for dispersal even though the streams are not able to support most life stages of FYLF (M. van Hatterm, CDFW, pers. comm.). Because dispersal is most likely to occur in the fall after the breeding season survey period, WEST coordinated with CDFW to focus surveys on suitable breeding habitat. Therefore those areas that met qualifications for suitable breeding habitat for FYLF would be surveyed for egg masses and adults during the 2019 breeding season.

During the July 2019 site visit, a WEST biologist showed CDFW examples of each category of FYLF habitat surveyed in 2018 (i.e., low-quality, medium-quality, high-quality), and the majority of the breeding habitats surveyed in 2019. The group conducted VES surveys out to 500 ft in two of the survey areas, and in areas immediately adjacent to crossings at the rest of the suitable breeding habitat visited that day. No life stages of FYLF or any sensitive amphibian species were detected during the site visit. During the July 2019 site visit, CDFW biologists agreed that it was less effective to conduct standard VES at the lower quality habitats, and that habitats identified as potentially suitable breeding habitat for FYLF were unlikely to be able to support egg mass attachment during the breeding period due to high flow velocities and low temps (≤ 10 degrees Celsius) into early July (M. van Hatterm, CDFW, pers. comm.). CDFW biologists recommended environmental DNA (eDNA) as an alternative methodology and the group agreed that this would be a more effective option of determining presence/absence of FYLF at the Project.

CONCLUSION

Surveys for FYLF conducted during and immediately following the breeding season are considered most effective (van Hatterm and Mantor 2018); however, no FYLF were detected during 2018 or 2019 VES conducted within the best habitats present within the development corridors. The lack of FYLF detections during the VES was consistent with results of past stream surveys conducted (primarily for fish) in support of timber management activities within the leasehold area by the landowners (R. Klug, Resource Planning Manager, LandVest Timberlands, pers. comm.).

Although some areas within the development corridors were modeled as medium suitability for FYLF and some areas as having moderate to high connectivity, several of these areas were field-verified by a WEST biologist to be marginal or unsuitable habitat based on FLYF preferred habitat characteristics. Areas deemed marginal or unsuitable were either dry and/or the vegetative cover

was inappropriate (i.e., too much canopy cover precluding sun exposure). Based on the generally poor quality of FYLF habitat identified at the Project's stream crossings, the lack of FYLF detections during VES conducted in 2018 and 2019 in the highest quality habitats identified, and lack of historical FYLF detections documented by landowners during past stream surveys, it is unlikely that FYLF occur at the Project. Additionally, according to the CWHR habitat connectivity model, connectivity between the closest known FYLF occurrence locations and the development corridors are essentially non-existent (see Figure 2), suggesting that FYLF are not likely to immigrate into the area from other known occurrence areas. The data available from historical work in support of timber management activities within the leasehold area, and 2018/2019 habitat assessments and surveys for FYLF, suggest that FYLF do not currently occur in, nor will they likely colonize the generally low-quality habitats present in the Project's development corridors; therefore, no impacts to FYLF are expected as a result of the Project.

This assessment is supported by early and ongoing communication with CDFW biologists and herpetologists concerning the potential for FYLF to occur in the development corridors and recommendations for surveys. Based on a site visit, CDFW confirmed that the likelihood of breeding habitat supporting egg masses is low, largely because of the late snow melt typical of the region. Additionally, dense vegetation along streams make VES more difficult and potentially less effective than surveys conducted along more open waterways. In consideration of these factors, CDFW biologists suggested presence/absence surveys using eDNA methodology to further supplement the VES surveys. WEST performed eDNA surveys on the Project Site in September 2019; no positive detections of FYLF were encountered. A detailed discussion of the methodology and survey results are included in a separate report titled, "2019 eDNA Surveys for Foothill Yellow-legged Frog at the Fountain Wind Project, Shasta County, California".

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