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TECHNICAL MEMORANDUM

DATE: October 17, 2018

TO: Kristen Goland, Pacific Wind Development LLC

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

RE: 2018 Willow Flycatcher Survey Results, Fountain Wind Project, CA

Introduction

Pacific Wind Development LLC contracted Western EcoSystems Technology, Inc. (WEST) to provide biological survey support for the development of the proposed Fountain Wind Project (Project). Willow flycatcher (*Empidonax traillii*) is currently designated as endangered by the state of California (California Department of Fish and Wildlife [CDFW] 2018). While once considered common, willow flycatcher is now considered rare to locally uncommon across its breeding range (Craig and Williams 1998). Willow flycatcher breeding habitat consists of dense deciduous riparian shrub and willow thickets (Bombay et al. 2003). According to the California Natural Diversity Database (CNDDB), there are no known occurrences of willow flycatcher within or immediately adjacent to the Project; the nearest known occupied territories are located approximately 20 miles (mi; 32.2 kilometers [km]) to the northeast of the Project (CDFW 2018). However, while CNDDB data does not indicate any known occurrences of nesting willow flycatcher within the Project area, an assessment of potential willow flycatcher habitat and surveys of the most suitable habitat were conducted at the request of CDFW. This memorandum describes the methods and results of willow flycatcher surveys conducted at the Project during the 2018 nesting season.

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 (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 willow flycatcher habitat and conducting field surveys, survey corridors were provided in a Geographic Information System (GIS) format by Pacific Wind (Figure 1). The surveys corridors included areas that could be subject to direct impacts during Project construction. The survey 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).

Methods

CDFW's Willow Flycatcher Habitat Model and examination of aerial imagery were used to conduct a desktop review of potential willow flycatcher habitat within the Project area. This GIS-based model analyzes and compiles several remotely sensed GIS coverages to predict habitat suitability. Areas of modeled habitat occurring in the Project area were then buffered by 300 feet (ft; 91 meters [m]) to ensure that the habitat assessment and any surveys covered any potential territories located within 300 ft of the survey corridors. The 300 ft provided coverage that exceeds the average territory size (roughly 164 by 262 ft [50 by 80 m) of willow flycatchers in northern California (Bombay et al. 2003). Buffered habitat areas were then reviewed on aerial imagery to eliminate areas that were unsuitable (e.g., areas of early seral conifer forest away from streams). The remaining areas of modeled habitat considered potentially suitable were then overlaid on the Project survey corridors in a GIS, which resulted in the identification of several areas of potential willow flycatcher breeding habitat within or adjacent to the survey corridors. A WEST biologist with prior experience assessing willow flycatcher habitat suitability then performed a field reconnaissance at the Project to evaluate the areas of potentially suitable habitat that overlapped the survey corridors and to identify areas of potential habitat not predicted by the model. Criteria for inclusion as potential habitat as defined by the CDFW model included cover component (i.e., primary vegetative cover type), distance to perennial water, and species range (i.e., known species occurrences; Timossi et al. 1995). Based on the desktop review and field reconnaissance, two areas of predicted habitat and one additional field-identified area met the criteria for suitable willow flycatcher habitat. Two of the areas (Survey Areas 1 and 2) were of lower quality, both being small (less than 1.5 ac [0.6ha] each) and having limited or sparse willow components compared to Survey Area 3 (approximate 3.0 ac [1.2 ha]; Figure 1).

Protocol-level presence/absence surveys were conducted at each of the three identified potential willow flycatcher habitat areas (Survey Areas 1-3; Figures 2-4). Surveys were conducted by a WEST biologist with prior experience conducting willow flycatcher surveys. Surveys followed the CDFW-recommended protocol (Bombay et al. 2003), which requires a minimum of two separate field surveys at each site during the breeding season; one during survey period 2 (June 15-25) and one during either survey period 1 (June 1-14), or survey period 3 (June 26-July 15). Consistent with this requirement, an initial survey was conducted during survey period 2 and a follow-up survey was conducted during survey period 3, with successive surveys conducted at least five days apart.

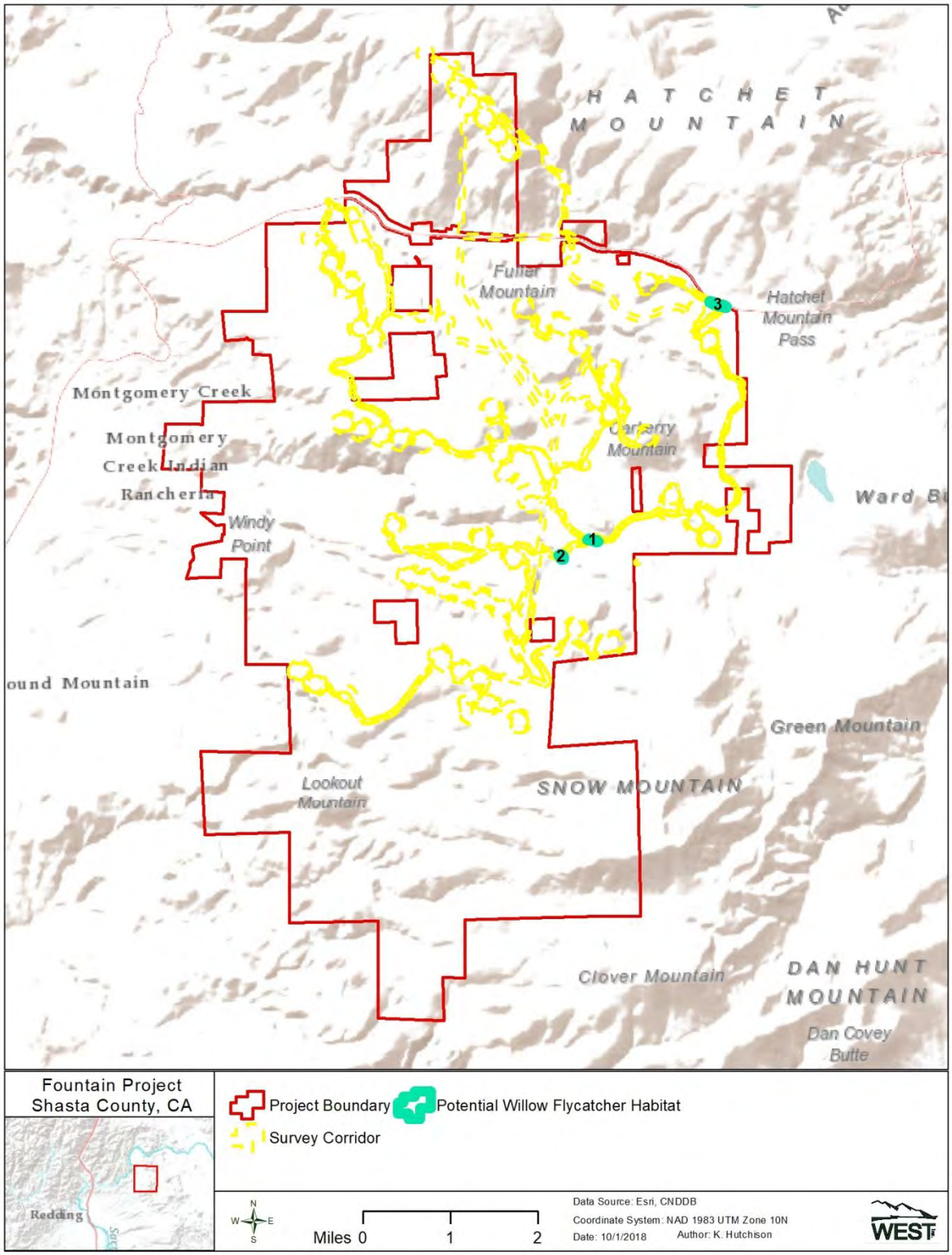

Figure 1. Survey corridors and areas of potential willow flycatcher habitat as provided by the California Natural Diversity Database and verified by field reconnaissance within the Fountain Wind Project, Shasta County, California.

Seventeen survey stations were established within the three survey areas: four in Survey Area 1 (Figure 2), six in Survey Area 2 (Figure 3) and seven in Survey Area 3 (Figure 4). Survey stations were established within suitable willow flycatcher habitat no more than 98 ft (30 m) apart in dense vegetation, and 164 ft (50 m) apart in open vegetation in order to ensure adequate coverage (Bombay et al. 2003). Ten-minute listening periods to document spontaneous singing were conducted at each survey area prior to initiating broadcast surveys. Following the listening period, recorded willow flycatcher songs were broadcast while the observer listened for responses for a minimum of six minutes (Bombay et al. 2003).

Results

Two rounds of willow flycatcher surveys were completed in the three survey areas on June 23-24 and July 6, for a total of 34 surveys (Table 1). Surveys on June 23-24 corresponded to survey period 2 and surveys on July 6 corresponded to survey period 3, as defined in the survey protocol. No willow flycatchers were detected during surveys (Table 1).

Table 1. Results of willow flycatcher surveys conducted in June and July 2018, during survey periods 2 and 3, at the Fountain Wind Project, Shasta County, California.

Survey Area	Survey Date	Number of Survey Points	Detections
	Survey Period 2		
1	23 June	4	0
2	23 June	6	0
3	24 June	7	0
	Survey Period 3		
1	6 July	4	0
2	6 July	6	0
3	6 July	7	0

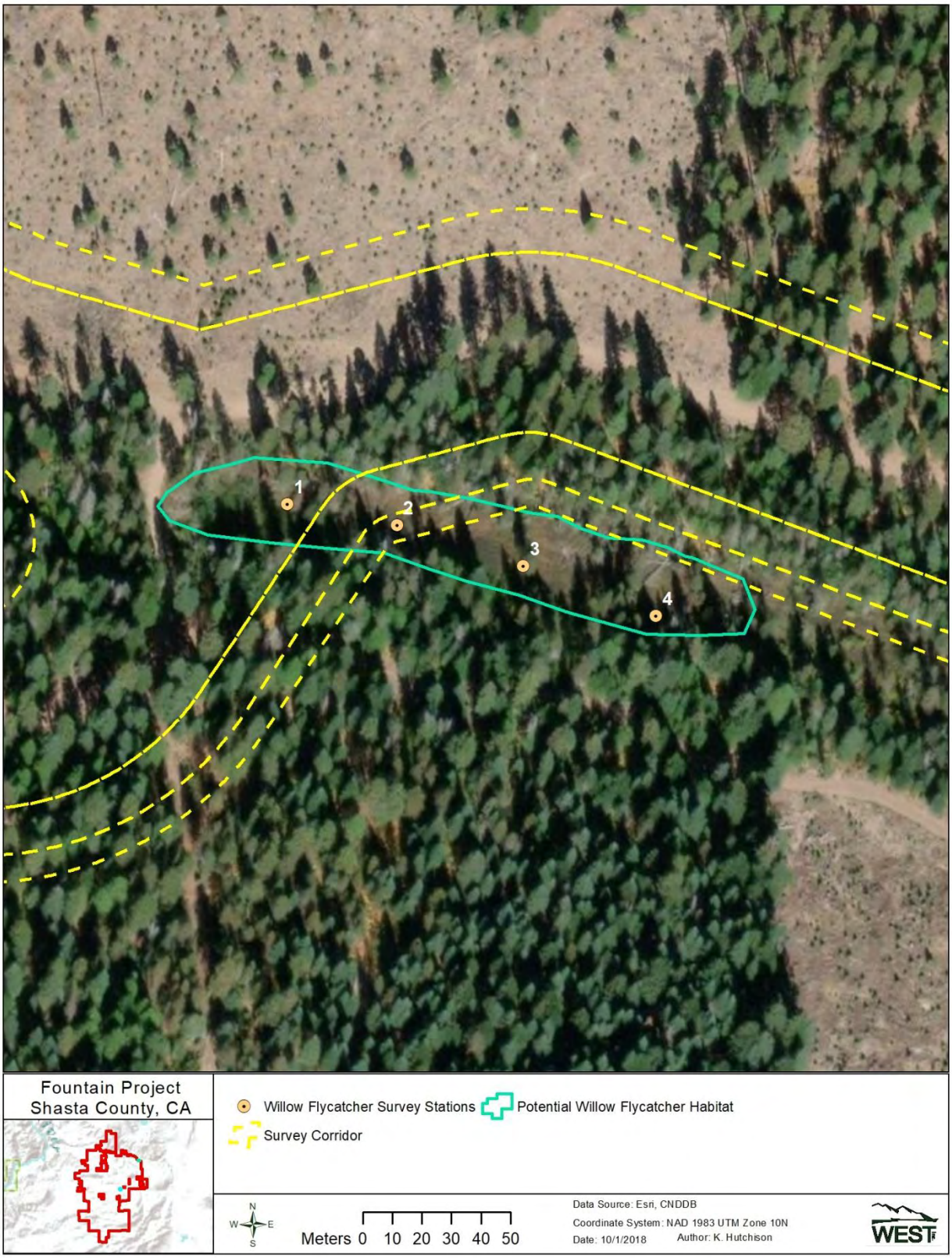

Figure 2. Willow flycatcher survey stations within Survey Area 1 at the Fountain Wind Project, Shasta County, California.

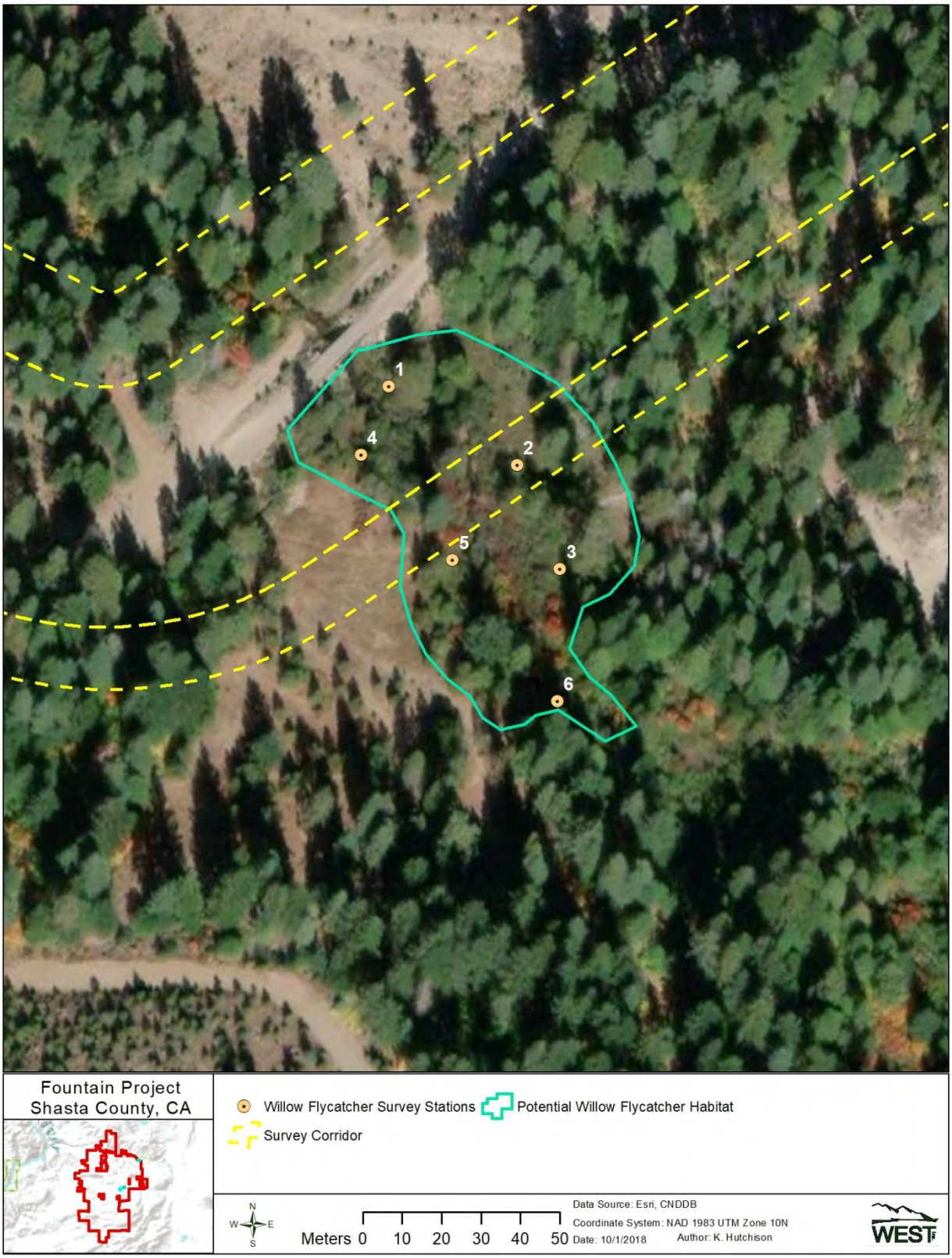

Figure 3. Willow flycatcher survey stations within Survey Area 2 at the Fountain Wind Project, Shasta County, California.

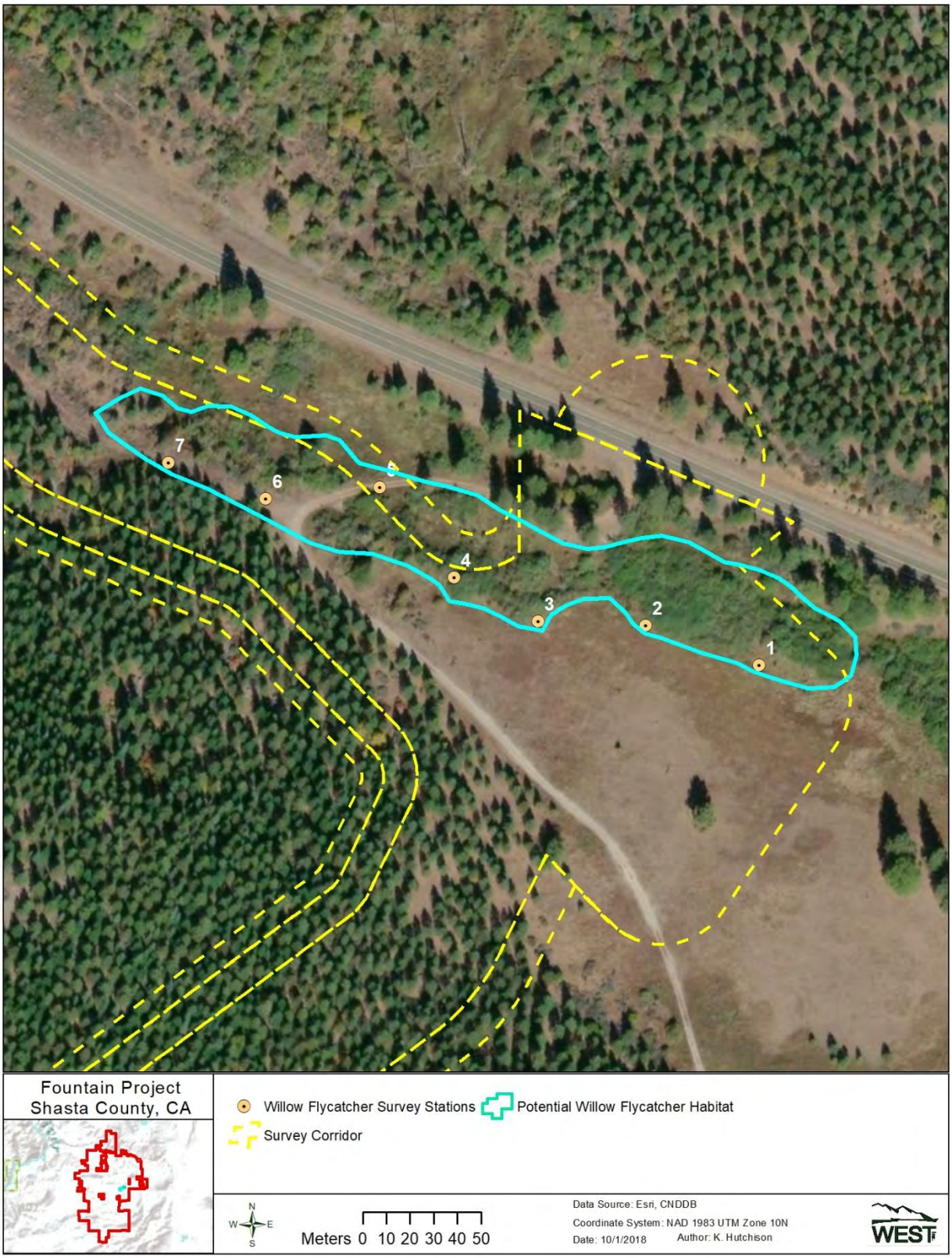

Figure 4. Willow flycatcher survey stations within Survey Area 3 at the Fountain Wind Project, Shasta County, California.

Discussion and Conclusions

The absence of willow flycatcher detections within the three potentially suitable willow flycatcher habitat areas indicates that these areas were not occupied during the 2018 nesting season. In general, habitat for willow flycatcher in Survey Areas 1 and 2 was of lower quality than in area 3. It is unlikely that these two areas could support breeding willow flycatcher in future years. Survey Area 3 contained more extensive patches of dense vegetation (willow) and had a greater potential to support breeding willow flycatchers. Although the survey corridors (i.e., area of potential impact) depicted in Figure 4 encompass the majority of identified willow flycatcher habitat in Survey Area 3, recent updates to the Project layout indicate that this area may not be used as an access point to Highway 299. As such, the riparian habitat associated with Survey Area 3 may not be directly impacted by construction or operation of the Project and would remain intact and available for use by willow flycatcher. Additionally, given the location of this habitat patch immediately adjacent of State Route 299 (within 30 m [98 ft] in places), as well as the existing logging road running through the habitat, disturbance related impacts from vehicle traffic within the Project should be minimal relative to ongoing disturbance to this habitat patch resulting from vehicle activity on State Route 299 and permitted logging activities.

Although willow flycatcher was not detected within the Project during the 2018 breeding season surveys, willow flycatchers may fly over the Project during migration and may use patches of riparian/wetland and meadow habitat as stopover habitat in spring and fall, such as those identified during this survey effort. In general, willow flycatchers are not expected to have a high risk of collision with wind turbines. In their breeding and stopover habitats, willow flycatcher are not expected to fly at rotor-swept heights (i.e., above 30 m [98 feet]), preferring to stick close to willow thickets and other brushy areas where they perch on the edge or top of shrubs and low trees and fly out from their perch to catch insects, or flit between willows and other shrubs in the understory (Sedgwick 2000). In a comprehensive analysis of small-passerine fatalities resulting from collisions with turbines during 116 studies conducted at 71 wind energy facilities in the US and Canada, Erickson et al. (2014) found no willow flycatcher fatalities among the 3,110 small-passerine fatalities documented. Of the more than 3,000 small-passerine fatalities, just 79 (1.6%) were flycatchers (family=Tyrannidae), and of these, only 25 (0.8%) were *Empidonax* flycatchers (Erickson et al. 2014).

If construction activities have the potential to directly impact areas of potential willow flycatcher habitat within the Project area, additional protocol-level breeding surveys may be warranted if construction is to occur during the breeding season (approximately June 15 to September 15). If areas of potentially suitable habitat will not be directly impacted during Project construction, then no further willow flycatcher surveys are likely warranted.

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