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TECHNICAL MEMORANDUM

DATE: September 5, 2019

TO: John Kuba – ConnectGen Operating LLC.

FROM: Andrea Chatfield, Troy Rintz, and Joel Thompson – Western EcoSystems Technology, Inc.

RE: 2019 Raptor Nest Survey Report for the Fountain Wind Project, California

INTRODUCTION

The Fountain Wind Project (Project), is a proposed renewable wind energy generation project under development in eastern Shasta County, California by Fountain Wind LLC (Fountain Wind), a subsidiary of Avangrid Renewables LLC. In August 2019, ConnectGen Operating LLC (ConnectGen) entered into agreement with Fountain Wind to lead the continued development of the Project. To assess potential impacts to nesting golden eagles (*Aquila chrysaetos*) and/or bald eagles (*Haliaeetus leucocephalus*), the US Fish and Wildlife Service (USFWS) recommends conducting eagle nest surveys within survey areas that extend up to 10 miles (mi; 16 kilometers [km]) from proposed wind energy facilities prior to construction (USFWS 2013). In addition to eagle nest surveys, the USFWS (2012) and California Department of Fish and Wildlife (CDFW; California Energy Commission [CEC] and California Department of Fish and Game [CDFG] 2007) recommend conducting nest surveys for other raptors within proposed wind energy projects and a surrounding buffer of at least 1.0 mi (1.6 km). Shasta County, as California Environmental Quality Act (CEQA) lead agency, may also use these surveys as a basis for determining the significance of Project impacts on the species.

Fountain Wind contracted Western EcoSystems Technology, Inc. (WEST) to provide biological support for the development of the proposed Project, including raptor nest surveys. In 2017, WEST conducted aerial surveys for eagle and other raptor nests within 10.0-mi and 2.0-mi (3.2-km) buffers of the Project, respectively (WEST 2018a). In 2018, due to concerns raised by CDFW regarding the need for a Memorandum of Understanding (MOU) to conduct aerial surveys for eagles, WEST conducted eagle nest status surveys from the ground (WEST 2018b), as discussions regarding aerial surveys had not been resolved prior to the nesting season. In 2019, following receipt of an interim MOU from CDFW, WEST conducted a third year of aerial surveys

for eagle and other raptor nests at the Project. The following memorandum provides a summary of the methods and results of the 2019 survey effort, as well as a summary of nest status from 2017 and 2018 surveys.

SURVEY AREAS

The Survey Areas included the Project Area, provided as Geographic Information System data by Fountain Wind, which encompassed all possible areas under consideration of development as of March 2019, plus 2- and 10-mi buffers of the Project Area. In September 2019, following completion of the 2019 raptor nest survey, the Project layout was slightly modified, resulting in a reduced Project footprint. These modifications to the Project layout occurred entirely within the original March 2019 Project Area used to establish the 2019 Survey Areas, and therefore all results presented in this memorandum remain valid for the most current (as of September 2019) Project layout.

The 2- and 10-mi Survey Areas are located in Shasta County, California, west of the community of Burney (Figure 1). East-west running California State Route 299 bisects the Survey Areas. The Lassen National Forest extends into the southeastern portion of the Survey Areas, and parts of the Shasta-Trinity National Forest extend into the western and northern portions of the Survey Areas. The dominant vegetation type in the Survey Areas is Sierran mixed conifer forest (post-fire and unburned), with smaller amounts of mixed montane chaparral and mixed montane riparian forest/scrub. The primary land use within the Project area, and much of the Survey Areas outside of the National Forests, is commercial timber production, which has resulted in a highly fragmented landscape across much of the region.

The Survey Areas fall within the Cascades Ecological Region (ecoregion; Griffith et al. 2016), an area generally marked by steep ridges as well as both active and dormant volcanoes. The ecoregion is characterized by a mesic, temperate climate, which supports productive coniferous forests. Topography within the Survey Areas includes gently rolling hills that transition to relatively steep, low mountains. The Pit River is the most significant waterway within the Survey Areas; however, numerous smaller creeks and several small reservoirs also are present (Figure 1).

METHODS

Two helicopter-based aerial nest surveys were conducted during the 2019 raptor breeding season, with timing and methodology consistent with the 2017 aerial nest survey effort at the Project, as well as survey protocols recommended by the CDFW and USFWS (CEC and CDFG 2007, Pagel et al. 2010, USFWS 2012, 2013). Two WEST biologists, who have extensive experience conducting similar surveys in California and elsewhere, conducted the surveys. The initial 2019 survey was conducted on March 19 and 21, a time period that overlaps the early reproductive period of eagles in northern California (e.g., nest initiation/incubation). This initial survey utilized an intuitive controlled survey method focused on identifying and searching specific habitat features within the Survey Areas that held the highest potential to support the target

species. Within the 2-mi Survey Area, efforts focused on habitat features typically used by raptors that build large, conspicuous stick nests (e.g., eagles, osprey [*Pandion haliaetus]*, and red-tailed hawk [*Buteo jamaicensis*]), while search efforts beyond the 2-mi buffer, out to 10 mi, focused on eagle nests specifically. Key habitat features within the Survey Areas included cliffs, rock outcrops, incised drainages and canyons, power line structures, and large/dominant trees.

The second survey was conducted on May 20 and 22 when eagles and other raptor species are engaged in reproductive activities (e.g., incubating, brooding) at active nests. This second survey was conducted as described above for areas within the 2-mi buffer, while surveys beyond the 2-mi buffer primarily focused on confirming the status of previously documented eagle nests. However, some additional effort was spent searching for eagle nests in a few specific areas identified during the initial survey as being most suitable for supporting eagle nests (e.g., cliffs, transmission line and river corridors) and near historical eagle nest locations where nests were not located during the initial survey. Flight path tracks showing the extent of survey coverage during both the March and May surveys are provided in Figure 2.

During surveys, the helicopter was positioned to allow thorough visual inspection of appropriate habitat features. In general, the helicopter remained within a zone 100 feet (ft; 31 meters [m]) to 500 ft (152 m) above ground level and moved at a relative air speed of approximately 50 mi (80 km) per hour. When nests were located, the helicopter reduced speed and adjusted flight to allow for a clear view of the nest for documentation and photographing. For each nest found, the location was recorded and nest attribute data were collected, including nest substrate, nest size, and nest condition, along with any comments useful in determining the nest status. Nest size was categorized as: small = small stick nest characteristic of corvids or accipiters (e.g., common raven [*Corvus corax*], sharp-shinned hawk [*Accipiter striatus*]), medium = medium stick nest characteristic of buteos and large owls (e.g., red-tailed hawk, great-horned owl [*Bubo virginianus*]), or large = large stick nest that could support eagles, but may also be used by other large raptors (e.g., red-tailed hawk, great-horned owl, osprey).

Consistent with terminology used in the 2017 and 2018 nest survey reports, nesting status for the 2019 nesting season used the recommended terminology of Steenhof et al. (2017), based on the most advanced level of nesting activity documented during the course of both surveys (i.e., status could change from unoccupied to occupied during subsequent surveys in a nesting season, but may not change from occupied to unoccupied in a season). A nest was considered “occupied” if it contained eggs, young, or an incubating eagle, or had a pair of eagles on or near it, or had been recently repaired or decorated (Steenhof et al. 2017). Occupied nests were further classified as “in-use” if eggs had been laid, as evidenced by the presence of an incubating bird, eggs, young, or any other indication that eggs had been laid in the current year (Steenhof et al. 2017). Nests not meeting the above criteria for “occupied” were classified as “unoccupied” if the nest had been visited at least twice. A status of “unknown” was assigned to nests that could not be effectively monitored and therefore did not meet the criteria of occupied or unoccupied as described above.

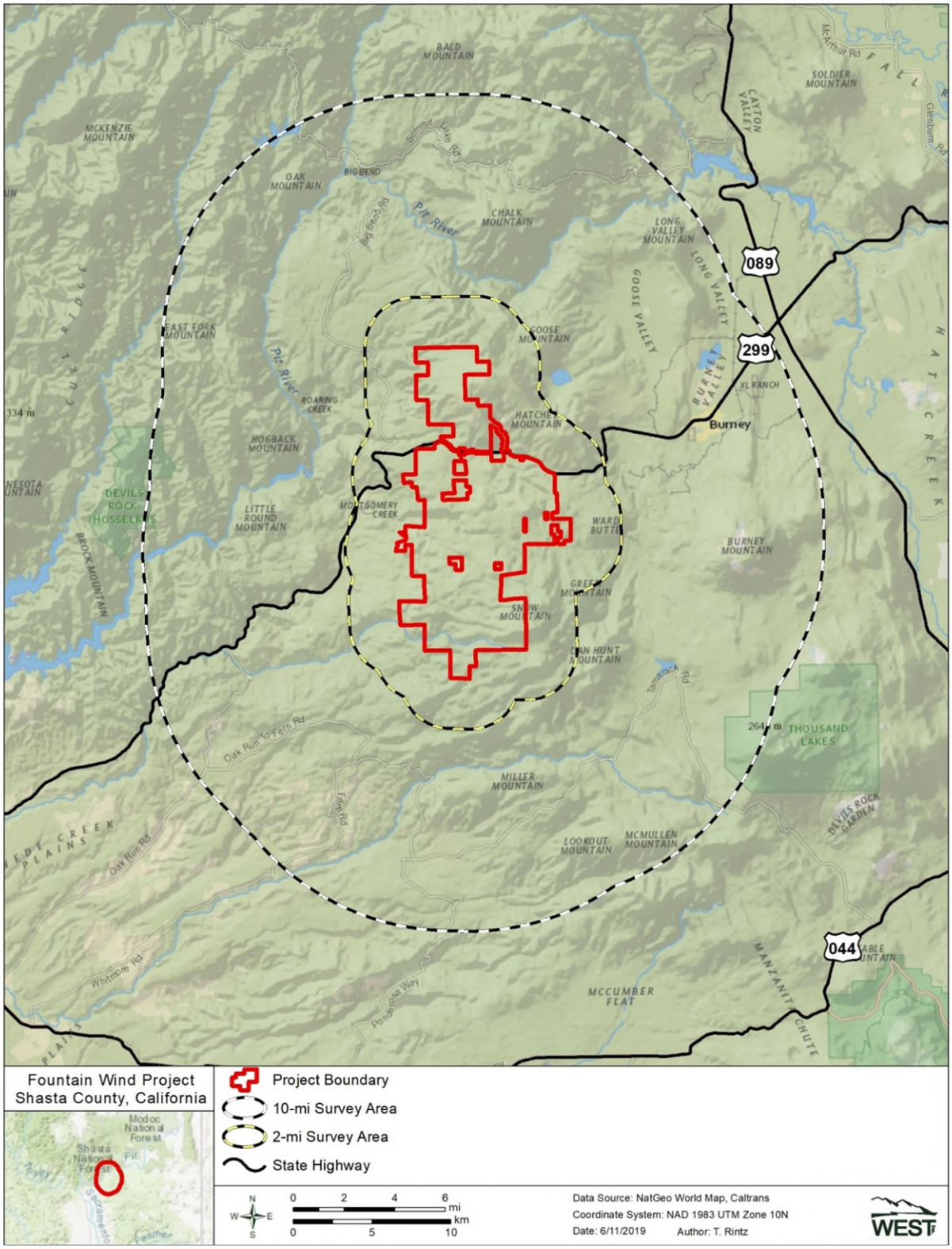

Figure 1. Overview of the 2019 raptor nest Survey Areas at the Fountain Wind Project including 2.0-mile (3.2-kilometer) and 10.0-mile (16-kilometer) survey buffers.

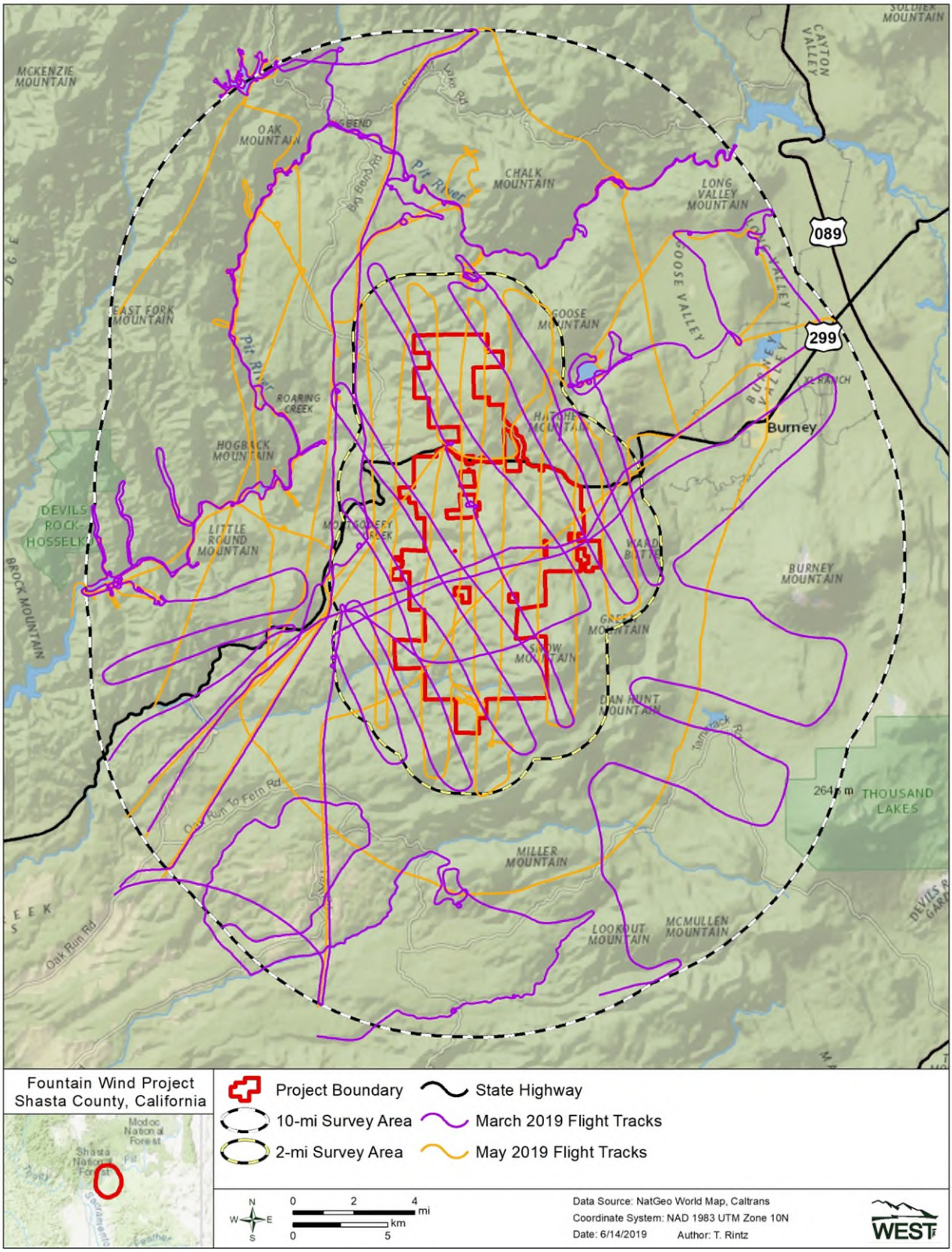

Figure 2. Flight tracks for aerial raptor nest surveys conducted at the Fountain Wind Project on March 19 and 21, and May 20 and 22, 2019.

RESULTS AND DISCUSSION

Thirteen occupied bald eagle nests were documented during the 2019 surveys, with nine occupied nests located within the 10-mi Survey Area and four occupied nests located just outside the 10-mi Survey Area (Figure 3, Table 1). Of the 13 occupied bald eagle nests, 12 were documented as in-use (Table 1). As of the second survey on May 20 and 22, nine of the 12 in-use bald eagle nests contained from one to three chicks estimated to be one to four weeks of age (Table 1). An additional three in-use nests contained an adult in incubating position during the March surveys; however, no evidence of eggs or young were observed during the May survey suggesting either an abandoned or failed nesting attempt (Table 1). The remaining occupied nest, while having adults present and tending to the nest in March, showed no evidence of eggs or young during either survey (Table 1). Four additional nests, previously documented as historical bald eagle nests by CDFW, were located and determined to be unoccupied in 2019. Fifteen historical eagle nests, including three historical golden eagle nests (nests 2366, 55; and 117; Figure 3, Table 1), could not be located during the surveys. All of the occupied eagle nests identified during the surveys were in trees and looked to be in good condition. Photographs of the 13 occupied bald eagle nests are included in Appendix A. Nest status documented during the 2017 and 2018 survey efforts are also included in Table 1 and additional details on the 2017 and 2018 nests are available in the respective nest survey reports (WEST 2018a, 2018b).

In 2019, the occupied bald eagle nest closest to the Project was at Lake Margaret (Nest W205; Appendix A1), approximately 3.0 mi (4.8 km) east of the Project Area boundary (Figure 3). The eagles at Lake Margaret have been part of a USFWS bald eagle movement study, and as such, have been fitted with platform transmitting terminal tags that track their movements. While USFWS may have details on how the Lake Margaret pair utilizes the landscape; data were not obtained for inclusion in this report. Both adults and a 1-week old chick were observed at the Lake Margaret nest during the May survey. The next closest occupied bald eagle nests to the Project were along the Pit River (nests 308, 307, 59, 58, 310, and 157a; Appendix A2−7), all located between 4.2 and 6.5 mi (6.8 and 10.5 km) from the Project area boundary (Figure 3). Four of the occupied bald eagle nests identified during the surveys (nests W200, 44, W101, and W102; Table 1), were located at Iron Canyon Reservoir, just beyond the 10-mi Survey Area (Figure 3). These nests are included in this report to maintain consistency with the 2017 and 2018 nest survey memos (see WEST 2018a, 2018b), even though they are no longer within the 10-mi Survey Area due to changes to the Project area boundary between 2017 and 2019.

Nests of other raptor species or ravens identified during the aerial survey included one occupied osprey nest located near the Project Area boundary, and three occupied common raven nests, all within 2.0 mi of the Project Area boundary (Figure 3, Table 1). An additional eight unoccupied medium to large stick nests of unknown species were located throughout the Survey Areas (Figure 3, Table 1).

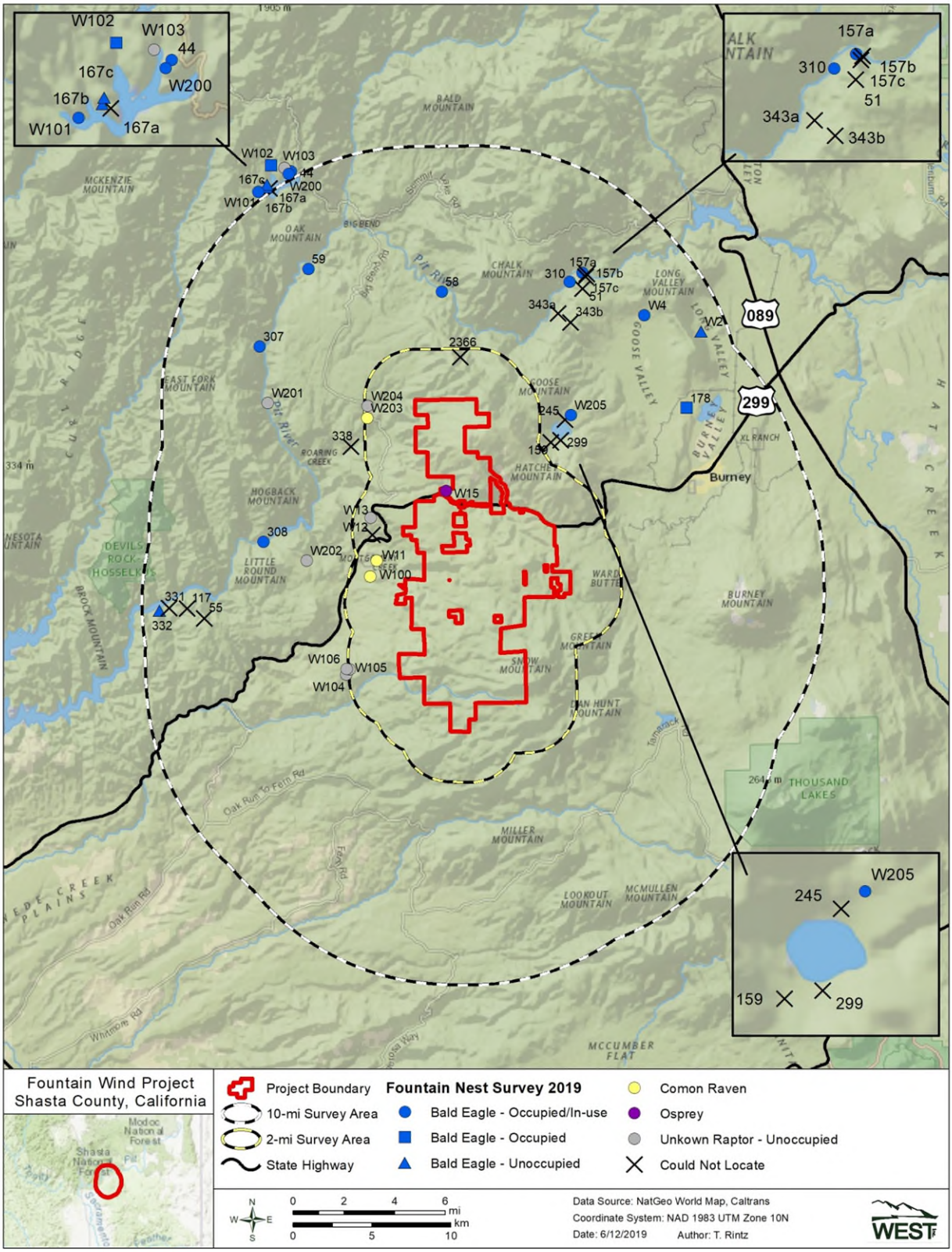

Figure 3. Eagle and other raptor nest locations documented during aerial surveys for the Fountain Wind Project, March 19 and 21, and May 20 and 22, 2019.

Table 1. Results of the 2019 eagle/raptor nest surveys conducted on March 19 and 21, and May 20 and 22 at the Fountain Wind Project in Shasta County, California. Additional details on 2017 and 2018 nest surveys are available in the 2017 and 2018 survey reports (Western EcoSystems Technology, Inc. 2018a, 2018b).

Nest ID[1]	Species	Nest Status[2] 2017	2018	2019	Nest Attributes Substrate	Size[3]	2019 Nest Comments
W205	Bald eagle	-	-	Occupied/In-Use	Tree	Large	One chick in nest estimated to be 14 days old on May 22
308	Bald eagle	Unoccupied	Occupied/In-Use	Occupied/In-Use	Tree	Large	One chick in nest estimated to be 28 days old on May 22
307	Bald eagle	Occupied/In-Use	Not surveyed	Occupied/In-Use	Tree	Large	Two chicks in nest estimated to be 14 days old on May 20
59	Bald eagle	Occupied/In-Use	Unknown	Occupied/In-Use	Tree	Large	One chick in nest estimated to be 14 days old on May 20
58	Bald eagle	Occupied/In-Use	Unknown	Occupied/In-Use	Tree	Large	Two chicks in nest estimated to be 14 days old on May 20
310	Bald eagle	Occupied/In-Use	Occupied	Occupied/In-Use	Tree	Large	Two chicks in nest estimated to be 14 days old on May 20
157a	Bald eagle	Occupied/In-Use	Unknown	Occupied/In-Use	Tree	Large	Three chicks in nest estimated to be 21 days old on May 20
W4	Bald eagle	Occupied/In-Use	Occupied	Occupied/In-Use	Tree	Large	Two chicks in nest estimated to be 21 days old on May 22
W200	Bald eagle	-	-	Occupied/In-Use	Tree	Large	Two chicks in nest estimated to be 21 days old on May 22
44	Bald eagle	-	-	Occupied/In-Use	Tree	Large	Adult in incubating position in March; no sign of nesting in May indicates failed nesting attempt
W101	Bald eagle	-	-	Occupied/In-Use	Tree	Large	Adult in incubating position in March; no sign of nesting in May indicates failed nesting attempt
W102	Bald eagle	-	-	Occupied/In-Use	Tree	Large	Adult in incubating position in March; no sign of nesting in May indicates failed nesting attempt
178	Bald eagle	Occupied/In-Use	Occupied/In-Use	Occupied	Tree	Large	Adult on side of nest both surveys with greenery present

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Nest		Nest Status[2]			Nest Attributes		
ID[1]	Species	2017	2018	2019	Substrate	Size[3]	2019 Nest Comments
332	Bald eagle	Occupied/In-Use	Not surveyed	Unoccupied	Tree	Large	No evidence of nesting in either survey
W2	Bald eagle	Occupied	Occupied	Unoccupied	Tree	Large	No evidence of nesting in either survey
167b	Bald eagle	Occupied	Unknown	Unoccupied	Tree	Large	Historical bald eagle nest in poor condition; no evidence of use
167c	Bald eagle	Unoccupied	Unknown	Unoccupied	Tree	Large	Historical bald eagle nest in poor condition; no evidence of use
343a	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest, likely destroyed in fire
343b	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest, likely destroyed in fire
331	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest
157b	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest
157c	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest
51	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest
245	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest
159	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest
299	Bald eagle	Occupied/In-Use	Not surveyed	Could not locate	-	-	Historical bald eagle nest, nest fell out of tree since 2017
167a	Bald eagle	-	-	Could not locate	-	-	Historical bald eagle nest
2366	Golden eagle	Could not locate	Could not locate	Could not locate	-	-	Historical golden eagle nest
55	Golden eagle	Could not locate	Could not locate	Could not locate	-	-	Historical golden eagle nest
117	Golden eagle	Could not locate	Could not locate	Could not locate	-	-	Historical golden eagle nest
W15	Osprey	Occupied/In-Use	-	Occupied	Tree	Large	Adults observed tending in the May survey
W11	Common raven	Unoccupied	-	Occupied	Powerline	Medium	Two chicks in nest estimated to be 14 days old on May 22
W100	Common raven	-	-	Occupied	Powerline	Medium	Adult in incubating position in May
W203	Common raven	-	-	Occupied	Powerline	Medium	Adult in incubating position on May 22
W13	Red-tailed hawk	Occupied	-	Unoccupied	Powerline	Medium	Medium-sized nest in good condition
W103	Unknown raptor	-	-	Unoccupied	Tree	Large	Possible bald eagle nest

Table 1. Results of the 2019 eagle/raptor nest surveys conducted on March 19 and 21, and May 20 and 22 at the Fountain Wind Project in Shasta County, California. Additional details on 2017 and 2018 nest surveys are available in the 2017 and 2018 survey reports (Western EcoSystems Technology, Inc. 2018a, 2018b).

Nest		Nest Status[2]			Nest Attributes		
ID[1]	Species	2017	2018	2019	Substrate	Size[3]	2019 Nest Comments
W104	Unknown raptor	-	-	Unoccupied	Powerline	Medium	Medium-sized nest in good condition
W105	Unknown raptor	-	-	Unoccupied	Powerline	Medium	Medium-sized nest in good condition
W106	Unknown raptor	-	-	Unoccupied	Powerline	Medium	Medium-sized nest in good condition
W201	Unknown raptor	-	-	Unoccupied	Tree	Large	Possible bald eagle nest
W202	Unknown raptor	-	-	Unoccupied	Powerline	Medium	Medium-sized nest in good condition
W204	Unknown raptor	-	-	Unoccupied	Powerline	Medium	Medium-sized nest in good condition
338	Osprey	Occupied	-	Could not locate	-	-	Transmission tower has been upgraded since 2017
W12	Unknown raptor	Unoccupied	-	Could not locate	-	-	

[1] Identifications (IDs) preceded by W indicate nests newly discovered by WEST during surveys. All other IDs are consistent with historical IDs provided by California Department of Fish and Wildlife.

[2] Highest level of reproductive status determined for the current breeding season: **Occupied** = contained eggs, young, or an incubating eagle, or had a pair of eagles on or near it, or had been recently repaired or decorated. **In-Use** = an occupied nest in which eggs were laid, as evidenced by the presence of an incubating bird, eggs, young, or any other indication that eggs had been laid in the current year. **Unoccupied** = no sign of nesting or territory occupancy in the current nesting season, based on at least two visits. **Unknown** = nest was not located or status as occupied/unoccupied could not be confirmed as defined herein.

[3] **Small** = small stick nest characteristic of corvids or accipiters; **Medium** = medium stick nest characteristic of buteos and large owls; **Large** = large stick nest that could support eagles, but may also be used by other large buteos, osprey, large owls.

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Appendix A: Photographs of Occupied Bald Eagle Nests Documented During 2019 Aerial Nest Surveys at the Fountain Wind Project, Shasta County, California.

Appendix A1: Nest W205, occupied/in-use, located approximately 3.0 miles (4.8 kilometers) east of the Fountain Wind Project.

Appendix A2: Nest 308, occupied/in-use, located approximately 5.0 miles (8.0 kilometers) west of the Fountain Wind Project.

Appendix A3: Nest 307, occupied/in-use, located approximately 6.0 miles (9.7 kilometers) northwest of the Fountain Wind Project.

Appendix A4: Nest 59, occupied/in-use, located approximately 6.5 miles (10.5 kilometers) northwest of the Fountain Wind Project.

Appendix A5: Nest 58, occupied/in-use, located approximately 4.2 miles (6.8 kilometers) north of the Fountain Wind Project.

Appendix A6: Nest 310, occupied/in-use, located approximately 6.0 miles (9.7 kilometers) northeast of the Fountain Wind Project.

Appendix A7: Nest 157a, occupied/in-use, located approximately 6.5 miles (10.5 kilometers) northeast of the Fountain Wind Project.

Appendix A8: Nest W4, occupied/in-use, located approximately 6.7 miles (10.8 kilometers) northeast of the Fountain Wind Project.

Appendix A9: Nest W200, occupied/in-use, located approximately 10.2 miles (16.4 kilometers) northwest of the Fountain Wind Project.

Appendix A10: Nest 44, occupied/in-use, located approximately 10.2 miles (16.4 kilometers) northwest of the Fountain Wind Project.

Appendix A11: Nest W101, occupied/in-use, located approximately 10.2 miles (16.4 kilometers) northwest of the Fountain Wind Project.

Appendix A12: Nest W102, occupied/in-use, located approximately 10.8 miles (17.4 kilometers) northwest of the Fountain Wind Project.

Appendix A13: Nest 178, occupied, located approximately 7.8 miles (12.6 kilometers) east of the Fountain Wind Project.