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## Acronyms and Abbreviations

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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>ft</td>
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<tr>
<td>gen-tie</td>
<td>generation transmission line</td>
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HUMBOLDT WIND ENERGY PROJECT BALD EAGLE AND GOLDEN EAGLE AERIAL SURVEY REPORT

Executive Summary

Humboldt Wind, LLC plans to permit, build, and operate a wind energy project in Humboldt County, California. As one part of the studies to support review of the project pursuant to state and federal regulations, Stantec Consulting Services Inc. conducted aerial surveys and ground-based surveys for nesting bald eagles (Haliaeetus leucocephalus) and golden eagles (Aquila chrysaetos) in 2018 and 2019. This report summarizes the results of the 2019 survey.

Two rounds of aerial surveys were conducted during the 2019 nesting season: March 11–14 and May 6–8. Three biologists (excluding the pilot) experienced in raptor nesting biology and conducting aerial surveys for nesting raptors conducted the surveys from a Bell L-4 “Long Ranger” or an Aerostar 350 helicopter. During the first aerial survey, two occupied golden eagle nests were detected within the 10-mile survey area. During the second aerial survey, one occupied bald eagle nest was found that contained two small chicks and both golden eagle nests appeared to have been abandoned or failed. Ground-based surveys were conducted in late February and late March in the vicinity of historic golden eagle nests within 2 miles of project turbines. Ground-based surveys yielded observations of both bald eagles and golden eagles but no territorial or nesting behavior.

The nests of other raptor species detected included red-tailed hawks (Buteo jamaicensis) and ospreys (Pandion haliaetus).
1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) prepared a Draft Biological Resources Work Plan (Draft Work Plan) detailing biological resource surveys designed to support project planning (Stantec 2018). In March and May of 2019, additional aerial eagle and raptor nest surveys were completed following methods outlined in that Work Plan, as well as ground-based monitoring of nesting eagle activity near the project. This report provides a summary of those surveys completed in 2019.

2.0 SURVEY AREA

Per the U.S. Fish and Wildlife Service Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy (USFWS 2013), a survey area was established using a 10-mi (16-kilometer) radius around the turbine locations as well as the gen-tie. This survey area encompasses approximately 872 square mi, centered on Monument and Bear River Ridges, located immediately south and southwest, respectively, of Scotia, Humboldt County, California. Generally, the survey area extended from the Pacific Ocean coastline south of the Eel River estuary and north of Petrolia, and eastward approximately to the Dinsmore airport (Figure 2). The overall topography is steep, with moderate slopes on ridgelines and gently sloped to generally flat topography on floodplain and other bottomland areas. Elevations range from sea level to approximately 3,500 feet (ft). Habitats in the survey area are dominated by coniferous forests, coastal prairies, woodlands, and riparian, agricultural (primarily mid- to higher-elevation pastures for cattle grazing), and other habitats dominated by urban, suburban, and rural development. Limited aquatic habitats also occur, including riverine and emergent wetlands and estuarine areas.

3.0 HISTORIC EAGLE INFORMATION

Bald eagles (Haliaeetus leucocephalus) and golden eagles (Aquila chrysaetos) are both known to occur in Humboldt County, including the survey area and vicinity. Bald eagles are considered a rare to uncommon resident and local breeder in the county, with increased numbers during winter (Harris 2005, Hunter et al. 2005). Golden eagles are also rare to uncommon residents and breeders (Harris 2005, Hunter et al. 2005) and best known from southern Humboldt County, including the survey area and vicinity (Hunter et al. 2005, McAllister and Fix 2008).

Bald eagle and golden eagle habitat occurs throughout the survey area. The coniferous forest, grassland, woodland, riparian, agricultural, and aquatic habitats provide known or potential nesting, roosting, and foraging habitat for both species. Bald eagles likely use the riverine, riparian, and agricultural habitats for most foraging and roosting activities, while riparian and conifer forest habitats provide potential nesting habitat. Golden eagles likely use all habitats in the survey area for foraging, most likely focusing on the coastal prairie and nearby woodlands and forests. Historic nest locations (i.e., those known from previously recorded agency records or databases, or other public-domain data) were recorded in conifer forest stands in areas characterized by interspersed forest and prairie habitats.
Nest records of both eagle species available in the California Natural Diversity Data Base and records provided by Humboldt Redwood Company as part of their monitoring program associated with their Habitat Conservation Plan were reviewed prior to the survey. Both data sources contained historic nests, many of which were captured in both data sets. Two historic bald eagle nest sites occur in the survey area. The oldest was initially reported in 2010 when local observations suggested potential nesting near Rio Dell (HRC 2014), approximately 4.3 mi from the nearest proposed turbine. The nest site was confirmed during 2013 and located on the south side of the Eel River near the Belleview area north of Rio Dell, though the nest may have failed (HRC 2014). The most recent historic bald eagle nest site was discovered during 2014 along the Avenue of the Giants adjacent to the Eel River near the CAL FIRE High Rock Conservation Camp (HRC 2015), approximately 5.4 mi from the nearest proposed turbine. Nesting behavior was confirmed at this site in 2015, but nest success was undetermined at that time (HRC 2015). The nest was unoccupied during the 2018 survey; however, adult bald eagles were observed during the 2018 breeding season survey. The continued late season observations suggest bald eagles are more common residents in the Eel River Valley compared to the recent past when summer and fall observations were rare (HRC 2016).

Sixteen records of historic golden eagle nests occurred in the two data sets that were reviewed. Some records date from 1994, and the most recent documented nests were recorded in 2006. Of the 16 golden eagle nests for which location data were available in the 10-mi survey area, 13 were located south of the Monument Ridge and Bear River Ridge areas. Three historic golden eagle nests were reported in the eastern and southeastern portion of the survey area. Six of the 16 historic golden eagle nest records occur within 2 mi of proposed turbine locations. All but one of these was located south of the Bear River and the nearest was located approximately 1.0 mi from the nearest proposed turbine.

4.0 METHODS

4.1 AERIAL SURVEY

Aerial eagle nest surveys were conducted during two separate survey rounds. Each survey round covered the entire survey area (10-mi radius around the turbine locations as well as the gen-tie), and the two survey rounds were separated by at least 30 days. Surveys were completed from either a Bell Long Ranger L-4 helicopter or an Aerostar 350 helicopter, which provided personnel capacity, stable vertical and slow speed maneuverability in steep, mountainous terrain, and good visibility for all observers.

During the surveys, aerial routes were flown in potential bald and golden eagle habitat following the guidelines described by the U.S. Fish and Wildlife Service (2013), Jackman and Jenkins (2004), and Pagel et al. (2010). Each survey included three biologists with aerial nest survey experience, excluding the helicopter pilot. The surveys consisted of systematic passes over landscape features representing potential bald and golden eagle nesting, roosting, and foraging habitat such as ridgelines, canyons, river corridors, and forest edges to access potential nesting substrates (e.g., trees, cliffs, and other natural features and transmission line towers or other anthropogenic structures). Each historic nest location (two bald eagle nests and 16 golden eagle nests) was also visited to search for those nest structures. Surveys were conducted during appropriate weather and related conditions including wind, light, and visibility. In the event unsuitable survey conditions occurred over a planned survey area (e.g., fog or low
clouds over a ridge or canyon), flight planning was adjusted to focus the survey effort in areas with suitable conditions, to avoid compromising surveyor visibility.

Eagle observations (nests and incidental observations of flying or perched eagles) were made with the unaided eye and using regular and image-stabilizing binoculars. Distances from cliff faces or other rock outcrops occurring in the survey area ranged from approximately 30 to 650 ft depending on light, winds, and potential avian disturbance or safety considerations. Airspeeds during the surveys ranged between 15 to 35 knots for surveys, with occasional hovering, and 35 to 100 knots during cruising. Flight altitude above ground level ranged from 150 to 1,000 ft during surveys, with most surveys between 250 to 500 ft, and 300 to 1,000 ft during cruising.

Prior to the survey, historic nest locations were uploaded on iPads® loaded with project maps and Collector® App software. During surveys, flight time, survey conditions, and all eagle observations were documented using a spreadsheet-based recording software run on the iPads. For all eagle observations, species, behavior, general habitat, location, age (if possible), and nest reproductive status were recorded, as applicable. Similar data on location, species, and nest condition and status were also recorded for any other large stick nests occupied by non-eagle raptors or that appeared unoccupied. Flight tracks of the helicopter were recorded using GPS Kit® software. The helicopter’s guidance system provided backup tracks in the event of tablet computer or software failure. All data files were uploaded daily, following each survey, and post-processed using ESRI® ArcGIS™ software for analysis and presentation purposes.

4.2 GROUND SURVEY

Two rounds of ground-based surveys of eagle activity near the six historic golden eagle nests located within 2 mi of proposed turbine locations were completed. Two survey point locations were established for this survey; each one near a cluster of 4 (Point 1) and a cluster of 2 (Point 2) historic golden eagle nests (Figure 2). The two rounds of ground-based surveys were completed at both points, one in late February and one in late March. During each round of surveys each point was surveyed once for 4 hours. The February survey was completed on February 28, 2019, and the March survey was completed on March 30 and 31, 2019.

The surveys were completed by an experienced avian biologist using 10x42 binoculars and a 22-48x65 spotting scope. The biologist periodically scanned the air, hillsides, and trees in all directions of each survey point for eagles, including the vicinity of the historic nest locations. All observations of eagles of either species were recorded in a field notebook, including species, age, and activity, and the flight paths of eagles were traced onto a topographic map.

5.0 RESULTS

5.1 AERIAL SURVEY

5.1.1 Survey Effort

The first aerial survey round was conducted between March 11 and 14, 2019. The first round consisted of approximately 12.5 hours of aerial survey time along approximately 695 mi of aerial transects (Figure 3). Good survey
conditions including clear weather, sufficient light, and good visibility occurred during the surveys. Gusty wind conditions on March 12 limited the survey time on that day.

The second survey round occurred between May 6 and 8, 2019, and consisted of approximately 14.3 hours survey time along approximately 749 mi of aerial transects (Figure 3). Good survey conditions including clear weather, good light, and sufficient visibility also occurred during these surveys.

5.1.2 Bald Eagles

One occupied, active bald eagle nest was documented during the 2019 aerial survey effort (Figure 4). This nest was a previously unknown nest located along the Van Duzen River, approximately 4.1 mi northeast of the Bridgeville substation and nearly 17 mi from the nearest proposed turbine location. The nest was empty during the first survey event in March, but in May held an adult bald eagle with two small chicks. The two historic bald eagle nest locations (near Rio Dell and near the High Rock Conservation Camp) were not located in 2019.

Eight bald eagles were observed incidentally during the aerial surveys. All were observations of adult birds either perched or flying and were distributed largely along the Eel River (both the main stem and south fork; Figure 4). However, two observations occurred in the western portion of the survey area, including a perched adult on a forested ridge within 2 mi of the coast and an adult south of the Bear River, approximately 2.5 mi from the coast.

5.1.3 Golden Eagles

Two occupied, active golden eagle nests and three unoccupied historic golden eagle nests were documented during the 2019 aerial survey effort (Figure 5). Both occupied nests were located south of the Bear River, within 2 mi of some proposed turbine locations, and both were included in the data bases of historic golden eagle nest locations.

Occupied Golden Eagle Nest 1 was found on March 13 after an adult bird flushed from a nearby location. A second bird was observed standing on the nest. No greenery or eggs were observed in the nest, but it was considered occupied and active. In May, there were no golden eagles observed on or near the nest, despite two visits to examine the area for golden eagle activity, and it is assumed that early nesting activities either failed or did not take place.

Occupied Golden Eagle Nest 2 was also found on March 13 adjacent to a logging road accessing Rainbow Ridge. An adult bird was observed in the nest, in incubation position. During the May survey an adult bird appeared to be in the nest in either incubation or brooding position. No chicks were observed in the nest and there was not any other adult golden eagle activity in the area. The nest tree was subsequently visited by vehicle twice and no golden eagle activity was noted on the nest or in the vicinity.

Three other historic golden eagle nests were located during the survey; either in March, in May, or during both survey events. These three nests do not appear to have been used for nesting by golden eagles in 2019. None of the remaining historic golden eagle nests were located during the survey; nor were any previously unknown golden eagle nests discovered.

Five golden eagles were observed incidentally during the aerial surveys and all were adults. This included two birds at Occupied Golden Eagle Nest 1 in March and another near one of the unoccupied historic golden eagle nests near the southern end of the survey area (Figure 5). Two adult birds were also seen near the eastern end of the survey area (Figure 5), where one was observed perched on a rock outcropping in a field and the other circling nearby. The
second bird then landed near the first bird. Searches of nearby ledges and cliffs did not yield any potential nests for this pair of birds.

5.1.4 Other Species

Five occupied osprey (*Pandion haliaetus*) nests and one occupied red-tailed hawk (*Buteo jamaicensis*) nest, and seven unoccupied large stick nests were documented in the survey area (Figure 6). Four of the osprey nests were located along the main stem and south fork of the Eel River while the fifth was located on the Van Duzen River. The red-tailed hawk nest was located in a predominantly deciduous forest area between the Eel River and agricultural fields, just south of Fortuna.

5.2 GROUND SURVEY

Both bald eagles and golden eagles were observed during the ground-based survey focused on the six historic golden eagle nests within 2 mi of project turbines. An adult and immature bald eagle were observed at Points 1 and 2 during the February 28, 2019, survey. Based on the plumage characteristics and behaviors of both of these birds and the timing of the surveys at the two points (they were sampled in succession on the same day) it is anticipated that the same two individual birds were observed at both of these points. The adult bald eagle did not display any behavior indicative of active nesting near the survey points. No golden eagles were observed during the February survey.

No eagles were observed at Point 1 (which was centered on four historic golden eagle nest records, one of which was determined to be active during the first aerial survey [Occupied Golden Eagle Nest 1]) during the late March survey. One bald eagle and two golden eagles were observed during the survey at Point 2 (which was centered on two historic golden eagle nests, one of which was determined to be active during the first aerial survey [Occupied Golden Eagle Nest 2]). The bald eagle (adult) was observed flying southward, south of the survey point and towards Rainbow Ridge, east of Occupied Golden Eagle Nest 2. The two adult golden eagles were observed flying along the slopes north of the Bear River but south of Monument Ridge. Both were seen flying southwest, up the Bear River Valley.

6.0 DISCUSSION

The 2019 aerial eagle nest survey included a search for all historic bald and golden eagle nests in the survey area, 5 of which were located and were golden eagle nest records. Many of the nest records were dated, some going back as far as 1994, and the database notes for some of them indicate that, in many cases, the nest tree is likely no longer present.

Two historic golden eagle nests were determined to be occupied and active during the first aerial survey but one (Occupied Golden Eagle Nest 1) appeared to have either gone unused, as it was empty during the May survey, or failed early in the nesting season. The other nest (Occupied Golden Eagle Nest 2) appeared to contain a low-lying adult and no chicks during the second aerial survey. Given the time between the two aerial flights it was anticipated that if the nesting attempt was successful chicks should have been observable in the nest in May. Additionally, informal discussions with HRC biologists completing eagle monitoring in accordance with HRC’s HCP indicated that
this nest had become inactive. This nest tree is adjacent to an active logging road and the nest is visible from the road. Therefore, two follow-up visits to view the nest from the logging road were completed. During both visits the nest appeared empty during an initial drive past it. The nest was then viewed from an uphill location so that the bowl of the nest and nest cup could be seen. These observations yielded no golden eagles in the nest and no golden activity in the vicinity of the nest. Some eagle body feathers were visible along the rim of the nest and in adjacent foliage, indicating some level of prolonged use of the nest in 2019. However, given the lack of obvious adult nesting and brood-rearing activity and no indications of chicks in the nest both from Stantec’s observations and HRC’s (chicks would have been fairly large at the time of the follow-up ground survey), it appears that this nest failed in 2019.

The occupied bald eagle nest observed along the Van Duzen River is a previously unknown nest for this species. No eagles were observed in or near the nest during the March survey, but two small chicks were present with an adult in May. Based on size and timing of the observation, the chicks were estimated to have been no more than a week old at that time. The historic bald eagle nest located near the High Rock Conservation Camp was not located and that nest may have fallen. The other bald eagle nest record only has a general location description (south side of the Eel River in the Bellevue area, northwest of Rio Dell). Despite repeated passes past this area in March and May, a nest structure was not located.
7.0 REFERENCES


FIGURES
Bear River Ridge

Monument Ridge

- Proposed Representative Wind Turbine Locations
- Generation Transmission line (gen-tie)
- Proposed Access Roads

\textbf{Notes:}
1. Coordinate System: NAD 1983 UTM Zone 10N
2. Base map: ESRI World Topographic Map web mapping service.
Proposed Representative Wind Turbine Locations

Survey Area Boundary

Proposed Generation Tie-In Line (gen-tie)

March 2019 Aerial Survey Tracks

May 2019 Aerial Survey Tracks

Notes

2. Base map: ESRI World Imagery Map web mapping service

Eagle and Raptor Nest Survey Tracks

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for any errors or omissions, and any costs arising in any way from the content or provision of the data.
Eagle and Raptor Nest Survey
Results – Bald Eagles


2. Base map: ESRI World Imagery Map web mapping service

- Proposed Representative Wind Turbine Locations
- Proposed Generation Tie-In Line (gen-tie)
- Survey Area Boundary
- Occupied Bald Eagle Nest
- Historic Nest – Not found in 2019
- Incidental Bald Eagle Observation

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Eagle and Raptor Nest Survey Results – Golden Eagles

- Proposed Representative Wind Turbine Locations
- Proposed Generation Tie-In Line (gen-tie)
- Survey Area Boundary
- Occupied Golden Eagle Nest
- Historic Nest – Unoccupied in 2019
- Historic Nest – Not found in 2019
- Incidental Golden Eagle Observation

Notes:
2. Base map: ESRI World Imagery Map web mapping service

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