

## **APPENDIX I**

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Biological Resources: *Humboldt Wind Energy Project Northern Spotted Owl  
Habitat Assessment and Auditory and Visual Disturbance Analysis Report,  
Humboldt County, California, Summer 2018*



## **Humboldt Wind Energy Project**

Northern Spotted Owl Habitat Assessment  
and Auditory and Visual Disturbance  
Analysis Report

October 26, 2018

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**HUMBOLDT WIND ENERGY PROJECT NORTHERN SPOTTED OWL HABITAT ASSESSMENT AND AUDITORY  
AND VISUAL DISTURBANCE ANALYSIS REPORT**

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## **Acronyms and Abbreviations**

ac	acre
dB	Decibel/s
DBH	diameter at breast height
ft	foot/feet
gen-tie	generation transmission line
HCP	Habitat Conservation Plan
HRC	Humboldt Redwood Company
in.	inch/inches
m	meter/s
mi	mile/s
NSO	northern spotted owl
USFWS	U.S. Fish and Wildlife Service

## **HUMBOLDT WIND ENERGY PROJECT NORTHERN SPOTTED OWL HABITAT ASSESSMENT AND AUDITORY AND VISUAL DISTURBANCE ANALYSIS REPORT**

### **Note:**

Often, agency suggestions and guidelines are provided in US units of measure (e.g., acres [ac] feet [ft], or miles [mi]), and in other instances, agency guidance is provided in metric (aka SI, or System International) units (e.g., meters [m] or kilometers [km]). To convert an otherwise readily recognized agency standard (e.g., 10 mi or 1 km) to the other system may result in confusion. Accordingly, measures are provided in either system, using the original agency suggestion unchanged, and provide conversion to the other standard only when it makes sense to do so.

# HUMBOLDT WIND ENERGY PROJECT NORTHERN SPOTTED OWL HABITAT ASSESSMENT AND AUDITORY AND VISUAL DISTURBANCE ANALYSIS REPORT

## 1.0 INTRODUCTION

Humboldt Wind, LLC (Humboldt Wind) is planning to construct and operate the Humboldt Wind Energy Project (project) in south-central Humboldt County, California (Figure 1). The project consists of up to 60 wind turbines and associated facilities including meteorological towers, electrical collection system, access roads, construction staging areas, a substation, an operations and maintenance facility, up to a 25-mile (mi) generation transmission line (gen-tie) and its point of interconnection at the existing Pacific Gas & Electric Bridgeville Substation. The project would have a nameplate generating capacity of up to 155 megawatts. Proposed turbine locations are situated on two prominent ridgelines, Bear River Ridge and Monument Ridge, 4.7 mi south and southwest of Scotia, in Humboldt County, California (Figure 1).

The project area encompasses areas of potential activity and includes a 1,000-foot-(ft)-wide corridor centered on proposed turbine locations; a 200-ft wide corridor centered on project roads, the electrical collection line, and the gen-tie; and a 500-ft-wide buffer around proposed staging and temporary impact areas and project substations, encompassing 2,241 acres (ac) (Figure 2). The project area is divided into the following segments for description purposes:

- Bear River Ridge
- Western Monument Ridge
- Eastern Monument Ridge
- Monument Ridge – Highway 101
- Highway 101 – Shively Ridge
- Shively Ridge
- Bridgeville

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). One resource consideration identified in the Draft Work Plan is a habitat assessment for northern spotted owl (NSO) (*Strix occidentalis caurina*). In August 2018, Stantec conducted a NSO habitat assessment followed by an auditory and visual disturbance analysis.

The NSO is listed under the federal Endangered Species Act and California Endangered Species Act as threatened. This species is also listed by the California Department of Fish and Wildlife as a species of special concern. The NSO is protected under other federal and state laws and regulations, including the Migratory Bird Treaty Act of 1918 as amended and California Fish and Game Code Sections 3503.5 and 3513.

This NSO habitat assessment describes the environmental setting and species life history and summarizes the methods and results of the habitat assessment and disturbance analysis.

# HUMBOLDT WIND ENERGY PROJECT NORTHERN SPOTTED OWL HABITAT ASSESSMENT AND AUDITORY AND VISUAL DISTURBANCE ANALYSIS REPORT

## 2.0 ENVIRONMENTAL SETTING

Humboldt County is within the Klamath/North Coast bioregion, and features a rocky coastline, montane forests, and small and sparsely populated settlements. The county is among those with the wettest and foggiest weather in California. Cool, moist climate is typical on the coast but becomes progressively drier, warmer, and more variable but remaining mild inland. Humboldt County features several biological communities; the most abundant is coniferous forest comprising Douglas fir, redwood, and pine forests, followed by oak woodlands, and grasslands. Less abundant habitats include coastal beach dune vegetation, northern coastal scrub, chaparral, salt marsh, riparian, and freshwater marsh. Humboldt Bay, located about 16 mi north of the project, is the second largest estuary in California. As such, the Bay and coast of Humboldt County have high biodiversity and support many species of resident and migratory wildlife with high seasonal and year-round abundance. Six rivers run through the county, providing habitat for fish and wildlife as well as important water resources. Nearly 400,000 ac of the county's undeveloped forests and coastlines are designated as parks and forests.

Humboldt County spans two geologic provinces. The Coast Ranges Province in the county's center and southwest comprises mainly the Franciscan Complex, with schists, sand, and other alluvial deposits associated with the coast. The Klamath Mountains Province in the northeast features older sedimentary rock including sandstone, chert, slate, and schist.

The average July temperature in Humboldt County is typically in the 60s (Fahrenheit). While rain can occur throughout the year, about 90% of the annual rain results from Pacific Ocean storms and falls between October and April. Seasonal totals average more than 40 inches (in.) in the driest areas and exceed 100 in. in the wettest zones. Moisture and moderate temperature combined create high average relative humidity.

The project is on privately owned and managed lands in rural, unincorporated south-central Humboldt County, 10 mi southeast of Ferndale, 20 mi south of Eureka, and 22 mi north of Garberville, California. Most of the project would be located on two prominent ridgelines that are located south and east of the town of Scotia. Monument Ridge is located south and west of Highway 101 and the Eel River, and Shively Ridge is located north and east of Highway 101 and the Eel River.

The project area consists primarily of managed timberlands that are dominated by redwood and Douglas-fir forests, with annual grassland, hardwood, and chaparral inclusions. In addition to timber production, some areas of the project site are managed for cattle grazing. The topography is diverse and steep in places, and elevation ranges from nearly sea level in river bottoms to just over 3,000 ft.

The general plan designation for the majority of this area is Timber, with a smaller amount of Agricultural Grazing. About 100 ac of the project area has a designation of Residential Agriculture. Most of the area is zoned Timber Production Zone and Agriculture Exclusive with a combining zone specifying a minimum building site of 160 ac (AE-B-5(160)).

The majority of the project site is located on lands owned by Humboldt Redwood Company (HRC), which operates under a Habitat Conservation Plan (HCP) that was originally established in 1999 under the previous landowners. Per the HCP, NSO surveys were conducted throughout the entire land ownership annually from 1999 to 2003. In 2004, the NSO survey strategy was revised and approved by regulatory agencies to include surveying one-fifth of the

## **HUMBOLDT WIND ENERGY PROJECT NORTHERN SPOTTED OWL HABITAT ASSESSMENT AND AUDITORY AND VISUAL DISTURBANCE ANALYSIS REPORT**

property annually in addition to surveying all areas proposed for timber harvest under timber harvest plans. As part of the NSO survey process, NSO habitat maps were developed for the property identifying locations of nesting, roosting, and foraging habitat.

### **3.0 NATURAL HISTORY OF NORTHERN SPOTTED OWL**

#### **3.1 RANGE AND HABITATS**

NSO is one of three recognized subspecies of spotted owl. The range of NSO currently extends from southwest British Columbia, Canada, through the Cascade Mountains and coastal ranges in Washington, Oregon, and California, as far south as Marin County, California (USFWS 2011). Like most owls, NSO is nocturnal. It requires older, mixed-age and structurally complex forests with old growth characteristics and high canopy closure (Solis and Gutiérrez 1990). It nests and roosts in multi-story, multi-species, moderate to dense canopy dominated by large diameter trees with a high incidence of cavities or broken tops, sufficient open space below the canopy for flight, and an accumulation of woody debris on the ground (Solis and Gutiérrez 1990, USFWS 2011). NSOs usually nest in a tree or snag cavity or in broken tops of large trees. They less frequently nest in mistletoe clumps or abandoned raptor or raven (*Corvus corax*) nests (Zeiner et al. 1990).

#### **3.2 BEHAVIOR**

NSOs are nonmigratory and occupy the same home range year-round. They are territorial (i.e., the owls or pairs will defend an area) although home ranges of adjacent owls or pairs can overlap to a large extent (Solis and Gutiérrez 1990). The size of the home range varies geographically: along the Oregon Cascades, estimated average home range size was 2,955 ac, and in Washington's Olympic Peninsula, it was reportedly 14,211 ac (USFWS 2011). Northern California NSOs had smaller home ranges than reported for Oregon and Washington above with an average of 1,020 ac (Solis and Gutiérrez 1990), but these authors acknowledged the likelihood that their study underestimated home range sizes. Variability in home range size has been attributed to several variables in addition to geography within the NSO's range, including differences in local prey species and season: in northern California, NSOs occupied the most restricted home ranges during summer (Solis and Gutiérrez 1990).

In the Oregon Cascades, NSOs feed predominantly on wood rats, and in the Olympic Peninsula, they feed predominantly on flying squirrels (USFWS 2011). However, in northern California, NSOs feed on a variety of prey, including small mammals, birds, amphibians, reptiles, and insects (Zeiner et al. 1990, USFWS 2011). In northern California, NSOs forage and roost mostly on north-facing slopes (Solis and Gutiérrez 1990).

#### **3.3 LIFESPAN AND REPRODUCTION**

NSO is a relatively long-lived species with a long reproductive life span. According to Eric Forsman with the United States Forest Service, several banded individuals in Oregon were at least 16-17 years of age (Cornell Lab of Ornithology, 2018). NSO is monogamous, but pairs do not necessarily breed every year. Breeding generally begins at 2 to 5 years of age. The female typically lays 1 to 4 eggs in late March or April. The male delivers food to the

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female and the young while the female is brooding. Juvenile owls leave the nest in late May or June; however, they still depend on food provided by their parents until about September (Zeiner et al. 1990, USFWS 2011).

## **4.0 METHODS**

The habitat assessment for NSO was conducted following guidelines provided in the NSO Protocol (USFWS 2012). An auditory and visual disturbance assessment was also performed following methods provided in Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California (USFWS 2006).

The survey area for the habitat assessment was derived per the USFWS NSO Protocol, which recommends a 0.7-mile survey radius for projects located in the California Coast physiographic province redwood zone. As such, Stantec surveyed a 0.7-mile buffer around the project area (areas of potential activity) depicted in Figure 2. The survey area encompasses approximately 40,791 ac (USFWS 2012, Figure 3).

### **4.1 DATABASE AND LITERATURE REVIEW AND DESKTOP-LEVEL HABITAT ASSESSMENT**

To assess NSO habitat present within the survey area, Stantec reviewed: 1) HRC's existing NSO habitat maps and occurrence records for their managed timberlands within the survey area; 2) California Department of Fish and Wildlife Biogeographic Information and Observation System California Natural Diversity Database NSO occurrence records; and 3) USFWS online Critical Habitat Portal to determine whether designated critical habitat for NSO occurs in the survey area or vicinity. Following this review, Stantec developed habitat spatial data using ESRI ArcGIS/Arcinfo and generally mapped and characterized habitats using definitions for functional nesting, roosting, and foraging habitats provided in California Forest Practice Rules 2017 (California Department of Forestry and Fire Protection 2017):

- Functional nesting habitat is habitat with a dominant and codominant tree canopy closure of at least 40 percent and a total canopy (including dominant, codominant, and intermediates) of at least 60 percent. Usually the stand is distinctly multi-layered with an average stem diameter in dominant and codominant conifers and hardwoods >11-in diameter at breast height (DBH). The stand usually consists of several tree species (including hardwoods) of mixed sizes. All nests, snags, down logs, and decadent trees shall also be considered as part of the habitat. Nesting substrates are provided by broken top trees, cavities, or platforms such as those created by a hawk or squirrel nest, mistletoe broom, accumulated debris. Owls are known to nest in less than optimal habitat. Nesting areas may also be associated with characteristics of topographic relief and aspect which alter microclimates.
- Functional roosting habitat during the territorial breeding season consists of stands where average stem diameter is >11-in DBH among dominant and codominant trees. Hardwoods and conifers provide an average of at least 40 percent canopy closure, but the stand can have a high degree of variability. Stand size and configuration must be sufficient to provide multiple perch sites which are suitable for protection from various environmental conditions, including wind, heat, and precipitation.

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- Functional foraging habitat is dependent upon the presence and availability of prey on the forest floor or in the canopy; presence of accessible perching limbs; and adjacency to stands with canopy closures >40 percent. Average stem diameter is usually >6-in DBH for hardwoods and >11-in DBH for conifers among dominants, and codominants, and the total overhead canopy closure, including intermediate trees is at least 40 percent. Where overall canopy closure is >80 percent, foraging habitat is limited to areas with ample flight space below limbs and among stems. Foraging habitat is smaller size classes and lower percentage canopy closures must be justified by local information.

Stantec used the desktop resources reviewed to evaluate and map NSO functional nesting, roosting, and foraging habitats in the survey area. Biologists conducted desktop-level habitat mapping using current ESRI aerial imagery as a base map and prepared field maps showing NSO habitat in the survey area. The field maps ranged in scale from 1:2,000 to 1:500 depending on quality of the aerial imagery and complexity of the landscape.

### **4.2 HABITAT ASSESSMENT**

Using the field maps, biologists conducted field evaluations throughout the survey area between August 13 and 31, 2018 to field verify the results of the desktop-level habitat mapping. However, due to the size of the survey area and in some cases access constraints (e.g., private property with no permission to access), some areas were not evaluated in the field. An additional survey visit was conducted at the Bridgeville Substation on February 22, 2019. Following the field evaluations, NSO habitats were revised and digitized in ESRI ArcGIS/Arcinfo for spatial analysis and to create a map set depicting NSO functional nesting, roosting, and foraging habitats in the survey area.

### **4.3 AUDITORY AND VISUAL DISTURBANCE ANALYSIS**

The auditory and visual disturbance analysis was conducted using the Northern Spotted Owl Sound and Visual Harassment Decision Support Tools as provided in Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California (USFWS 2006). Harassment is defined as including, but not limited to:

- Flushing an adult or juvenile from an active nest during the reproductive period
- Precluding adult feeding of the young for a daily feeding cycle
- Precluding feeding attempts of the young during part of multiple feeding cycles

In the USFWS guidance, a set of criteria is described to define when it is likely that the above listed and other project-related harassment would occur. Behaviors demonstrating harassment in response to project sound levels and human disturbance may occur when:

- the action-generated sound level exceeds ambient (i.e., pre-project) sound levels by 20–25 decibels (dB);
- the total sound level when action-generated sound is combined with ambient sound levels exceeds 90 dB, or;
- when human activity would occur within 40 meters (m) of an active nest.

Stantec applied the harassment distances and conditions from the USFWS guidance, steps 1–5 to project conditions as currently known. Conservative assumptions are made that likely under-estimate ambient sound levels and over-estimate construction sound levels.

## 5.0 RESULTS

### 5.1 HABITAT ASSESSMENT

Stantec documented 33,213 ac of combined NSO habitats (i.e., nesting, roosting, and foraging) in the survey area and 7,577 ac of non-habitat. Of the 33,213 ac of NSO habitat in the survey area, 1,473 ac occurs within the project area, including 161 ac of functional nesting habitat (Table 1, Figure 4).

**Table 1. Northern Spotted Owl Habitats in Study Area and Project Area**

Habitat classification	Study Area (ac)	Project Area (ac)
Nesting	7,831	161
Roosting	11,726	442
Foraging	13,656	844
TOTAL	33, 213	1,447

No designated critical habitat for NSO occurs in the project area. However, critical habitat for NSO is designated at two locations in the survey area, both of which are in the eastern portion near the Bridgeville segment. One critical habitat unit is north of the gen-tie along the Van Duzen River at Maple Creek and the other is southeast of the gen-tie along Burr Creek.

### 5.2 AUDITORY AND VISUAL DISTURBANCE ANALYSIS

Stantec assessed the potential for the project to exceed ambient noise generated in the survey area per steps 1-5 in the USFWS guidance, and accordingly, began the analysis and approximation of distances and areas within which harassment could occur to NSO.

- **Step 1** – Existing ambient sound level. The survey area consists of a set of linear segments, in a range of habitats, and close to a continuum of existing human uses ranging from those with natural settings and low ambient noise (e.g., grazing lands and unharvested forest stands) to managed lands and commercial activities that can occasionally generate high ambient noise levels (e.g., road maintenance, logging). Accordingly, existing ambient sound levels result from a range of vehicle traffic associated with existing public roadways and with commercial operations on properties where the project is proposed and its surroundings. Ambient sound levels are expected to range from **Natural Ambient** to **High**, depending on location within the project area. At this stage, we conservatively assume a **Very Low** existing sound level.
- **Step 2** – Proposed action sound levels. Action-generated sound sources can be expected to range from **Low** (e.g., chainsaws) to **Moderate** (e.g., pickup truck), to **High** (e.g., concrete batch plant). The extent to which these sound levels will be above existing ambient and natural background sound levels (which are expected to range from **Natural Ambient** to **High**) will vary on location within the project area, and adjacent non-project land uses. At this stage, we conservatively assume a **High** action-generated sound level.
- **Step 3** – Estimated harassment distances. USFWS guidance provided an estimate of 100 m for **Very Low** ambient sound levels with a **High** action-generated sound level. The 100 m is from the outer edge of the project footprint, extending into NSO habitat.
- **Step 4** – Sound attenuation. This may be used in the future to refine presumed noise impact disturbance areas based on local conditions and their capacity to attenuate sounds.

## HUMBOLDT WIND ENERGY PROJECT NORTHERN SPOTTED OWL HABITAT ASSESSMENT AND AUDITORY AND VISUAL DISTURBANCE ANALYSIS REPORT

- **Step 5** – Human activities. Any visual disturbances planned within 40 m of nests, nest branches, or flight paths would be assumed to cause visual harassment.

Based on the above steps, auditory harassment could result from construction activities within 100 m or less of functional nesting habitat if they take place during the nesting season (February to mid-July) and the habitat is occupied. Visual harassment could also result from construction activities that take place during the nesting season and are within 40 m of an active nest or occupied activity center. According to the results of HRC's NSO surveys, NSO activity centers have not been documented within either 100 m or 40 m of the project area.

## 6.0 CONCLUSION

The survey area provides an estimated 33,213 ac of NSO habitat including 7,831 ac of functional nesting habitat. Approximately 161 ac of the functional nesting habitat occurs within the project area. The project could conservatively remove up to 1,473 ac of NSO habitat to accommodate project components: 161 ac of nesting, 468 ac of roosting, and 844 ac of foraging habitat. However, actual acreage loss is expected to be much less as the project area is large enough to allow for project components to be shifted to avoid identified NSO habitats as construction-level plans are prepared.

No designated critical habitat for NSO occurs in the project area; therefore, no impacts on designated critical habitat will occur.

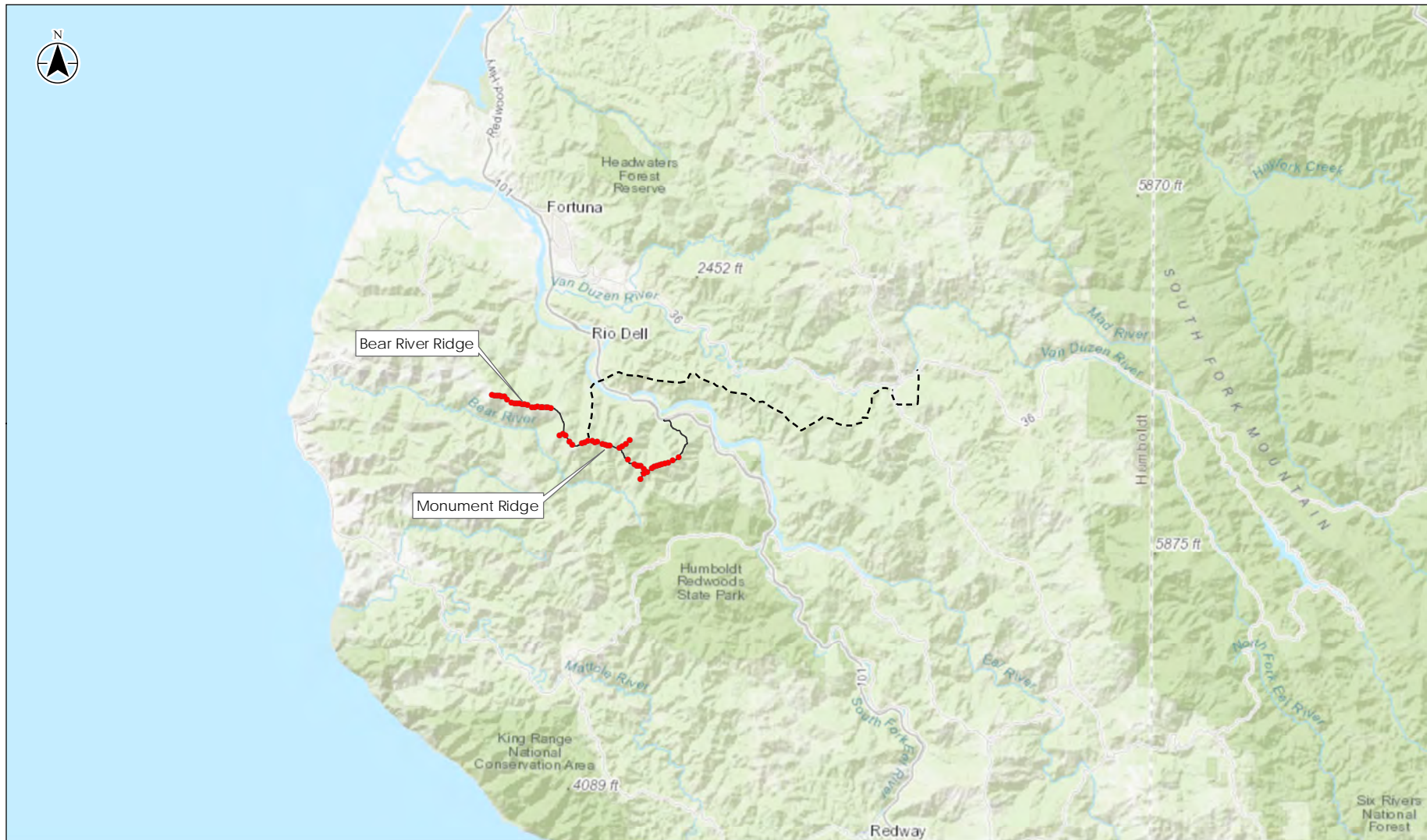
Based on the auditory and visual disturbance analysis, if construction activities occurred during the nesting season for NSO (February to mid-July), auditory and/or visual harassment could occur if NSO are nesting within 100 m. No NSO activity centers were documented in HRC's dataset within 100 m or 40 m of the project area.

# HUMBOLDT WIND ENERGY PROJECT NORTHERN SPOTTED OWL HABITAT ASSESSMENT AND AUDITORY AND VISUAL DISTURBANCE ANALYSIS REPORT

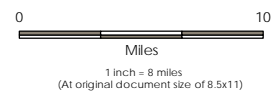
## 7.0 REFERENCES

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## **FIGURES**



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



Notes  
 1. Coordinate System: NAD 1983 UTM Zone 10N  
 2. Base map: ESRI World Topographic Map web mapping service.



Project Location  
 Humboldt County, California  
 Prepared by PG on 2018-08-06  
 Technical Reviewed by YA on 2018-08-07  
 Independent Review by JD on 2018-08-07

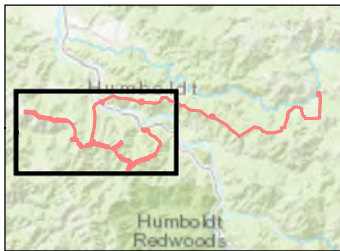
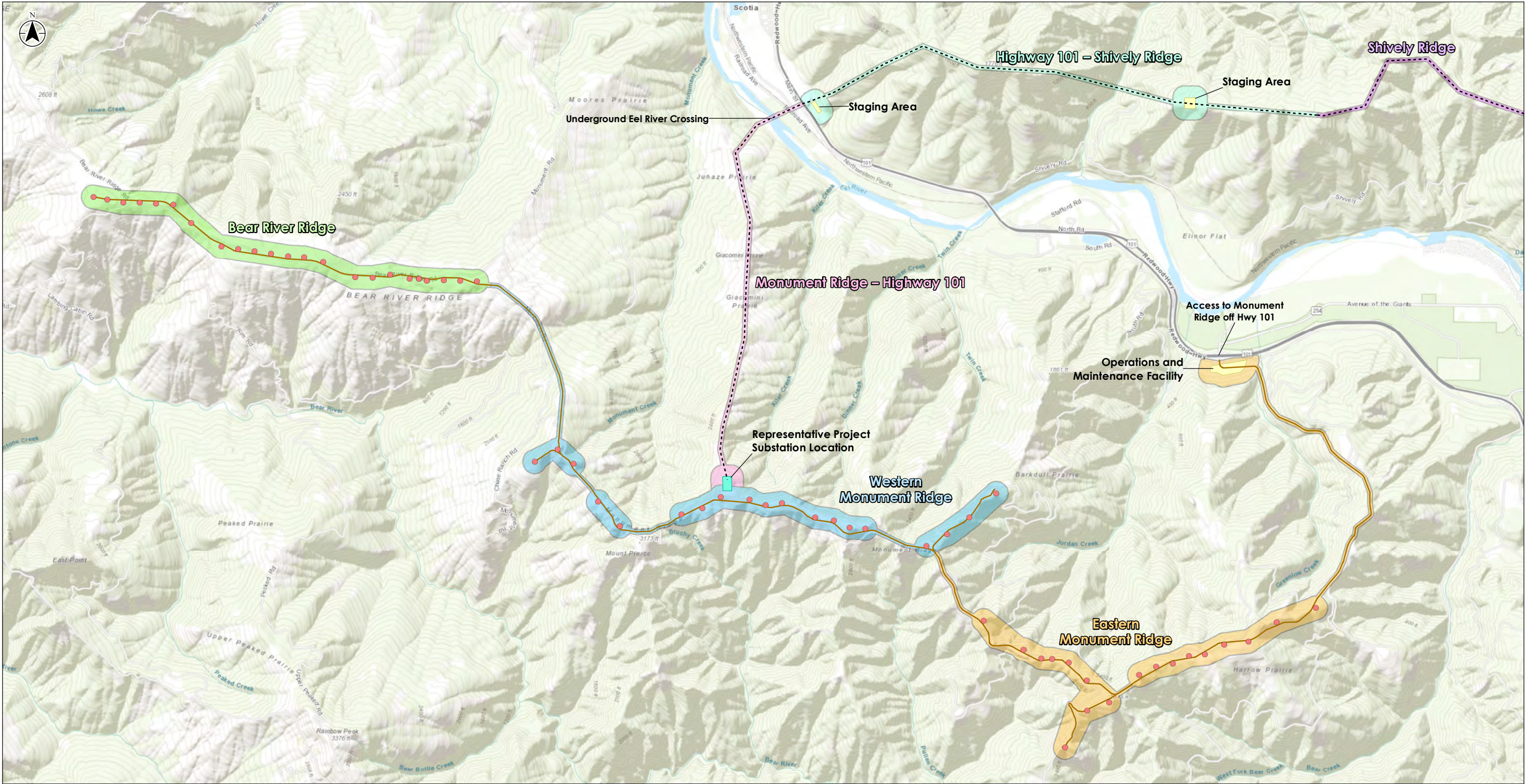
Client/Project  
 Humboldt Wind, LLC  
 Humboldt Wind Energy Project

Figure No.

1

Title

General Overview

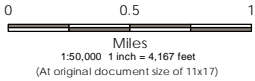


**Project Area, by Segment**

- |                              |                             |
|------------------------------|-----------------------------|
| Bear River Ridge             | Highway 101 - Shively Ridge |
| Western Monument Ridge       | Shively Ridge               |
| Monument Ridge - Highway 101 | Bridgeville                 |
| Eastern Monument Ridge       |                             |

**Project Components**

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



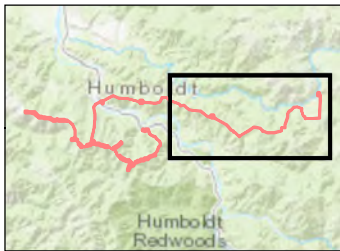
**Notes**  
1. Coordinate System: NAD 1983 UTM Zone 10N  
2. Base map: Esri World Topographic Map



Project Location  
Humboldt County, California  
Prepared by PG on 2018-10-01  
Technical Review by DP on 2018-10-02  
Independent Review by JD on 2018-10-02

Client/Project  
Humboldt Wind, LLC  
Humboldt Wind Energy Project

Figure No.  
**2**  
Title  
**Project Area**

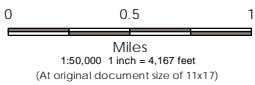


Project Area, by Segment

- |                              |                             |
|------------------------------|-----------------------------|
| Bear River Ridge             | Highway 101 - Shively Ridge |
| Western Monument Ridge       | Shively Ridge               |
| Monument Ridge - Highway 101 | Bridgeville                 |
| Eastern Monument Ridge       |                             |

Project Components

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



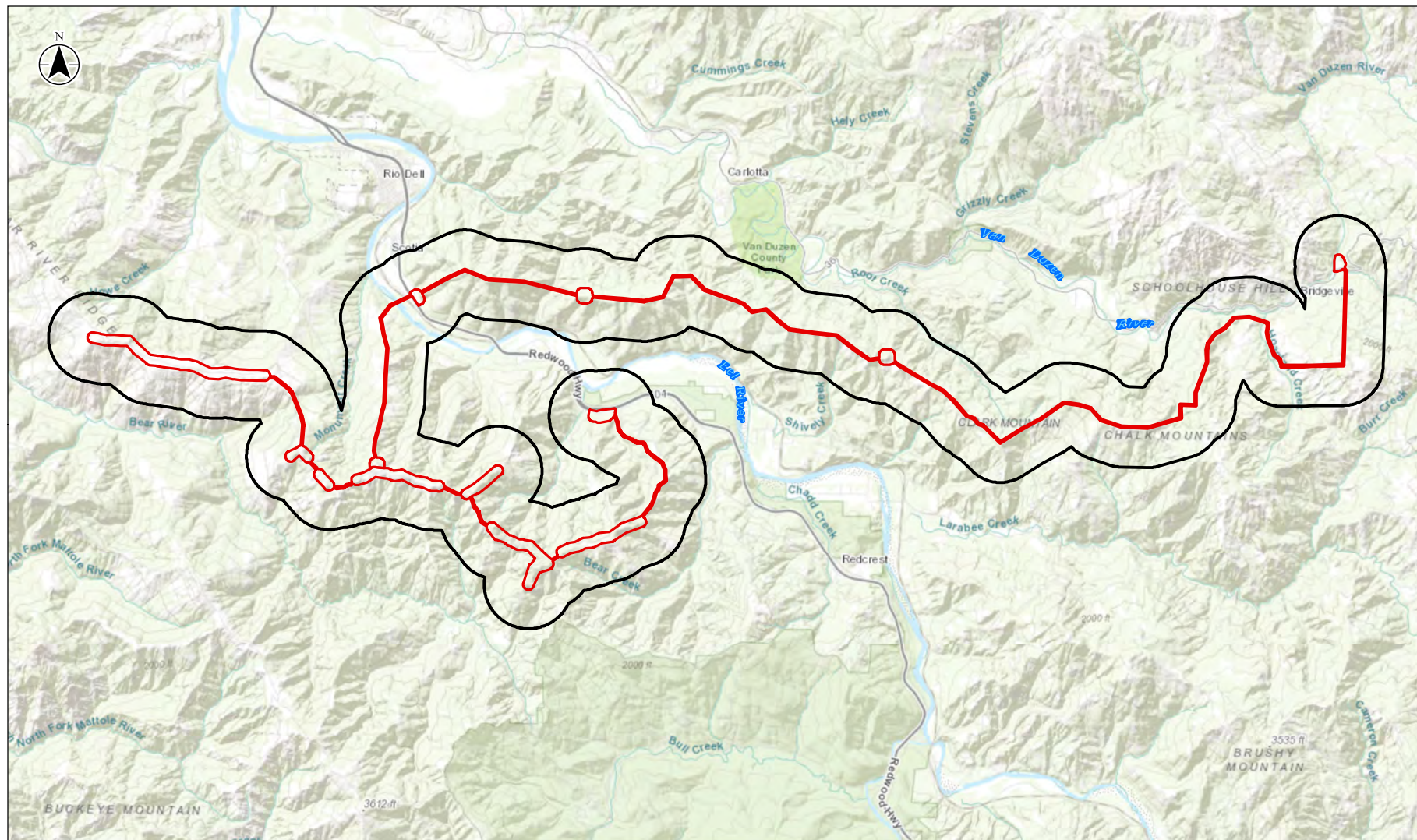
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2. Base map: Esri World Topographic Map



Project Location  
Humboldt County, California  
185703758  
Prepared by PG on 2018-10-01  
Technical Review by DP on 2018-10-02  
Independent Review by JD on 2018-10-02

Client/Project  
Humboldt Wind, LLC  
Humboldt Wind Energy Project

Figure No.  
2  
Title  
Project Area



- Survey Area (0.7-mile radius of Project Area)
- Project Area



Notes  
 1. Coordinate System: NAD 1983 UTM Zone 10N  
 2. Base map: ESRI World Topographic Map web mapping service.



Project Location  
 Humboldt County, California  
 Prepared by PG on 2018-10-01  
 Technical Review by DP on 2018-10-02  
 Independent Review by JD on 2018-10-02

Client/Project  
 Humboldt Wind, LLC  
 Humboldt Wind Energy Project

Figure No.

3

Title

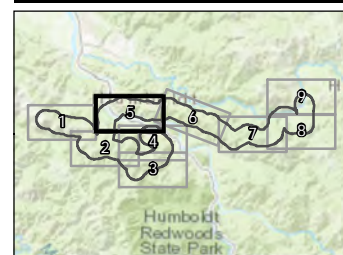
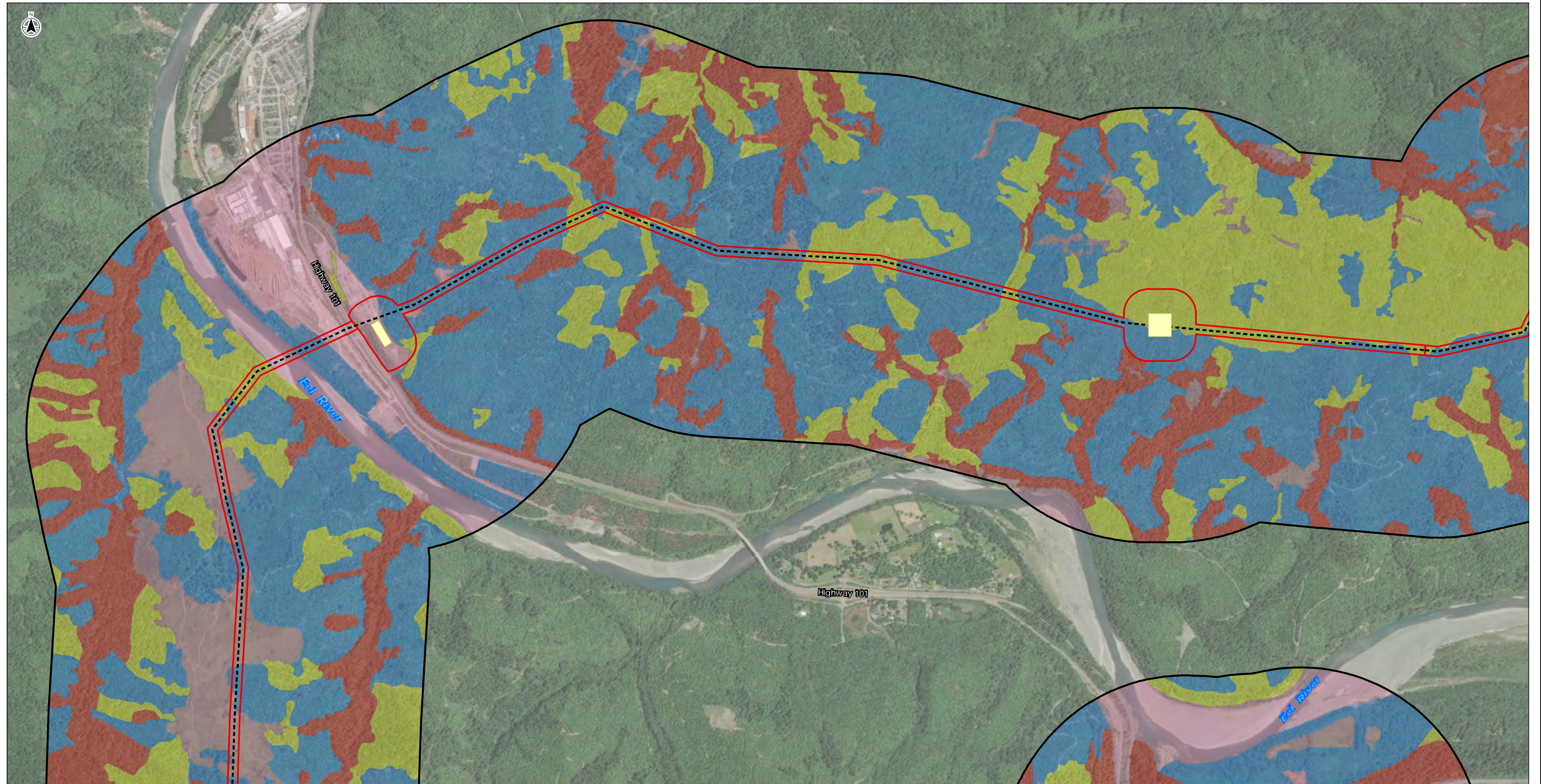
Survey Area









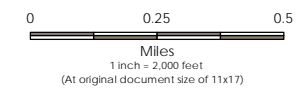




## Project Components

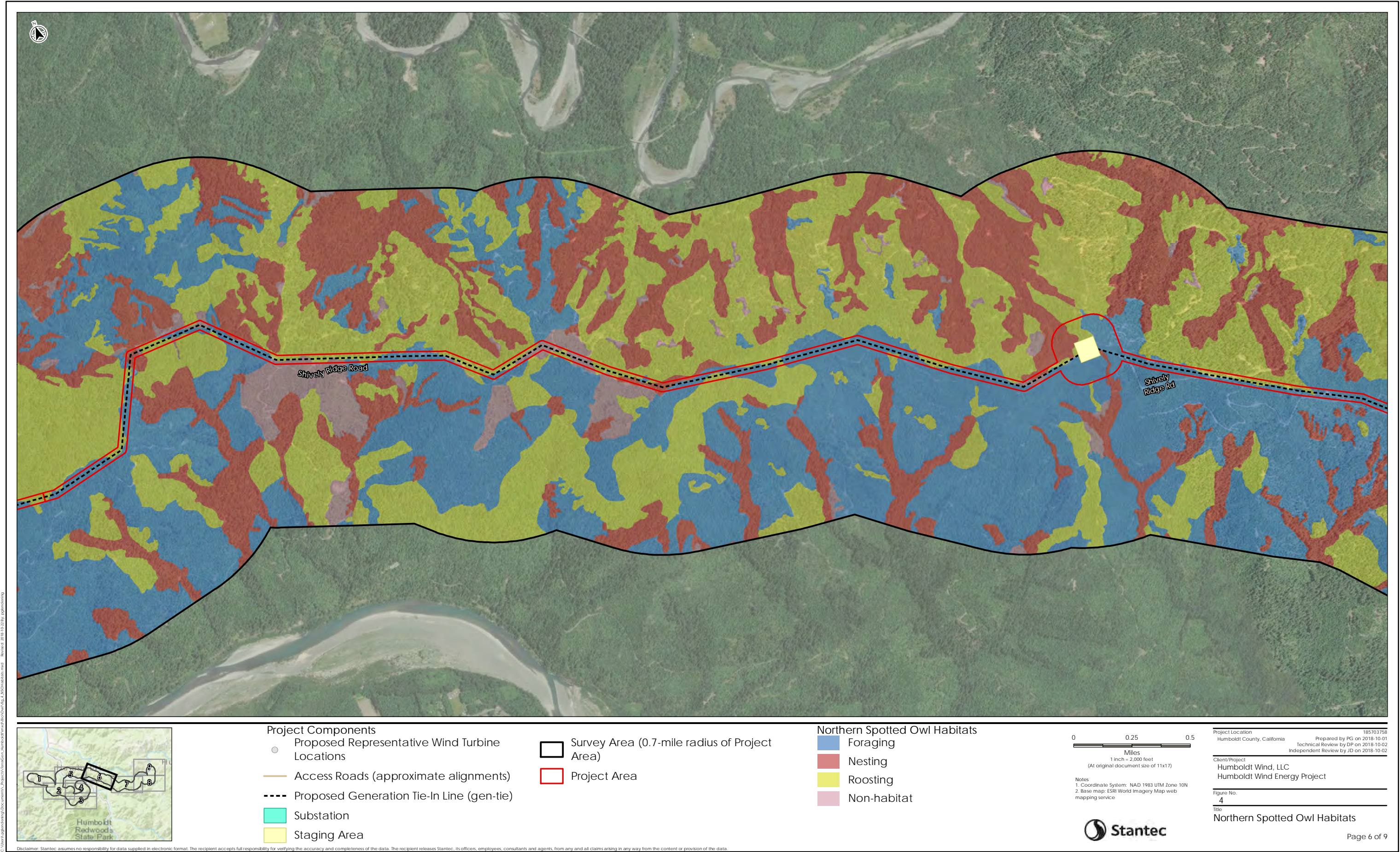
-  Survey Area (0.7-mile radius of Project Area)  
 Project Area

## Northern Spotted Owl Habitats



Project Location	185703758
Humboldt County, California	Prepared by PG on 2018-10-01
	Technical Review by DP on 2018-10-02
	Independent Review by JD on 2018-10-02

Figure No.  
4  
Title  
Northern Spotted Owl Habitats



C:\Users\lgilens\Documents\Projects\Humboldt\Humboldt\Map\Map\_100\Habitats.mxd  
Reviewed: 2018-10-22 By: jlgilens



