Appendix A. Eagle Conservation Plan for the Oso Grande Wind Energy Project

Eagle Conservation Plan for the Oso Grande Wind Energy Project

Tucson Electric Power Company

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EXECUTIVE SUMMARY

Tucson Electric Power Company (TEP) owns and operates the 250-megawatt Oso Grande Wind Energy Project (Project) in Chaves, Lea, and Eddy Counties, New Mexico. TEP prepared this Eagle Conservation Plan (ECP) to support an application to the US Fish and Wildlife Service (USFWS) for an incidental take permit (ITP) for golden eagles under 50 Code of Federal Regulations 22.80 for ongoing operation of the Project. The ECP provides detailed information on the Project; pre-construction eagle studies; detailed analyses of risk including an estimation of anticipated levels of golden eagle take; project siting, design, construction, and operational measures to avoid and minimize the take of eagles; and adaptive management measures to ensure permit compliance.

Site-specific baseline surveys conducted at the Project in 2018 assessed the temporal and spatial use of the Project area by eagles in accordance with Stage 2 of the USFWS Eagle Conservation Plan Guidance (ECPG). The 13-month study, conducted from October 2018 to November 2019, consisted of 303 hours of observation at 23 survey plots across the Project area. Biologists recorded 39 golden eagle observations resulting in 62 eagle exposure minutes. The number of recorded golden eagle exposure minutes was highest in the fall (31 minutes), followed by winter (20 minutes), and spring (11 minutes); no exposure minutes were recorded in summer. When adjusted for survey effort, golden eagle exposure was similar between fall and winter (0.32 and 0.29 exposure minutes/hour), and lower in spring (0.16 exposure minutes/hour). Biologists recorded golden eagle exposure minutes at 15 of the 23 survey points, with the greatest number of exposure minutes at points located in the south-central portion of the Project area. The biologists did not record any bald eagles during the surveys. Additionally, they did not document any active golden or bald eagle nests or nest structures suitable for use by golden or bald eagles within the Project area or surrounding 16-kilometer (10-mile) survey area during aerial eagle nest surveys conducted in spring 2019.

The Stage 3 risk assessment uses the USFWS Bayesian Collision Risk Model (CRM) to provide a quantitative prediction of golden eagle mortality associated with Project operations. An initial analysis uses the CRM in conjunction with the pre-construction eagle use data collected during the 2018-2019 survey effort. Given spatial and temporal limitation of these site-specific data, the ECP also presents the results of the USFWS national prior-probability distributions (priors-only model), which excludes the pre-construction eagle use data collected at the Project. Based on these two CRM analyses, the predicted annual mean golden eagle fatality rate at the Project (upper 80% credible limit) is 3.33 eagles/year (using the CRM with site-specific eagle use data) and 6.42 eagles/year (using the priors-only CRM). The USFWS local area population (LAP) analysis estimates that the predicted level of golden eagle take (6.42 eagles/year) represents approximately 2.21% of the estimated LAP for golden eagles. The Project meets a Category 2 designation for risk to golden eagles as defined in the ECPG based on the information presented in the ECP.

TEP requests an eagle take allocation of up to 6.42 golden eagles per year, or up to 193 golden eagles over the 30-year permit term. TEP believes a take permit for bald eagles is not warranted

for the Project given the absence of any bald eagle observations recorded during surveys, and the absence of bald eagle roosting, nesting, and foraging habitat.

TEP will work in conjunction with the USFWS to develop a mitigation plan to offset the impacts of the predicted take using a mitigation ratio of 1.2 golden eagles to one eagle taken. The USFWS determined the final compensatory mitigation requirements for the Project using a resource equivalency analysis (REA) focused on power pole retrofits. To fully offset the predicted take of 33 eagles over the first five years of the eagle ITP term, TEP has committed to retrofitting high-risk power poles, including 530 poles for 30-year retrofits or 1,217 poles for 10-year retrofits.

TEP will monitor eagle mortality at the Project to ensure the level of estimated take remains within the level of take authorized by the ITP. TEP and USFWS will review and agree upon the final monitoring plan prior to implementation. TEP and USFWS will re-assess fatality rates during an initial 2-year review period following permit issuance. This initial 2-year check-in will allow TEP and USFWS to review and evaluate the site-specific eagle fatality data and potentially revise the adaptive management triggers if warranted based on the post-construction monitoring data. Following the initial 2-year review period, fatality data and adaptive management triggers will be reviewed every five years for the remainder of the eagle ITP term. TEP, in consultation with the USFWS, will determine the need for and implement conservation measures if concerns arise about the rate of eagle take, relative to authorized take.

DOCUMENT PRODUCTION

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REPORT REFERENCE

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1.0 INTRODUCTION AND PURPOSE

1.1 Background

Tucson Electric Power Company (TEP) owns and operates the utility-scale Oso Grande Wind Energy Project (Project) in Chaves, Lea, and Eddy Counties, New Mexico (Figure 1). The Project is located predominantly on privately owned land, encompasses 10,322 hectares (25,507 acres), and has 62 wind turbines suppling up to 250 megawatts (MW) of renewable energy. A 55-kilometer (km; 34-mile) 345-kilovolt (kV) generation tie (gen-tie) transmission line runs southwest from the Project to the Empire Switchyard in Eddy County (Figure 2). Oso Grande Wind, LLC, (OGW) planned and developed the Project and transferred ownership to TEP on January 9, 2020. TEP began commercial operations at the Project in May 2021.

TEP is committed to operating and decommissioning the Project in an environmentally responsible and sustainable manner. TEP prepared this Eagle Conservation Plan (ECP) with technical assistance from Western EcoSystems Technology, Inc. (WEST) to support its application to the US Fish and Wildlife Service (USFWS or Service) for an incidental take permit for golden eagles (*Aquila chrysaetos*) under 50 Code of Federal Regulations (CFR) 22.80 for ongoing operation of the Project.

TEP utilized the 2013 USFWS Eagle Conservation Plan Guidance, Version 2 (ECPG)[1] and updates to the eagle permit rule issued by the USFWS in 2016 to develop this ECP. The ECP is organized as follows:

1. Project description
2. Initial site assessment
3. Site specific surveys
4. Eagle risk assessment and mortality estimates, compensatory mitigation, and cumulative impacts
5. Avoidance and minimization measures (Best Management Practices [BMPs] and Conservation Measures [CMs]) implemented or planned for implementation
6. Post-permit monitoring
7. Adaptive management

TEP recognizes that it may need to modify this ECP based on continued data collection at the Project and future coordination with the USFWS Region 2.

[1] USFWS 2013.

1.2 Project Description

The Project area (area within the Project Boundary; Figures 1 and 2) encompasses 10,322 hectares (25,507 acres) of mostly private land, located approximately 29 km (18 miles) west of the town of Lovington, New Mexico (Figure 1). The 250-MW Project has 62 wind energy turbines, including 48 SG 145 4.5-MW turbines and 14 SWT 108 2.415-MW turbines (Figure 2). The larger 4.5-MW turbines have a hub height of 108 meters (m; 354 feet [ft]) and a rotor diameter of 145 m (476 ft). The smaller 2.415-MW turbines have a hub height of 80 m (262 ft) and a rotor diameter of 108 m. The Project has several supporting facilities including but not limited to step-up transformers, underground communication cables, 34.5-kV overhead collector lines, two permanent meteorological (met) towers, a 55-km, 345-kV overhead gen-tie transmission line, a 345-kV/34.5-kV substation, a switchyard, an operations and maintenance (O&M) building, an aircraft detection lighting system, and other ancillary facilities or structures (Figure 2).

1.3 Environmental Setting

The Project area is located primarily within the Arid Llano Estacado Ecoregion of the High Plains. The western edge of the Project area falls within the Shinnery Sands Ecoregion.[2] The Arid Llano Estacado Ecoregion is a mostly flat, elevated plain with few to no streams, but numerous ephemeral pools (playa lakes) containing surface water on a seasonal basis. The ecoregion is characterized by grassland and shrubland, with heavy livestock grazing, oil and gas production, and smaller areas of irrigated cropland (cotton [*Gossypium* spp.], sorghum [*Sorghum bicolor*], and wheat [*Triticum aevestium*]), all of which alter the natural playa lake flora and fauna.[3] Smooth plains, sand hills, and dunes, with comparatively little to no stream network present, characterize the Shinnery Sands Ecoregion, along the western edge of the Project area. This area is also primarily grassland and shrubland, with a mix of ranching, livestock grazing, wildlife conservation lands, farmland, and oil and gas production.[4] Numerous oil fields surround the Project area landscape (Figure 2).

The Project area topography is generally flat, with elevations ranging from 1,219 to 1,341 m (4,000 to 4,400 ft) above mean sea level. According to the National Land Cover Database,[5] the majority of the Project area (approximately 76%) is composed of shrub/scrub land cover types, with smaller amounts of herbaceous/grassland cover types (approximately 22%) and developed areas (approximately 0.1%; Figure 3). The Southwest Regional Gap Analysis Project[6] identifies the Western Great Plains Shortgrass Prairie as the dominant vegetation community, encompassing approximately 93% of the Project area. Based on field reconnaissance surveys conducted for the Project in 2018, much of the shortgrass prairie vegetation assemblages within the Project area are in a degraded ecological state due to intense livestock grazing.[7]

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[2] Griffith et al. 2006, US Environmental Protection Agency [USEPA] 2017

[3] Griffith et al. 2006

[4] Griffith et al. 2006, USEPA 2017

[5] Jin et al. 2019, Homer et al. 2020

[6] Lowry et al. 2005

[7] SWCA Environmental Consultants [SWCA] 2019a

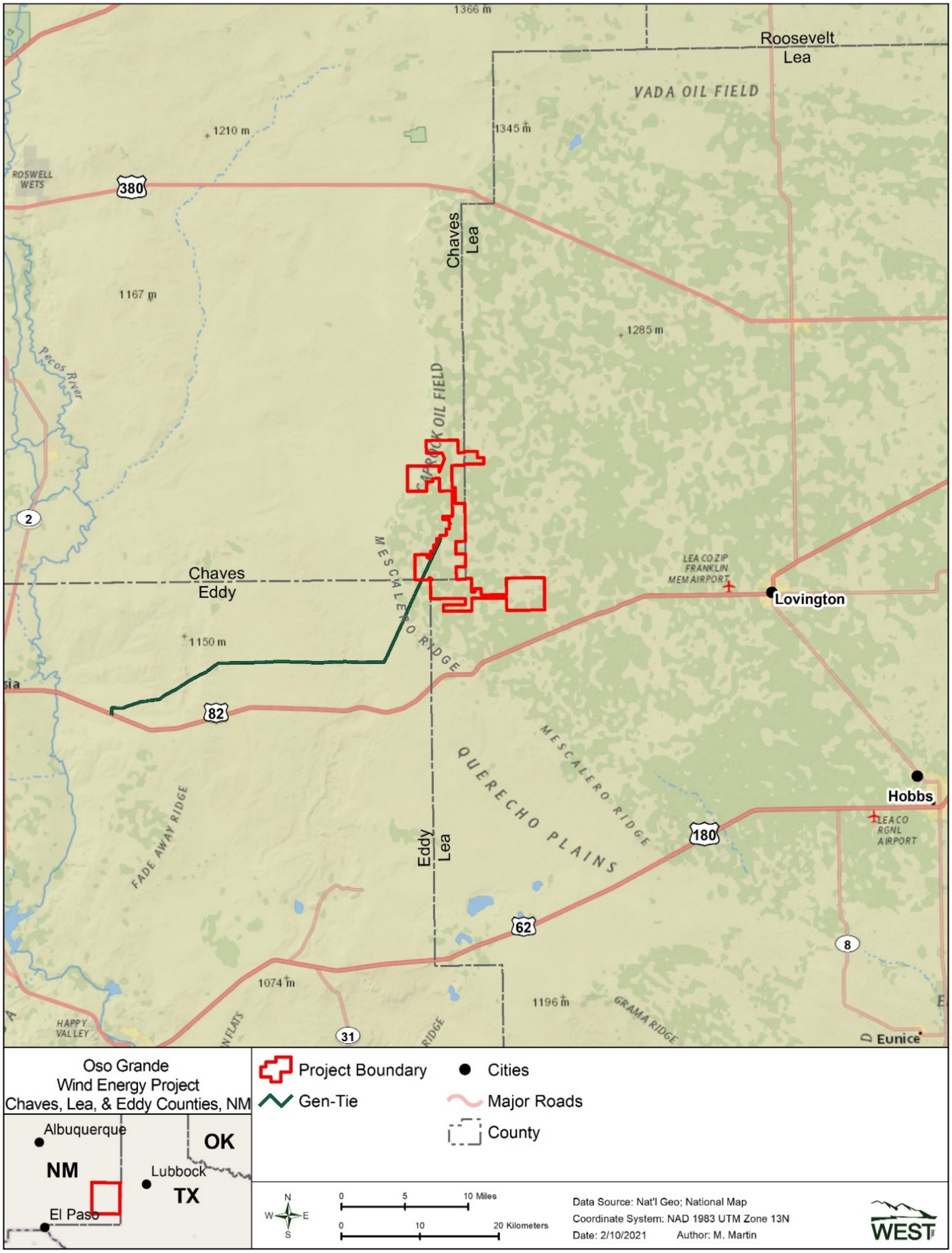

Figure 1. Location of the Oso Grande Wind Energy Project, Chaves, Lea, and Eddy counties, New Mexico.

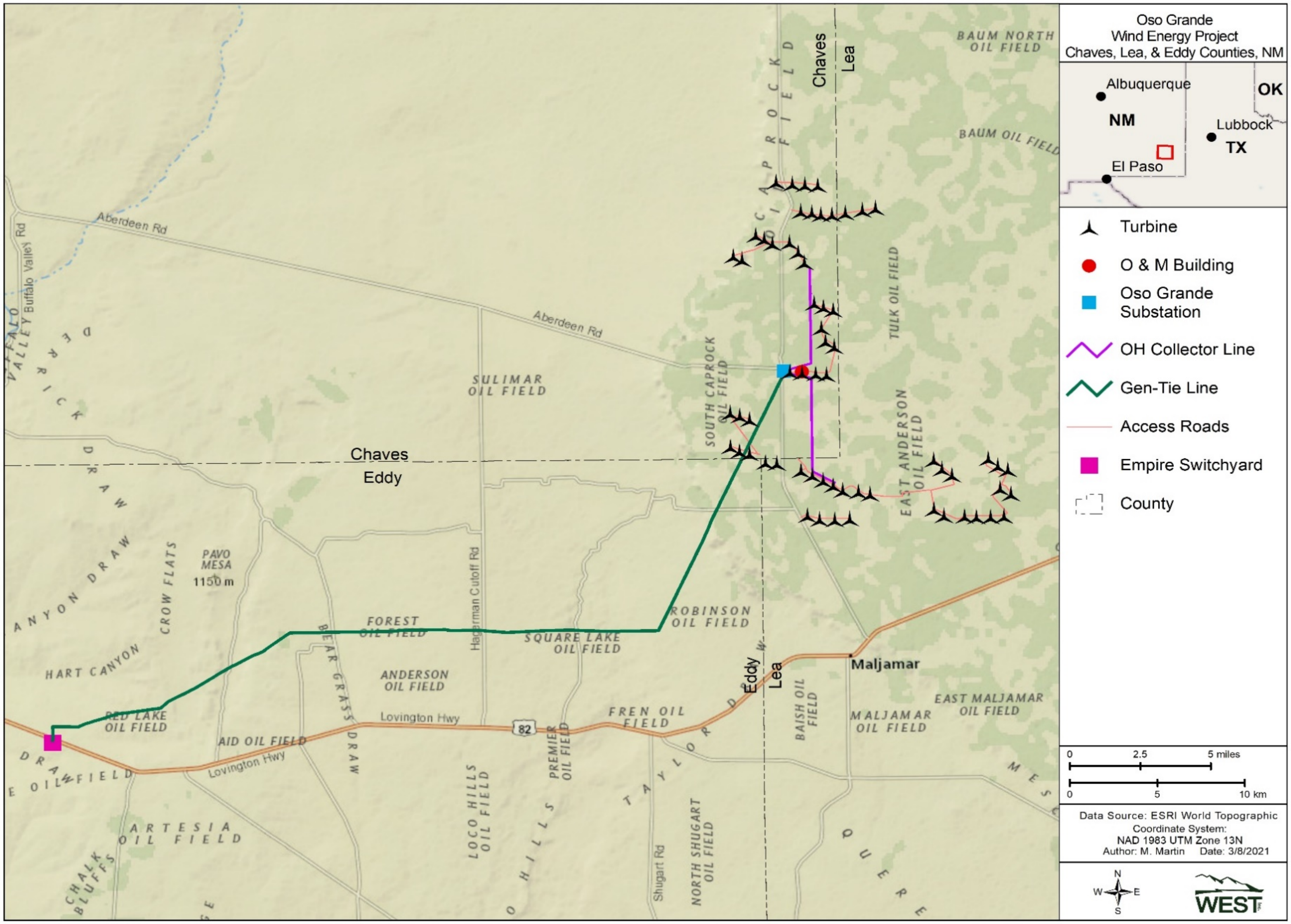

Figure 2. Oso Grande Wind Energy Project and supporting infrastructure, Chaves, Lea, and Eddy counties, New Mexico.

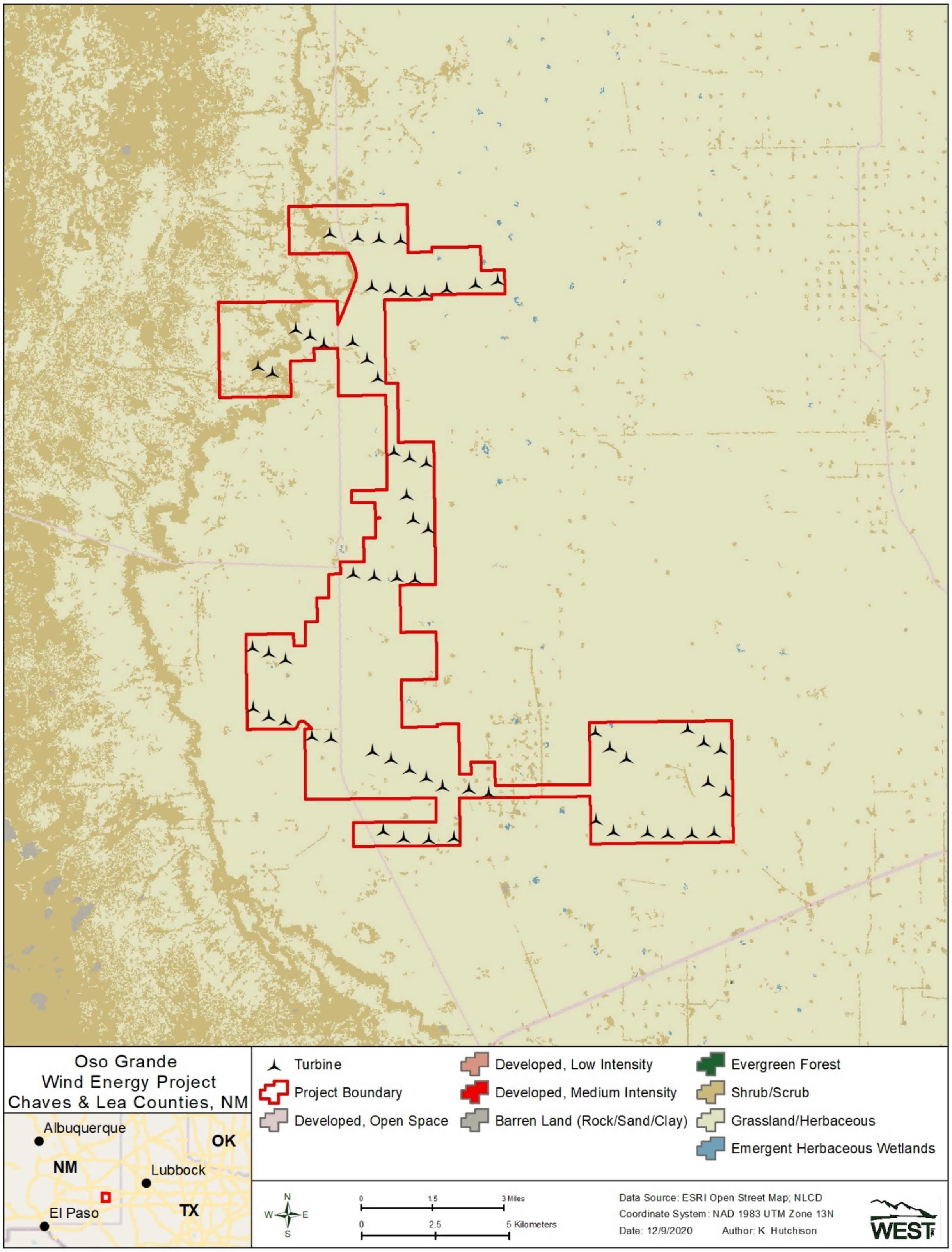

Figure 3. Land use/land cover types present within the Oso Grande Wind Energy Project Area, Chaves and Lea counties, New Mexico.

Water resources within the Project area do not include named drainages or perennial (year-round) streams or rivers; however, there are intermittent (seasonal) and ephemeral (rain-dependent) streams within the Project area. Data reviewed from the Playa Lakes Joint Venture (PLJV)[8] probable playa dataset indicate the presence of four playa lakes encompassing approximately 3.6 hectares (9.0 acres) within the Project area (Figure 4). Data from the National Wetlands Inventory (NWI) identify approximately 231 hectares (572 acres) of wetland within the Project area, most of which occur within freshwater emergent wetlands that are only seasonally inundated (Figure 4).[9]

1.4 Regulatory Framework

1.4.1 Laws and Regulations

1.4.1.1 Bald and Golden Eagle Protection Act

Under the authority of the Bald and Golden Eagle Protection Act (BGEPA),[10] bald eagles (*Haliaeetus leucocephalus*) and golden eagles (collectively referred to as "eagle"), are afforded additional legal protection beyond the Migratory Bird Treaty Act (MBTA).[11] The BGEPA prohibits the take, sale, purchase, barter, offer of sale, purchase, or barter, transport, export or import, at any time or in any manner for any bald or golden eagle, alive or dead, or any part, nest, or egg thereof.[12] The BGEPA definition of eagle take is to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.[13]" The USFWS defines the term "disturb" to mean to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.[14]

In 2009,[15] the USFWS established rules for a permit program for the incidental take of eagles. The ECPG[16] is a national framework that assesses and mitigates risk specific to eagles through development of ECPs and issuance of eagle take permits for wind facilities.

[8] PLJV 2019
[9] SWCA 2019c
[10] 16 USC 668–668d
[11] MBTA 1918
[12] 16 USC 668(a)
[13] 50 CFR 22.6
[14] 50 CFR 22.6
[15] 50 CFR 22.80, 85
[16] USFWS 2013

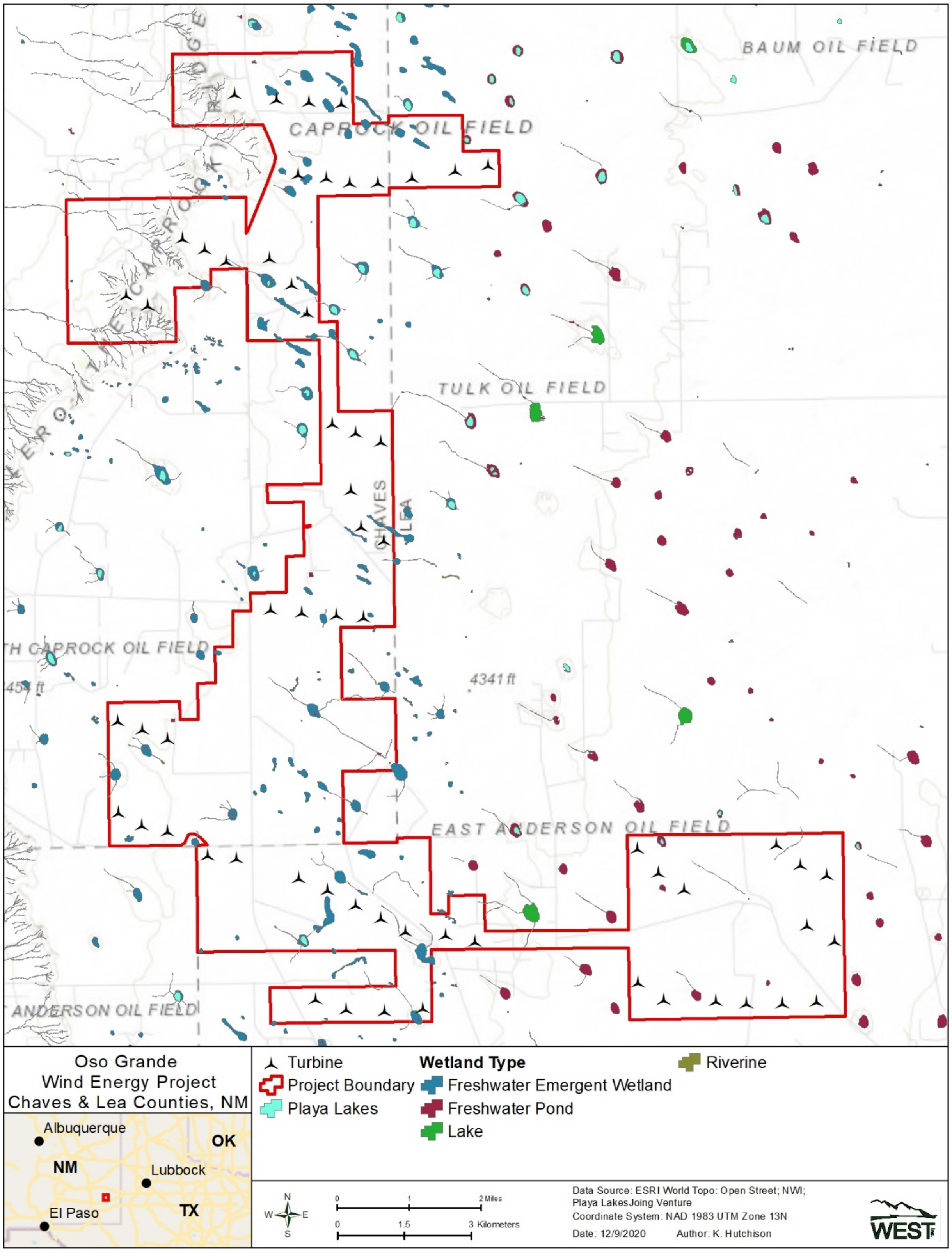

Figure 4. Playa lakes and other wetlands present within the Oso Grande Wind Energy Project Area, Chaves and Lea counties, New Mexico.

In 2016, the USFWS revised the permit regulations for incidental take of eagles.[17] The 2016 revisions:

1. Modify the definition of the BGEPA's "preservation standard"
2. Remove the distinction between standardized and programmatic permits
3. Codify standardized mitigation requirements
4. Redefine the level of take for an eagle management unit to be within an administrative migratory flyway instead of a Bird Conservation Region
5. Extend the maximum permit length to 30 years; and
6. Add a practicability standard to the issuance criteria that implements measures to minimize the potential take of golden eagles to the maximum extent practicable

The 2016 regulations also included revisions to the permit fee schedule.[18]

1.4.1.2 Migratory Bird Treaty Act

The federal regulatory framework for protecting eagles includes the MBTA of 1918. In the United States, the MBTA is the cornerstone of migratory bird conservation and protection. The MBTA implements four treaties that provide international protection of migratory birds. The take prohibition for MBTA states:

> "Unless and except as permitted by regulations…[19] it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill… possess, offer for sale, sell …purchase … ship, export, import …transport or cause to be transported… any migratory bird, any part, nest, or eggs of any such bird ….[The Act] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior."

The word "take" is defined by regulation as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect."[20] The USFWS maintains a list of all species protected by the MBTA.[21] This list includes more than one thousand species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines. MBTA protects bald eagles and golden eagles. A separate MBTA authorization for activities that take eagles, in addition to an Eagle Act authorization, is not required because 50 CFR 22.10(b) exempts those with Eagle Act permits from the requirement to obtain an MBTA permit.

[17] 50 CFR 22

[18] 50 CFR 13.11

[19] 16 US Code (USC) 703

[20] 50 CFR 10.12

[21] 50 CFR 10.13

1.4.1.3 National Environmental Policy Act

The issuance of an eagle take permit by the USFWS constitutes a discretionary federal action and thus requires an assessment of the potential environmental impacts associated with the action and alternatives under the National Environmental Policy Act (NEPA). The NEPA establishes national environmental policies and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within federal agencies.[22] The NEPA utilizes a systematic, interdisciplinary approach to ensure that potential environmental impacts of federal actions and appropriate mitigations are fully considered. All federal agencies are required to prepare detailed statements that assess the environmental impacts of, and alternatives to, major federal actions that could significantly affect the environment.

In promulgating the 2016 BGEPA regulations, USFWS conducted a NEPA analysis consisting of a draft and final Programmatic Environmental Impact Statement for the Eagle Rule Revision (PEIS).[23] As stated in the PEIS, the Service anticipates tiering subsequent Environmental Assessments (EAs) for site-specific projects involving incidental take of eagles off the 2016 PEIS.

1.4.1.4 New Mexico Wildlife Conservation Act

The State of New Mexico regulates threatened and endangered species under the New Mexico Wildlife Conservation Act of 1978.[24] The act provides the New Mexico Department of Game and Fish (NMDGF) authorization to designate threatened and endangered species and to take measures to conserve listed species and associated habitats. The act prohibits the take, possession, transportation, or exportation from the state, or the sale of any of the animal species designated by state law as endangered or threatened without the issuance of a permit. The bald eagle is a state-listed threatened species under New Mexico state law.[25]

1.4.2 Guidelines

1.4.2.1 Land-based Wind Energy Guidelines

The USFWS developed voluntary Land-based Wind Energy Guidelines (WEG) in March 2012[26] to help shape the siting, design, and operation of projects for the wind industry with regard to wildlife protection. The WEG also provide a structured, scientific process for addressing wildlife conservation concerns at all stages of land-based wind energy development, as well as BMPs for site development, construction, retrofitting, repowering, and decommissioning.

1.4.2.2 Eagle Conservation Plan Guidance and Technical Appendices

In April 2013, the USFWS published the ECPG, which supplements the WEG and includes recommendations on evaluating the risk to eagles posed by a proposed site for a wind generation

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[22] 42 USC 4321 et seq. [1970]

[23] US Fish and Wildlife Service Draft and Final Programmatic Environmental Impact Statement for the Eagle Rule Revision (2016c) Available at *http://www.fws.gov/birds/management/managed-species/eaglemanagement.php* and also at *http://www.regulations.gov* Docket No. FWS–R9–MB–2011–0094

[24] 17-2-41 New Mexico Statutes Annotated 1978

[25] NMDGF 2018, 2019

[26] USFWS 2012

facility; categorizes a site based on that risk; sets the protocols for pre-construction and post-construction studies; and provides options for mitigating impacts, among other issues. The ECPG delineates the conditions for issuance of programmatic permits for incidental eagle take under the BGEPA, with a particular focus on the wind energy industry. As described in the ECPG, conservation measures to avoid and minimize take to the maximum extent possible must be implemented.

The ECPG recommends five stages in the development of an ECP to support application for programmatic permits for take of eagles:

Stage 1: Prepare an initial site assessment using publicly available data to identify potential eagle use areas

Stage 2: Complete rigorous on-site surveys designed to assess the potential risk of the project to eagles

Stage 3: Predict eagle risk through the estimation of the annual number of eagle fatalities

Stage 4: Identify and evaluate the avoidance and minimization measures, and if necessary, identify compensatory mitigation

Stage 5: Monitor post-construction to determine whether actual take matches anticipated take such that adaptive management is required

The sections below discuss the studies or actions taken at the Project by OGW and TEP, or the actions that TEP plans to take, to adhere to the recommendations presented in the ECPG for these five stages.

2.0 STAGE 1 – SITE ASSESSMENT

Stage 1 of the ECPG is an initial site assessment performed by the wind project developer to evaluate relatively broad geographic areas and assess the relative importance to resident breeding and non-breeding eagles, and migrant and wintering eagles. Prior to Project development, SWCA prepared a Site Characterization Report (SCR), consistent with Stage 1 of the ECP that describes the biological resources present within the proposed Project area.[27] The SCR evaluated biological resources within the Project area through a desktop review of existing information obtained from publicly available sources, such as reports, published literature, online databases, and geographic information system data. SWCA reviewed the following available data: spatial datasets with information about topography, elevation, land use/land cover, wetlands, and wildlife distributions in New Mexico, as well as information from the USFWS, NMDGF, US Geological Survey (USGS) Breeding Bird Surveys,[28] National Audubon Society (Audubon) Christmas Bird Count,[29] The Nature Conservancy's (TNC's) Priority Conservation

[27] SWCA 2019d

[28] Pardieck et al. 2020

[29] Audubon 2020

Areas (PCAs),[30] Playa Lakes Joint Venture (PLJV) data,[31] Cornell Lab of Ornithology,[32] and publicly available data from other wind-energy facilities in the region. SWCA used Google Earth[33] to identify various habitat features of significance to wildlife, such as plant communities, topography, and potential raptor roosting, nesting, and foraging habitat. Additionally, the SCR incorporated the results of field reconnaissance surveys conducted by SWCA within the Project area from September through November 2018.

2.1 Golden Eagles

Based on the Stage 1 evaluation, SWCA concluded that golden eagle use of the Project could occur year-round with increased use in the winter. Golden eagles breed within the region with historical nesting territories documented in every county in New Mexico, except Lea County.[34] Golden eagles also winter in and migrate through New Mexico.[35] Data reviewed at the county level revealed 162 golden eagle observations within the two counties where the Project is located (114 observations in Chaves County and 48 in Torrance County) with observations occurring year-round, but more concentrated in fall, winter, and early spring.[36] During the field reconnaissance in September and October of 2019, SWCA biologists observed golden eagles within the Project area, and also observed potential golden eagle prey species, such as desert cottontail (*Sylvilagus audubonii*) and black-tailed prairie dog (*Cynomys ludovicianus*).[37]

2.2 Bald Eagles

Based on the Stage 1 evaluation, SWCA concluded that bald eagle use of the Project is infrequent and generally limited to winter. Bald eagles most commonly forage near large, open lakes, reservoirs, and rivers, which are not present in the Project area. Bald eagles may forage less frequently over woodlands, open grasslands, and livestock ponds, which are present within the Project area, to take advantage of secondary food sources, such as carrion, waterfowl, or other small to medium-sized animals. The potential for bald eagles to nest within the Project area is very low because the Project does not contain and is not close to these types of significant water bodies known as primary hunting/foraging features for this species in all seasons.[38] New Mexico has a relatively small breeding population of bald eagles, likely less than 10 breeding pairs.[39] A review of eBird data at the county level revealed 20 bald eagle observations within the two counties where the Project is located (18 observations in Chaves County and two in Lea County) occurring in fall, winter, and early spring.[40] The closest of these eBird observations were reported in the winter near the Mescalero Sand Dunes, approximately 10 km (12 miles) north of the Project

[30] TNC 2019

[31] PLJV 2019a

[32] Cornell Lab of Ornithology 2020

[33] Google Earth 2016

[34] Stahlecker et al. 2010

[35] Stahlecker et al. 2010

[36] Cornell Lab of Ornithology 2020

[37] SWCA 2019d

[38] Buehler 2020

[39] New Mexico Avian Conservation Partners 2017

[40] Cornell Lab of Ornithology 2020

area.[41] SWCA did not observe any bald eagles during their September-October reconnaissance surveys at the Project.[42]

3.0 STAGE 2 – SITE-SPECIFIC SURVEYS AND ASSESSMENTS

In 2018, prior to Project construction, OGW contracted SWCA[43] to conduct site-specific studies, consistent with ECPG recommendations to investigate eagle activity at the proposed Project. These studies consisted of year-round avian use surveys, a raptor nest survey, and a concentrated prey base assessment (Table 1).[44] The below summary includes the methods and results of key site-specific studies, which is useful to assess eagle risk at the Project. The surveys involved the collection of data on all birds; however, for the purposes of this ECP, the following sections present the survey methods and results specific to eagles.

Table 1. Pre-construction surveys that provide site-specific eagle data for the Oso Grande Wind Energy Project.

Study Component	Timing	Methodology	Source
Avian Use Surveys	October 2018 – November 2019	60-minute fixed-point large bird use surveys conducted approximately monthly at 23 survey points located across the Project area.	SWCA 2020
Raptor Nest Surveys	April – May 2019	Aerial surveys to locate eagle nests within a 16-kilometer (km) buffer of the Project area, and all raptor and raven nests within a 3.2-km buffer of the Project area.	SWCA 2019c
Concentrated Prey Base Assessment	April – Jun 2019	Desktop and field-based evaluation of big game ranges, waterbodies, avian migration stopover and foraging sites, and black-tailed prairie dog colonies.	SWCA 2019a

3.1 Avian Use Surveys

SWCA initiated an avian use study at the proposed Project in 2018 to understand the temporal and spatial use of the Project area by avian species while assessing eagle use in accordance with Stage 2 of the ECPG.[45] Information collected during the study helped to evaluate the potential risk of Project operation to eagles.

3.1.1 Methods

SWCA biologists conducted monthly fixed-point avian use surveys at 23 survey points from October 2018 to November 2019 (Figure 5). At the initiation of the study in October, biologists conducted surveys at 14 points. Following a shift in the delineation of the Project area in December 2018, an additional nine points were added and 23 total points were surveyed for the

41 Cornell Lab of Ornithology 2020

42 SWCA 2019d

43 SWCA 2019a, 2019c, 2020

44 SWCA 2019a, 2019c, 2020

45 SWCA 2020

remainder of the study period. SWCA established survey point locations using a stratified random approach designed to survey representative habitats and topography of the Project, while achieving relatively even coverage of the study area (Figure 5). Three of the 23 survey points (OG-070, OG-092, and OG-123; Figure 5) were located just outside the southern boundary of the Project area due to changes in the proposed layout; however, SWCA included the results from these three survey points in their avian use analyses, because of their proximity to the Project.

SWCA biologists conducted surveys at each point, once per month, for a period of 80 minutes. During the surveys, biologists recorded only small birds during the first 20 minutes and only large birds during the remaining 60 minutes of the survey period. SWCA defines large birds as waterbirds, waterfowl, shorebirds, gulls/terns, diurnal raptors (i.e., kites, accipiters, buteos, eagles, falcons, northern harrier [*Circus hudsonius*], and osprey [*Pandion haliaetus*]), owls, vultures, upland game birds, doves/pigeons, goatsuckers, and large corvids and small birds as cuckoos, swifts/hummingbirds, woodpeckers, kingfishers, small corvids, and passerines. Each survey point was the center of a circular survey plot with an 800-m (2,625-ft) radius for large birds (including eagles) and 100-m (328-ft) radius for small birds.[46] The 800-m radius survey plots provided more than 30% spatial coverage of the Project area (see Figure 5) and covered 14.6% of the eventual Project footprint defined as the minimum convex polygon (MCP) encompassing the hazardous area around all turbines (i.e., turbines locations buffered by the rotor radii of turbines present within a project).

Although the surveys were conducted for less than two years and at less than 30% of the final Project footprint, survey methodology was consistent with all other aspects of the ECPG and Final Eagle Rule. SWCA biologists conducted all surveys during daylight hours and randomized survey times to cover all daylight hours during a season. Surveys occurred under all weather conditions, except when visibility was less than 800 m horizontally and 200 m (656 ft) vertically (above ground level [AGL])[47] or when access to survey locations was limited due to road conditions or other factors. To the extent practicable and as dictated by changes to the Project area, surveys were performed approximately the same number of times at each point.

Biologists recorded the following data for each large bird observation: time of observation, species, number of individuals, age and sex, behavior, flight height and direction, and bearing and distance from the observer at initial detection. Specific to eagles, biologists collected data on flight height, distance from observer, and behavior during each minute the eagle was in view for use calculation of eagle exposure minutes. Eagle use data and flight paths were mapped and compared qualitatively to study area characteristics (e.g., topographic features) and to identify potential areas of concentrated use.

[46] Reynolds et al. 1980; USFWS 2013, 2016b

[47] USFWS 2016a

3.1.2 Results

SWCA[48] conducted between 12 and 14 large bird use surveys at 23 survey points from October 20, 2018, to November 24, 2019, resulting in 303 hours of eagle/large bird survey effort. Results from surveys were generally in line with conclusions from the Stage 1 assessment, with no bald eagle use recorded during the 13-month study, and occasional golden eagle use recorded only in fall, winter, and early spring.

SWCA recorded 39 golden eagle observations during large bird use surveys (Table 2). There were no obvious areas of concentrated golden eagle use within the Project area, with golden eagles observed at 15 of the 23 survey points (Figures 6 and 7). Use was generally higher in the southern half of the Project area (Figures 6 and 7). Use by points with recorded golden eagle observations ranged from 0.04–0.19 observations/800-m plot/hour (Figure 6).

The 39 golden eagle observations recorded during the 303 hours of survey effort resulted in 62 eagle “exposure minutes” (Table 2). Exposure minutes are defined as the time in minutes an eagle within an 800-m survey plot is observed flying at a height at or below 200 m (656 ft) AGL and is potentially susceptible to collision with turbine blades if turbines are present on the landscape. The number of recorded exposure minutes was highest in the fall (31 minutes), followed by winter (20 minutes), and spring (11 minutes). SWCA did not record any exposure minutes in summer (Table 2). Exposure was similar between fall and winter (0.32 and 0.29 exposure minutes/hour when adjusted for survey effort and lower in spring (0.16 exposure minutes/hour; Table 2). Overall, golden eagle exposure during all surveys was 0.20 exposure minutes/hour (62 exposure minutes/303 observation hours).

SWCA recorded golden eagle exposure minutes at 15 of the 23 survey points, with the greatest number of exposure minutes recorded at points OG-084, OG-085, and OG-017 (16, seven, and five exposure minutes per point, respectively) located in the south-central portion of the Project area (Figure 6). Golden eagle flight paths did not suggest distinct paths of travel through or within the Project Area (Figure 7).

Table 2. Golden eagle observations recorded during surveys conducted from October 20, 2018 – November 24, 2019 at the Oso Grande Wind Energy Project in Chaves and Lea counties, New Mexico.

Season[1]	Survey Effort (hours)	Total Observations	Observations within 800 m and flying below 200 m AGL	Exposure Minutes[2]	Exposure/ Hour[3]
Fall	97	15	13	31	0.32
Winter	69	17	12	20	0.29
Spring	69	7	6	11	0.16
Summer	68	0	0	0	0
Total	**303**	**39**	**31**	**62**	**0.20**

1. Fall = September 1 – November 30, Winter = December 1 –February 28, Spring = March 1 – May 31, Summer = June 1 – August 31.

2. Total minutes of eagle flight recorded within 800 m of the survey point horizontally and below 200 m vertically.

3. Number of exposure minutes per hour of survey effort.

48 SWCA 2020

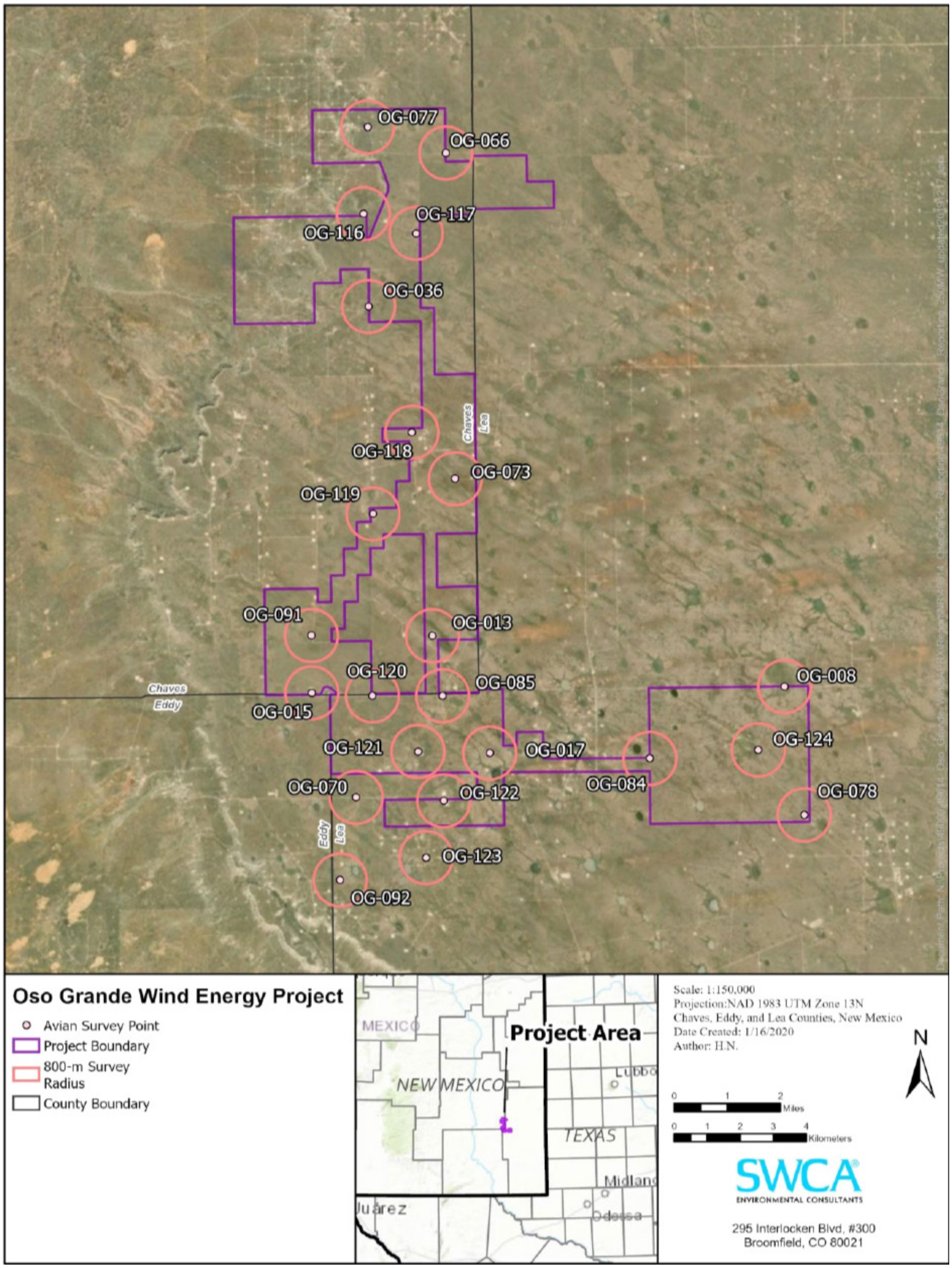

Figure 5. Large bird survey points and plots at the Oso Grande Wind Energy Project, October 2018 – November 2019.[49]

[49] SWCA 2020

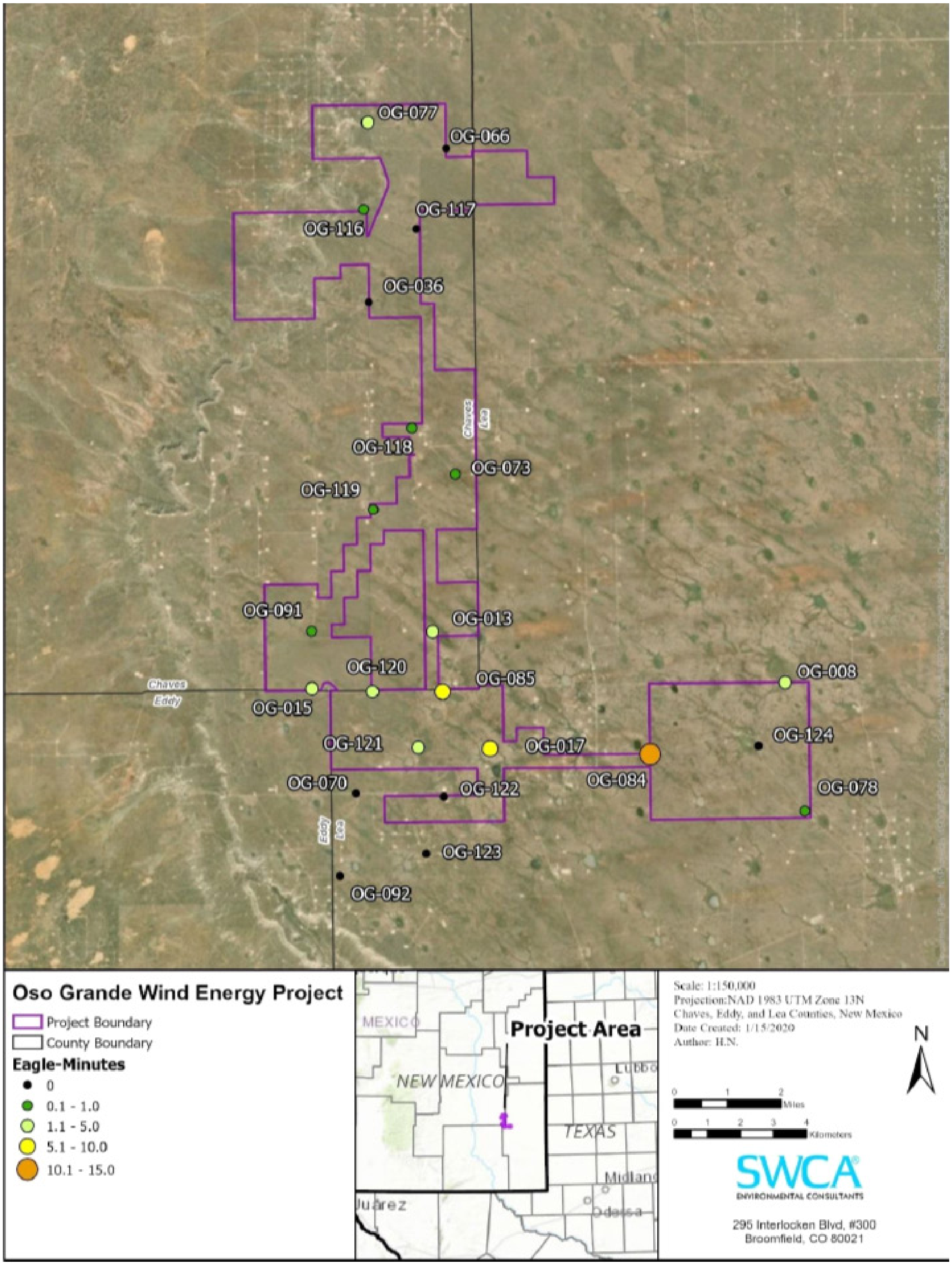

Figure 6. Observed golden eagle exposure minutes per survey point at the Oso Grande Wind Energy Project, October 2018 – November 2019.[50]

50 SWCA 2020

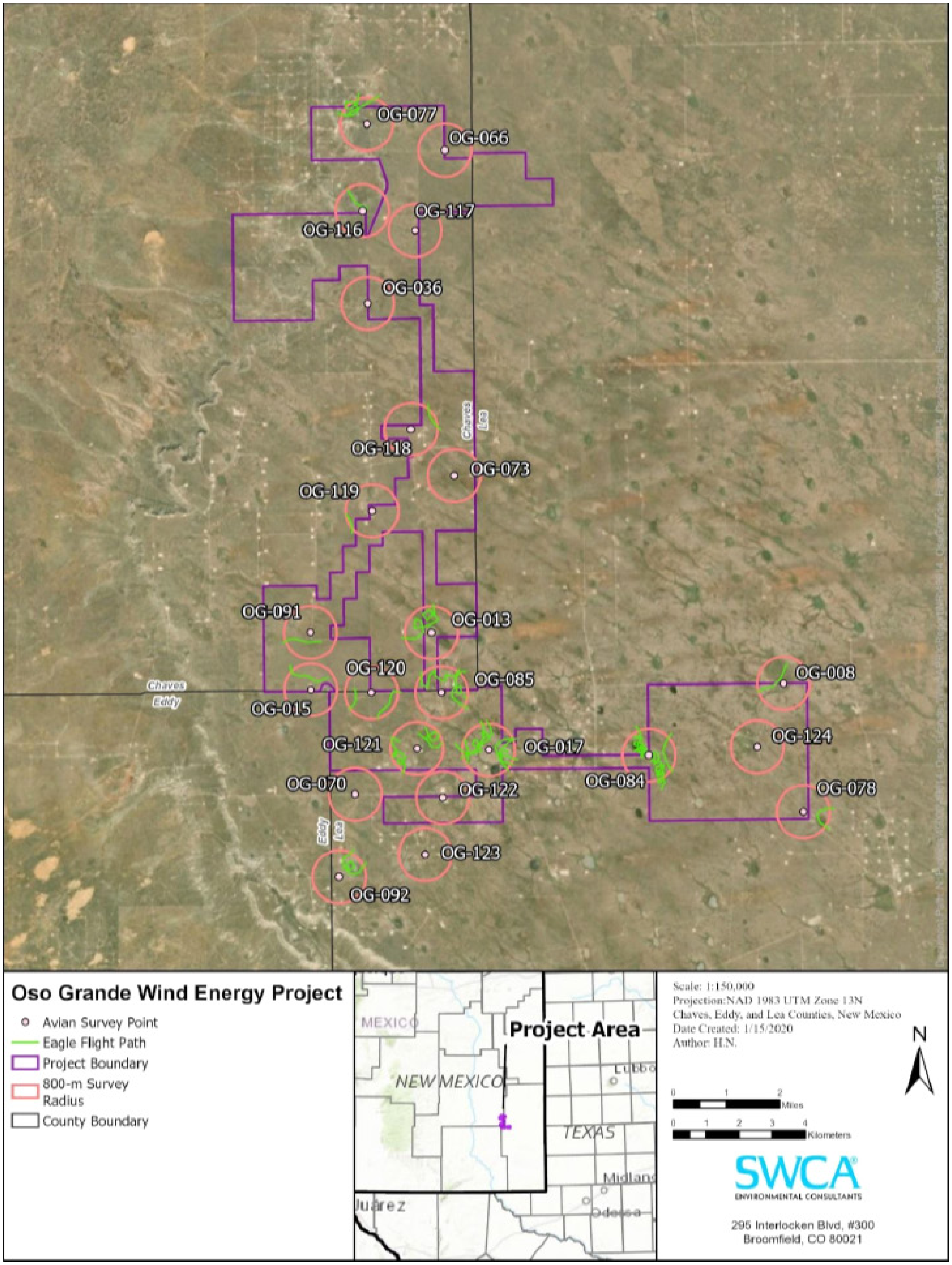

Figure 7. Golden eagle flight paths recorded during large bird use surveys at the Oso Grande Wind Energy Project, October 2018 – November 2019.[51].

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[51] SWCA 2020

3.2 Raptor Nest Survey

In spring 2019, SWCA conducted a survey for nesting raptors within the Project area and surrounding landscape.[52] SWCA conducted surveys for all raptor nests within a 3.2-km (2.0-mile) buffer of the Project area, and specifically for golden and bald eagle nests within a 16-km (10-mile) buffer of the Project area, consistent with the survey area recommendation in the WEG and ECPG (Figure 8). In April 2020, the USFWS released an update to the eagle nest survey guidance in the ECPG, reducing the recommended survey area from a 16-km buffer to a 3.2-km buffer surrounding a project's footprint.[53] The USFWS justified the updated survey recommendation by an analysis of telemetry data from 101 breeding adult golden eagles from across North America.[54] These data indicate that territorial breeding golden eagles of both sexes seldom range further than 3.0 km (1.9 mi) from their territory centers.[55] Based on this updated survey recommendation, methods and results from only the 3.2-km survey area are presented below.

3.2.1 Methods

SWCA conducted two rounds of aerial surveys for nesting raptors between April 2 and May 5, 2019. SWCA conducted surveys from a helicopter with two avian biologists and a pilot along north-south transects spaced about 800 m apart within the 3.2-km survey area (Figure 8). Due to the topographically complex landscape along the Mescalero Ridge to the west of the Project area, SWCA surveyed the entire cliff edge after transects were completed to provide better visibility for cliff-based nests. SWCA recorded the location and species for all active raptor and raven (*Corvus* spp.) nests observed during surveys, as well as the location of any inactive nest structures suitable for use by raptors.

3.2.2 Results

During the 2019 raptor nest surveys, SWCA did not document any active golden or bald eagle nests or nest structures suitable for use by eagles within the 3.2-km survey area systematically searched via transects.[56] Although the eagle nest survey was conducted for only one season, SWCA found no eagle nests or nest structures that would warrant a second year of survey.

3.3 Concentrated Prey Base Assessment

SWCA conducted a concentrated prey base assessment of the Project area consistent with pre-construction site evaluation recommendations in the ECPG.[57] The ECPG references concentrated prey bases as areas that are rich in prey resources or that have a high prey density that may be used seasonally by eagles or other raptor species.[58]

[52] SWCA 2019c
[53] USFWS 2020a, 2020b
[54] USFWS 2020b
[55] USFWS 2020b
[56] SWCA 2019c.
[57] SWCA 2019a
[58] USFWS 2013

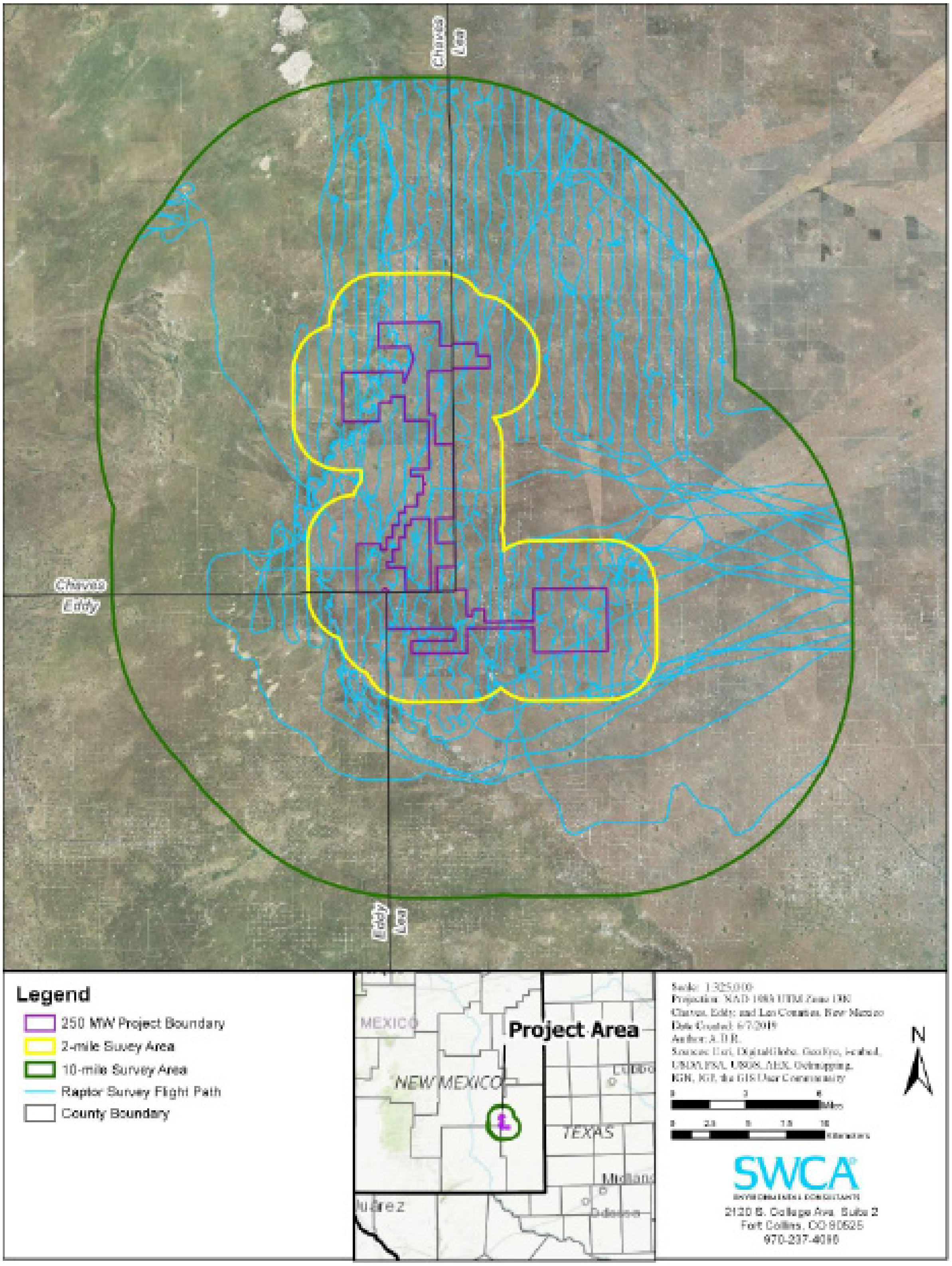

Figure 8. Aerial raptor nest survey flight paths within the Oso Grande Wind Energy Project and surrounding 2.0-mile and 10-mile survey areas.[59]

[59] SWCA 2019c

3.3.1 Methods

In spring, 2019, SWCA conducted the prey base assessment via a desktop evaluation of the Project area and surrounding 3.2-km buffer of the Project area (Study Area; Figure 9) to evaluate areas of concentrated prey that eagles and other raptor species may potentially use. These include big game concentration ranges, waterbodies used as avian migration stopover or foraging sites, black-tailed prairie dog colonies, and non-colonial prey species such as small rodents, rabbits *(Leporidae* spp.), and ground squirrels (*Urocitellus* spp.). SWCA obtained information from the following publicly available sources to complete the desktop evaluation: the Biota Information System of New Mexico (BISON-M),[60] the NWI,[61] the New Mexico Crucial Habitat Assessment Tool (CHAT),[62] and the USGS Gap Analysis Project.[63] SWCA used these data sources to evaluate the potential for concentration of prey species in and surrounding the Project area based on species distributions and natural history characteristics.

SWCA conducted a field survey for black-tailed prairie dog colonies within the Study Area to supplement the desktop evaluation using methods outlined by McDonald et al.[64] The field survey consisted of the following three components: 1) aerial survey to identify locations of potential prairie dog colonies; 2) desktop review of aerial imagery to delineate the boundaries of those locations; and 3) ground-based (road and pedestrian) survey to confirm the presence, activity status, and general boundaries of potential colonies identified during the aerial survey. SWCA also recorded observations of prairie dog colonies and other potential prey species identified incidentally during the course of other fieldwork conducted for the Project.

SWCA conducted the aerial portion of the survey concurrently with the helicopter-based raptor nest and lesser prairie-chicken lek surveys performed between April 4 and May 4, 2019 and conducted the follow-up ground based surveys for prairie dog colonies between April 16 and June 6, 2019. SWCA delineated potential prairie-dog colonies on aerial imagery and these areas were further assessed for prairie dog activity during follow-up ground-based surveys.

3.3.2 Results

The Project area is within the ranges of mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and pronghorn (*Antilocapra americana*), which encompass much of the western US.[65] White-tailed deer are not expected to occur within the Project area due to lack of suitable habitat; however, both pronghorn and mule deer were observed in the Project area during aerial surveys and incidentally during other field work for the Project. Mule deer were observed exclusively along, or to the west of, the Mescalero Ridge. Based on evaluation of big game species' ranges as defined by New Mexico's CHAT, the Project area or surrounding 3.2-km buffer,

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60 BISON-M 2019

61 USFWS 2018

62 CHAT 201

63 USGS 2018

64 McDonald et al. 2011

65 USGS 2018

do not contain priority habitat for either pronghorn or mule deer.[66] There is potential for big game individuals to occur as occasional, road-killed, scavenging opportunities for eagles.[67]

Waterbodies in the Project area, primarily stock ponds and playas, may provide temporary foraging opportunities for eagles because of their potential to support concentrated prey bases (e.g. waterfowl, sandhill cranes [*Antigone canadensis*], shorebirds, and other avian species). Such features are highly dependent on environmental factors such as rainfall and snowmelt, and are expected to provide limited foraging opportunities primarily during the spring and fall migratory seasons. Based on the USFWS NWI dataset,[68] approximately 3.6 hectares of wetlands are present with the Project area (Figure 4). SWCA did not expect that waterbody features within the Project area to be a significant attractant for eagles due to their size and seasonality.[69]

Desktop and field survey data indicated the presence of five black-tailed prairie dog colonies within 3.2 km of the Project area, two confirmed active and the remaining three confirmed inactive (Figure 9). The two active colonies (PDT12 and PDT10) encompass 19.1 and 0.7 hectares (47.3 and 1.8 acres), respectively, and are located outside of the Project boundary considered during Project development (Figure 9), but within the Project footprint, as defined by the MCP. The colonies are approximately 0.8 and 1.3 km (0.5 and 0.8 miles) from the nearest Project turbines, respectively (Figure 9). These two active colonies likely provide an available, concentrated prey base for golden eagles.

3.4 Eagle Risk Categorization for Stage 2

The eagle risk categorization typically applies to projects before they are under construction, to aid in the siting and design considerations. Here, the project has already been constructed, and the permit requested addresses potential impacts associated with project operations. Accordingly, the Stage 2 risk categorization does not apply.

4.0 STAGE 3 – ASSESSING GOLDEN EAGLE RISK AND PREDICTING FATALITIES

There is currently a high degree of uncertainty associated with the potential impacts of wind energy development on eagles. Qualitative assessments focusing on factors that contribute to risk are useful in understanding the likely level of eagle risk potentially associated with a particular project. Quantitative assessment models focus on eagle use in a project area prior to construction to develop specific estimates of post-construction eagle fatalities. This section includes both qualitative and quantitative assessments of eagle risk at the Project in accordance with the recommendations in the ECPG.

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66 CHAT 2019

67 SWCA 2019a

68 USFWS 2018

69 SWCA 2019a

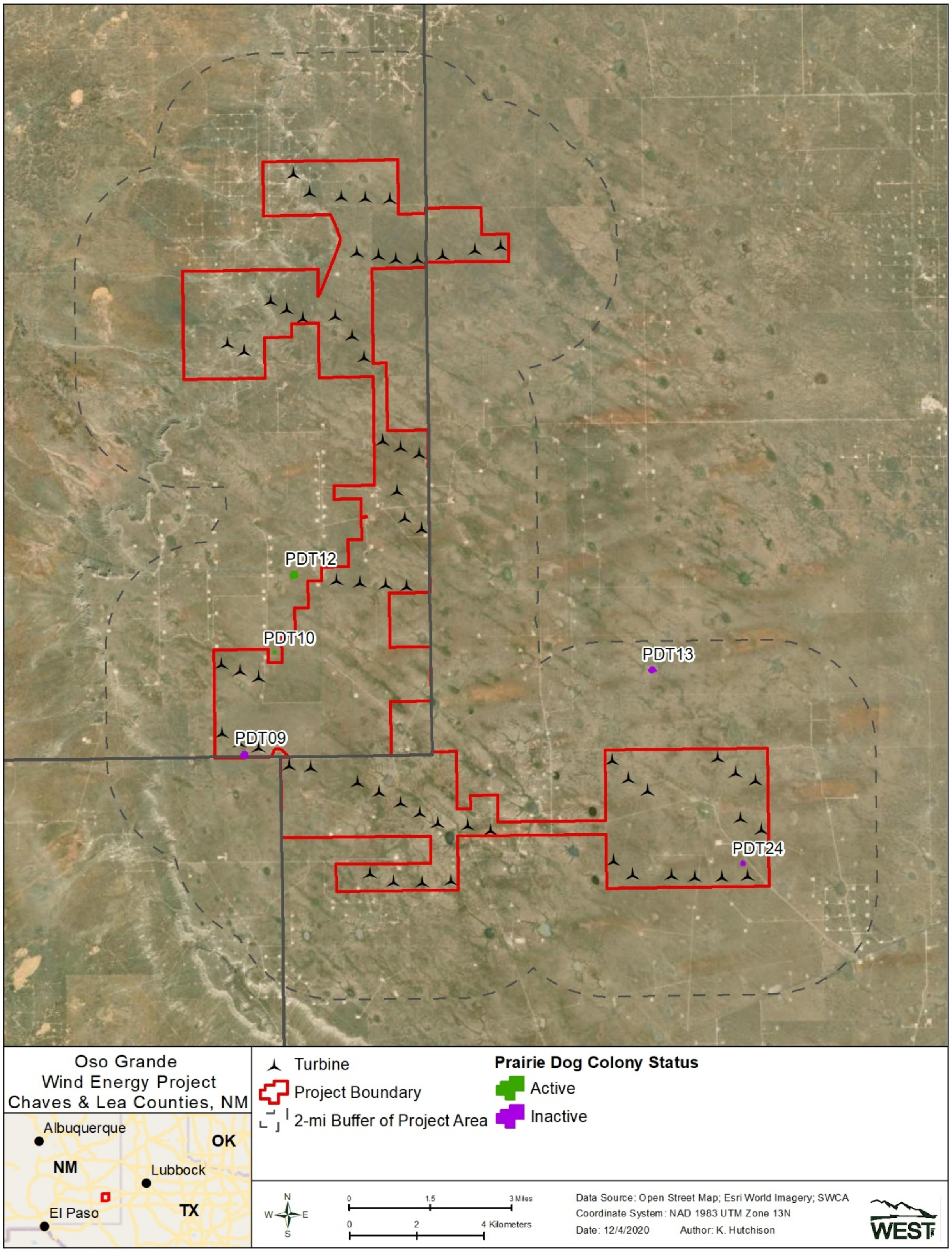

Figure 9. Location of black-tailed prairie dog colonies in 2019 within the Oso Grande Wind Energy Project and surrounding 2.0 mile buffer.

4.1 Qualitative Risk Assessment

A variety of factors influence the risk of an eagle colliding with a wind turbine, including biological characteristics of eagles and the physical characteristics associated with the Project. Biological factors are eagle-specific and may include nest or nesting area location and status, residency status, bird age, and intra-specific or inter-individual behavioral traits including flight behavior. Physical factors include environmental and landscape features such as topography, wind speed and direction, season, and prey resources. The combined interaction of these factors affects eagle behavior and use patterns, which, in turn, influence the probability of collisions at the Project. In addition to abundance (i.e., eagle abundance and total exposure minutes), the two main risk factors identified in the ECPG are 1) the interaction of topographic features, season, and wind currents that create conditions for relatively high-risk flight behavior near turbines, and 2) behavior that distracts eagles and presumably makes eagles less vigilant (e.g., active hunting or foraging and/or inter- and intra-specific interactions such as territorial defense). TEP and WEST evaluated these factors during development of the ECP using the results of pre-construction studies conducted for the Project. Of the factors evaluated, prey resources, nesting status, and season are likely to have the greatest influence on collision risk at the Project. The below text discusses these factors, along with eagle use of the Project in the context of collision risk.

Spatially, the 31 golden eagles recorded within the zone of risk during the 13-month study period were observed at 15 of the 23 survey points. Eagle use was generally observed throughout the Project area, but was relatively higher in the southern half of the Project area with the highest number of golden eagle observations (seven) recorded at Point OG-017 and the highest number of eagle exposure minutes (16) recorded at Point OG-084. Both points are located in the south-central portion of the Project (Figures 6 and 7). Golden eagle use of the Project area did not appear to correlate with any topographic features, or with any identified concentrated prey or water resources.[70] SWCA recorded relatively lower eagle use in the northwestern portion of the Project area where turbines are located closest to the caprock (i.e., four turbines located within 180 m [590 feet] of the Mescalero Ridge; Figure 2); however avian use survey coverage in this area was spatially limited (Figure 5) and the results of surveys may not accurately reflect golden eagle use of this topographic feature along the northwestern boundary of the Project. Recent telemetry research has shown golden eagle use in the northwestern portion of the project footprint and north and northwest of the Project.[71] At the two survey points located along the caprock, SWCA recorded three golden eagle observations, two at OG-077 (six exposure minutes) and one at OG-116 (one exposure minute; Figures 6 and 7).

The two active prairie dog colonies documented during surveys are located to the east of the Project's turbines, closest to survey points OG-119 and OG-091. SWCA recorded a single golden eagle resulting in one exposure minute at each of these points, which suggests that the prairie dog colonies did not serve to concentrate golden eagle foraging in these areas, although the 13-month study would not have captured intra annual variation in eagle use across the Project area.

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[70] SWCA 2019a, 2020

71 K. McDonnell, pers. comm. 2021

Large prey concentrations within the Project area appear to be limited based on field assessments. Some primary prey species are likely associated with certain land cover types (e.g., black-tailed jackrabbit [*Lepus californicus*] is associated with mixed shrub-grasslands in New Mexico[72]) within the Project area. Such prey-base land cover associations may influence eagle use patterns and associated collision risk in a way not discernible from a qualitative review of survey data.

Seasonally, survey data indicate golden eagle use within the Project area is highest in winter and fall. SWCA recorded the highest number of eagle observations in December (seven observations), followed by October, November, and March (each with four observations). SWCA recorded no eagle observations in late spring and summer (May through August). Only one year of surveys were conducted, however, so survey data may not fully capture seasonal variability in use. USFWS telemetry data show golden eagle records within the Project footprint and in the surrounding area each month, demonstrating year-round eagle use of the Project.[73] While no eagle nests were documented during raptor nest surveys, there is a historical record of an unoccupied golden eagle nest on Mescalero Ridge, within 8.0 km (5.0 mi) south of the Project.[74] Seasonal use data and the absence of known occupied eagle nests within 3.2-km of the Project area[75] suggest the majority of use is attributed to wintering and migrating eagles. Thus, based on seasonal use patterns, potential risk to golden eagles is anticipated to be highest in the winter, followed by migration periods (i.e., spring and fall).

Based on the qualitative assessment of the Project's topography, potential prey resources, and the spatial and temporal distribution of eagle use at the Project, it is predicted that collision risk is greatest in the south-central portions of the Project during the winter, and to a lesser extent, spring and fall. However, data are lacking on potential intra annual variation in eagle use of the site.

4.2 Quantitative Risk Assessment

WEST used the USFWS Bayesian collision risk model [CRM]) to provide a quantitative prediction of golden eagle mortality associated with Project operations. Table 3 presents the variables used in the CRM, and the section below includes discussion for these variables. The ECPG[76] presents a more detailed discussion of the CRM and modeling approach.

72 Frey and Yates 1996

73 K. McDonnell, pers. comm. 2021

74 K. McDonnell, pers. comm. 2021

75 SWCA 2019c

76 USFWS 2013

Table 3. Variables used in the US Fish and Wildlife Service (USFWS) approach for predicting annual eagle fatalities from turbine collisions at a wind facility.[77]

Symbol	Name	Description and units
F	Annual Fatalities	Annual eagle fatalities from turbine collisions
λ	Exposure Rate	The expected number of exposure events (eagle minutes) per survey hour per 3D survey area (hour × km^3)
C	Collision Rate	The probability of an eagle colliding with a turbine given exposure
ε	Expansion Factor	Product of daylight hours and total hazardous area (hour × km^3)
k	Eagle Minutes	Number of minutes that eagles were observed flying within 800 m and below 200 m during surveys
δ	Turbine Hazardous Area	Rotor-swept area around a turbine from 0–200 m above ground level (km^3)
n	Trials	Number of trials for which events could have been observed (the number of hour · km^3 observed)
τ	Risk Hours	Total hours eagles are at risk of collision during a given year or season (all daylight hours)
n_t	Number of Turbines	Number of turbines at the Project

Note: units in the Eagle Conservation Plan Guidance are 2-dimensional, but the updated USFWS priors are in three dimensions (3D).

km = kilometer; m = meter.

The CRM assumes that pre-construction eagle use at a proposed project positively correlates with the project's fatality rate.[78] The ECPG recommends use of the results of pre-construction point count surveys as the primary input in the USFWS model. However, the pre-construction avian use study conducted at the Project do not meet the requirements of incidental take permit regulations (50 CRF 22.80(d)(3)(ii)), or the assumptions of the CRM, primarily due to inadequate temporal and spatial survey coverage of the Project. As a result, two quantitative eagle fatality predictions, both using the USFWS CRM, are presented below. The first prediction (Section 4.2.1) incorporates the results of pre-construction point count surveys to inform the CRM, with the knowledge that, while the data do not confirm to the standards in the ECPG and Final Rule, they still provide useful site-specific eagle use information to help inform eagle risk at the Project. The second prediction (Section 4.2.2) is based on the USFWS's eagle risk analysis[79] using only the national prior-probability distributions for golden eagle exposure and collision probability (i.e., priors-only model), and do not take into account any site-specific eagle use data. The results of the priors-only model is the basis for TEP's requested golden eagle take allocation. Because no bald eagles were observed during 303 hours of avian use survey, fatality predictions for bald eagles were not completed and only results for golden eagles are reported below.

[77] USFWS 2013

[78] USFWS 2013

[79] USFWS 2022

4.2.1 Take Prediction Using Site-specific Eagle Use Data

4.2.1.1 Survey Data

Modeling was performed using the 13 months of pre-construction avian use data collected by SWCA[80]. Specifically, these data include one-hour fixed-point surveys conducted monthly at 23 survey locations throughout the Project area from October 20, 2018 to November 24, 2019 (see Section 3.1). The most current guidance in the 2016 Eagle Final Rule recommends using survey data from plots that intersect with the Project's MCP.[81] Twenty survey plots at the Project intersect with the MCP, and the other three points fall just outside to the south. Note that SWCA selected avian survey points (and associated 800 m buffers) to achieve 30% coverage of the Project area because the exact number and location of turbines was not known at that time. For the purposes of predicting eagle fatalities at the Project, WEST used data from only the 20 survey points for which the 800 m radius survey plot intersects with the MCP (MCP points).

Following ECPG recommendations, golden eagle risk seconds recorded during the study were round up to the nearest whole minute for each eagle observation.[82] Recorded seconds for birds observed outside of the risk zone (within 800 m and below 200 m) were not considered risk seconds. Likewise, eagles exhibiting non-flight behaviors (perching) were also not included in the count of risk seconds.

4.2.1.2 Exposure Rate

Exposure rate (λ) is the expected number of exposure events (eagle minutes) per survey hour per cubic kilometer (hour × km^3). Bayesian analyses incorporate a prior belief (i.e., a best starting-point estimate) regarding model parameters as supporting evidence in determining a posterior distribution. To estimate the exposure rate, we used the updated prior distributions for exposure released by the USFWS in 2021[83] and described in New et al.[84] The USFWS derived these updated prior distributions with data from a range of projects including 61 wind energy facilities with information on golden eagle exposure.[85] The USFWS defines the updated prior distribution for the 3-dimensional (3D) exposure rate as:

$$\text{Prior } \lambda \sim \text{Gamma}(\alpha, \beta), \text{ with shape and rate parameters } \alpha = 0.29 \text{ and } \beta = 0.24$$

WEST used the pre-construction eagle exposure data (risk minutes and survey effort) to update the prior distribution to estimate the parameters for the posterior distribution. By assuming the eagle risk minutes follow a Poisson distribution with rate parameter λ, the posterior distribution for exposure rate is:

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[80] SWCA 2020

[81] USFWS 2016

[82] SWCA 2020

[83] USFWS 2021

[84] New et al. 2018

[85] New et al. 2018

$$\text{Posterior } \lambda \sim \text{Gamma}\left(\alpha + \sum_{i=1}^{n} k_i,\ \beta + n\right)$$

where *k* are the observed eagle risk minutes (minutes eagles observed flying within 800 m and below 200 m [626 ft] above ground level), *n* is the number of trials (the survey effort defined using survey hours and survey plot volume [hr·km^3]), and α and β are the parameters that define the prior distribution.

WEST used eagle flight minutes observed within 800 m of the observer and under 200 m in height above ground level to inform the model. This includes 62 golden eagle risk minutes observed during 264 hours of survey for the 20 MCP survey points. The posterior distributions for golden eagle exposure rate vary by season, with the highest exposure in the fall and winter (Table 4). The mean exposure rate estimated from the MCP survey points across seasons was 0.59 (flight minutes observed per hour per km^3; Table 4).

Table 4. Estimated exposure rate (λ) by season for golden eagles using data from the 20 MCP survey points at the Oso Grande Wind Project, 2018 – 2019.

Variable	Fall	Winter	Spring	Summer	Overall
1) Recorded eagle flight minutes	31	20	11	0	62
2) Number of surveys	84	60	60	60	264
3) Length of survey (hours)	1	1	1	1	1
4) Survey hours	84	60	60	60	264
5) Survey plot radius (meters)	800	800	800	800	800
6) Survey plot height (meters)	200	200	200	200	200
7) Eagle flight minutes (Line 1 + α)	31.29	20.29	11.29	0.29	62.29
8) Survey effort (survey hours x area surveyed [km^3] + β)	34.02	24.36	24.36	24.36	106.40
9) Mean exposure rate (Line 7/Line 8)	0.92	0.83	0.46	0.01	0.59

km^3 = cubic kilometer

4.2.1.3 Expansion Factor

WEST multiplied a facility-specific expansion factor by the eagle exposure rate calculated above to estimate the number of annual eagle exposure events expected at the Project during operation. The expansion factor scales the exposure rate to the total hours eagles are at risk of collision during a year (assumed to be all daylight hours at the Project location; τ) across the total 3D hazardous volume (δ_i) surrounding turbine locations (n_t):[86]

$$\varepsilon = \tau \sum_{i=1}^{n_t} \delta_i$$

The USFWS defines the turbine hazardous volume (δ_i) as the 3D cylinder around each turbine with radius equal to the rotor radius and height of 200 m above ground level, or 25 m above the

[86] USFWS 2013

maximum turbine blade reach, whichever is greater.[87] The expansion factor (ε) was calculated for the Project assuming 48 turbines with a rotor radius of 72.5 m (145-m diameter) and 14 turbines with a rotor radius of 54 m (108-m diameter). The combined annual expansion factor for the Project was 818.29 hour per km^3 (Table 5).

Table 5. Estimated expansion factor (*ε*) by season and by turbine size at the Oso Grande Wind Project, 2018 – 2019. Note that these values are the same whether running the model using all survey points or the subset of MCP survey points.

Variable	Fall	Winter	Spring	Summer	Overall
10) Daylight hours per season	1038	936	1190	1279	4443
Turbines with larger rotor size					
10a) Number of turbines	48	48	48	48	48
11a) Turbine rotor radius (meters)	72.50	72.50	72.50	72.50	72.50
12a) Turbine hazardous height (meters)	200.00	200.00	200.00	200.00	200.00
13a) Turbine hazardous volume (km^3)	0.159	0.159	0.159	0.159	0.159
Turbines with smaller rotor size					
10b) Number of turbines	14	14	14	14	14
11b) Turbine rotor radius (meters)	54.00	54.00	54.00	54.00	54.00
12b) Turbine hazardous height (meters)	200.00	200.00	200.00	200.00	200.00
13b) Turbine hazardous volume (km^3)	0.026	0.026	0.026	0.026	0.026
Combined expansion factor					
13c) Combined expansion factor	191.17	172.39	219.17	235.56	818.29

4.2.1.4 Collision Probability

The collision correction factor (*C*) is defined as the rate at which an eagle collides with a turbine given each minute of eagle flight in the turbine hazardous area. To estimate the collision probability, WEST used the updated prior distributions for collision probability released by the USFWS in 2021[88] and described in New et al.[89] (Table 6). The USFWS derived these updated prior distributions from 21 wind energy facilities with information on golden eagle collision probability.[90] The USFWS uses the mean of the estimated flight minutes within the turbine hazardous zone versus recorded collision events at those facilities to determine a collision rate prior distribution for golden eagles of:

$$\text{Prior } C \sim \text{Beta } (v,\ v'), \text{ with parameters } v = 1.29 \text{ and } v' = 227.60$$

Table 6. Collision probability for the USFWS Bayesian Collision Risk Model as applied to the Oso Grande Wind Project

Collision Probability (*C*) Parameter	Fall	Winter	Spring	Summer	Overall
14) Prior fatalities	1.29	1.29	1.29	1.29	1.29
15) Prior exposure events not resulting in fatality	227.60	227.60	227.60	227.60	227.60
16) Prior mean collision correction factor (line 14/(line 14+line 15))	0.0056	0.0056	0.0056	0.0056	0.0056

[87] USFWS 2013, 2016b

[88] USFWS 2021

[89] New et al. 2018

[90] New et al. 2018

4.2.1.5 Predicting Annual Fatalities

The CRM estimates the distribution of predicted annual fatalities as the product of the expansion factor, the exposure rate posterior distribution, and the collision rate prior distribution:

$$F = \varepsilon \times \text{posterior } \lambda \times \text{prior } C$$

Credible intervals (CI; i.e., Bayesian confidence intervals) are calculated using a simulation of 1,000,000 samples each from the posterior distribution of eagle exposure (λ) and the prior distribution of collision rate (*C*). WEST used the product of each of these draws along with the expansion factor to estimate the distribution of possible fatalities at the Project. The upper 80th CI of this distribution is used as the estimated take for a project seeking an incidental eagle take permit.[91]

Based on the CRM with the updated priors and using the site-specific eagle use data, the predicted annual mean golden eagle fatality rate is 2.39 eagles/year (upper 80% credible limit = 3.33; Table 7).

Table 7. Predicted annual golden eagle fatality rates for the Oso Grande Wind Energy Project, based on survey data collected 2018 – 2019 at the 20 MCP survey points.

	Predicted Golden Eagle Fatality Rate				
Estimate	**Fall**	**Winter**	**Spring**	**Summer**	**Overall**
Mean fatalities	0.99	0.81	0.57	0.02	2.39
Upper 80% Credible Limit	1.55	1.27	0.89	0.02	3.33

ECPG = Eagle Conservation Plan Guidance; MCP = Minimum convex Polygone.

4.2.2 Take Prediction Using Priors-only Model

To estimate annual golden eagle fatalities at the Project, the USFWS[92] excluded the site-specific eagle use data and relied solely on the national golden eagle priors for the eagle exposure and collision probability parameters (see discussion of these parameters in Section 4.2.1 above; Table 8). Based on these probability distributions, as well as an expansion factor to account for the total hours eagles are at risk of collision across the hazardous area surrounding all Project turbines (Table 9), the estimated annual golden eagle take for the Project is 6.42 golden eagles per year at the 80th quantile.

Table 8. Distribution values for the priors-only collision risk model used to estimate golden eagle fatalities at the Oso Grande Wind Project. Table from USFWS (2021).

Model	**Exposure, mean ± SD (eagle-minutes/hour*km^3)**	**Collision probability, mean ± SD (collision/eagle-minutes**	**Expansion factor ((hour*km^3)/year)**
Annual priors only (no survey data)	1.21 ± 2.26	0.0056 ± 0.0049	818.85

[91] USFWS 2013, 2016b

[92] USFWS 2022

Table 9. Annual golden eagle fatality estimates, based on the priors-only collision risk model, for the Oso Grande Wind Project. Table from US Fish and Wildlife Service (2021).

Model	Mean	Standard Deviation	80th quantile
Annual priors only (no survey data)	5.58	14.69	6.42

The fatality prediction derived from the USFWS CRM can be updated with site-specific, post-construction monitoring data. A baseline post-construction monitoring study was initiated at the Project in December 2021 (see Section 5.3), and subsequent post-permit eagle fatality monitoring will be conducted during each administrative review period following permit issuance (Section 6.1). Site-specific mortality data can be incorporated into a posterior, site specific estimate of collision probability to further refine mortality predictions for the Project prior to permit issuance or to inform the level of take coverage that may be needed in subsequent review periods.

4.3 Cumulative Impacts

4.3.1 Local Area Population Analysis

The USFWS identifies take limits at two spatial scales to maintain stable or increasing golden eagle populations: (1) the Eagle Management Unit (EMU) which, for the Project, is defined as the Central Flyway (Central EMU); and (2) the Local Area Population (LAP) which is defined as a 175-km (109-mi) buffer area based on the natal dispersal distance for golden eagles.[93] The sustainable rate of golden eagle take within the EMU is zero unless otherwise mitigated. The USFWS assesses the predicted take levels for a project relative to 5% of the LAP.[94]

The USFWS estimated the Project LAP to be approximately 290 golden eagles (USFWS Cumulative Effects Tool, run February 14, 2022).[95] Based on this analysis, the predicted annual take of 6.42 golden eagles represents 2.21% of the LAP. As of February 2022, there are two other facilities that overlap with the Project's LAP that are permitted to take golden eagles. The predicted annual take for the Project combined with the authorized take of eagles at surrounding facilities could result in a total annual take of 6.59 golden eagles, representing 2.27% of the LAP, falling below the 5% benchmark.

4.4 Eagle Risk Categorization for Stage 3

The ECPG bases its site risk categorization on: 1) whether or not there are important eagle use areas or migration concentration sites within the Project footprint or vicinity; 2) the predicted fatality estimate (i.e., is it less than or greater than 0.03 eagles per year or approximately one eagle over a 30-year period?); 3) whether the annual predicted eagle fatality estimate is greater than 5% of the estimated LAP size; and 4) whether fatalities at the Project cause the cumulative annual take for the LAP to exceed 5% of the estimated LAP size.

[93] USFWS 2016a

[94] USFWS 2016a

[95] USFWS 2022

Based on the pre-construction survey work, the Project does not appear to have any major foraging or migration concentration sites within its footprint, nor does it contain any recently occupied nest sites; however, it does have migratory/overwintering use by golden eagles. Two prairie dog colonies were documented within the Project footprint in 2019; however, Project turbines are sited at least 0.8 km from these active colonies. While these areas are considered important eagle-use areas, the 13-month eagle use study did not indicate concentrated use of these areas. The predicted fatality rate for the Project is greater than 0.03 golden eagles per year, but is less than 5% of the estimated LAP. Furthermore, the Project will fully offset the permitted amount of take through compensatory mitigation at a 1:2:1 ratio (see Section 5.4 below); therefore, take of golden eagles at the Project will not result in any net reduction in golden eagle populations. Based on this information, the Project meets a Category 2 designation. The USFWS will analyze the cumulative effects of on-going take of golden eagles from other sources in the region as part of the NEPA process.

4.5 Requested Take and Permit Term

Based on the USFWS CRM, operation of the Project may result in take of up to 6.42 golden eagles per year, leading to a total requested take allocation of 33 golden eagles per five-year permit review period, or up to 193 golden eagles over the 30-year permit term.

5.0 STAGE 4 – AVOIDANCE AND MINIMIZATION OF RISK USING CONSERVATION MEASURES AND COMPENSATORY MITIGATION

This section identifies the impact, avoidance, and minimization measures in the design, construction, and operation of the Project.

5.1 Avoidance and Minimization of Risk during Project Planning and Design

- The Project is located away from features that support a prey base for eagles. This includes significant water features such as lakes, reservoirs, and large rivers, and turbines located within areas that do not support a high density of fossorial wildlife (.e.g., prairie dog colonies). These measures minimize attraction of foraging eagles to the Project.
- The Project is located outside of areas designated for environmental resource conservation, such as Areas of Critical Environmental Concern, Important Bird Areas, National Wildlife Refuges, Wilderness Areas, important migratory pathways or stopover sites, or other specially designated areas.
- The Project is located outside of an area with known eagle nests.

- OGW followed the most recent Avian Power Line Interaction Committee (APLIC) suggested guidelines[96] to the extent possible based on local conditions and Project design and engineering. Specifically, this included designing power lines for appropriate spacing and/or applying cover-up materials or devices to minimize electrocution risk of perching birds. Specific actions include riser assemblies with silicone line hose over bare conductors, spike perching excluders on cross arms, and surge arresters with avian protection insulating covers. Collision risks for eagles are minimized by designing all utility lines in accordance with APLIC collision guidelines.[97] If an avian collision risk occurs along the Project's transmission line during line operation, applicable measures to minimize the potential for bird collisions will be implemented in accordance with APLIC's suggested measures to increase the visibility of the smaller-diameter shield wire (e.g., flight diverters).[98]

5.2 Best Management Practices during Construction

The BMPs listed below are applicable to golden eagles and represent a subset of measures OGW implemented at the Project to minimize impacts to wildlife and habitat during construction. These include practices that broadly relate to landscape management, wildlife management, and/or personnel management and are relevant to eagles. In general, BMPs are either permanent (e.g., building a transmission line according to APLIC guidance) or maintained for the life of the Project (e.g., reduced speed limits on Project's roads). OGW implemented the following BMPs to avoid or minimize impacts to golden eagles during Project construction:

- Instruct all supervisory construction personnel on wildlife resource protection measures, including (1) applicable federal and state laws (e.g., those that prohibit animal collection or removal), and (2) the importance of these resources and the purpose and necessity of protecting them, and ensuring this information was disseminated to applicable contractor personnel, including the correct reporting procedures prior to construction.
- Train construction personnel to be aware of eagles within the Project and general relevant wildlife issues such as eagle prey base.
- Protect and preserve existing trees, vegetation, water resources, and wildlife habitat to the extent practical during construction.
- Minimize construction areas, ground disturbance, and vegetation clearance to the greatest extent possible.
- Engineer and construct turbine pads in a manner that prevents small mammals from burrowing underneath.

[96] APLIC 2006
[97] APLIC 2012
[98] APLIC 2012

- Implement sufficient clearances in structure design for the 345kV transmission between potential contact points or configurations (e.g., suspension insulators) to minimize or prevent avian electrocution risk.[99] OGW referred to current guidelines and methodologies in the construction of power line facilities to minimize the potential for avian electrocutions and collisions.
- Restrict traffic to roads associated with the Project and minimize use of other roads to the extent possible. Speed limits were set to avoid wildlife collisions that could create carrion attractive to eagles.

5.3 Avoidance and Minimization Measures during Operations

TEP has implemented the following conservation measures relevant to eagles during Project operations:

- Train all operations personnel on practices used to avoid and minimize impacts to wildlife and other biological resources, including identification of potential wildlife conflicts and the proper response, sensitivity to eagles and other wildlife, and education on wildlife laws.
- Take action to reduce vehicle collision risk to animals and remove carcasses from the Project area.
- Instruct Project personnel and visitors to drive at low speeds (<25 mph) and be alert for wildlife, especially in low visibility conditions.
- Implement a baseline avian and bat fatality monitoring study following the start of Project operations, consistent with the Project's Bird and Bat Conservation Strategy (BBCS).[100] The post-construction monitoring plan includes eagle-specific carcass surveys to estimate impacts to eagles at the Project in advance of receiving the ITP and implementing the required post-permit eagle fatality monitoring described in Section 6.1.
- Implement a Wildlife Incidental Reporting Program (WIRP; see Section 6.2) at the start of Project operations to ensure operations personnel document bird or bat casualties encountered during routine maintenance work or at any time when personnel are at the Project. The WIRP will continue for the life of the project to identify any additional wildlife concerns through an environmental information management system.

5.4 Upfront Compensatory Mitigation

Compensatory mitigation occurs in the eagle permitting process if the conservation measures do not remove the potential for take, and the projected take exceeds calculated thresholds for the species-specific eagle management unit in which the Project is located. To mitigate impacts, the USFWS uses a mitigation ratio for golden eagles of 1.2 eagles to one eagle taken.[101]

[99] APLIC 2006
[100] TEP 2021
[101] USFWS 2016b

TEP recognizes that mitigation is required for impacts to golden eagles resulting from Project operations, and will work with the USFWS to develop a mitigation plan to offset the impacts of the predicted eagle take.[102] The USFWS determines the final compensatory mitigation requirements for the Project using a resource equivalency analysis (REA)[103] based on the final predicted level of take for the Project. To fully offset the predicted take of 33 eagles over the first five years of the eagle ITP term, TEP has committed to retrofitting high-risk power poles, including 530 poles for 30-year retrofits or 1,217 poles for 10-year retrofits. The final mitigation plan may encompass a percentage of both retrofit types, resulting in a final number of pole retrofits between 530 and 1,217. This number of poles, calculated using the USFWS's REA, assumes that an eagle ITP, if issued, would be issued in 2022 and retrofits would be completed before the beginning of the golden eagle breeding season in 2024. The USFWS will credit the excess mitigated take to TEP for the subsequent 5-year period if take estimates are less than mitigated take after the initial review period. If estimated take is higher, the USFWS will require additional mitigation.

TEP is in the process of developing a mitigation plan which will describe the approach to mitigation and ultimately provide documentation of all poles identified for retrofitting necessary to mitigate the initial five years of predicted take at the Project. TEP anticipates that the mitigation plan will focus on power pole retrofits by either: 1) working directly with local utilities to compensate them for retrofitting poles, or 2) placing the funds to retrofit power poles into a third-party mitigation account. Based upon communication with the USFWS, other potential mitigation options may become available in the near future, including support for lead abatement programs, carcass removal along highways, habitat restoration/prey enhancement programs, or funding for mitigation banking efforts. The USFWS would need to approve any alternative compensatory mitigation options to offset the amount of estimated eagle take from the Project by the alternative mitigation measures. TEP will coordinate with the USFWS if additional mitigation options become available.

6.0 STAGE 5 – POST-PERMIT MORTALITY MONITORING

6.1 Eagle Mortality Monitoring Plan

In addition to implementing baseline avian and bat fatality monitoring at the Project following the start of operations, as outlined in the Project's BBCS,[104] TEP will monitor eagle mortality at the Project following issuance of the ITP. The purpose of the mortality monitoring is to estimate the level of incidental take at the Project used to inform adaptive management decisions. This ensures that the level of estimated take of eagles remains within the level of take authorized by the ITP. To ensure permit compliance, TEP and USFWS will re-assess fatality rates every five years of the permit term.[105]

[102] USFWS 2013

[103] USFWS 2013

[104] TEP 2021

[105] USFWS 2016b

The post-permit monitoring plan has two primary components: 1) systematic eagle mortality monitoring conducted by a qualified, independent, third party, and 2) incidental monitoring by the Project's field personnel in accordance with the WIRP (see Section 6.2 below) during all years of Project operations. TEP's eagle mortality monitoring plan will achieve the following:

- A cost-effective strategy that includes the metrics necessary to monitor take of eagles and effectiveness of the minimization measures; and
- A monitoring plan designed to facilitate evaluation of thresholds that indicate whether an adaptive management response is needed to maintain permit compliance

The results of experimental bias trials (i.e., searcher efficiency and carcass persistence trials) will inform the study design for systematic eagle mortality monitoring, which may be modified in future years to meet the objectives of the monitoring plan. Additionally, because post-construction monitoring methods are constantly improving as researchers develop new and more accurate methods of survey and analysis, TEP will consider new techniques and protocols for inclusion in the Project's post-permit monitoring plan as they become available. TEP and USFWS will agree upon the final monitoring plan prior to implementation.

6.2 Wildlife Incidental Reporting Program

As part of the post-permit monitoring, TEP plans to implement a WIRP at the Project immediately following the commencement of operations. TEP will train field personnel annually on the WIRP and its procedures for reporting any incidental avian, bat, and eagle fatalities that may be encountered during project operations, as well as effective data gathering, photo documentation and record keeping procedures. The WIRP will remain in effect during the years of systematic eagle mortality monitoring and throughout the operational life of the Project.

6.3 Reporting

TEP will notify the USFWS immediately if possible, but no later than 48 hours from discovery of a dead or injured eagle, or at the beginning of the next business day. Additionally, TEP will prepare and submit an eagle incident report to the USFWS within seven business days. This report will include a description of the find, photographs, and a data sheet that provides such information as date/time, turbine number and location, physical description of the find (consisting of any obvious injuries and general carcass condition), evidence of scavenging, and estimated time of injury/death.

In addition to specific incident reports, the independent third party will provide the USFWS and TEP with a report after each year of systematic eagle mortality monitoring. This report will provide a summary of completed monitoring; an estimate of annual take based on results of monitoring as modified by correction factors (i.e., searcher efficiency, carcass persistence; area searched); and a summary of total take at the Project, including the cumulative estimated take at the end of the ITP term.

7.0 ADAPTIVE MANAGEMENT PROCESS

TEP will communicate with the USFWS regarding the need for or implementation of additional mitigation or conservation measures at the Project if concerns arise about the rate of eagle take relative to the CRM predictions. As indicated in Section 4.2.2, fatality predictions from the USFWS CRM can be updated with site-specific, post-construction monitoring data. The site-specific mortality data can be incorporated into a posterior, site specific, estimate of collision probability to further refine mortality predictions for the Project and to inform the level of take coverage that may be needed in subsequent review periods. A stepwise process will guide the implementation of additional conservation measures, as needed (Table 10). If the USFWS issues a permit, the two parties will revisit the adaptive management table (Table 10) and revise it as necessary during each administrative permit review period. Administrative reviews will occur at least every five years as required for all long-term eagle ITPs. Given the eagle fatality monitoring initiated at the Project in December 2021, TEP anticipates the ITP will include an initial 2-year review period, rather than the standard 5-year review period (Table 10). This initial 2-year check-in will allow TEP and USFWS to review and evaluate the site-specific eagle fatality data and potentially revise the adaptive management triggers if warranted based on the post-construction monitoring data. Following the initial 2-year review period, fatality data and adaptive management triggers will be reviewed every five years for the remainder of the eagle ITP term.

8.0 CONCLUSION

TEP prepared this summary of eagle related studies to provide guidance for all eagle avoidance, minimization, mitigation and monitoring efforts for the Project. The measures described in this document are intended to help protect and reduce potential impacts to eagles and monitor actual impacts to eagles at the Project. TEP anticipates that this ECP will adaptively manage impacts to eagles from ongoing operations at the Project.

Table 10. Summary of stepwise adaptive management process for golden eagle take at the Oso Grande Wind Energy Project, based on a permitted take rate averaging 6.42 golden eagles/year and totaling 193 eagles (rounded) over the 30-year permit term. Triggers are based on the number of eagles found assuming a minimum average detection probability (g) of 0.35[1] for each 5-year review period (following the initial 2-year check-in) and using a 50% credible interval.

Step	Trigger	Adaptive Management Measure
Step I	≥ 5 golden eagle remains found in first 5 years OR ≥ 8 golden eagle remains found in first 10 years	At the beginning of the next year of compliance monitoring, implement all of the following: • Assess eagle fatalities to determine if cause or risk factors can be determined (e.g., season, weather, presence of prey/carrion, fire, or other events) • Provide assessment results and other relevant data to USFWS
Step II	≥ 11 golden eagle remains found in first 5 years OR ≥ 22 golden eagle remains found in first 10 years OR ≥ 32 golden eagle remains found in first 15 years	At the beginning of the next year of compliance monitoring, implement all of the following: • Implement Step I adaptive management response • Complete additional studies (e.g., eagle use surveys) to better understand risk factors • Coordinate with USFWS to determine next steps
Step III	≥ 25 golden eagle remains found in first 10 years OR ≥ 36 golden eagle remains found in first 15 years OR ≥ 47 golden eagle remains found in first 20 years	At the beginning of the next year of compliance monitoring, implement all of the following: • Implement Step I and Step II adaptive management response • Test one or more conservation measures designed to reduce the likelihood of future take such as: o Reducing eagle use near turbines (i.e., deterrent), o Reducing the source of collision (i.e., curtailment), such as installation of automated eagle detection technology, or human biological monitors, or o Other measure(s) agreed upon in consultation with the USFWS. • Effectiveness study design of any conservation measure implemented must be approved by the USFWS.
Step IV	≥ 50 golden eagle remains found in first 20 years OR ≥ 58 golden eagle remains found in first 25 years	Immediately upon meeting this trigger, implement the following: • If technology, biological monitors, or other conservation measures have previously been implemented at the Project, alter the programming or implementation of those effort(s) to enhance effectiveness, or implement another conservation measure agreed upon in consultation with the USFWS. The effectiveness of any measure or enhanced measure must be studied with the study design approved by the USFWS.

1. If the minimum average site-wide g-value of 0.35 is not achieved in any 5-year review period or searcher efficiency rates, as determined through on-site bias trials, are not quantifiable for every search method used during the 5-year review period, then more rigorous fatality monitoring to achieve an average g of 0.35, and/or additional searcher efficiency trials will be required. This may be implemented through additional years of third party monitoring and/or enhanced operations monitoring (e.g., increased search frequency, increased search area coverage) including searcher efficiency trials for each novel search method (e.g., full plot transect searches, scans, road and pad searches, incidental monitoring) employed during the 5-year review period.

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50 Code of Federal Regulations (CFR) § 10.13. 1973. Title 50 - Wildlife and Fisheries; Chapter I -United States Fish and Wildlife Service, Department of the Interior; Subchapter B Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 10 - General Provisions; Subpart B - Definitions; Section (§) 10.13. List of Migratory Birds. 50 CFR 10.13. [38 Federal Register (FR) 22015, August 15, 1973, as amended 50 FR 52889, December 26, 1985.].

50 Code of Federal Regulations (CFR) Part 22. 1974. Title 50 - Wildlife and Fisheries; Chapter I - United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits. 50 CFR 22. [39 Federal Register (FR) 1183, January 4, 1974, unless otherwise noted. 16 United States Code (USC) 668-668d; 16 USC 703-712; 16 USC 1531-1544.].

50 Code of Federal Regulations (CFR) § 22.10. 1999. Title 50 - Wildlife and Fisheries; Chapter I - United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits; Subpart a - Introduction and General Requirements; Section (§) 22.10 - Relationship to Other Permit Requirements. 50 CFR 22.10. [64 FR 50472, Sept. 17, 1999, as amended at 68 FR 61140, Oct. 27, 2003; 73 FR 29083, May 20, 2008; 81 FR 91550, Dec. 16, 2016; Redesignated and amended at 87 FR 884, Jan. 7, 2022]. Available online: https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-22/subpart-A/section-22.10

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50 Code of Federal Regulations (CFR) § 22.80. 2009. Title 50 - Wildlife and Fisheries; Chapter I - United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits; Subpart C - Specific Eagle Permit Provisions; Section (§) 22.80 - Permits for Eagle Take That Is Associated with, but Not the Purpose of, an Activity. 50 CFR 22.80. [74 FR 46877, Sept. 11, 2009, as amended at 79 FR 73725, Dec. 9, 2013; 81 FR 8004, Feb. 17, 2016; 81 FR 91551, Dec. 16, 2016. Redesignated at 87 FR 884, Jan. 7, 2022; 87 FR 885, Jan. 7, 2022].

50 Code of Federal Regulations (CFR) § 22.85. 2009. Title 50 - Wildlife and Fisheries; Chapter I - United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits; Subpart C - Specific Eagle Permit Provisions; Section (§) 22.85 - Removal of Eagle Nests. 50 CFR 22.85. [74 FR 46877, Sept. 11, 2009, as amended at 81 FR 91553, Dec. 16, 2016. Redesignated at 87 FR 884, Jan. 7, 2022; 87 FR 885, Jan. 7, 2022]. Available online: https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-22/subpart-C/section-22.85

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