

ORIGINAL

NEW APPLICATION



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BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

L-21261A-23-0219-00225

IN THE MATTER OF THE APPLICATION OF RWE RENEWABLES DEVELOPMENT, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES, SECTIONS 40-360, ET. SEQ., FOR A CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE FORGED ETHIC WIND ENERGY INTERCONNECTION PROJECT LOCATED IN COCONINO COUNTY, ARIZONA.

DOCKET NO.:

Case No.

NOTICE OF FILING APPLICATION FOR CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY

RWE Renewables Development, LLC ("Applicant") through undersigned counsel, provides notice of filing of the Application for Certificates of Environmental Compatibility for the Forged Ethic Wind Energy Interconnection Project under § 40-360.03.

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Application
for
Certificates of Environmental Compatibility
Forged Ethic Wind Energy Interconnection Project

Prepared for:
State of Arizona Power Plant and Transmission Line Siting Committee

Submitted by:
RWE Renewables Development, LLC

July 2023
Case No: _____

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CHAPTER 1. INTRODUCTION

Pursuant to Arizona Revised Statutes (ARS) 40-360 et seq., RWE Clean Energy (RWECE or Applicant) is seeking two Certificates of Environmental Compatibility (CECs) for the proposed Forged Ethic Wind Energy Interconnection Project (Interconnection Project). The Interconnection Project will connect the Forged Ethic Wind Energy Project (Wind Project) to the regional electric grid via the Navajo Southern Transmission System's (NSTS) Moenkopi to Cedar Mountain 500-kilovolt (kV) transmission line, which is operated by Arizona Public Service (APS).

The Interconnection Project is an aboveground, 5-mile-long, 500-kV alternating current generation intertie transmission line and a planned APS 500-kV switchyard along the Moenkopi to Cedar Mountain transmission line (APS Switchyard). Two CECs are required because the Applicant will own and operate the transmission line and APS will operate the switchyard, which will be the point of interconnection. The Wind Project includes a collection substation (Project Substation) that will increase the voltage of electricity generated by the Wind Project to match the point of interconnection. There are no thermal electrical generating plants included as part of the Interconnection Project.

The Interconnection Project is approximately 25 miles north of Flagstaff, Arizona. The general location and vicinity of the Interconnection and Wind Projects are shown on Figures 1 and 2.

RWECE is a global development firm that develops, owns, and operates of the most efficient, highest performing renewable projects in the United States. RWECE employs around 1,500 people in the United States and is focused on growing the company's portfolio of renewable projects. RWECE is developing and operating numerous renewable energy projects across the country, including several land-based wind facilities and renewable energy developments in Arizona.

The Interconnection Project was included in the Applicant's Ten-Year Transmission System Plan filed with the Arizona Corporation Commission on February 1, 2023. Project construction is anticipated to begin as early as 2024, with an expected in-service date as early as Q4 2025.

1.1 INTERCONNECTION PROJECT DESCRIPTION

The Interconnection Project would extend approximately 5 miles within an approximately 200-foot-wide right-of-way (ROW) (Figure 3). The Interconnection Project would be adjacent to and immediately north of the existing 500-kV Moenkopi to Cedar Mountain transmission line.¹ The maximum height of transmission towers for the Interconnection Project would be approximately 165 feet. The Applicant anticipates using a combination of the following transmission tower types: steel strain dead end, H-frame; steel tangent V-string, H-frame; steel 3-pole dead end; steel 3-pole strain dead end; and steel 3-pole terminal dead end. Conceptual drawings showing the typical structures are provided in Exhibit G. Span lengths between structures would be approximately 600 feet for 3-pole structures and 1,100 to 1,300 feet for H-frame structures. Variation in span length may be needed to meet site-specific engineering requirements including topography.

The Interconnection Project (and Wind Project) are proposed on the CO Bar Ranch, which includes a checkerboard area of private and Arizona State Trust land (managed by the Arizona State Land Department [ASLD]). The CO Bar Ranch is an active cattle ranch operated by Babbitt Ranches. The Interconnection Project would traverse private and ASLD-managed lands.

¹ The Moenkopi to Cedar Mountain transmission line is located within a 300-foot-wide right-of-way.

Lands to the southwest of the Interconnection Project are managed by the Coconino National Forest (NF) and Kaibab NF; lands to the southeast are managed by ASLD. Kaibab NF lands are also located to the north. The Navajo Nation reservation is approximately 2.6 miles northeast of the Interconnection Project (see Figure 2).

1.1.1 Proposed Route

The Interconnection Project would connect the Project Substation to the APS Switchyard (i.e., the point of interconnection). Starting at the Project Substation in Township 26N, Range 5E, Section 21, the Interconnection Project would proceed south for approximately 0.3 miles. The Interconnection Project would then turn southwest for approximately 4.4 miles before entering the APS Switchyard. The Interconnection Project would have a 200-foot-wide right-of-way (ROW); the ROW would be located within the CEC Corridor, described below. The proposed alignment for the Interconnection Project is shown on Figure 3.

1.1.2 APS Switchyard

The APS Switchyard will be immediately adjacent to, and on the north side of, the existing Moenkopi to Cedar Mountain transmission line. The Interconnection Project (and other renewable energy developments planned on the CO Bar Ranch) will interconnect to the 500-kV APS Switchyard (U.S. Bureau of Reclamation [Reclamation] 2022). The APS Switchyard will include major equipment such as 500-kV circuit breakers, switches, and associated bus work. The APS Switchyard will be in Township 26N, Range 5E, Section 21. The Interconnection Project would dead-end into a dedicated bay in the APS Switchyard.

1.2 WIND PROJECT DESCRIPTION

The Wind Project is a planned 323-megawatt (MW) wind energy facility located on private, and Arizona State Trust lands in unincorporated Coconino County. The Wind Project will include approximately 102 turbines, a meteorological tower, internal access roads, underground collector lines, the Project Substation, a laydown yard, an operations and maintenance area, and access roads. The overall Wind Project area is approximately 29,106 acres; however, the actual wind facility disturbance footprint would be less than 5% of the total area.

1.2.1 Project Substation

The purpose of the Project Substation is to increase the voltage of electricity generated by the Wind Project to match the voltage at the point of interconnection.² Electricity generated by individual wind turbines would travel through lower-voltage (e.g., 34.5-kV) collector lines to the Project Substation where a power transformer would increase the voltage to 500-kV for delivery onto the NSTS. All collector lines from the Wind Project would terminate at the Project Substation. The Project Substation is proposed on private property on approximately 6 acres in Township 26N, Range 6E, Section 7.

² The Project Substation would include the following major equipment: 34.5-kV medium-voltage bus and associated switching apparatus; 500-kV bus and switching apparatus; 34.5-kV to 500-kV transformer; steel support structures with foundations; control building; security and perimeter fence; and security and emergency lighting. In accordance with Commission Decision No. 77761, the Applicant is not requesting authorization to construct the substation. If the Commission determines that authorization for substations is required, the Applicant asks that the Commission provide that authorization as part of this proceeding.

1.3 PURPOSE AND NEED

The purpose of the Interconnection Project is to allow for delivery of renewable energy into the transmission grid in the southwestern United States. RWECE will execute Power Purchase Agreements for which the Interconnection Project will serve. Adding renewable energy projects meets several objectives at the local, state, and federal levels, including the need for additional energy supplies to serve the region and the priority placed on meeting this need with clean, renewable energy.

1.4 REQUESTED CEC CORRIDOR

The Applicant requests approval of a corridor within which the Interconnection Project would be constructed (CEC Corridor). The requested CEC Corridor extends between the Project Substation and the APS Switchyard. The CEC Corridor starts as a rectangular area buffered around the planned location for the Project Substation, on private property in Township 26N, Section 6E, Range 7. The CEC Corridor then proceeds south for approximately 0.3 miles as a 200-foot-wide area before turning southwest at the northern edge of the Moenkopi to Cedar Mountain 500-kV transmission line. The CEC Corridor then proceeds southwest as a 300-foot-wide area for approximately 4.4 miles. Once the CEC Corridor reaches Township 26N, Range 5E, Section 21, the CEC Corridor widens to include private property in Section 21 that is north of the southern limit of the Moenkopi to Cedar Mountain 500-kV transmission line ROW. The CEC Corridor widens in Section 21 to accommodate potential routing variants for the Interconnection Project to enter the APS Switchyard and provide an area in which to site the APS Switchyard. The requested CEC Corridor is displayed on Figure 3.

The CEC Corridor is in the Township, Range, and Sections identified in Table 1, below. In total, the CEC Corridor is approximately 355 acres, consisting of 284 acres (80 percent) of private property and 71 acres (20 percent) of ASLD lands.

Table 1. CEC Corridor Location

Township	Range	Section
26 North	5 East	12
26 North	5 East	13
26 North	5 East	14
26 North	5 East	15
26 North	5 East	16
26 North	5 East	21
26 North	6 East	7

1.5 PROPOSED INTERCONNECTION

The Interconnection Project would connect to the regional electrical grid via the existing Moenkopi to Cedar Mountain 500-kV transmission line. The Moenkopi to Cedar Mountain 500-kV transmission line is part of the NSTS, of which the Reclamation is a part owner and APS is the operator. All interconnection requests for the NSTS that result in an LGIA must be submitted to APS and approved by the owners of the transmission line, including the Regional Director of Reclamation’s Lower Colorado Basin Region. Prior to the Regional Director’s approval, Reclamation must complete an environmental review of the proposed interconnection in compliance with the National Environmental Policy Act of 1969 (NEPA)

(Public Law 91-190). Reclamation, as the lead federal agency, is preparing an environmental assessment (EA) for the proposed Interconnection Project to assess the environmental effects of the proposed interconnection. Additional information about completed and ongoing environmental studies that support the Reclamation EA process is described in Exhibit B.

RWECE will execute an LGIA with APS and the NSTS members. Reclamation, as a part owner of the NSTS, is required to approve the LGIA. As part of the interconnection agreement process, APS will complete a System Impact Study and a Facilities Study to assess the requirements of the proposed interconnection. The Applicant entered into an agreement with APS to complete the SIS in June 2021. The System Impact Study is anticipated in fall 2023, with the Facilities Study following approximately one year after.

The Applicant notes that it may refine minor design characteristics for the Interconnection Project during its final engineering phase. Representative structure diagrams for the Interconnection Project are presented in Exhibit G.

1.6 ENVIRONMENTAL AND PUBLIC SITING PROCESS

1.6.1 Siting Process

The siting process focused on identifying a reasonably direct route to interconnect the Wind Project to the APS Switchyard. The Applicant sought to minimize environmental impacts and expenses by selecting a direct route, while considering existing land use and infrastructure. Constructing the Interconnection Project immediately adjacent to the existing Moenkopi to Cedar Mountain 500-kV transmission line will help consolidate energy infrastructure and minimize the overall impact of the Interconnection Project.

1.6.2 Public Outreach Process

The Applicant has coordinated with stakeholders, including agencies, public officials, tribes, and the public, to present information about the Interconnection Project (and Wind Project), and provide multiple ways to submit comments. Public outreach activities include informational mailing, newspaper advertisements, social media advertisement, a website for the Interconnection and Wind Projects, and an in-person open house. Further information is included in Exhibit J.

1.7 SUMMARY OF ENVIRONMENTAL COMPATIBILITY

The Interconnection Project is compatible with existing land uses, as described further in Exhibit B. The Interconnection Project is compatible with numerous planning objectives of the Coconino County Comprehensive Plan, which encourage rural land use and renewable energy (Coconino County 2015). For example, the Comprehensive Plan states “utility-scale energy projects that allow for the continuation of traditional land uses such as ranching and hunting shall be preferred over projects that assume all use of the land” (Coconino County 2015:176). The Wind Project, including the Interconnection Project, will not encumber existing ranching activities; siting the Interconnection Project parallel to an existing transmission corridor consolidates electrical infrastructure and minimizes potential environmental impacts.

The Interconnection Project is compatible with Coconino County’s “General” zoning district. The Wind Project and Interconnection Project will be reviewed through Coconino County’s conditional use permit process, in accordance with the Coconino County utility-scale renewable energy ordinance. RWECE plans to submit its conditional use permit application in August 2023.

The Interconnection Project would minimally affect the area's natural and human environment. Specifically:

- The Interconnection Project is consistent with existing and planned land uses on the CO Bar Ranch (see Exhibits A and B).
- The Interconnection Project would permanently displace a relatively small amount of habitat and result in minor impacts to wildlife and vegetation, including special-status species (see Exhibits C and D). Collocating a portion of the Interconnection Project with existing transmission lines will help to minimize the Interconnection Project's overall environmental impacts. No areas of biological wealth exist in the Interconnection Project vicinity.
- The Interconnection Project is compatible with the existing visual landscape of the area, which is dominated by the existing 500-kV Moenkopi to Cedar Mountain transmission line. From a distance, elements of the Interconnection Project would be visually consistent with the existing electrical facilities (see Exhibit E).
- The Interconnection Project will not affect any known historic sites or structures, or archaeological sites, based on a past surveys which cover the entire Project Area (see Exhibit E).
- The Interconnection Project will not affect recreation, including use of the Arizona National Scenic Trail and dispersed recreation on ASLD lands (see Exhibit F). The Arizona National Scenic Trail is further discussed in the context of visual impacts (see Exhibit E) and noise impacts (see Exhibit I).
- The Interconnection Project is consistent with the existing soundscape of the immediate area because it would produce sounds similar to those generated by the nearby existing transmission lines (see Exhibit I).

1.8 CONCLUSION

The Applicant is committed to avoiding where possible and minimizing where practicable environmental impacts and believes the Interconnection Project is environmentally compatible. The Applicant further believes that the Interconnection Project is in the public interest because the Wind Project's contribution to meeting the need for an adequate, economical, and reliable supply of electric power outweighs the impact of the Interconnection Project on the environment and ecology of the state. The Applicant, therefore, respectfully requests that the Power Plant and Transmission Line Siting Committee grant, and the Arizona Corporation Commission approve, CECs for the construction of the Interconnection Project.

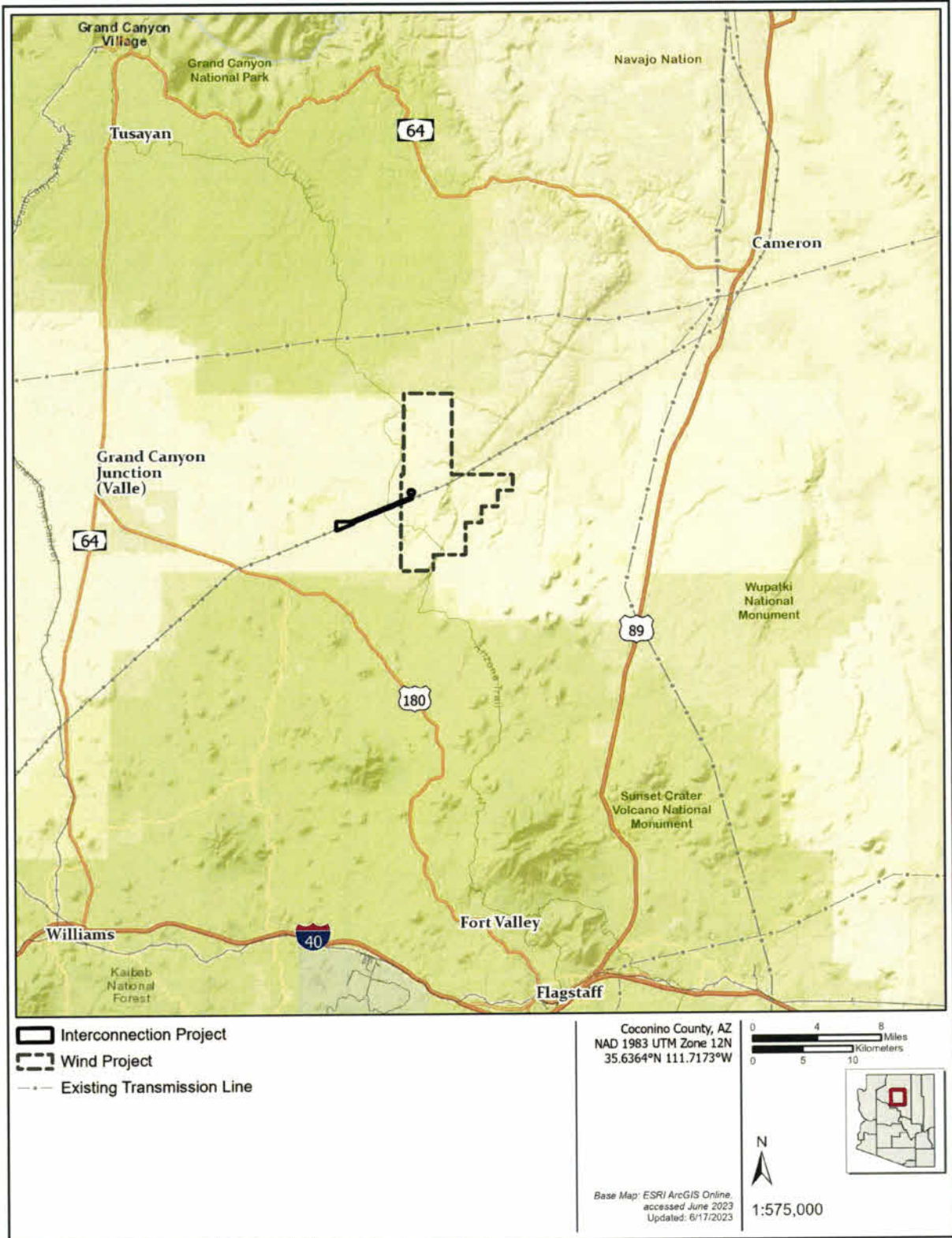


Figure 1. Wind Project and Interconnection Project vicinity.

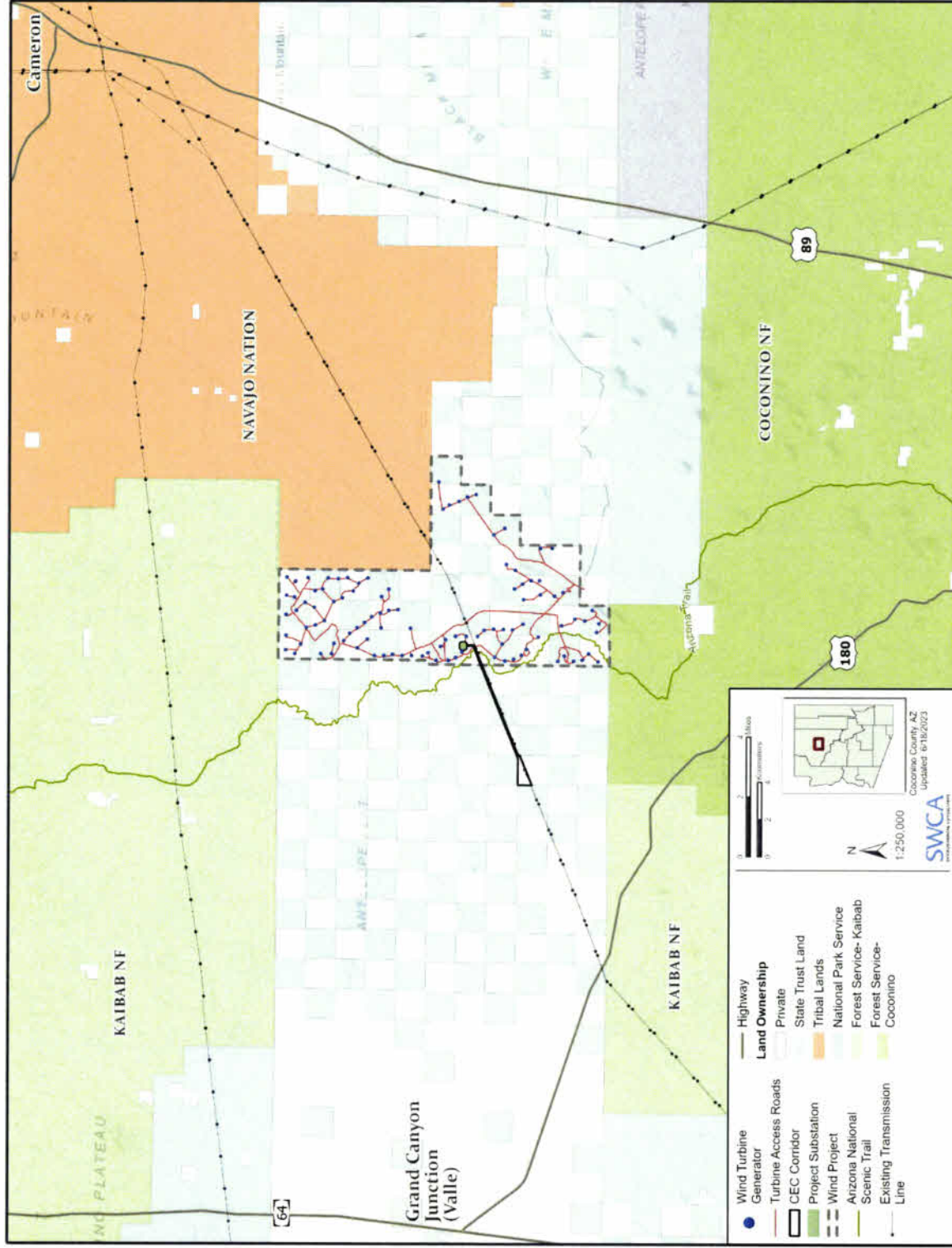


Figure 2. Wind Project and Interconnection Project overview.

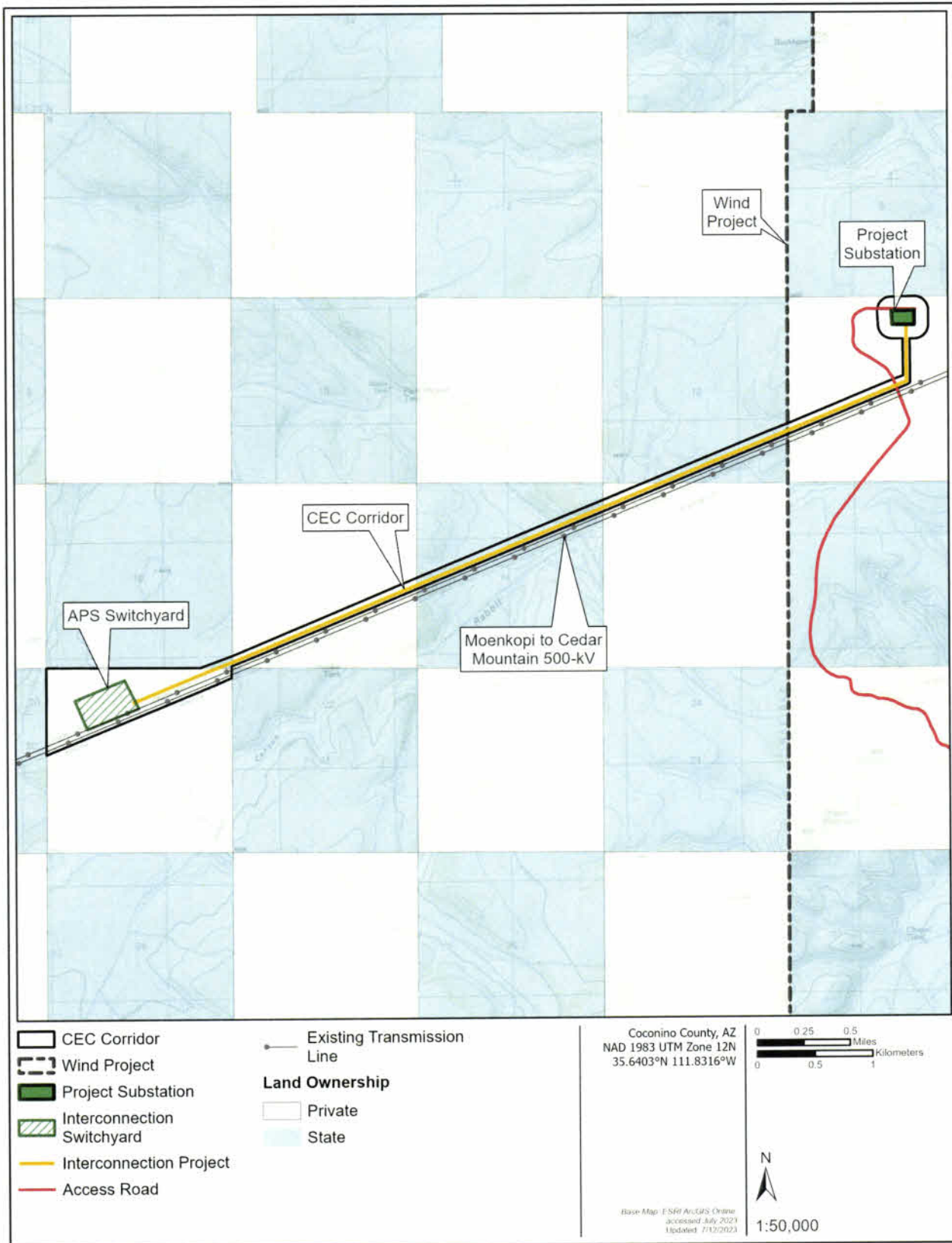


Figure 3. Interconnection Project and requested CEC Corridor.

1.9 LITERATURE CITED

- Coconino County. 2015. *Coconino County Comprehensive Plan*. Available at: <https://www.coconino.az.gov/DocumentCenter/View/10608/Coconino-County-Comprehensive-Plan---2017-Approval?bidId=>. Accessed May 2023.
- U.S. Bureau of Reclamation (Reclamation). 2022. *Final Environmental Assessment for the Babbitt Ranch Energy Center Interconnection Project*. Glendale, Arizona: U.S. Department of the Interior, Bureau of Reclamation, Interior Region 8: Lower Colorado Basin, Phoenix Area Office, Glendale, Arizona. December. Available at: https://www.usbr.gov/lc/phoenix/reports/BREC/FinalEA_BREC_Interconection_Project.pdf. Accessed May 2023.

APPLICATION FOR CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

1. Name and address of the applicant

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2. Name, address, and telephone number of a representative of the applicant who has access to technical knowledge and background information concerning this application, and who will be available to answer questions or furnish additional information

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San Francisco, CA 94111
(312) 783-1515

3. Date on which the applicant filed a Ten Year Plan in compliance with ARS § 40-360.02, in which the facilities for which this application is made were described

The Interconnection Project was included in RWECE's Ten-Year Transmission System Plan, which was filed on February 1, 2023.

4. Description of the proposed facility, including:

a. With respect to an electric generating plant:

There are no thermal electrical generating plants included as part of the Interconnection Project.

b. With respect to a proposed transmission line:

i. Nominal voltage for which the line is designed; description of the proposed structures and switchyards or substations associated therewith; and purpose for constructing said transmission line

(1) Nominal voltage:

The nominal voltage for the Interconnection Project is 500 kV alternating current.

(2) Description of the proposed structures:

The Applicant anticipates using a combination of the following transmission tower types: steel strain dead end, H-frame; steel tangent V-string, H-frame; steel 3-pole dead end; steel 3-pole strain dead end; and steel 3-pole terminal dead end. Conceptual drawings showing the typical structures are provided in Exhibit G.

(3) Description of proposed switchyards and substations:

The purpose of the Project Substation is to increase the voltage of electricity generated by the Wind Project to match the voltage at the point of interconnection. Electricity generated by individual wind turbines would travel through lower-voltage (e.g., 34.5-kV) collector lines to the Project Substation where a power transformer would increase the voltage to 500 kV for delivery onto the NSTS. All collector lines

from the Wind Project would terminate at the Project Substation. The Project Substation is proposed on private property on an approximately 6-acre area in Section 7, Township 26 North, Range 6 East. The Project Substation would include the following major system equipment: 34.5-kV medium-voltage bus and associated switching apparatus; 500-kV bus and switching apparatus; 34.5-kV to 500-kV transformer; steel support structures (see Exhibit G for a representative A-frame riser structure) with foundations; control building; security and perimeter fence; and security and emergency lighting.

The APS Switchyard will include major equipment such as 500-kV circuit breakers, switches, and associated bus work. The APS Switchyard would be located in Section 21, Township 26 North, Range 5 East, on the north side of the existing Moenkopi to Cedar Mountain 500-kV transmission line.

(4) Purpose for constructing said transmission line:

The Interconnection Project is needed to connect the proposed Wind Project to the regional electrical transmission grid.

ii. Description of geographical points between which the transmission line will run the straight-line distance between such points and the length of the transmission line for each alternative route for which the application is made

(1) Description of geographical points between which the transmission line will run:

The Interconnection Project would originate at the Project Substation in Township 26N, Range 6E, Section 7.

The Interconnection Project would traverse Township 26N, Range 5E, Sections 12, 13, 14, 15, 16, and 21; and Township 26N, Section 6E, Range 7.

The Interconnection Project would end at the APS Switchyard in Township 26N, Range 5E, Section 21.

(2) Straight-line distance between such points:

The straight-line distance between the points of origin and termination is approximately 4.8 miles.

(3) Length of the transmission line for each alternative route:

Interconnection Project: approximately 5 miles. No alternative routes are proposed.

iii. Nominal width of right-of-way required, nominal length of spans, maximum height of supporting structures and minimum height of conductor above ground

(1) Nominal width of right-of-way required:

The right-of-way would be up to 200 feet wide.

(2) Nominal length of spans:

For the Interconnection Project, span lengths between structures would be approximately 600 feet for 3-pole structures and 1,100 to 1,300 feet for H-frame structures. Variation in span length may be needed to meet site-specific engineering requirements including topography.

(3) Maximum height of supporting structures:

The maximum height of the supporting structures would be approximately 165 feet above the ground surface.

(4) Minimum height of conductor above ground:

The minimum height of the conductor above the existing grade will be 32 feet. All clearances will be in accordance with applicable codes and regulations.

- iv. To the extent available, the estimated costs of proposed transmission line and route, stated separately. (If application contains alternative routes, furnish an estimate for each route and a brief description of the reasons for any variations in such estimates.)**

The estimated cost for the Interconnection project is \$17.1 million. This includes the costs for construction of the transmission line, including the conductor and the supporting structures.

The estimated cost for land required for the Interconnection Project is approximately \$300,000.

- v. Description of proposed route and switchyard locations. (If application contains alternative routes, list routes in order of applicant's preference with a summary of reasons for such order of preference and any changes such alternative routes would require in the plans reflected in (i) through (iv) hereof.)**

The Interconnection Project would connect the Project Substation to the APS Switchyard (i.e., the point of interconnection). Starting at the Project Substation in Township 26N, Range 5E, Section 21, the Interconnection Project would proceed south for approximately 0.3 miles. The Interconnection project would then turn southwest for approximately 4.4 miles before entering the APS Switchyard. The Interconnection Project would have a 200-foot-wide right-of-way (ROW); the ROW would be located within the requested CEC Corridor. The Interconnection Project would be adjacent to and immediately north of the existing Moenkopi to Cedar Mountain 500-kV transmission line. The proposed alignment for the Interconnection Project and APS Switchyard are shown on Figure 3.

- vi. For each alternative route for which application is made, list the ownership percentages of land traversed by the entire route (federal, state, Indian, private, etc.).**

The proposed route for the Interconnection Project totals approximately 5 miles. Approximately 60 percent of the route for the Interconnection Project would traverse private property; approximately 40 percent of the route for the Interconnection Project would traverse ASLD land. The APS Switchyard will be located entirely on private land.

- 5. List the areas of jurisdiction [as defined in ARS § 40-360(1)] affected by each alternative site or route and designate those proposed sites or routes, if any, which are contrary to the zoning ordinances or master plans of any of such areas of jurisdiction.**

The Interconnection Project would be located on Arizona State Trust land (managed by the ASLD) and private property. The jurisdictions regulating use of lands crossed by the Interconnection Project are with the ASLD for State Trust land and Coconino County for private property. A single route is proposed for the Interconnection Project; the Interconnection Project is not contrary to the Coconino County zoning ordinance or master plans of either jurisdiction.

6. Describe any environmental studies applicant has performed or caused to be performed in connection with this application or intends to perform or cause to be performed in such connection, including the contemplated date of completion.

The Applicant has evaluated available secondary and field data related to biological resources, visual resources, cultural resources, recreational resources, land use, noise levels, and communications signals to assess the potential impacts that may result from the construction, operation, and maintenance of the Interconnection Project. These evaluations are included in Exhibits B, C, D, E, F, H, and I to this application. Other environmental studies completed or planned for the Interconnection Project are described in Exhibit B.

RWE CLEAN ENERGY

/s/ Matthew Ryan

By Matthew Ryan
Manager, Utility-Scale Development
RWE Clean Energy, LLC

I HEREBY CERTIFY that on this 24th day of July 2023, I have delivered to the Arizona Corporation Commission twenty-five (25) copies of this Application for Certificates of Environmental Compatibility.

EXHIBIT A. LOCATION MAP AND LAND USE MAPS

In accordance with Arizona Corporation Commission Rules of Practice and Procedure R14-3-219, RWE Clean Energy (the Applicant) provides the following location maps and land use information:

*Where commercially available**, 1) a topographic map, 1:250,000 scale, showing any proposed transmission line route longer than 50 miles and the adjacent area; and 2) a topographic map, a scale of 1:62,500, for routes shorter than 50 miles showing any proposed transmission line route and the adjacent area*

Where commercially available, a topographic map, 1:62,500 scale, of each proposed transmission line route longer than 50 miles showing that portion of the route within two miles of any subdivided area. The general land use plan within the area shall be shown on a 1:62,500 map required for Exhibit A-3, and for the map required by this Exhibit A-4, which shall also show the areas of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of an overlay.

***If a topographic map is not commercially available, a map of similar scale, which reflects prominent or important physical features of the area in the vicinity of the proposed site or route, shall be substituted.*

Land Use Overview

The following exhibits are required by the Arizona Corporation Commission's Rules of Practice and Procedure R14-3-219 to support the land use studies conducted for this application:

- Exhibit A-1 illustrates the Interconnection Project and underlying land ownership within a 1-mile Study Area.
- Exhibit A-2 illustrates existing land use within a 1-mile Study Area of the Interconnection Project.
- Exhibit A-3 illustrates planned land use within a 1-mile Study Area of the Interconnection Project.

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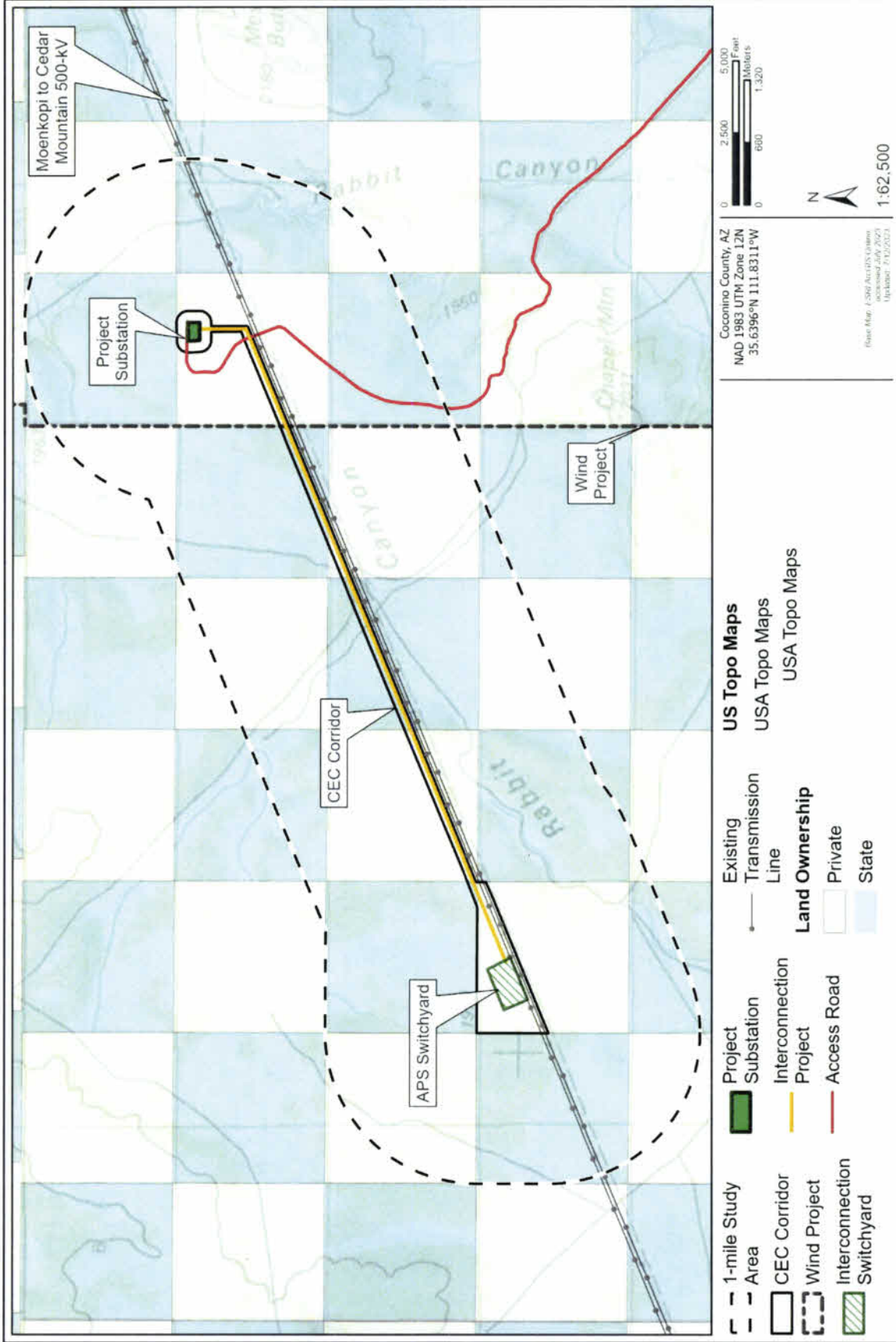


Exhibit A-1. Interconnection Project and underlying land ownership.

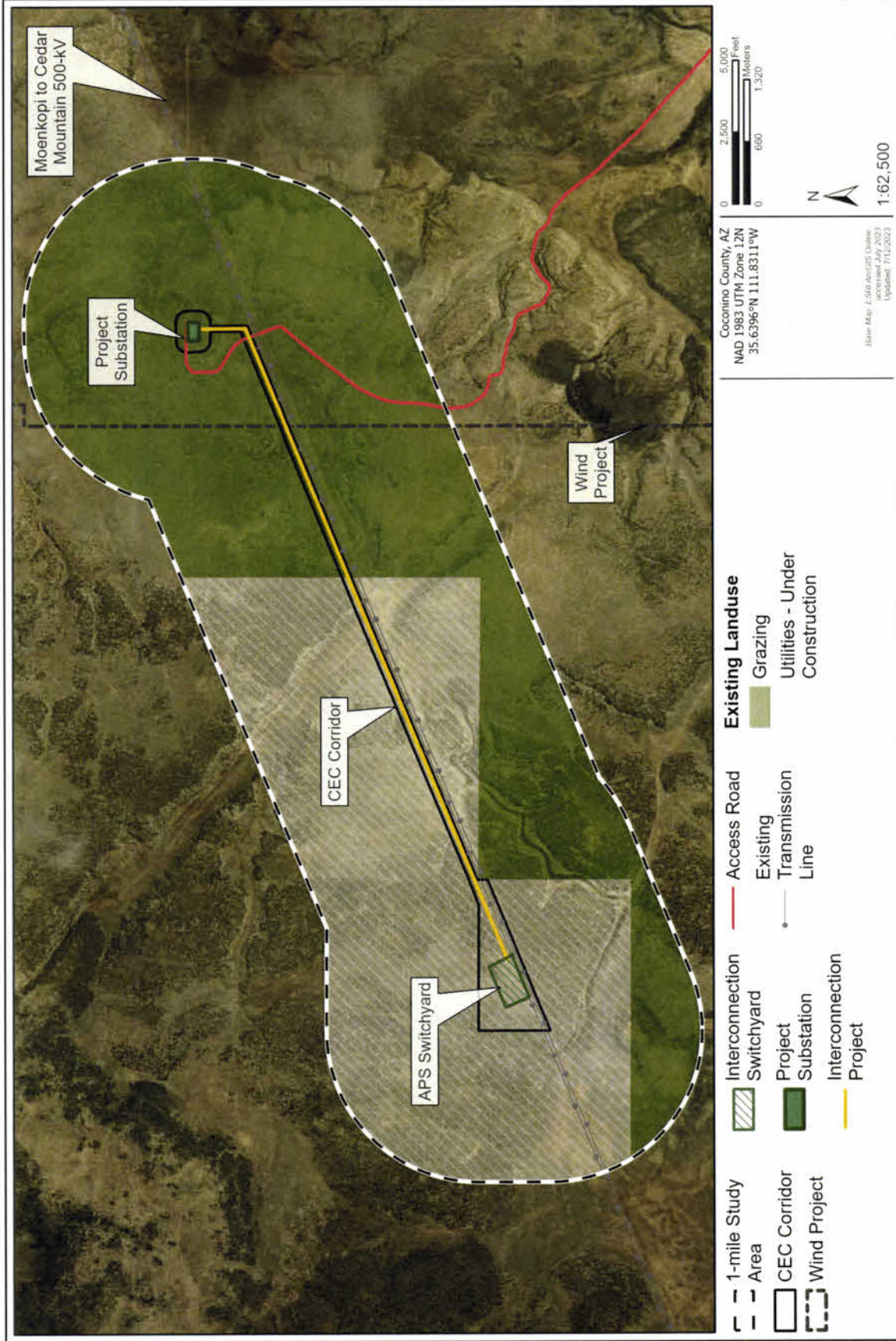


Exhibit A-2. Existing land use within the interconnection Project's 1-mile Study Area.

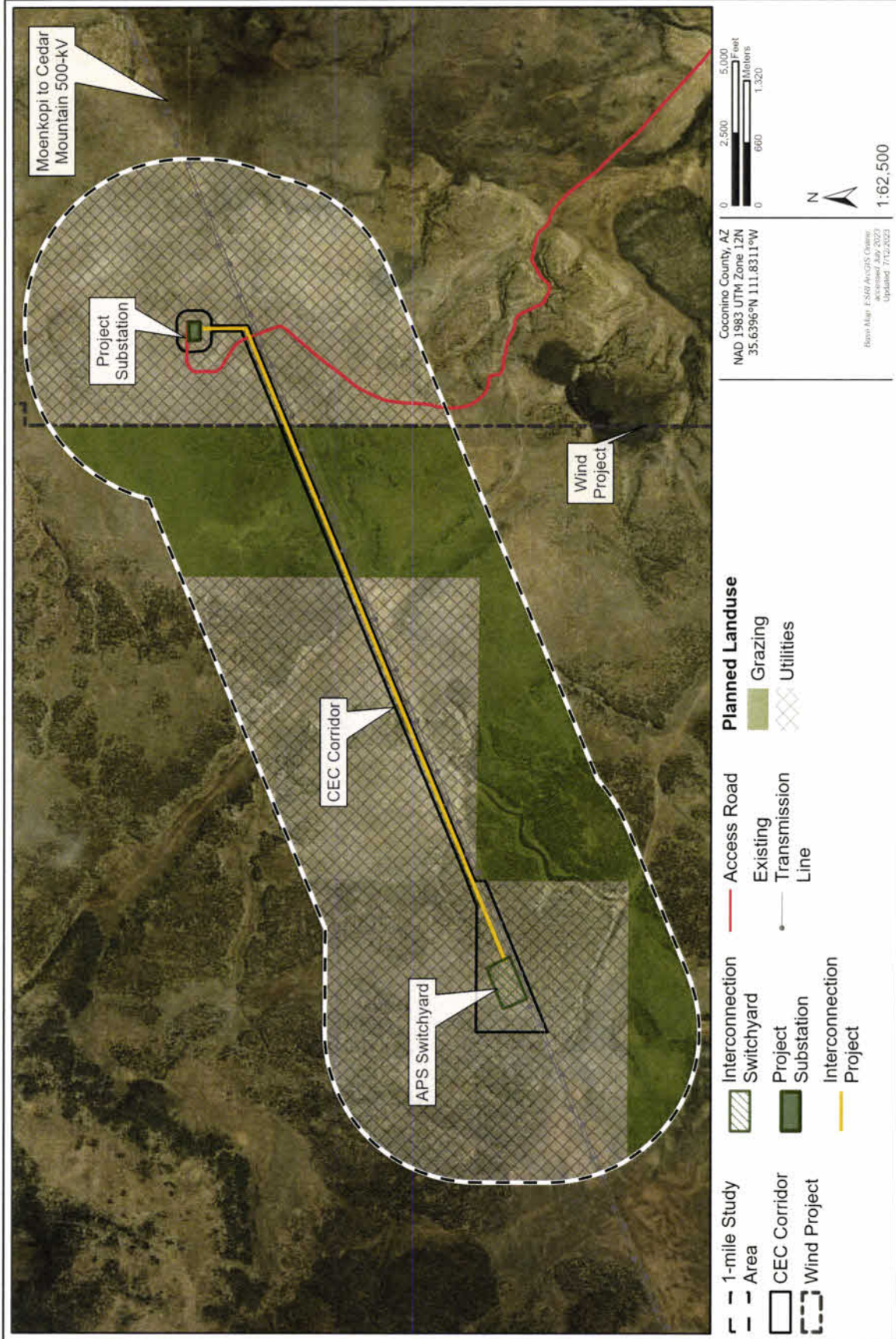


Exhibit A-4. Planned land use within the Interconnection Project's 1-mile Study Area.

EXHIBIT B. ENVIRONMENTAL STUDIES

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

Attach any environmental studies which applicant has made or obtained in connection with the proposed site(s) or route(s). If an environmental report has been prepared for any federal agency or if a federal agency has prepared an environmental statement pursuant to Section 102 of the National Environmental Policy Act, a copy shall be included as a part of this exhibit.

Introduction

Numerous environmental reports have been completed or are underway in connection with the Interconnection Project. RWE Clean Energy's (RWECE or the Applicant) consultant, SWCA Environmental Consultants, prepared a pre-construction wildlife survey plan for the proposed Forged Ethic (formerly Zeus) Wind Energy Project (Wind Project) in 2020, and began field studies in 2021. In addition, this exhibit includes a description of relevant Coconino County land use plans and zoning ordinance.

Completed and Ongoing Environmental Studies

Completed environmental reports are either attached to this exhibit or are provided in other application exhibits as indicated in Table B-1.

Table B-1. Completed and Ongoing Environmental Studies

Environmental Study	Study Status	Location in CEC Application
Pre-Construction Wildlife Survey Plan for the Proposed Zeus Wind Energy Project; ³ June 2020	Completed	Exhibit B, Attachment B-1
Raptor Migration Surveys for the Proposed Zeus Wind Energy Project, 2021; January 2022	Completed	Exhibit B, Attachment B-2
Bat Acoustic Surveys for the Zeus Wind Project; June 2022	Completed	Exhibit B, Attachment B-3
Eagle and Other Raptor Species Nest Surveys, Zeus Wind Energy Facility, 2021 and 2022 Nesting Seasons; July 2022	Completed	Exhibit B, Attachment B-4
Avian Use Surveys for the Proposed Forged Ethic Wind Energy Project, June 2021–June 2022 [Year 1]; August 2022	Completed	Exhibit B, Attachment B-5
Tier 1 Preliminary Site Evaluation and Tier 2 Site Characterization Report, Forged Ethic Wind Energy Project, Coconino County, Arizona; October 2022	Completed	Exhibit B, Attachment B-6
Aquatic Resources Assessment Report, Forged Ethic Wind Energy Project; December 2022	Completed	Exhibit B, Attachment B-7
Avian Use Surveys for the Proposed Forged Ethic Wind Energy Project, June 2022–June 2023 [Year 2]	Field studies completed; report underway	–
Native Plant Inventory	Field studies completed; report underway	–

³ The Forged Ethic Wind Energy Project was formerly referred to as the Zeus Wind Energy Project.

Environmental Study	Study Status	Location in CEC Application
Cultural Resources	Completed	See Exhibit E
Scenic Areas	Completed	See Exhibit E

In addition to the studies listed in Table B-1, an environmental assessment (EA) is being prepared for the Forged Ethic Wind Energy Interconnection Project (Interconnection Project). An EA is required for the project because a federal agency, the U.S. Bureau of Reclamation (Reclamation), must approve interconnecting the wind project to the Navajo Southern Transmission System, which Reclamation partly owns. That approval is considered a major federal action requiring compliance with the National Environmental Policy Act of 1969 (Public Law 91-190). The draft EA is nearing completion.

A draft biological evaluation (BE) is in preparation for the Interconnection Project in support of the EA. The draft BE found that the Interconnection Project would have no effect on any species listed under the Endangered Species Act of 1973, as amended (ESA) (16 United States Code 1531 et seq.) and would have no effect on designated or proposed critical habitat. The draft BE also found that the Interconnection Project may impact individual monarch butterflies, a candidate species for listing under the ESA, but is not likely to result in a trend toward federal listing or loss of viability of the species (see Exhibit C for an encapsulation of the draft BE).

The Applicant has contracted with SWCA Environmental Consultants to conduct native plant surveys on ASLD lands per ASLD protocols. An estimate will be made of the number of native trees, shrubs, and cactus plants that would be removed from state lands as a result of the Interconnection Project. This estimate will be used to calculate the fee needed to be paid to the ASLD to compensate for the loss of vegetation from state lands. The Applicant completed field surveys in June 2023; report preparation is underway as of July 2023.

Land Use Plans

Coconino County Comprehensive Plan

The Coconino County Comprehensive Plan (Comprehensive Plan) provides a policy framework that guides Coconino County (the County) in making decisions that impact land use, among other things. Specifically, the Comprehensive Plan states that it is “not a regulatory document” but rather that it “provides a plan for future growth and is intended to guide the Planning and Zoning Commission and the Board of Supervisors when making decisions in the pursuit of coordinated, appropriate, and harmonious development in the unincorporated area of Coconino County” (Coconino County 2015:11).

In addition to the Comprehensive Plan, which covers the entire county, Coconino County has adopted nine area plans and one “rural planning area” that focus on guiding development in specific areas. The Interconnection Project does not intersect the planning boundaries of any of the area plans or the rural planning area. Furthermore, the Interconnection Project is outside of the Flagstaff Regional Plan 2020 planning boundary (Coconino County 2015:88). In general, the ASLD coordinates with jurisdictions on general and comprehensive planning efforts (Coconino County 2015:13).

The Comprehensive Plan’s Land Use and Growth chapter includes policies and goals for various land use categories, including a category called “Ranchland Land Uses.” The Comprehensive Plan states that “the intent of this land use category is for a rural lifestyle allowing for large ranches, agricultural grazing land, and open environment” (Coconino County 2015:67). The County’s stated goal for the Ranchland Land Use category is to “conserve working ranches, unfragmented landscapes, and the County’s rural

character” (Coconino County 2015:67). Additionally, the Comprehensive Plan acknowledges that “utility land uses,” including high-voltage transmission lines, are “essential for basic economic infrastructure or social purposes” (Coconino County 2015:75).

The Comprehensive Plan’s Energy chapter states that “reliable, clean energy is critical to the health, safety, and welfare of residents in Coconino County” (Coconino County 2015:169). The Comprehensive Plan includes the following policies:

- The siting of utility-scale projects and transmission lines shall consider the protection of viewsheds; the potential for noise disturbances to adjacent residential areas; the conservation of species, habitats, and water resources; the preservation of prehistoric, historic, and cultural sites; the conservation of scenic corridors; and the protection of the character of public lands. Underground collection lines are strongly encouraged. (Coconino County 2015:176)
- Utility-scale energy projects that allow for the continuation of traditional land uses such as ranching and hunting shall be preferred over projects that assume all use of the land. The ability to retain multiple uses of the land such as combining solar rooftop installations with agreements to keep ranches intact is ideal. (Coconino County 2015:176)

As described further in the exhibits of this application, the Interconnection Project is planned in a manner that minimizes impacts to biological, visual, cultural, and noise resources. Existing land use within 1-mile of the Interconnection Project is predominantly comprised of “grazing” and “utilities – under construction” (See Exhibit A-2). Areas designated as “utilities – under construction” are related to another renewable energy development on the CO Bar Ranch. Neither the Interconnection Project nor the Wind Project would interfere with or encumber ranching activities. The Interconnection Project would almost entirely parallel an existing 500-kV transmission line and would not increase residential density. Although the overall area for the Wind Project is approximately 29,106 acres, the actual wind facility disturbance footprint would be less than 5% of the total area. Therefore, the Interconnection Project will not affect the existing “rural lifestyle” of the area. No amendments to the Coconino County Comprehensive Plan are required for the Interconnection Project.

Coconino County Zoning Ordinance

The Interconnection Project is within the County’s “General” zoning district. The General zone is a rural land use designation for unincorporated areas of the county not specifically designated for any other zone classification. Construction and operation of the Interconnection Project is considered a conditionally permitted use, in accordance with the County’s conditional use permit process and utility-scale renewable energy systems ordinance. RWECE plans to apply for a conditional use permit for the Forged Ethic Wind Energy Project, including the Interconnection Project, in late summer 2023.

Literature Cited

Coconino County. 2015. *Coconino County Comprehensive Plan*. Available at:
<https://www.coconino.az.gov/DocumentCenter/View/10608/Coconino-County-Comprehensive-Plan---2017-Approval?bidId=>. Accessed May 2023.

Exhibit B – Attachment B-1

Pre-Construction Wildlife Survey Plan for the
Proposed Zeus Wind Energy Project; June 2020

Pre-Construction Wildlife Survey Plan for the Proposed Zeus Wind Energy Project

JUNE 2020

SWCA

PREPARED FOR

RWE Renewables Development, LLC

PREPARED BY

SWCA Environmental Consultants

PRE-CONSTRUCTION WILDLIFE SURVEY PLAN FOR THE PROPOSED ZEUS WIND ENERGY PROJECT

Prepared for

RWE Renewables Development, LLC
701 Brazos Street, Suite 1400
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Attn: Morgan Schwenn

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SWCA Project No. 58229

EXECUTIVE SUMMARY

RWE Renewables Development, LLC contracted SWCA Environmental Consultants in October 2019 to develop this pre-construction wildlife survey plan for the proposed Zeus Wind Energy Project, a proposed maximum 300-megawatt wind energy facility. The project would be located on privately-owned Babbitt Ranches and Arizona State Land Department Trust lands within an approximately 71,628-acre project area approximately 25 miles north of Flagstaff, in Coconino County, Arizona. The purpose of this plan is to describe the preconstruction survey methods that will be used to collect the environmental and biological information needed to assess the use by wildlife within the project area, incorporating the latest agency guidance.

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1 INTRODUCTION

RWE Renewables Development, LLC (RWE) is proposing to develop the Zeus Wind Energy Project (project), a proposed maximum 300-megawatt wind energy facility. The project would be located on privately-owned Babbitt Ranches and Arizona State Land Department Trust lands within an approximately 71,628-acre project area approximately 25 miles north of Flagstaff, in Coconino County, Arizona. (Figure 1).

The purpose of this plan is to describe the preconstruction survey methods that will be used to collect the environmental and biological information needed to assess the use by wildlife within the project area, incorporating the latest agency guidance. The surveys described herein are intended to meet the U.S. Fish and Wildlife Service's (USFWS's) Eagle Rule (USFWS 2016), *Land-Based Wind Energy Guidelines* (WEG) Tier 3 field studies (USFWS 2012), *Eagle Conservation Plan Guidance* (ECPG) Stage 2 field studies (USFWS 2013), and Arizona Game and Fish Department's (AGFD's) *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona* Chapter 3 objectives (AGFD 2012).

Field surveys further described below include:

- avian (eagle, other large bird, and small bird) use surveys;
- eagle and other raptor species nest surveys;
- bat acoustic surveys; and
- incidental wildlife observations.

2 PRE-CONSTRUCTION WILDLIFE SURVEY SCHEDULE

Table 1 presents the wildlife survey schedule.

Table 1. Proposed Pre-Construction Wildlife Survey Schedule for the Project

Survey Type	Timeframe
Eagle, large bird, and small bird use surveys	Approx. start July 2020–July 2022 (2 full years); in Year 1, surveys conducted twice per month per plot; in Year 2, small bird use surveys excluded, and eagle/large bird use surveys conducted once per month per plot
Eagle and other raptor species nest surveys	March–April; two aerial surveys during each of the 2021 and 2022 breeding seasons
Fall Raptor Migration Survey	October–September 2021
Bat acoustic surveys	March–November 2021 (i.e., spring through fall seasons); units record data daily
Incidental wildlife observations	Conducted during all wildlife-related fieldwork

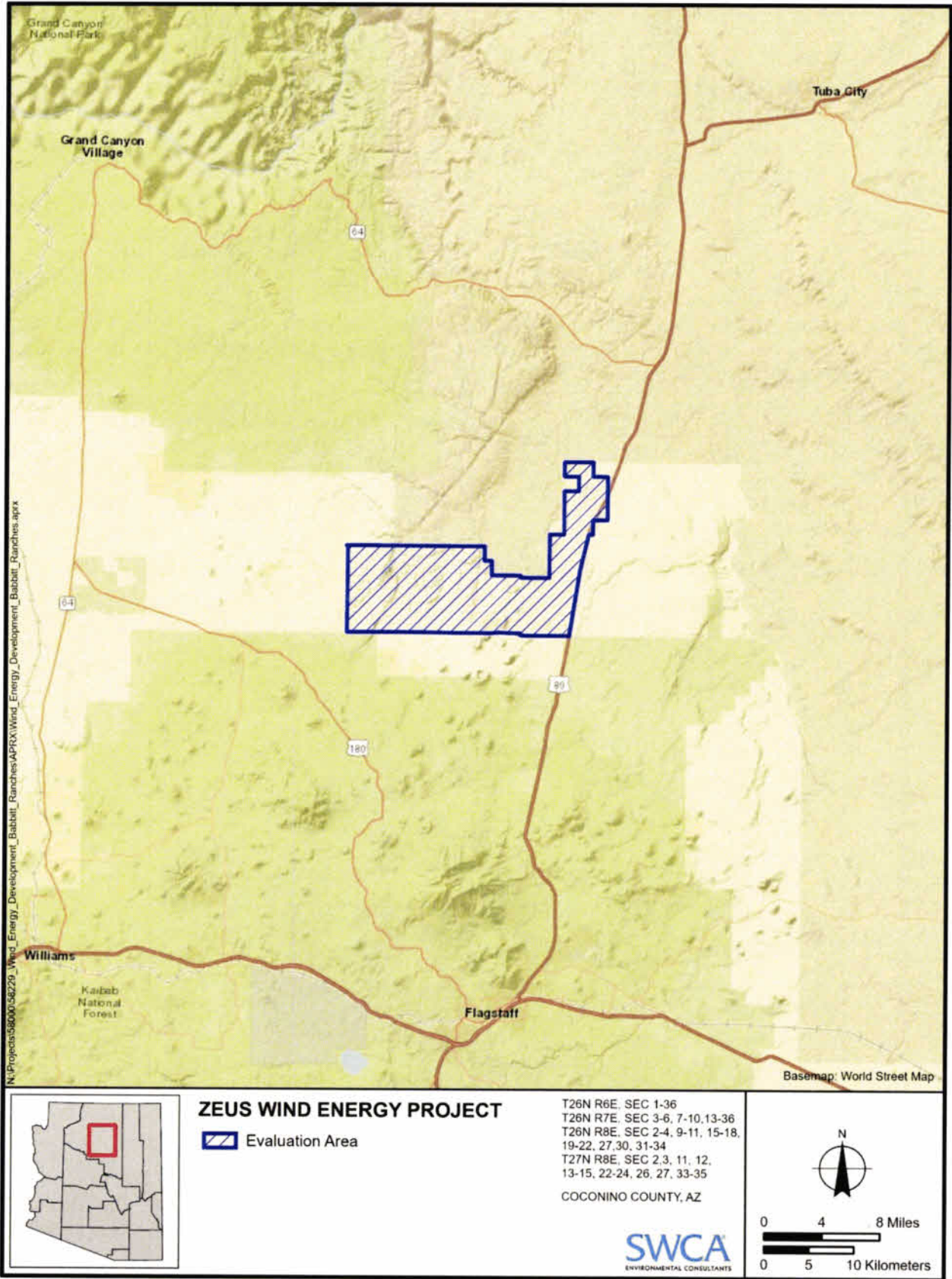


Figure 1. Project location.

3 AVIAN USE SURVEYS

3.1 Eagle and Large Bird Survey Plan

Avian use surveys will commence in approx. July 2020 and will be conducted for a full 2 years. The surveys have been designed in accordance with the Eagle Rule, which codified specific minimum standards, WEG, and ECPG.

Avian sampling plots will be comprised of 800-meter (m)-radius plots established to cover 30% of the area within 1 kilometer (km) of the turbine array design. The survey plots will be distributed to represent 1) the site spatially and 2) the varying habitat conditions (i.e., plots represent grassland/shrub-steppe and juniper (*Juniperus* sp.) habitats, water and topographic features, and potential eagle use areas [e.g., prairie dog (*Cynomys* sp.) colonies]). Within those parameters, plots will be micro-sited in the field to maximize views of the surrounding airspace.

In Year 1, each plot will be surveyed for 1 hour twice per month¹(24 sampling periods). Start times will represent all daylight hours, with each plot assigned a morning (i.e., before 10:00 a.m.) and a late morning/afternoon time slot per month. Surveyors will adhere to the schedule as logistics/weather/safety issues (e.g., lightning, visibility)² allow. Surveyors will scan for eagles and other large birds by alternating use of binoculars and unaided eye.

From the central point of each plot, surveyors will record the following data corresponding to each bird/bird group seen or heard (data form provided in Appendix A):

- Start and end time (in seconds; HH:MM:SS format) for each bird or group of birds entering/leaving the plot
- Species
- Number of birds per observation
- Distance from the observer to each bird/bird group (estimated to the nearest meter)
- Flight height (estimated to the nearest meter)
- Behavior

For each non-eagle large bird/bird group, surveyors will record distance and height measurements when first observed in the 800-m-radius plot (Reynolds et al. 1980 as cited in USFWS 2012). If a given bird/bird group is initially detected above 200 m, surveyors will also record whether the bird/bird group flew below 200 m (risk zone). For any eagles observed within the 800-m-radius × 200-m-height cylinder, surveyors will record distance, height, and behavior data by eagle-minute (i.e., eagle detection data will be partitioned into 1-minute intervals, including total flight seconds per observation)³. Perched eagles and those observed outside of the cylinder (incidental observations) will also be recorded but will be distinguished from eagles flying within the cylinder (USFWS 2013). The same data recorded for eagles observed within sampling cylinders will be recorded for incidentals.

¹ The Eagle Rule calls for each plot to be surveyed at least 1 hour once per month. The ECPG recommends 1 or 2 hours per plot per month, depending on site characterization (expected eagle use). In Year 1, each plot will be surveyed for 2 hours per month to ensure precision when calculating eagle fatality estimates.

² Per the ECPG, surveys are not conducted when visibility is <800 m horizontally and <200 m vertically.

³ Per the Eagle Rule, the height above ground level must be either 200 m or 25 m above the maximum blade reach, whichever is greater; therefore, the sampling cylinder height may be adjusted based on turbine height prior to initiation of surveys.

Surveyors will use a rangefinder, accurate to more than 800 m; printed topographic maps zoomed to each plot depicting 100-, 200-, 400-, 600-, and 800-m concentric circles; and vertical landmarks (e.g., meteorological towers and trees of known height) to estimate horizontal and vertical distances. Specific behavioral activities to be recorded will include soaring flight, unidirectional flapping-gliding, kiting-hovering, stooping/diving at prey, undulating/territorial flight, and perching (USFWS 2013). For each eagle detected, surveyors will also record the bearing to the bird, its flight direction, and sex and age class (if known) (USFWS 2013). All eagle flight paths and perch locations, in and outside of the cylinder, will be mapped on the plot-specific topographic maps and, as needed, on larger-scale site overview maps.

Surveyors will record the following weather data during each count (USFWS 2013):

- Wind direction and speed
- Cloud cover
- Precipitation
- Temperature

Surveyors will follow the same methods in Year 2; however, each plot will be surveyed once per month (12 sampling periods). To ensure start times represent all daylight hours, surveys at a given plot will alternate from morning (i.e., before 10:00 a.m.) to late morning/afternoon times, or vice versa, during successive survey periods. The project will continue to review the plot survey effort as turbine array design iterations are developed and as needed, ensuring 30% coverage of the final proposed design.

3.2 Eagle and Large Bird Data Interpretation/Analyses

Avian use count data are used to estimate the annual number of eagle collision fatalities, identify important eagle (and other species of concern) use or migration concentration areas, and, generally, to estimate the spatial distribution and relative frequency of diurnal birds using the project area (USFWS 2012, 2013).

Each eagle observed flying within the sampling area will be summarized in number of minutes, rounded to the next highest integer (e.g., an eagle observed flying within the cylinder for a given minute equals 1 exposure minute; two eagles in flight in the cylinder in a given minute [or the same eagle in flight continuing into a second 1-minute interval] equals 2 exposure minutes). The spatial and temporal distribution of eagle minutes will be summarized. Eagle minutes and total survey minutes recorded among relevant avian use counts will be used to inform a posterior probability distribution of eagle exposure to develop model-based predictions of annual eagle fatalities (Bayesian method; USFWS 2013, 2016). All eagle flight paths will be presented on a final map, with those recorded during use surveys distinguished from incidental observations.

Other compilations of the data will include:

- species composition (species list);
- relative occurrence (number of detections per guild/species in relation to total number of observations); and
- frequency (use; number of observations by group [e.g., species, guild, large bird group]/unit time [e.g., 20-minute period, 30-minute period, 1-hour period]).

Frequency data will be grouped by season, plot/group of plots (i.e., spatial distribution), and/or by risk zone (<200 m), as needed, to evaluate baseline bird activity patterns.

3.3 Small Bird Survey Plan

Small bird surveys will be conducted for one full year in Year 1, immediately prior to the large bird/eagle use counts at the same large bird/eagle plots.⁴ Small bird surveys will be excluded from the Year 2 preconstruction survey effort. The small bird surveys will be conducted for 10 minutes within a 100-m survey radius (AGFD 2012; Matsuoka et al. 2014; Ralph et al. 1995; Ralph et al. 1993; Reynolds et al. 1980). Surveyors will record the following data corresponding to each bird/bird group seen or heard:

- Species
- Number of birds per observation
- Distance from the observer to each bird/bird group (estimated to the nearest meter)
- Flight height (estimated to the nearest meter)

Distance and height measurements will be estimated using a rangefinder and vertical landmarks.

3.4 Small Bird Data Interpretation/Analyses

Compilations of the data for small bird use surveys will be similar to those reported for non-eagle large birds. Frequency data (i.e., number of observations by group/10-minute period) will be grouped by season, habitat type, plot/group of plots (i.e., spatial distribution), and/or by risk zone (<200 m), as needed, to evaluate baseline bird activity patterns.

4 EAGLE AND OTHER RAPTOR SPECIES NEST SURVEYS

4.1 Nest Survey Plan

Two consecutive breeding season, eagle-focused nest occupancy⁵ aerial surveys will be conducted. The two surveys will be timed as follows to maximize detection of eagle nest occupancy data for all eagle and potential eagle nests identified within 2 miles (USFWS 2020) of the project area:

- Survey 1 (inventory and early nest occupancy): early March, when early-nesting eagles are expected to have initiated courtship, nest maintenance/ornamentation, and incubation activities
- Survey 2 (continued inventory and late nest occupancy): April, when all nesting eagles are expected to have initiated nesting activities

As part of the second eagle nest survey in Year 1, a project proximity-focused aerial survey of non-eagle raptor species⁶ nests within 1 mile⁷ of the proposed project will be completed. The timing of the survey will be selected to maximize species identification and detection of nest occupancy of non-eagle raptor

⁴ The ECPG and AGFD (2012) recommend that the small bird counts be conducted exclusive of those for eagles and other large birds.

⁵ The term *nest occupancy* is defined as a nest in which one or more of the following occur: 1) young are raised, 2) eggs are laid, 3) an adult is observed sitting, presumably in incubation or brooding posture, in the nest, 4) two adults are observed perched on or near the nest, 5) an adult and a bird in immature plumage is observed on or near the nest, if mating behavior was observed (e.g., display flights, copulation), and/or 6) recent repairs (e.g., fresh greenery, sticks with fresh breaks), mute (i.e., whitewash), or feathers are visible at or near the nest (Driscoll 2010; Postupalsky 1974; Steenhof and Newton 2007).

⁶ Common raven (*Corvus corax*; a corvid [not a raptor]) nests are also commonly recorded using the method.

⁷ USFWS (2012) recommends surveys for raptor nests within at least 1 mile of wind turbines.

species nests. In inventorying non-eagle raptor species' nests, surveyors will use a combination of transect (in densely treed habitats, north-south transects spaced at 200-meter intervals) and strategic/targeted searches (in lightly treed habitats; e.g., searching specific trees within grassland-dominated habitats).

Survey preparation will include obtaining eagle nest location data from the landowner, Babbitt Ranches, who has been surveying for eagle nests within and out to 2 miles of the project area for the past 10 years. Coordination with AGFD will also provide general areas (4 × 4-mile blocks) and associated past occupancy/activity⁸ data for known, historical,⁹ and potential eagle breeding areas/territories¹⁰ (hereafter, territory/territories) that were previously identified during state-wide surveys. Combined, these data will provide focal areas to streamline survey effort and inform expectations (e.g., the data provide a general understanding of number of nests and nest structure condition recorded during past surveys). Project surveyors and AGFD will also coordinate in real time during the surveys to ensure that all specific known nest structures will be located.

Eagle nest survey methods will generally follow Pagel et al. (2010). The surveys will be sensitive to local nesting chronologies and disturbance at nests and will be conducted during weather conditions favorable to aerial surveys. A Bell 206L-series "Long Ranger" helicopter will be used, which allows for close approach to accurately determine nest contents (Phillips et al. 1984). The surveyors will use both a laptop with a built-in GPS unit and a handheld GPS unit to record survey tracks and nest locations. During refueling, the surveyors and pilot will further evaluate survey coverage and logistics for completing survey objectives. During all surveys, surveyors will thoroughly investigate appropriate nesting substrates in proximity to known nests and nest clusters to identify any newly built nests or nests that may have been missed during previous surveys. Surveyors will focus on locating and recording eagle nests while completing the 2-mile-radius eagle inventory surveys; however, other species' nests will be recorded incidentally.

For each nest found, surveyors recorded:

- date and time of observation;
- nest identification number;
- nest substrate (i.e., cliff, tree, transmission tower);
- nest condition and contents; and
- species, if known.

"Undetermined species" nests will include any nests that are too deteriorated to confidently identify species or that exhibit qualities characteristic of several species. For these nests, surveyors will record an informed opinion regarding which species are most likely to use the nest based on nest structure and placement (e.g., "undetermined: resembles *Buteo* spp. or golden eagle," or "undetermined: resembles *Buteo* spp. or common raven"). Species determinations will also be noted for nests being used by species that presumably did not construct them (i.e., several species are known to use heterospecific nest structures; some species, such as great horned owls do not construct their own nests). A species

⁸ An *active* nest is one in which an egg or eggs are laid and/or young are raised (Driscoll 2010; Postupalsky 1974).

⁹ Historical breeding areas/territories are those that have not been occupied by eagles in the last 10 years or more.

¹⁰ A *territory or breeding area* is an area that contains, or historically contained, one or more nests within the home range of a mated pair: a confined locality where nests are found, usually in successive years, and where no more than one pair is known to have bred at any one time (Steenhof and Newton 2007). The number of unique territories in a given area can be refined over multiple years of survey and may vary from year to year.

determination for a given nest may change after surveyors observe nest structure, contents, and species activity during repeated visits under different conditions (e.g., lighting).

The following nest conditions/contents will be recorded: 1) sticks-intact, 2) sticks-deteriorating, 3) greenery/ornamentation, 4) adult in incubation/brooding posture, and 5) number of egg(s)/nestling(s). Surveyors will photograph nests using a DSLR camera with a 100–500 mm lens and note specific nest structure characteristics and proximity of nearby nests. Following the surveys, photographs of each nest will be thoroughly examined to confirm species determinations and record evidence of nest occupancy and specific nest contents that may have been overlooked or were unclear during the aerial surveys. In accordance with Pagel et al. (2010), all recommended data fields (e.g., USFWS naming convention, territory status, nest elevation, hatch date, fledge date) for each nest will be entered into a Microsoft Access database.

In Year 2, each of the eagle and potential eagle nests identified in Year 1 will again be revisited twice (i.e., two survey periods) to document nest occupancy. The two Year 2 surveys will, again, be timed to maximize nest occupancy data. During these surveys, surveyors will again take care to thoroughly investigate appropriate nesting substrates in proximity to known nests and nest clusters to identify any newly built nests or nests that may have been missed during previous surveys.

5 FALL RAPTOR MIGRATION SURVEY

5.1 Fall Raptor Migration Survey Plan

As a first step, a 1 or 2-day field reconnaissance of the greater project area will be completed to locate two observation points (stations) where field counts of fall migrating raptors will be conducted. The two observation points/stations will be located on an east-west axis within the greater project area and will offer wide fields of view near topographic features that can potentially serve to concentrate migrant raptors. Observation points will be spaced sufficiently apart to detect all migrant raptors crossing an “east-west axis count boundary.”

Counts will be conducted using standard techniques (AGFD 2012, Bildstein et al. 2007, Dunn et al. 2008). Each point will be counted for 10 consecutive days from 9:00AM–3:00PM (6-hour period) between September 20 and October 5. Surveyors will count all raptors and map their flight paths within an unlimited plot radius (AGFD 2012). For each bird or group of birds detected, surveyors will record the species, number of individuals, distance from observer, predominant flight direction and height, behavior, and habitat. Specific behavioral activities will include soaring flight, unidirectional flapping-gliding, kiting-hovering, stooping/diving at prey, undulation/territorial flight, and perching. Flight paths and perch locations of all observed raptors will be mapped in the field and digitized in GIS. Observers will differentiate and record southbound fall migrant and resident individuals.

Weather and environmental data recorded during each count will include the following:

- Temperature
- Wind speed and direction
- Cloud cover
- Precipitation

Field personnel will consist of one observer per station (for a total of two observers), who will conduct daily field observations simultaneously. Observers will be experienced in standardized raptor count field surveys. Count days will be conducted back to back for 10 consecutive days, to the extent practicable.

5.2 Fall Raptor Migration Interpretation/Analyses

Analyses of field data will largely be based on methods used by HawkWatch International (HWI) and AGFD to allow results to be compared with existing data from other raptor migration stations in Arizona. Migration counts will assess species composition and relative abundance and determine the magnitude (number of raptors counted per hour and per day) of migrant raptor use across the sampling area. A landscape level depiction of the viewsheds at stations using Google Earth imagery will be provided. In order to compare project area data to existing HWI data, turkey vulture (*Cathartes aura*) will be excluded from fall migrant raptor species assemblage data. An overall comparison of project area data with those collected at other raptor migration stations in Arizona will be completed to ascertain the degree to which raptors potentially use the project area in the fall. Data collected will be appended to a summary report provided to AGFD to complement their statewide raptor migration dataset.

6 BAT ACOUSTIC SURVEYS

6.1 Monitoring Stations

To monitor bat activity, three acoustic bioacoustics monitoring stations will be installed in February 2021 within the project area. Monitoring stations will record data from March 1 (i.e., the beginning of the spring season) through November 30, 2021 (i.e., the end of the fall season). A MET tower station will include a high/low (45-m/5-m) ultrasonic microphone pairing (Figure 2). At this station, the microphone will be installed at approximately 45 m using a K-Bat acoustic rigging system (KB Energy), or similar. Each of the two microphones will be attached to a Song Meter SM4BAT FS (Wildlife Acoustics, Inc.) full-spectrum acoustic data collection device. Two other stations located within the project area will include a low (5-m) mount attached to the same detector type; both stations will be placed at water features (e.g., a seasonally wet stock tanks). Together, the three stations will represent varying use by bats at the site. The project will coordinate with AGFD to determine the locations of the two low mount stations. Surveyors conducting avian use counts will collect data cards and replace batteries twice per month throughout the monitoring period.

6.2 Bat Data Interpretation/Analysis

Calls will be analyzed using bat call identification software (Kaleidoscope) for filtering and analyzing full-spectrum bat call data. Compilations of the data will include:

- species or species/bat frequency (e.g., 25 kilohertz [kHz], 40 kHz) group composition (species/frequency group list);
- bat passes per detector-night (index of activity) by group (i.e., species, frequency group); and
- percentage of species/species group activity (bat passes by species/species group in relation to total number).

A bat pass is defined as at least one echolocation pulse separated by more than 1 second from the next pulse. This index of activity will be grouped by hour and season (i.e., temporal distribution) and

monitoring station (i.e., vertical and horizontal spatial distribution), as needed, to evaluate baseline patterns of bat activity.

7 INCIDENTAL WILDLIFE OBSERVATIONS

In an effort to collect data pertinent to potential eagle use and general wildlife use of the site, surveyors traveling on-site while conducting the above tasks, while conducting turbine micro-siting activities, and other project surveys (e.g., cultural resources surveys) have and will continue to record:

- eagle flight paths and perch locations (for eagles detected while conducting activities [e.g., driving on site] unrelated to eagle use counts);¹¹
- active prairie dog locations and occupied burrows;
- burrowing owl locations and active/potentially active owl burrows;
- large carrion (e.g., dead cows, dead elk [*Cervus elaphus*]);
- pronghorn (*Antilocapra americana*) and elk;
- bird nests
- bird concentrations (i.e., flocks, migration events, waterfowl use of the site's water features); and
- a running list of bird species seen and heard.

¹¹ Eagle flight paths will also be mapped during the standardized eagle and other large bird use surveys; they are distinguished from those recorded incidentally (see Section 3.2).

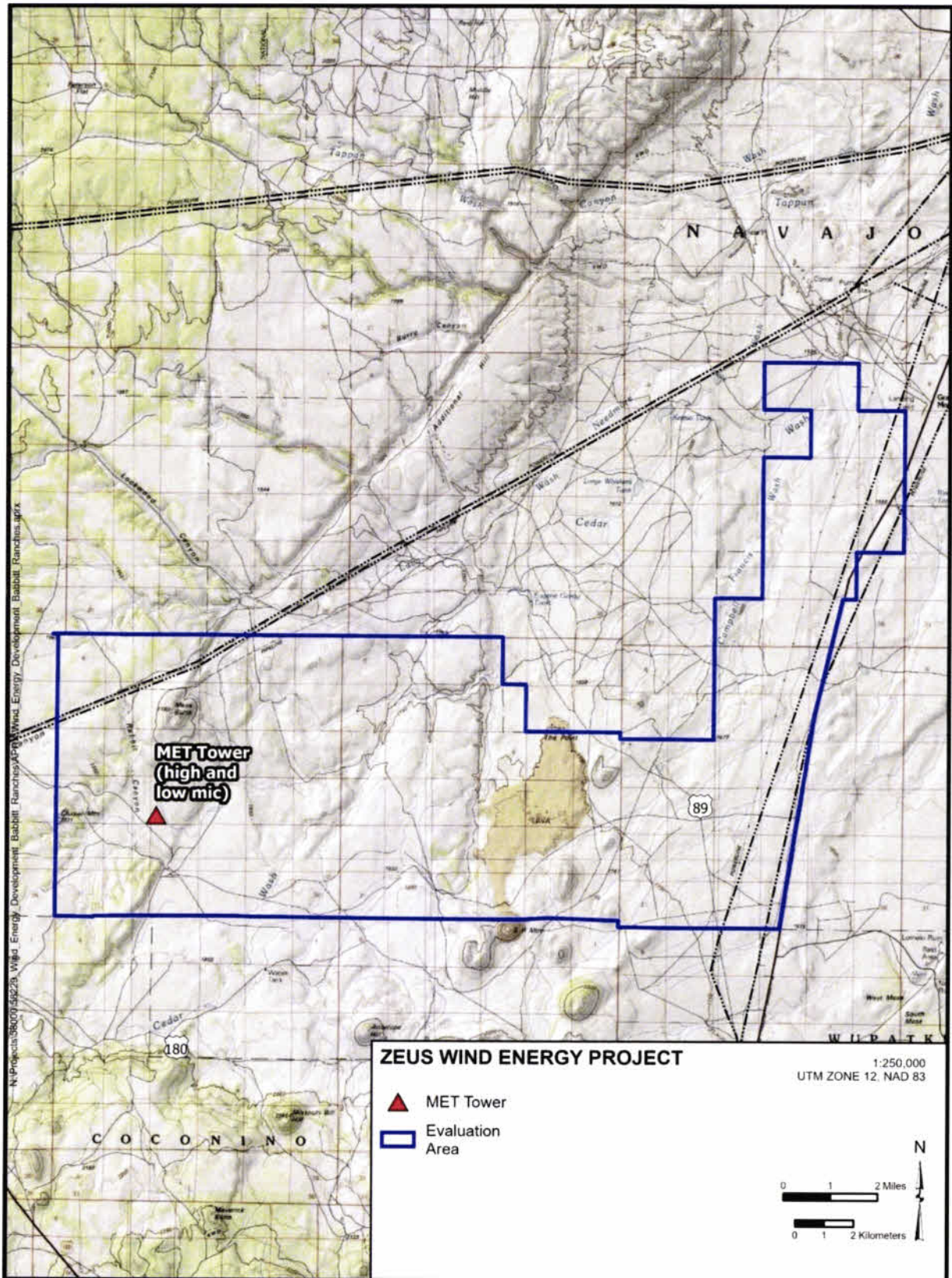


Figure 2. MET Tower bat acoustic monitoring station location (paired array; high and low microphone).

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APPENDIX A

Avian Use Count Data Forms and Example Eagle Flight Path Map

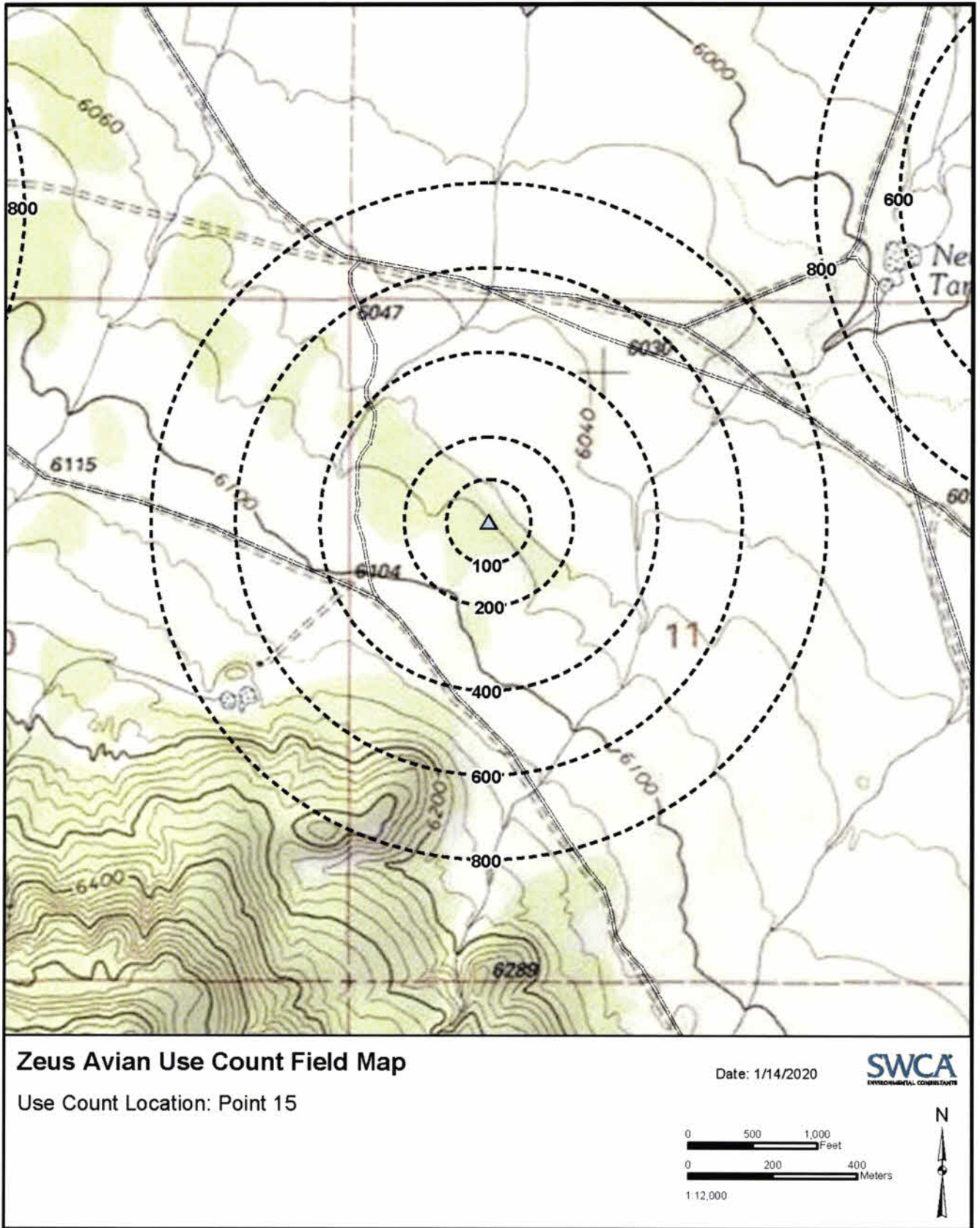


Figure A-1. Example eagle flight path map.

Exhibit B – Attachment B-2

Raptor Migration Surveys for the
Proposed Zeus Wind Energy Project, 2021; January 2022

Raptor Migration Surveys for the Proposed Zeus Wind Energy Project, 2021

JANUARY 2022

SWCA

PREPARED FOR
RWE Renewables Americas, LLC

PREPARED BY
SWCA Environmental Consultants

RAPTOR MIGRATION SURVEYS FOR THE PROPOSED ZEUS WIND ENERGY PROJECT, 2021

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January 2022

EXECUTIVE SUMMARY

RWE Renewables Americas, LLC is proposing to develop the Zeus Wind Energy Project, a wind energy facility approximately 40 km (24.9 mi) north of Flagstaff in Coconino County, Arizona. As part of pre-construction surveys for the proposed project, SWCA Environmental Consultants conducted migration counts for raptors in September and October 2021. This report presents the results of these migration count surveys. Two observation locations, Zeus West and Zeus East, were surveyed for 10 days between September 20 and October 1, 2021. In total, surveys were conducted for over 116 hours across both locations. Eleven raptor species and one vulture species were detected for a combined 2.5 birds per hour. The Zeus West location had more birds per hour than the Zeus East location (3.2 versus 1.8, respectively). The most common species was turkey vulture (*Cathartes aura*, 0.7 birds per hour, 27% of all observations), with *Accipiter* species the most common family (0.7 birds per hour, 30% of all observations). The highest number of migrants was recorded during the 1000 and 1200 hours of the survey day. There were slightly more observations of birds that flew in the low flight height category and those that only flew in the high flight height category. Counts of birds per hour at both locations were lower than those reported from other raptor migration count locations in northern Arizona.

Additional detailed key findings and interpretation are provided within the report.

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1 INTRODUCTION

RWE Renewables Americas, LLC is proposing to develop the Zeus Wind Energy Project, a 300-megawatt nameplate capacity wind energy facility. The project would be located on private and state land within a 14,330-ha (35,409-ac) analysis area approximately 40 km (24.9 mi) north of Flagstaff, Arizona (Figure 1). Within the analysis area, RWE has identified a 7,201-ha (17,793-ac) buildable area.

In accordance with recommendations in the Arizona Game and Fish Department's (AGFD's) *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona* (AGFD 2012) and the U.S. Fish and Wildlife Service's (USFWS's) *Land-Based Wind Energy Guidelines* for Tier 3 field studies (USFWS 2012), SWCA Environmental Consultants (SWCA) conducted fall raptor migration counts between September 20 and October 1, 2021. The objective of the count was to conduct a pilot study of raptor migration activity within the analysis area and compare migration rates to other count locations in the region. SWCA aimed to document migration rates, species composition, and patterns of migratory raptor and vulture activity within the analysis area. This report presents the results of this pilot study.

1.1 Environmental Setting

The analysis area is located in the high, semiarid plateau country of north-central Arizona and includes portions of the San Francisco Volcanic Field. Topographically, the area is characterized by flat to rolling plains cut by shallow canyons, low mesas and escarpments formed by lava flows, and small cinder cones at elevations between approximately 1,676 and 2,012 m (5,500 and 6,600 ft) above mean sea level. Notable landforms include Lockwood Canyon, a shallow canyon (approximately 45 m [147.6 ft] deep) with gently to moderately sloping walls. The analysis area wraps around, but does not include, Mesa Butte, a prominent cinder cone that rises some 200 m (656.2 ft) above the surrounding terrain (see Figure 1). The Little Colorado River is approximately 30 km to 40 km (18.6 to 24.8 mi) east of the analysis area, and the Grand Canyon is approximately 30 km (18.6 mi) to the northwest.

The climate in the region is generally warm and dry. Summer daytime temperatures can exceed 37.8 degrees C (100 degrees F) but are normally more moderate, while winter nighttime temperatures drop below freezing (Thybonny and Thomas 1998). Annual precipitation averages 25–36 cm (10–14 in), with about half of precipitation totals occurring in July, August, and September.

The analysis area falls within the Arizona/New Mexico Mountains Level III ecoregion (U.S. Environmental Protection Agency 2011). Vegetation largely consists of Intermountain Basins Semi-Desert Shrub-Steppe, Inter-Mountain Basins Semi-Desert Grassland, and Colorado Plateau Pinyon-Juniper Woodland cover types (U.S. Geological Survey 2016). The tree layer, where present, is dominated by twoneedle pinyon (*Pinus edulis*) and oneseed juniper (*Juniperus monosperma*). Land uses include cattle ranching/grazing and outdoor recreation. Existing modifications include facilities associated with ranching (i.e., access roads, outbuildings, corrals). Earthen and metal stock tanks provide the only surface water other than ephemeral washes.

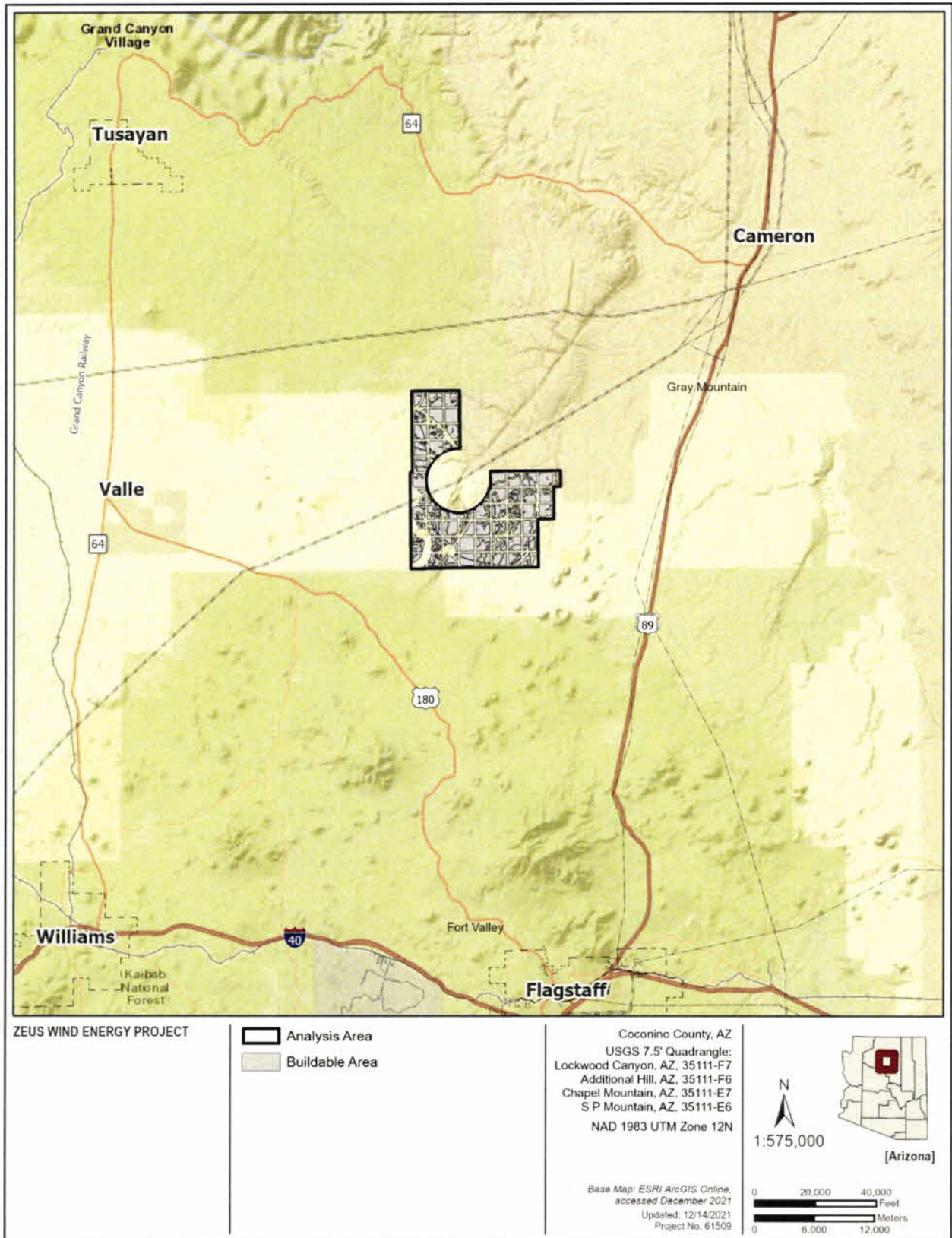


Figure 1. Project location showing the analysis area and buildable area.

2 METHODS

2.1 Surveys

Two observation points were selected with good northern viewsheds, one on the eastern side of the analysis area and one on the western side (Figure 2). Counts were conducted for six hours (weather permitting) roughly between 0900 hours and 1500 hours for 10 days between September 20 and October 1, 2021, following standard migration counting procedures (AGFD 2012; Dunn et al. 2008; Bildstein et al. 2007). Counts were conducted simultaneously at the two observation points, with one observer at each location. To control for observer bias, counts were conducted by a rotation of five different observers. General survey data recorded for each survey hour included weather data, predominant flight direction, and observation time in minutes (see Appendix A for data sheet). Weather data included temperature, wind speed (average and maximum) and wind direction, cloud cover, visibility distance, precipitation, and barometric pressure. Weather data were recorded using a compass along with a Kestrel Pocket Weather Meter Model 2500 (Nielsen-Kellerman Company, Boothwyn, PA).

All observed birds were classified as either migratory or non-migratory, and data were recorded accordingly. Migratory birds were those individuals that exhibited predominantly southward and uninterrupted flight. Birds that exhibited non-migration behaviors such as extended periods of perching or hunting behaviors, or whose flight paths were not in predominantly uninterrupted, southward directions, were considered non-migrants and recorded separately. Additionally, flight paths of all eagles were recorded and will be presented in a separate report.

2.1.1 *Migratory Bird Data*

Data recorded for migratory birds included hourly counts per species within categorical flight heights above the ground and categorical horizontal distances from the observation point. Flight heights were recorded as the lowest flight height observed and placed into one of three categories: 200 m (219 yards) or less above the ground, between 200 m and 250 m (273 yards) above the ground, or over 250 m above the ground. Horizontal distances were recorded as the closest distance a bird came to the observation point and placed into one of two categories: 800 m (875 yards) or less from the observation point or greater than 800 m from the point. Surveyors used a laser rangefinder (Nikon ProStaff 1000 Laser Rangefinder, Nikon, Inc., Melville, NY) accurate to more than 800 m (875 yards) to help determine distances.

2.1.2 *Non-migratory Bird Data*

Data recorded for each non-migrant included time of observation, duration of observation, species, age, count, categorical flight height, categorical horizontal distance from the observation point, general habitat the bird was flying over or perching within, and behavior. The flight height and horizontal distance categories were the same as those described above for migratory birds.

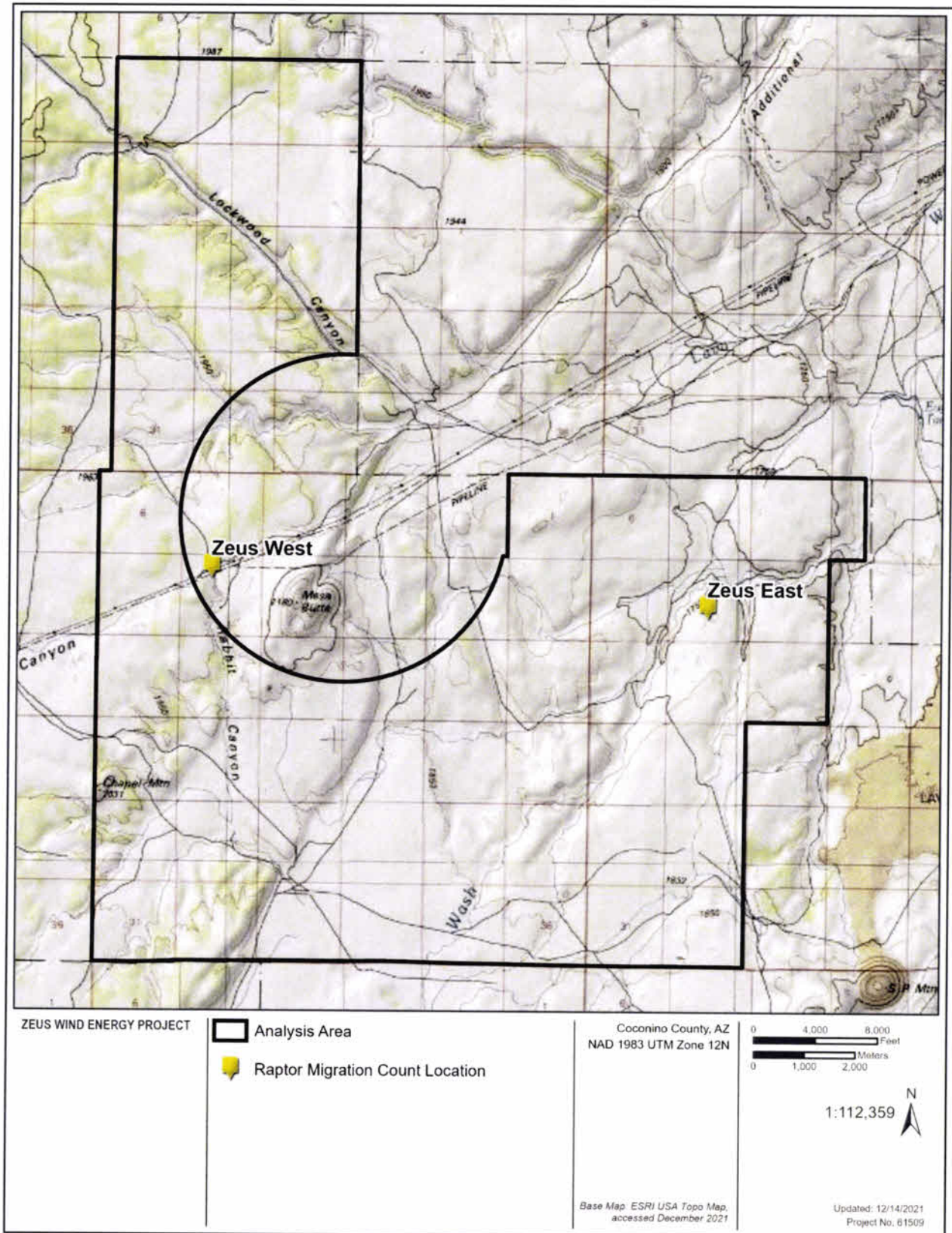


Figure 2. Raptor migration observation locations within the Zeus Wind Energy Project analysis area, Coconino County, Arizona.

2.2 Analysis

Weather variables were summarized to depict the average weather conditions over the 10 surveys during the 12-day survey period. For migratory birds, the number of birds per hour was calculated overall and for each species. Birds per hour was then compared across weather variables, between the two observation points, across time of day, and between flight heights. Five weather variables (wind speed, barometric pressure, cloud cover, and temperature) were used in stepwise model selection using an additive generalized linear model (GLM) to determine which were most influential on the number of birds per hour. The number of non-migrants was summarized by the number and duration of observations, and then compared across flight height categories and behaviors.

3 RESULTS

3.1 Survey Effort

Surveys were conducted by a single observer at both observation points for 10 days for a total of 116.7 hours (Table 1), approximately between the hours of 0900 and 1500 each day. A total of five different observers conducted the surveys, rotating between the two observation points each day to minimize observer bias.

Table 1. Survey effort (observation hours) across both observation points at the proposed Zeus Wind Energy Project, September–October 2021

Date	Zeus East Hours	Zeus West Hours	Total Hours
9/20/2021	6.0	5.8	11.8
9/21/2021	6.0	6.0	12.0
9/22/2021	6.0	5.9	11.9
9/23/2021	6.0	6.0	12.0
9/24/2021	6.0	6.0	12.0
9/25/2021	6.0	--	6.0
9/27/2021	5.8	4.9	10.7
9/28/2021	5.8	5.9	11.7
9/29/2021	5.8	5.8	11.6
9/30/2021	5.0	6.0	11.0
10/1/2021	--	6.0	6.0
Total	58.4	58.3	116.7

3.2 Weather Summary

The weather was generally fine for surveying, and although there were some afternoon rain events that caused observers to halt surveys (see Table 1 for survey length breakdown). Visibility was unlimited 79% of the time. Skies were more often clear ($\leq 10\%$ cloud cover 40% of the time) than totally cloudy ($\geq 90\%$ cloud cover 4% of the time), but some clouds were often present. No precipitation was recorded 92% of the time. Temperature during surveys ranged between 11.5 and 31.5 degrees C (52.7 and 88.7 degrees F),

with a mean (\pm SE) of 21.2 ± 0.4 degrees C (70.2 ± 0.7 degrees F). Barometric pressure ranged from 23.72 to 24.67 inHg, with a mean (\pm SE) of 24.16 ± 0.02 inHg. Wind speeds ranged from 0 to 30 km/hr (0 to 18.6 mi/hr), although wind speeds averaged ≤ 10 km/hr (6.2 mi/hr) 76% of the time. The wind direction was relatively split between the west (20% of the time at Zeus East and 25% of the time at Zeus West), the northeast (39% of the time at Zeus East and 19% of the time at Zeus West), and the east (11% of the time at Zeus East and 23% of the time at Zeus West) (Figure 3).

When comparing the number of birds per time observed in each survey hour with five weather variables (wind direction, wind speed, barometric pressure, cloud cover, and temperature), wind direction, temperature, and barometric pressure were the most important weather variables (GLM model results not reported). Birds per hour increased with decreasing temperature and barometric pressure, which possibly indicates an increase in migration during related weather patterns. Birds per hour also increased with wind direction measured in compass degrees and was generally highest with winds from the south and west (see Figure 3).

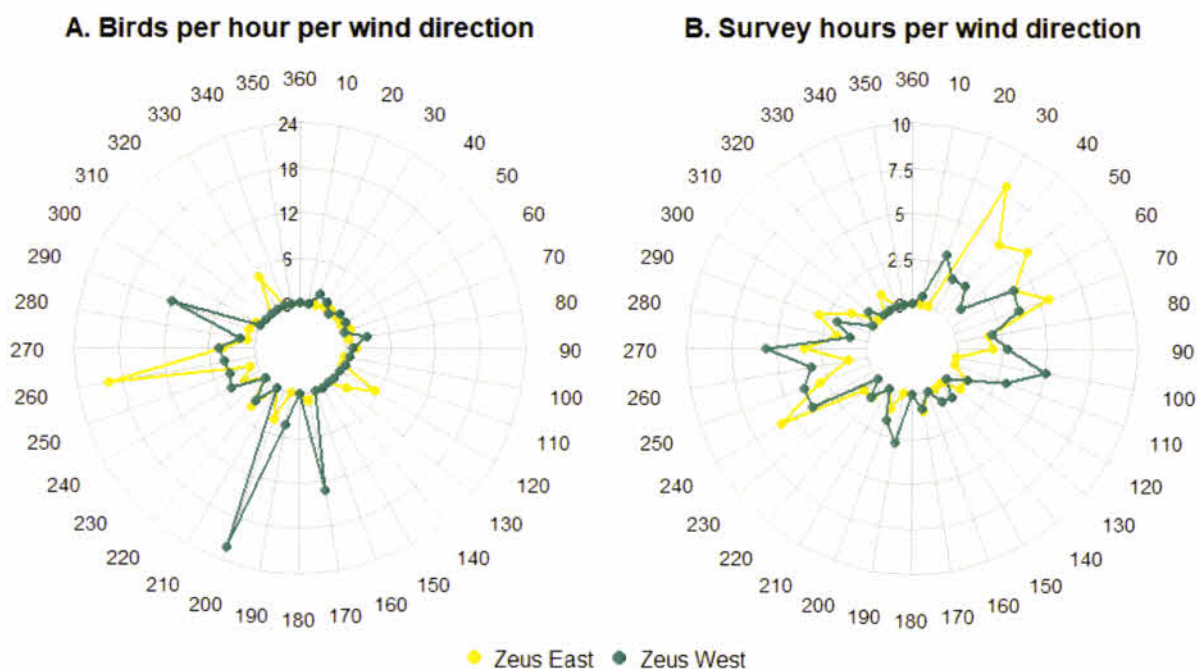


Figure 3. Number of birds per hour per wind direction (A) and number of hours surveyed per wind direction (B), both summarized by 10-degree compass direction increments, at the proposed Zeus Wind Energy Project, September–October 2021.

3.3 Migrant Results

Observers recorded 11 raptor species and one vulture species during the migration surveys (Table 2). Overall, observers recorded 2.5 birds per hour, with a higher amount at the Zeus West observation point than at Zeus East (3.2 birds per hour compared with 1.8, respectively). *Accipiter* species were the most common migrant observed (0.73 birds per hour, 30% of all observations), followed by vultures (specifically turkey vultures [*Cathartes aura*]; 0.68 birds per hour, 27% of all observations) and *Buteo* species (0.56 birds per hour, 23% of all observations) (see Table 2, Figure 4). A few migrant golden eagles (*Aquila chrysaetos*) and bald eagles (*Haliaeetus leucocephalus*) were observed, mostly at the Zeus West observation point.

Table 2. Birds per Hour (with raw observation counts [# obs] in parenthesis) at the proposed Zeus Wind Energy Project, September–October 2021

Family	Common Name	Zeus East birds/hr (# obs)	Zeus West birds/hr (# obs)	Total birds/hr (# obs)
	Cooper's Hawk	0.09 (5)	0.48 (28)	0.28 (33)
	Northern Goshawk	0 (0)	0.02 (1)	0.01 (1)
Accipiters	Sharp-shinned Hawk	0.17 (10)	0.33 (19)	0.25 (29)
	Unidentified/Unknown Accipiter	0.02 (1)	0.36 (21)	0.19 (22)
	Total Accipiters	0.27 (16)	1.18 (69)	0.73 (85)
	Red-tailed Hawk	0.33 (19)	0.38 (22)	0.35 (41)
	Swainson's Hawk	0.02 (1)	0 (0)	0.01 (1)
Buteos	Unidentified/Unknown Buteo	0.22 (13)	0.17 (10)	0.2 (23)
	Total Buteos	0.57 (33)	0.55 (32)	0.56 (65)
	Bald Eagle	0 (0)	0.03 (2)	0.02 (2)
Eagles	Golden Eagle	0.02 (1)	0.03 (2)	0.03 (3)
	Total Eagles	0.02 (1)	0.07 (4)	0.04 (5)
	American Kestrel	0.14 (8)	0.15 (9)	0.15 (17)
	Merlin	0 (0)	0.02 (1)	0.01 (1)
Falcons	Peregrine Falcon	0 (0)	0.03 (2)	0.02 (2)
	Unidentified/Unknown Falcon	0.05 (3)	0.05 (3)	0.05 (6)
	Total Falcons	0.19 (11)	0.26 (15)	0.22 (26)
	Northern Harrier	0.03 (2)	0.03 (2)	0.03 (4)
Other	Total Other	0.03 (2)	0.03 (2)	0.03 (4)
	Turkey Vulture	0.43 (25)	0.93 (54)	0.68 (79)
Vultures	Total Vultures	0.43 (25)	0.93 (54)	0.68 (79)
	Unidentified/Unknown Raptor	0.24 (14)	0.17 (10)	0.21 (24)
Unknown	Total Unknown	0.24 (14)	0.17 (10)	0.21 (24)
Overall	Total	1.75 (102)	3.19 (186)	2.47 (288)

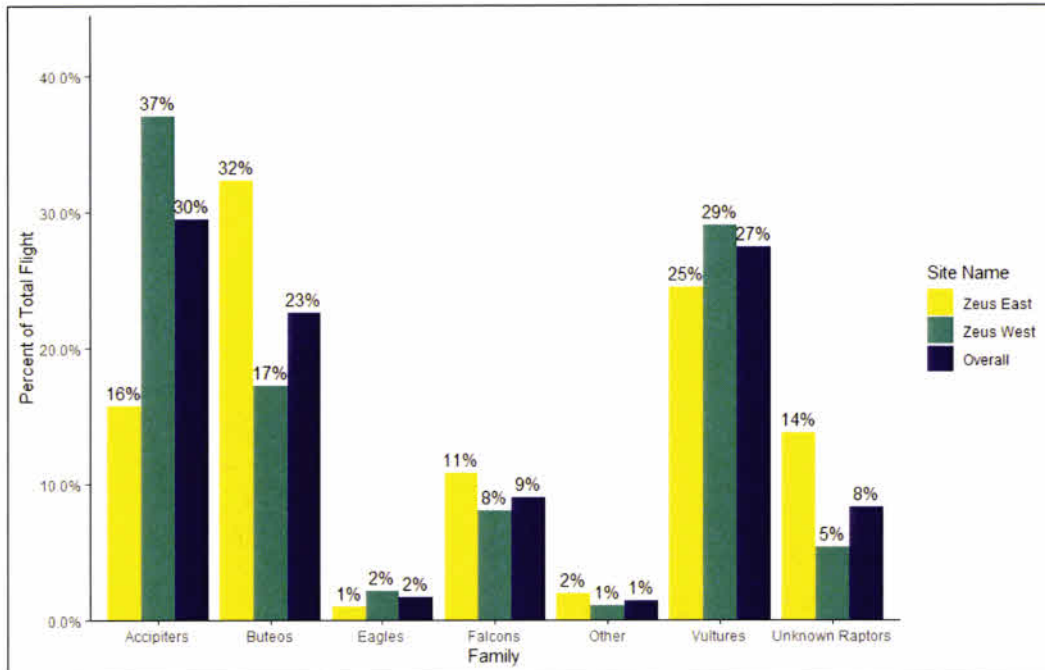


Figure 4. Relative abundance of migrating raptor and similar families at the proposed Zeus Wind Energy Project, September–October 2021.

Generally, more birds per hour were recorded during the morning survey hours compared with the afternoon (Figure 5). On average, there was a double peak in the number of birds per hour, first in the 1000 and then in the 1200 hour of the day. After noon, there were declines in birds per hour at both observation points through the end of the survey day (through the 1400 hour).

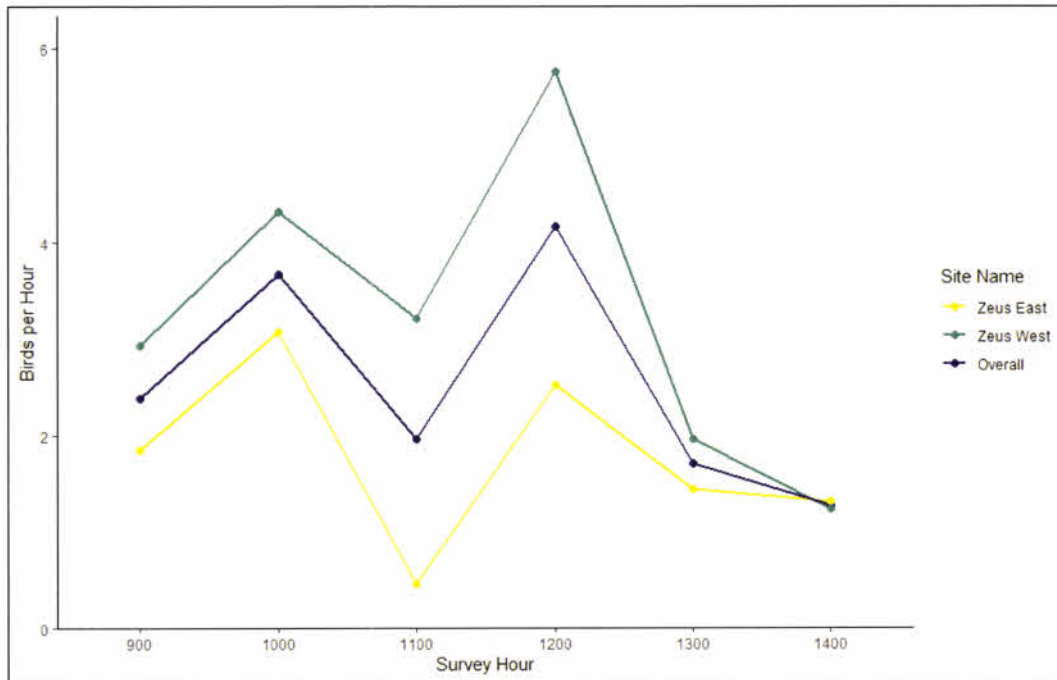


Figure 5. The number of migrating birds observed per hour for each survey hour (survey hour represents time of day at the start of the hour) at the proposed Zeus Wind Energy Project, September–October 2021.

Slightly more numbers of birds per hour were recorded with flight heights that went below 200 m (219 yards) above the ground as were recorded above 250 m (273 yards) above the ground (1.3 birds per hour and 0.9 birds per hour, respectively; Figure 6). A proportional number of birds per hour was recorded in the middle 200 m to 250 m flight height category as well, given the small vertical range of this category (0.3 birds per hour).

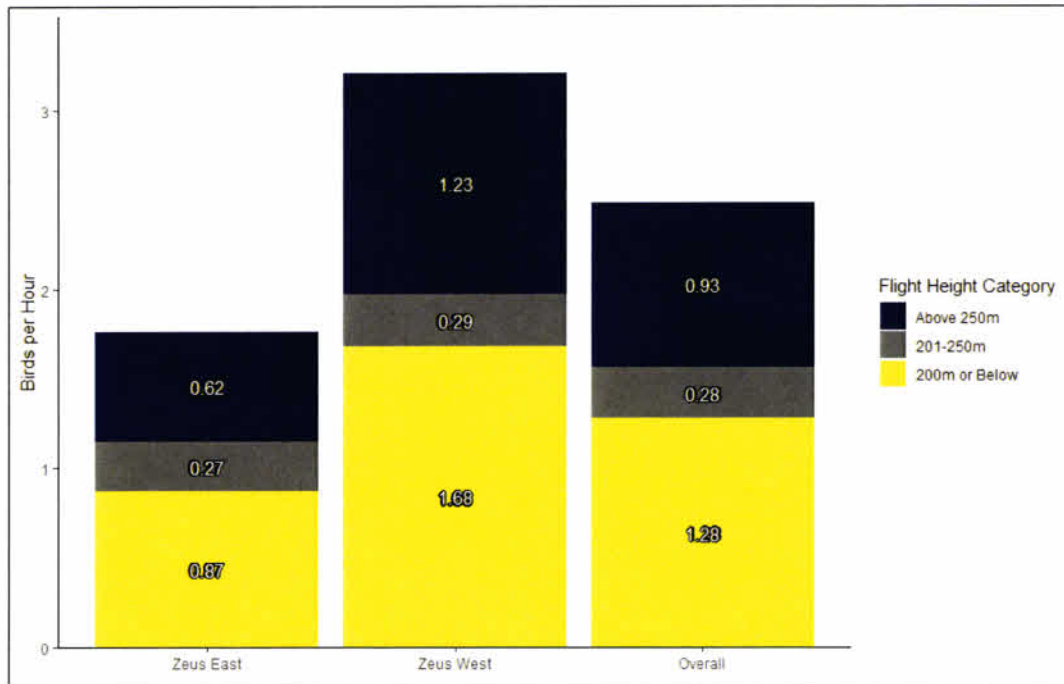


Figure 6. Number of birds per hour observed within three flight height categories at the proposed Zeus Wind Energy Project, September–October 2021.

3.4 Non-migrant Results

A total of 95 non-migrant birds were observed, for a total duration of 359 minutes (Table 3). The most observed species was red-tailed hawk (*Buteo jamaicensis*; 32 observations). Most non-migrants flew within the lowest flight height category of 200 m (219 yards) or less above the ground (78% of observations). The most common behaviors assigned to non-migrant observations were flying and soaring (45% and 35% of observations, respectively), although several perched and several hunting observations were made (12 and 7 observations, respectively, for a combined 20% of observations).

Table 3. Non-migrant birds observed (with duration in minutes in parenthesis) at the proposed Zeus Wind Energy Project, September–October 2021.

Family	Common Name	Zeus East birds (# min)	Zeus West birds (# min)	Total birds (# min)
Buteos	Ferruginous Hawk	1 (2)	0 (0)	1 (2)
	Red-tailed Hawk	17 (60)	15 (53)	32 (113)
	Unidentified/Unknown Buteo	1 (3)	1 (1)	2 (4)
	Total Buteos	19 (65)	16 (54)	35 (119)
Eagles	Golden Eagle	15 (89)	6 (16)	21 (105)
	Total Eagles	15 (89)	6 (16)	21 (105)
Falcons	American Kestrel	5 (44)	15 (75)	20 (119)
	Total Falcons	5 (44)	15 (75)	20 (119)
Vultures	Turkey Vulture	2 (1)	15 (13)	17 (14)
	Total Vultures	2 (1)	15 (13)	17 (14)
Unknown	Unidentified/Unknown Raptor	2 (2)	0 (0)	2 (2)
	Total Unknown	2 (2)	0 (0)	2 (2)
Overall	Total	43 (201)	52 (158)	95 (359)

4 DISCUSSION

Compared with other raptor migration observation locations in northern Arizona, both Zeus East and Zeus West were lower in the number of birds per hour recorded. For example, HawkWatch International has a long-term monitoring point located at Yaki Point in Grand Canyon National Park (approximately 35 miles to the northwest). The overall number of birds per hour at Yaki Point for each season between 2015 and 2019 ranged between 6.4 and 12.8 birds per hour (Appendix B; Oleyar and Watson 2020; Oleyar 2019; Oleyar and Watson 2018). As vultures were not counted at Yaki Point, these overall averages are approximately three to ten times higher than what was recorded at our two locations when vultures are excluded (1.32 and 2.26 birds per hour at Zeus East and Zeus West, respectively).

At an observation point located on the Aubrey cliffs about 113 km (70 mi) to the southwest, the overall number of birds per hour for an entire count season ranged between 3.7 birds per hour in 2012 to 6.1 birds per hour in 2011 (Jacobson and McCarty 2013; Jacobson et al. 2014; Kraft, et al. 2012). This location was surveyed from September 1 through October 31 in 2011–2013, and lower numbers of migrating birds were detected in October compared with September. The overall number of birds per hour was approximately five to nine times higher at Aubrey cliffs compared with our two locations when only using survey data collected during similar survey dates (September 20 through September 29) to our

study (15.3 birds per hour at Aubrey cliffs compared with 1.75 and 3.19 birds per hour at Zeus East and Zeus West, respectively; K. Jacobson, Arizona Game and Fish Department, personal communication).

5 KEY FINDINGS

- Over 116 survey hours were conducted across the two observation locations for an overall total of 2.5 birds per hour (1.8 birds per hour at Zeus East and 3.2 birds per hour at Zeus West).
- The most numerous species was turkey vulture (0.7 birds per hour), while the most numerous raptor species were red-tailed hawk (0.4 birds per hour), Cooper's hawk (*Accipiter cooperii*, 0.3 birds per hour), and sharp-shinned hawk (*Accipiter striatus*, 0.3 birds per hour).
- Survey hours with winds from southwesterly directions had higher numbers of birds per hour, and the peak number of birds per hour was during the 1000 and 1200 hours during the day. This is similar to what was found over three seasons at a count location on Aubrey cliffs, Arizona.
- Generally fewer birds per hour were recorded at Zeus East and Zeus West than at other nearby migration count locations.

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APPENDIX A
Data Sheet

Date:

	TIME (military)	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17
3)	Wind Speed Ave. (mph)									
4)	Wind Speed Max (mph)									
5)	Wind Direction (compass degree From)									
6)	Temp. (Deg. F)									
7)	Cloud Cover (%)									
8)	Visibility (km)									
9)	Precipitation code									
10)	Bar. Pressure									
11)	Flight Direction									
12)	No. of Observers									
13)	Obs. Time (min)									

Raptor Migration Datasheet (front page):

1) Height. Enter only the number seen (*no zeros*) for each species of migrant as described below:

L = Lowest flight height was 200m or less above the ground.

M = Lowest flight height was predominantly between 201m and 250m above the ground.

H = Lowest flight height was over 250m above the ground.

* = In addition to the L, M, or H totals, record the number of migrants that passed within 800m horizontal distance of the observation point in the column marked by an asterisk. This will be a sub-sample of those other 3 columns.

2) Species. TUVU=turkey vulture; OSPR=osprey; NOHA=northern harrier; SSHA=sharp-shinned hawk; COHA=Cooper's hawk; NOGO=northern goshawk; RTHA= red-tailed hawk; SWHA=Swainson's hawk; FEHA=ferruginous hawk; ZTHA=Zone-tailed hawk; BWAH=broad-winged hawk; GOEA=golden eagle; BAEA=bald eagle; AMKE=American kestrel; MERL=merlin; PRFA=prairie falcon; PEFA=peregrine falcon; UA=unidentified *Accipiter*; UB= unidentified *Buteo*; UE= unidentified eagle; UF= unidentified falcon; UR= unidentified raptor.

Weather and observation codes: For weather, record data only at the start of each hour of observation.

- 3) Wind Speed Ave. Record the average measured wind speed in mph by holding the kestrel into the wind for 1-2 min.
- 4) Wind Speed Max. Record the maximum measured wind speed in mph by holding the kestrel into the wind for 1-2 min.
- 5) Wind Direction. Enter the predominant compass direction from which the wind is coming, i.e., 35, 110, 300, etc.
- 6) Temperature. Record temperature in degrees Fahrenheit, placing kestrel unit out of direct sun or wind before taking the reading.
- 7) Cloud Cover. Record percent of sky with background cloud cover.
- 8) Visibility. Judge from your longest view and enter distance in kilometers (Note: 1 mile = 1.61 kilometers). Can enter 'unlimited' if view is not impeded.
- 9) Precipitation. Record code: 0 = none, 1 = Haze or Fog, 2 = Drizzle, 3 = Rain, 4 = Thunderstorm, 5 = Snow, 6 = wind driven dust, sand or snow.
- 10) Barometric Pressure. Record barometric pressure in inches.
- 11) Flight Direction. If migrants were detected for the hour, then enter the predominant compass direction migrants were heading toward, i.e., S, SSW, etc.
- 12) No. of Observers: Number of observers actively contributing to the count for the hour noted.
- 13) Observation time: Specify the number of minutes of observation during the hour noted.

RAPTOR MIGRATION TALLY SHEET

DATE: _____ LOCATION: _____

TIME	8-9				9-10				10-11				11-12			
Flight Height	L ¹	M	H	*	L	M	H	*	L	M	H	*	L	M	H	*
SSHA ²																

TIME	12-13				13-14				14-15				15-16			
Flight Height	L ¹	M	H	*	L	M	H	*	L	M	H	*	L	M	H	*
SSHA ²																

¹L = lowest height 200m or less above ground; M =lowest height 201-250m above ground; H = lowest height >250m above ground.
 *=birds also came within 800m of the observation point (this column is a sub-set of the L, M, and H columns).

²TUVU=turkey vulture; OSPR=osprey; NOHA=northern harrier; SSHA=sharp-shinned hawk; COHA=Cooper’s hawk; BWHA=broad-winged hawk; SWHA=Swainson’s hawk; RTHA= red-tailed hawk; FEHA=ferruginous hawk; ZTHA=Zone-tailed hawk; GOEA=golden eagle; BAEA=bald eagle; AMKE=American kestrel; MERL=merlin; PRFA=prairie falcon; PEFA=peregrine falcon; UA=unidentified *Accipiter*; UB=unidentified *Buteo*; UE= unidentified eagle; UF= unidentified falcon; UR= unidentified raptor.

APPENDIX B

Yaki Point Migratory Raptor Survey Summary

Table B-1. Birds per Hour (with raw observation counts in parenthesis) at the proposed Zeus Wind Energy Project, September–October 2021 and at HawkWatch International's Yaki Point hawk watch station between 2015 and 2019.

Family	Common Name	Zeus East birds/hr (# obs)	Zeus West birds/hr (# obs)	Total birds/hr (# obs)	Yaki Pt 2015* birds/hr (# obs)	Yaki Pt 2016* birds/hr (# obs)	Yaki Pt 2017* birds/hr (# obs)	Yaki Pt 2018* birds/hr (# obs)	Yaki Pt 2019* birds/hr (# obs)
	Cooper's Hawk	0.09 (5)	0.48 (28)	0.28 (33)	2.71 (1,538)	2.11 (1,247)	1.28 (761)	1.27 (691)	1.07 (598)
	Northern Goshawk	0 (0)	0.02 (1)	0.01 (1)	0.01 (3)	0.02 (10)	0.01 (5)	0.02 (13)	0.03 (14)
Accipiters	Sharp-shinned Hawk	0.17 (10)	0.33 (19)	0.25 (29)	3.89 (2,209)	2.84 (1,675)	2.07 (1,234)	1.99 (1,083)	1.93 (1,079)
	Unidentified/Unknown Accipiter	0.02 (1)	0.36 (21)	0.19 (22)	1.28 (728)	0.64 (377)	0.22 (133)	0.57 (308)	0.74 (415)
	Total Accipiters	0.27 (16)	1.18 (69)	0.73 (85)	7.88 (4,478)	5.6 (3,309)	3.58 (2,133)	3.85 (2,095)	3.77 (2,106)
	Broad-winged Hawk	0 (0)	0 (0)	0 (0)	0.08 (47)	0.06 (37)	0.05 (31)	0.02 (13)	0.03 (19)
	Ferruginous Hawk	0 (0)	0 (0)	0 (0)	0.01 (8)	0.02 (10)	0.01 (4)	0 (2)	0.01 (4)
	Red-shouldered Hawk	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)
	Red-tailed Hawk	0.33 (19)	0.38 (22)	0.35 (41)	3.03 (1,723)	2.56 (1,511)	2.17 (1,291)	1.58 (860)	1.65 (921)
Buteos	Rough-legged Hawk	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)
	Swainson's Hawk	0.02 (1)	0 (0)	0.01 (1)	0.24 (138)	0.1 (59)	0.11 (68)	0.08 (43)	0.08 (43)
	Zone-tailed Hawk	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (3)	0 (0)	0 (0)
	Unidentified/Unknown Buteo	0.22 (13)	0.17 (10)	0.2 (23)	0.12 (68)	0.1 (60)	0.04 (21)	0.02 (12)	0.12 (67)
	Total Buteos	0.57 (33)	0.55 (32)	0.56 (65)	3.49 (1,984)	2.84 (1,677)	2.38 (1,419)	1.71 (931)	1.89 (1,055)
	Bald Eagle	0 (0)	0.03 (2)	0.02 (2)	0.02 (11)	0.01 (8)	0.02 (12)	0.03 (14)	0.03 (16)
Eagles	Golden Eagle	0.02 (1)	0.03 (2)	0.03 (3)	0 (1)	0.01 (4)	0.01 (3)	0.01 (6)	0.02 (9)
	Unknown Eagle	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)	0 (0)
	Total Eagles	0.02 (1)	0.07 (4)	0.04 (5)	0.02 (12)	0.02 (13)	0.03 (15)	0.04 (20)	0.04 (25)
	American Kestrel	0.14 (8)	0.15 (9)	0.15 (17)	1.05 (595)	0.84 (496)	0.56 (332)	0.56 (302)	0.47 (263)
	Merlin	0 (0)	0.02 (1)	0.01 (1)	0.02 (10)	0.04 (22)	0.02 (13)	0.01 (7)	0.02 (13)
Falcons	Peregrine Falcon	0 (0)	0.03 (2)	0.02 (2)	0.02 (9)	0.03 (19)	0.02 (10)	0.01 (5)	0.04 (20)
	Prairie Falcon	0 (0)	0 (0)	0 (0)	0.01 (6)	0.02 (11)	0 (2)	0.02 (12)	0.03 (15)
	Unidentified/Unknown Falcon	0.05 (3)	0.05 (3)	0.05 (6)	0.03 (17)	0.06 (33)	0.01 (7)	0 (2)	0.04 (25)
	Total Falcons	0.19 (11)	0.26 (15)	0.22 (26)	1.12 (637)	0.98 (581)	0.61 (364)	0.6 (328)	0.6 (336)
	Northern Harrier	0.03 (2)	0.03 (2)	0.03 (4)	0.1 (55)	0.12 (68)	0.09 (55)	0.06 (33)	0.06 (36)
Other	Osprey	0 (0)	0 (0)	0 (0)	0.13 (75)	0.12 (71)	0.08 (48)	0.08 (42)	0.08 (42)
	Total Other	0.03 (2)	0.03 (2)	0.03 (4)	0.23 (130)	0.24 (139)	0.17 (103)	0.14 (75)	0.14 (78)

Family	Common Name	Zeus East birds/hr (# obs)	Zeus West birds/hr (# obs)	Total birds/hr (# obs)	Yaki Pt 2015* birds/hr (# obs)	Yaki Pt 2016* birds/hr (# obs)	Yaki Pt 2017* birds/hr (# obs)	Yaki Pt 2018* birds/hr (# obs)	Yaki Pt 2019* birds/hr (# obs)
Vultures	Turkey Vulture	0.43 (25)	0.93 (54)	0.68 (79)	--	--	--	--	--
	Total Vultures	0.43 (25)	0.93 (54)	0.68 (79)	--	--	--	--	--
Unknown	Unidentified/Unknown Raptor	0.24 (14)	0.17 (10)	0.21 (24)	0.09 (49)	0.12 (69)	0.01 (7)	0.01 (5)	0.01 (8)
	Total Unknown	0.24 (14)	0.17 (10)	0.21 (24)	0.09 (49)	0.12 (69)	0.01 (7)	0.01 (5)	0.01 (8)
Overall	Total	1.75 (102)	3.19 (186)	2.47 (288)	12.83 (7,290)	9.8 (5,788)	6.79 (4,041)	6.35 (3,454)	6.45 (3,608)

*Yaki Point data are summarized for an entire hawk watch season from the last week of August through the first week of November in each year. Further, Turkey Vultures are intentionally not recorded at Yaki Point. Yaki Point data were summarized from Oleyar and Watson (2020), Oleyar (2019), and Oleyar and Watson (2018).

Exhibit B – Attachment B-3

Bat Acoustic Surveys for the Zeus Wind Project; June 2022

Bat Acoustic Surveys for the Zeus Wind Energy Project

JUNE 2022

SWCA

PREPARED FOR

RWE Renewables Development, LLC

PREPARED BY

SWCA Environmental Consultants

BAT ACOUSTIC SURVEYS FOR THE ZEUS WIND ENERGY PROJECT

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June 2022

EXECUTIVE SUMMARY

RWE Renewables Development, LLC is proposing to develop the Zeus Wind Energy Project, a proposed maximum 300-megawatt wind energy facility on up to 71,628 acres of State and private lands roughly 25 miles north of Flagstaff, in Coconino County, Arizona. SWCA Environmental Consultants (SWCA) conducted passive bat acoustic surveys from February to November of 2021. The survey periods included the bat spring migration (March through May) and late summer/fall migration (August through November) seasons. Bat calls were recorded with ultrasonic detectors at three different locations placed strategically to represent the site's habitat and spatial components. The detectors included one paired high (~40 meters) and low (~5 meters) microphone array on a meteorological tower and two ground units (~5 meters) at earthen stock tanks likely to attract bats.

This report documents species composition and patterns of activity grouped by species, morphological groups, and call-frequency (kHz) groups. During the 2021 bat acoustic surveys, 20 species representing four species groups were detected. According to their distributional ranges, no federally listed bats would occur within the analysis area, and none were detected during the surveys. Survey results indicate it is likely that up to eight Tier 1B SGCN species occur within the analysis area.

Bat activity in the evaluation area was far greater at detectors placed near earthen stock tanks than at the meteorological tower. A season of relatively high overall bat activity extended from June to September (80-185 passes/station-night monthly average at the stock tank stations).

The majority of passes confidently identified were typical vesper bats (79%), followed by tree bats (11%) free-tailed bats (8%) and long-eared vesper bats (2%). The high-frequency (≥ 35 kHz) group made the most passes (65%). Mid-frequency passes (18–35 kHz) were also common (33%). Low-frequency (≤ 18 kHz) bat passes were rarely recorded (2%). The most active species were Western small-footed myotis (53.9% of all detections), big brown bat (8.3%), Yuma myotis (7.0%), silver-haired bat (5.8%), Mexican free-tailed bat (5.6%), and hoary bat (5.4%).

There was a dramatic shift in species composition and spatial distribution from June to August, with an early-season bat community peaking in activity in June at the stock tank near pinyon-juniper woods, and a late-season bat community peaking in activity in August-September at the stock tank in relatively open, rocky habitat. The high microphone at the meteorological tower recorded two distinct peaks of activity of mid-frequency bats (likely high-flying tree bats) in June and October that were not detected at any of the low microphones. Further detailed findings and interpretation are provided.

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1 INTRODUCTION

RWE Renewables Development, LLC is proposing to develop the Zeus Wind Energy Project, a proposed maximum 300-megawatt wind energy facility on up to 71,628 acres of State and private lands roughly 25 miles north of Flagstaff, in Coconino County, Arizona. In accordance with the U.S. Fish and Wildlife Service's (USFWS's) *Land-Based Wind Energy Guidelines* (USFWS 2012) and Arizona Game and Fish Department's (AGFD's) *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona* (AGFD 2012a), SWCA Environmental Consultants (SWCA) conducted passive bat acoustic surveys within and adjacent to the evaluation area (Figure 1). The number and location of bat acoustic stations was informed by AGFD's project-specific guidance.¹ The objective was to document the species composition and patterns of activity of bats using the airspace within and directly adjacent to the analysis area.

1.1 Environmental Setting

The evaluation area is located on the Colorado Plateau in north-central Arizona, between 5,000 and 6,500 feet (1500 and 2000 m) above mean sea level. The evaluation area is characterized by moderately rolling grassland and pinyon-juniper woodland with many ephemeral washes draining to the north. The Little Colorado River is located approximately 10 miles to the east, and the Colorado River is about 25 miles to the north, in the Grand Canyon. There are many earthen stock tanks within the evaluation area.

According to Brown (1994), the dominant biotic community present within the evaluation area is Plains and Great Basin Grassland, with Great Basin Conifer Woodland located in the southern and eastern portion of the evaluation area. Three land cover types are prevalent in the evaluation area: Inter-mountain Basins Semi-Desert Shrub-Steppe, Inter-mountain Basins Semi-desert Grassland, and Colorado Plateau Pinyon-Juniper Woodland (U.S. Geological Survey 2016). The tree layer, where present, is dominated by twoneedle pinyon (*Pinus edulis*) and oneseed juniper (*Juniperus monosperma*) (SWCA 2019).

The Arizona Game and Fish Department has identified a known colonial bat roost within 10 miles of the evaluation area (SWCA 2019).

¹ Project-specific study plan guidance for all wildlife surveys was initially provided by agencies including AGFD during agency coordination, meetings, and correspondence beginning in October 2019 and continuing through June of 2020 (SWCA 2020).

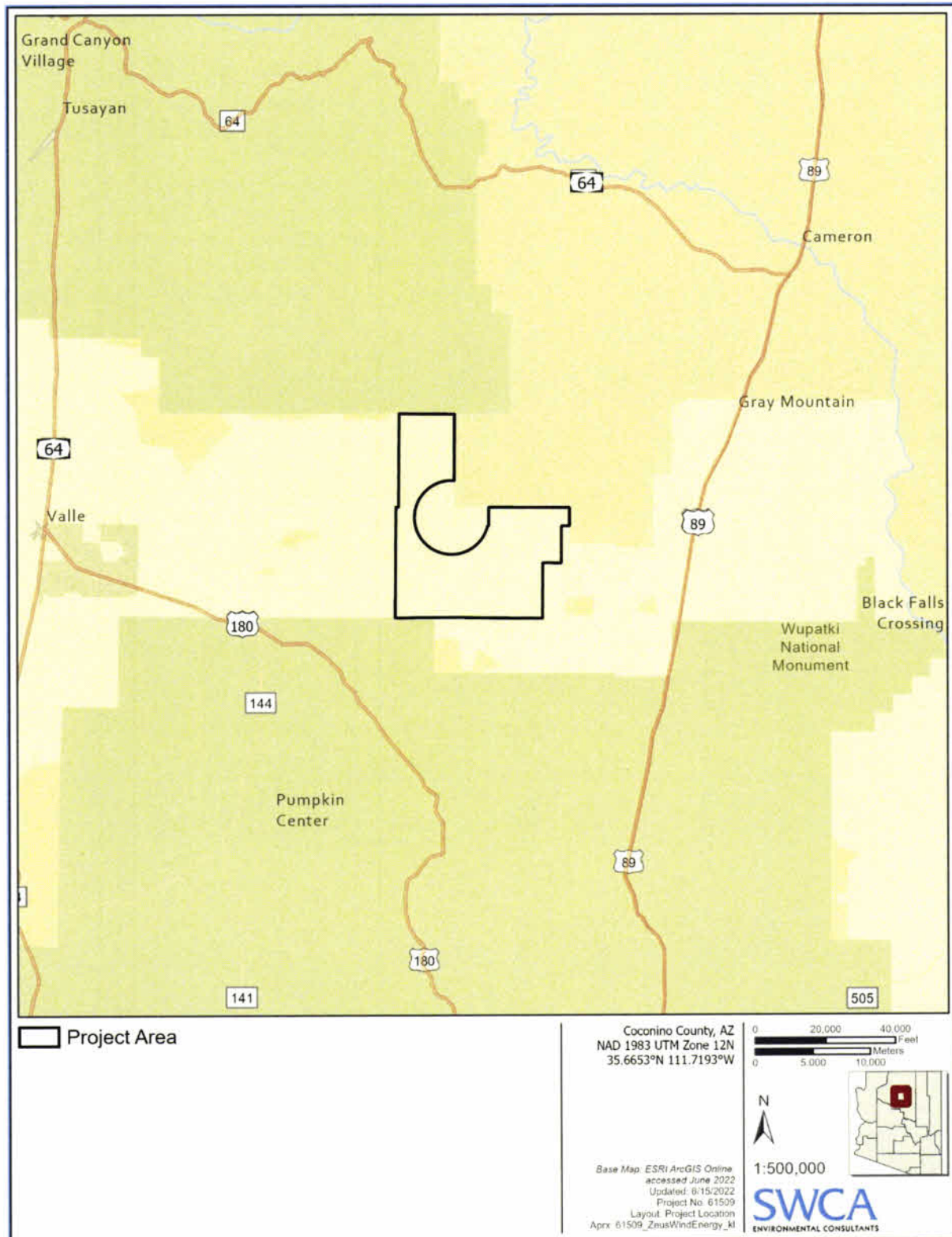


Figure 1. Location of the proposed Zeus Wind Project, Coconino County, Arizona.

Twenty-two bat species may occur in the project area (Table 1). None are federally listed, and ten are state Tier 1B Species of Greatest Conservation Need (SGCN) (AGFD 2012b).

Table 1. Bat Species That May Occur in the Zeus Wind Project Area

Common Name (Scientific Name)	State Status
Allen's big-eared bat (<i>Idionycteris phyllotis</i>)	SGCN (1B)
Arizona myotis (<i>Myotis occultus</i>)	SGCN (1B)
Big brown bat (<i>Eptesicus fuscus</i>)	--
Big free-tailed bat (<i>Nyctinomops macrotis</i>)	--
Mexican free-tailed bat (<i>Tadarida brasiliensis</i>)	SGCN (1B)
California myotis (<i>Myotis californicus</i>)	--
Canyon bat (<i>Parastrellus hesperus</i>)	--
Cave myotis (<i>Myotis velifer</i>)	SGCN (1B)
Fringed myotis (<i>Myotis thysanodes</i>)	--
Greater bonneted bat (<i>Eumops perotis</i>)	SGCN (1B)
Hoary bat (<i>Lasiurus cinereus</i>)	--
Long-eared myotis (<i>Myotis evotis</i>)	SGCN (1C)
Long-legged myotis (<i>Myotis volans</i>)	--
Pallid bat (<i>Antrozous pallidus</i>)	--
Pocketed free-tailed bat (<i>Nyctinomops femorosaccus</i>)	SGCN (1B)
Silver-haired bat (<i>Lasionycteris noctivagans</i>)	--
Southwestern myotis (<i>Myotis auriculus</i>)	SGCN (1C)
Spotted bat (<i>Euderma maculatum</i>)	SGCN (1B)
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	SGCN (1B)
Western red bat (<i>Lasiurus blossevillii</i>)	SGCN (1B)
Western small-footed myotis (<i>Myotis ciliolabrum</i>)	--
Yuma myotis (<i>Myotis yumanensis</i>)	SGCN (1B)

Source: AGFD (2021), International Union for Conservation of Nature and Natural Resources (2020), Reid (2006)

Note: SGCN = Species of Greatest Conservation Need; species identified by AGFD (2012b) as having conservation priority. Tier 1B species are those categorized as "vulnerable" but not fitting the Tier 1A criteria for highest priority. Tier 1C species are those for which existing data were insufficient for AGFD (2012b) to score one or more vulnerability criteria.

2 METHODS

2.1 Detector Placement and Settings

Four bat detectors were installed at three locations during 2021 (Table 2). All stations were deployed in February 2021, each consisting of one Song Meter SM4BAT-FS (Wildlife Acoustics, Inc.) with a single SMU2 microphone. Two bat detectors were installed at a meteorological (MET) tower— a low detector with its microphone on top of a 5-meter (16 feet) pole and a high detector with its microphone hoisted approximately 40 meters (~130 feet) up the MET tower. The other two bat detectors were installed on 5-meter poles adjacent to earthen stock tanks.

The sample was designed to assess bat use across the habitat types present in the evaluation area and to capture activity of high-flying species (where the MET tower made this feasible). The LK-TNK station was located about 40 m south of a dirt stock tank within Lockwood Canyon, a shallow canyon with dense pinyon-juniper woodland on its slopes and in the surrounding area. The microphone was placed facing the tank to the north; the tank was dry upon deployment in February 2021. The TOM-TNK station was located along a fence line surrounding a earthen stock tank. The microphone was positioned facing just west of the tank edge, about 80 m south of the water's edge; however, the tank was dry upon station deployment in February 2021. The habitat surrounding the tank is treeless with sparse grasses and shrubs and exposed soil. The MET tower (MET-HI and MET-LO stations) was located in a clearing about 70 m from the edge of a small, pinyon-juniper woodland.

Table 2. Bat Acoustic Station Locations

Station Name	Dates Deployed	Microphone Placement*	Microphone Type	UTM Zone 12 Easting, Northing
LK-TNK	2/19/2021–11/22/2021	5-m	SMU2	428032, 3954084
TOM-TNK	2/19/2021–11/22/2021	5-m	SMU2	438666, 3945612
MET-HI	2/24/2021–11/22/2021	50-m MET	SMU2	430050, 3946489
MET-LO	2/24/2021–11/22/2021	5-m MET	SMU2	

* Microphone heights are approximate.

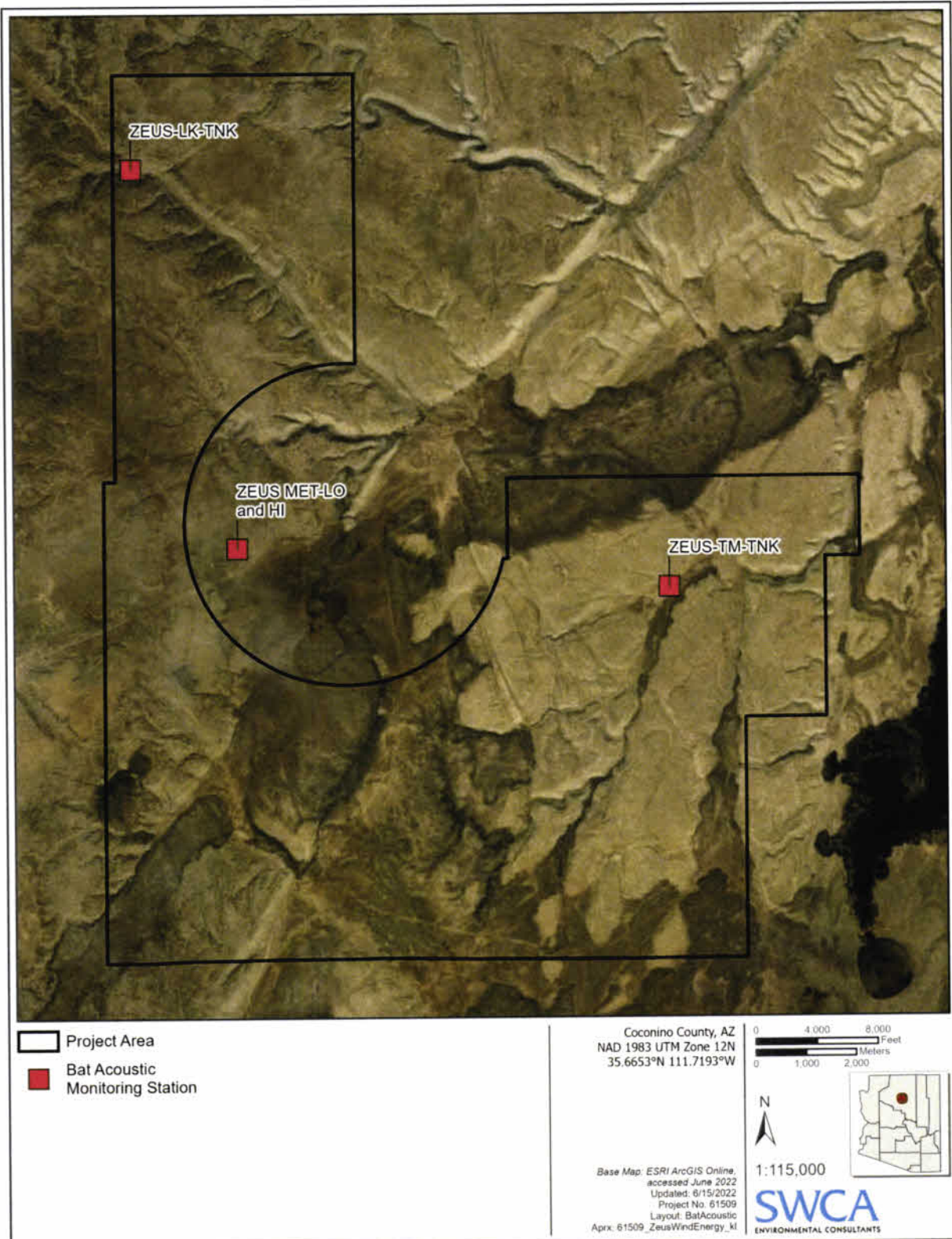


Figure 3. Bat detector locations in the Zeus Wind Energy evaluation area.

Photographs of station setups are provided in Appendix A. To maximize call quality for species identification, microphones were mounted to minimize interference from echo, clutter, and reflected noise. This included positioning microphones away from ground² and echo-producing³ (e.g., flat water and building facades) surfaces, prevailing winds, and precipitation⁴ (Bat Conservation and Management [BCM] 2017; Frick 2013; personal communication, Wildlife Acoustics, September 19, 2017, and May 14, 2020). SMM-U2 microphones were angled upward, but not directly upward, to avoid water and debris collection.

The SM4BAT-FS units used during the 2021 survey were set⁵ to record bat activity from 30 minutes after sunset until 30 minutes before sunrise. The units recorded individual bat passes into separate audio files (.WAV) and were set to the following audio settings:

- Gain: 0 dB
- 16k high filter: off
- Sample rate: 384 kHz
- Minimum duration (noise scrubber): 2.0 milliseconds
- Maximum duration (noise scrubber): 500 milliseconds
- Minimum trigger frequency: 8 kHz
- Trigger level: 24 dB
- Trigger window: 2 seconds
- Maximum file length: 5 seconds

2.2 Analysis

The basic unit of measurement for assessing bat activity is the number of bat passes per species (or species group) per unit time (night). A bat pass was defined as two or more echolocation calls recorded on a given sound recording file (Kerbiriou et al. 2019, Lausen et al. 2010). The number of station-nights (i.e., the number of nights a station was functional and recording echolocation calls) was determined based on log files the detectors produce, where status information is recorded at regular intervals during each nightly recording session. This provides an accurate count of station-nights by indicating when a station was malfunctioning and not recording echolocation data. Data compilations provided in this report include bat passes per station-night and relative bat passes, grouped spatially and temporally by species, species groups, and frequency groups. Seasons were defined as winter (February), spring (March through May), summer (June through August), and fall (September through November). Relative passes was defined as the number of passes of a species or species group / the total number of passes of all species or species groups × 100 (expressed as a percentage).

Automated species identification involved three steps: 1) noise scrubbing, 2) auto-identification, and 3) manual vetting. All files were processed using Kaleidoscope Pro. The software allows the user to

² BCM (2017) and Frick (2013) recommend placing microphones at least 3–7 feet (1–2 m) above ground to reduce less diagnostic approach-phase echolocation call characteristics, surface echoes, thermal layering, and near-ground air convection currents.

³ BCM (2017) recommends avoiding pooled water sources by at least 30 feet (9 m)..

⁴ To avoid debris and water collection, SMM-U2 microphones were positioned at a slight angle away from vertical (Wildlife Acoustics recommendation; personal communication, September 19, 2017, and May 14, 2020)..

⁵ Specific settings were based on regional expert guidance (the guidance was general to the region and was not project-specific) (personal communication, Janet Tyburec, Bat Survey Solutions, LLC, April 2018).

perform noise scrubbing and auto-identification tasks in a single batch operation. To identify and separate non-bat extraneous noise files from those with bat echolocation calls, files were scrubbed using the following signal parameters:⁶

- Frequency range: 8–120 kHz
- Call duration range: 2–500 milliseconds
- Minimum number of pulses: 2
- Maximum inter-syllable gap: 1,000 milliseconds
- Advanced signal processing: on

Species identification was automated in Kaleidoscope Pro, which relies on statistical comparisons of unknown pulses to algorithms trained on a reference call library (in this case, Wildlife Acoustics Bats of North America 5.4.0 AutoID species classifier). The software allows the user to define the correct set of species to be used in the classification process while excluding species—potentially those exhibiting overlapping call characteristics—that are unlikely to occur. The species list selected for this project (Tables 1 and 3) is conservative. Of these 22 species, two—Allen’s big-eared bat (*Idionycteris phyllotis*) and southwestern myotis (*Myotis auriculus*)—were not supported by the classifier. Allen’s big-eared bat calls are recognizable by an expert reviewer, but Southwestern myotis call characteristics overlap with other myotis bats, particularly long-eared myotis (*Myotis evotis*), enough to make classification unreliable.

The auto-identification process involves converting full-spectrum recordings into zero-cross format. The classifier uses Hidden Markov Models and Fisher Scores to model call shapes and determine differences between species. The software uses a maximum-likelihood estimator (MLE) to compare a confusion matrix of known error rates; the resulting p-values indicate whether there is statistical evidence supporting species presence (i.e., values close to 0 [e.g., < 0.05]) or absence (e.g., > 0.05). The default “balanced” setting was used, which balances between liberal and conservative classification.

To minimize misclassifications, an experienced SWCA biologist manually vetted the data. This qualitative vetting attempted to ensure that the auto-identification classifier had not misclassified files based on poor recording quality, non-search phase components of calls, or echolocation calls from species other than the classifier-suggested species (Reichert et al. 2018). Manual vetting eliminated noise sequences that passed the initial filter and verified probable presence of each species identified by the classifier but was not intended to identify or classify every call sequence recorded.

Bat passes were identified to species, when possible. Call ambiguity or poor quality (defined as files containing fewer than eight total call pulses and having a match ratio [the proportion of pulses that matched the overall species identification for that file] < 0.66) required that some passes be assigned only to a frequency group according to the average characteristic frequency calculated by the software for each file (Table 3). These frequency categories were selected to align generally with foraging and morphology guilds (Müller et al. 2012; Roemer et al. 2017). Species that use long, high intensity, narrowband, and low-to-mid-frequency echolocation calls predominantly hunt high and in open space. These low-to-mid-frequency call species also are generally larger-bodied and faster fliers. However, some species within the mid-frequency category (e.g., big brown bat [*Eptesicus fuscus*]) are foraging and habitat generalists and others (e.g., fringed myotis [*Myotis thysanodes*]) are ecologically similar to species with high-frequency calls. Species that use shorter, broadband to narrowband echolocation calls of higher frequency and lower intensity predominantly hunt close to the ground along edges of cluttered vegetation or in closed habitats.

⁶ Signal parameters were based on manufacturer recommendation and regional expert guidance (the guidance was general to the region and was not project-specific) (personal communication, Janet Tyburec, Bat Survey Solutions, LLC, April 2018).

They generally are smaller-bodied and have slower, more maneuverable flight. Bat passes identified to species were analyzed by species and species groups. Each species was assigned to one of five groups. Groups consisted of closely related species or species similar in their foraging behavior, roosting habits, and morphology. Species groups were free-tailed bats (family *Molossidae*), long-eared vesper bats (large-eared members of family *Vespertilionidae*), other vesper bats (typical bats of family *Vespertilionidae*, e.g. genus *Myotis*), leaf-nosed bats (family *Phyllostomidae*), and tree bats (genera *Lasiurus* and *Lasionycteris* of family *Vespertilionidae*) (see Table 3).

Table 3. Frequency and Species Groupings of Species that May Occur in the Analysis Area

Frequency Group	Common Name	Species Group	Supported by 5.4.0 AutoID Classifier
Low (≤ 18 kHz)	Allen's big-eared bat	long-eared vesper bat	no
	big free-tailed bat*	free-tailed bat	yes
	greater bonneted bat	free-tailed bat	yes
	pocketed free-tailed bat *	free-tailed bat	yes
	spotted bat	long-eared vesper bat	yes
Mid (18–35 kHz)	big brown bat	other vesper bat	yes
	Mexican free-tailed bat	free-tailed bat	yes
	fringed myotis	other vesper bat	yes
	hoary bat	tree bat	yes
	pallid bat	long-eared vesper bat	yes
	silver-haired bat	tree bat	yes
	Townsend's big-eared bat	long-eared vesper bat	yes
High (≥ 35 kHz)	Arizona myotis	other vesper bat	yes
	California myotis	other vesper bat	yes
	canyon bat	other vesper bat	yes
	cave myotis	other vesper bat	yes
	long-legged myotis	other vesper bat	yes
	southwestern myotis	other vesper bat	no
	western red bat	tree bat	yes
	western small-footed myotis	other vesper bat	yes
	Long-eared myotis	other vesper bat	yes
	Yuma myotis	other vesper bat	yes

*These species were lumped during analysis due to overlap in call characteristics.

3 RESULTS

3.1 Sampling Effort

The two stations at stock tanks were deployed from February 19, 2021, through November 22, 2021; the stations at the MET tower were deployed from February 24, 2021 through November 22, 2021. Table 4 presents the sampling effort by station. In total, 40,101 bat passes were recorded over 1,086 station-

nights. The dataset contains the main periods of bat activity: spring migration (March through May), breeding season (May through July), and late summer/fall migration (August through November).

One station (MET-HI) either failed to record or data was lost during the routine data download in late August. Otherwise, all stations were operational for the duration of the deployment.

Table 4. Sampling Effort and Number of Bat Passes by Bat Acoustic Detector, 2021

Station	Deployment Dates	Deployment Nights	Complete Station-Nights	Dates Without Surveys	Files Recorded	Bat Passes	Bat Passes Confidently Identified to Species [†]	Proportion of Bat Passes Identified to Species
LK-TNK	2/19/21–11/22/21	277	277		23,156	23,090	8,056	35%
TOM-TNK	2/19/21–11/22/21	277	277		14,335	14,157	3,302	23%
MET-HI	2/24/21–11/22/21	272	260	8/19/21–8/30/21	756	590	83	14%
MET-LO	2/24/21–11/22/21	272	272		2,844	2,264	526	23%
Total		1,098	1,086		41,091	40,101	11,967	30%

[†] Files were categorized as confident identifications if they contained at least eight total call pulses and had a match ratio ≥ 0.66 , or if they were manually identified.

3.2 Species/Frequency Group Composition

Bat detectors collected 11,967 recordings (passes) that were confidently identified to species (Table 5). The detectors recorded 20 species representing four species groups: other vesper bats (79%), tree bats (11%), free-tailed bats (8%), and long-eared vesper bats (2%). The most-detected species were Western small-footed myotis (53.9%), big brown bat (8.3%), Yuma myotis (7.0%), silver-haired bat (5.8%), Mexican free-tailed bat (5.6%), and hoary bat (5.4%).

Of the ten Tier 1B SGCN species that might occur (Table 1), surveys confirmed the presence of eight with confidence (Table 5). Of these, seven were sufficiently well-recorded and uniquely identifiable to be confirmed by the AutoID analysis alone (Arizona myotis, Mexican free-tailed bat, greater bonneted bat, spotted bat, Townsend's big-eared bat, Western red bat, and Yuma myotis). One additional species was confidently identified in the manual review (Allen's big-eared bat). Neither the AutoID classifier nor the expert reviewer could confidently distinguish the calls of the pocketed free-tailed bat from the congeneric big free-tailed bat. That genus, *Nyctinomops*, was confirmed present. Western red bat was not detected.

Nearly 98% of recorded bat passes had frequencies above 18 kHz (mid or high frequency groups). The high-frequency group (≥ 35 kHz) made 65.2% of passes. Average bat activity (for the 4-microphone array) was approximately 37 passes per night (Table 5).

Table 5. Bat Species, Species Group, and Frequency Group Detection, Passes, Activity, and Relative Activity, 2021

Common Name, Species Group, or Frequency Group	Detection Confidence				Passes	Relative Activity (%)	Activity
	LK-TNK	TOM-TNK	MET-HI	MET-LO			
Free-tailed bats							
Mexican free-tailed bat (<i>Tadarida brasiliensis</i>)	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	672	5.62	0.62
<i>Nyctinomops</i> spp.*	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	226	1.89	0.21
greater bonneted bat (<i>Eumops perotis</i>)	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	92	0.77	0.08
Free-tailed bats	–	–	–	–	990	8.27	0.91
Long-eared vesper bats							
pallid bat (<i>Antrozous pallidus</i>)	MC; p = 0.65	MC; p < 0.00001	p = 0.62	MC; p < 0.00001	149	1.25	0.14
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	–	MC; p < 0.00001	–	–	20	0.17	0.02
spotted bat (<i>Euderma maculatum</i>)	MC; p < 0.00001	MC; p < 0.00001	–	MC; p < 0.00001	11	0.09	0.01
Allen's big-eared bat (<i>Idionycteris phyllotis</i>)†	–	MC	MC	–	9	0.08	0.01
Long-eared vesper bats	–	–	–	–	189	1.58	0.17
Other vesper bats							
western small-footed myotis (<i>Myotis ciliolabrum</i>)	MC; p < 0.00001	MC; p < 0.00001	p = 0.21	MC; p < 0.00001	6,448	53.88	5.94
big brown bat (<i>Eptesicus fuscus</i>)	MC; p < 0.00001	MC; p < 0.00001	p = 0.29	MC; p < 0.00001	995	8.31	0.92
yuma myotis (<i>Myotis yumanensis</i>)	MC; p < 0.00001	MC; p < 0.00001	–	MC; –	832	6.95	0.77
California myotis (<i>Myotis californicus</i>)	MC; p < 0.00001	MC; p < 0.00001	–	MC; p < 0.00001	379	3.17	0.35
canyon bat (<i>Parastrellus hesperus</i>)	MC; p < 0.00001	MC; p < 0.00001	p = 0.09	MC; p < 0.00001	347	2.90	0.32
long-legged myotis (<i>Myotis volans</i>)	MC; p < 0.00001	p < 0.00001	–	p < 0.00001	244	2.04	0.22
fringed myotis (<i>Myotis thysanodes</i>)	MC; p < 0.00001	MC; p < 0.00001	–	MC; p = 0.09	103	0.86	0.09

Bat Acoustic Surveys for the Zeus Wind Project

Common Name, Species Group, or Frequency Group	Detection Confidence				Passes	Relative Activity (%)	Activity
	LK-TNK	TOM-TNK	MET-HI	MET-LO			
Arizona myotis (<i>Myotis occulus</i>)	MC; p < 0.00001	MC; p < 0.00001	p < 0.00001	p < 0.00001	56	0.47	0.05
long-eared myotis (<i>Myotis evotis</i>)/southwestern myotis (<i>Myotis auricolus</i>) [†]	–	MC; p < 0.00001	–	MC; p = 0.01	34	0.28	0.03
cave myotis (<i>Myotis velifer</i>)	p < 0.00001	p = 0.86	–	–	15	0.13	0.01
Other vesper bats	–	–	–	–	9,453	78.99	8.70
Tree bats							
silver-haired bat (<i>Lasionycteris noctivagans</i>)	MC; p < 0.00001	MC	MC	MC	693	5.79	0.64
hoary bat (<i>Lasiurus cinereus</i>)	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	MC; p < 0.00001	642	5.36	0.59
Tree bats	–	–	–	–	1,335	11.16	1.23
Total for calls identified to species	–	–	–	–	11,967	100.00	11.02
Frequency Groups							
High (≥ 35 kHz)	–	–	–	–	26,167	65.25	24.09
Mid (18-35 kHz)	–	–	–	–	13,097	32.66	12.06
Low (≤ 18 kHz)	–	–	–	–	837	2.09	0.77
Overall Total	–	–	–	–	40,101	100.00	36.93

Note: Species and species group data include confident species identifications only (11,967). Frequency group data include all bat passes (40,101). MC = species presence was manually confirmed. P = the range of p-values obtained from MLE analysis (Kaleidoscope Pro output) of each station separately. Relative passes = the number of passes of a species or species group / the total number of passes of all species or species groups × 100 (expressed as a percentage). Activity = the number of passes of each species or species group/station-night. Shaded rows indicate species with an activity value ≥ 0.1.

* Call characteristics of the pocketed free-tailed bat overlap with those of the big free-tailed bat and passes identified as pocketed free-tailed bat were lumped together with those identified as big free-tailed bats under their genus, *Nyctinomops*. No files stood out as being pocketed free-tailed bats.

[†]Species is not supported in the AutoID Classifier.

3.3 Patterns of Bat Activity

3.3.1 Seasonal Patterns

Seasonally, bat activity was highest in summer and fall (72.7 and 29.3 passes/station-night, respectively). High monthly activity for most species occurred between June and September (Table 6).

The summer-to-fall resident bat community composition changed markedly from the beginning to the end of the season. The spring to early summer prevalent species were Western small-footed myotis (22

passes/station-night in June), big brown bat (4.5 passes/station-night in June), Mexican free-tailed bat (1.8 passes/station-night in June), and cave myotis (0.04 passes/station-night in May). The late summer to fall bat community is more diverse, featuring Yuma myotis (4.3 passes/station-night in September), canyon bat (1.5 passes/station-night in August), California myotis (1.0 passes/station-night in September), *Nyctinomops* spp. (0.7 passes/station-night in August), long-legged myotis (0.7 passes/station-night in September), fringed myotis (0.5 passes/station-night in September), Townsend's big-eared bat (0.04 passes/station-night in September and October), Allen's big-eared bat (0.04 passes/station-night in August), and spotted bat (0.04 passes/station-night in August).

The MET-HI detector recorded low-to-mid frequency bat passes in a bimodal distribution (Figure 4). The ratios of identified passes (Figure 5) show these peaks likely correspond to migratory pulses of tree bats (hoary bats and Western red bats) in June to July and September to October, juxtaposed on free-tailed bat activity that increases steadily from June to August and declines in October.

Table 6. Activity by Species, Species Group, and Frequency Group per Month and Season, 2021

Name	Winter	Spring			Summer			Fall			Total
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
Free-tailed bats											
Mexican free-tailed bat	0.00	0.02	0.07	0.11	1.82	1.63	0.98	0.82	0.12	0.03	0.62
<i>Nyctinomops</i> species*	0.00	0.00	0.00	0.00	0.22	0.19	0.69	0.56	0.27	0.00	0.21
greater bonneted bat	0.00	0.00	0.00	0.00	0.04	0.37	0.18	0.07	0.1	0.00	0.08
Free-tailed bats	0.00	0.02	0.07	0.11	2.08	2.19	1.85	1.44	0.49	0.03	0.91
Long-eared vesper bats											
pallid bat	0.00	0.00	0.03	0.05	0.42	0.21	0.24	0.31	0.00	0.00	0.14
Townsend's big-eared bat	0.00	0.00	0.00	0.02	0.02	0.00	0.03	0.04	0.04	0.02	0.02
spotted bat	0.00	0.00	0.00	0.00	0.01	0.03	0.04	0.01	0.00	0.00	0.01
Allen's big-eared bat	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.02	0.00	0.01
Long-eared vesper bats	0.00	0.00	0.03	0.07	0.44	0.24	0.35	0.38	0.06	0.02	0.17
Other vesper bats											
western small-footed myotis	0.17	0.1	2.11	11.56	22.01	5.26	8.4	3.44	0.73	0.07	5.94
big brown bat	0.00	0.04	0.08	0.43	4.47	1.36	1.24	0.61	0.06	0.02	0.92
yuma myotis	0.00	0.00	0.00	0.01	0.02	0.01	2.26	4.25	0.52	0.00	0.77
California myotis	0.00	0.00	0.08	0.26	0.68	0.1	0.73	1.03	0.3	0.00	0.35
canyon bat	0.00	0.00	0.01	0.09	0.52	0.5	1.47	0.38	0.01	0.00	0.32
long-legged myotis	0.00	0.00	0.06	0.11	0.48	0.1	0.53	0.67	0.11	0.00	0.22
fringed myotis	0.00	0.00	0.01	0.02	0.06	0.02	0.06	0.49	0.19	0.00	0.09

Bat Acoustic Surveys for the Zeus Wind Project

Name	Winter	Spring			Summer			Fall			Total
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
Arizona myotis	0.00	0.00	0.01	0.03	0.12	0.1	0.13	0.05	0.03	0.00	0.05
long-eared myotis	0.00	0.00	0.00	0.01	0.02	0.17	0.06	0.03	0.00	0.00	0.03
cave myotis	0.00	0.00	0.02	0.04	0.03	0.00	0.01	0.02	0.01	0.00	0.01
Other vesper bats	0.17	0.15	2.38	12.56	28.39	7.63	14.9	10.96	1.95	0.09	8.7
Tree bats											
silver-haired bat	0.00	0.01	0.03	0.21	2.04	2.24	0.85	0.27	0.05	0.07	0.64
hoary bat	0.00	0.00	0.03	0.04	1.11	2.23	1.11	0.65	0.17	0.01	0.59
Tree bats	0.00	0.01	0.07	0.25	3.15	4.47	1.96	0.92	0.22	0.08	1.23
Monthly Total	0.17	0.18	2.54	13	34.06	14.52	19.05	13.69	2.73	0.23	11.02
Season Total	0.17	5.27			22.53			6.03			
Frequency Groups											
High (≥ 35 kHz)	0.43	0.3	5.24	25.32	55.82	18.5	53.41	54.72	6.35	0.23	24.09
Mid (18-35 kHz)	0.2	0.22	1.33	3.73	43.36	25.66	17.84	13.43	3.1	0.73	12.06
Low (≤ 18 kHz)	0.00	0.01	0.01	0.02	0.48	2.15	1.84	1.39	1.09	0.00	0.77
Monthly Total	0.63	0.52	6.58	29.07	99.65	46.31	73.09	69.53	10.54	0.95	36.93
Season Total	0.63	12.12			72.72			29.32			

Note: Species and species group data include confident species identifications only (11,967 files). Frequency group data include all bat passes (40,101 files). Activity = the number of bat passes per species or species group/station-night. Shaded rows indicate species with an activity value ≥ 0.1 .

* Call characteristics of the pocketed free-tailed bat overlap with those of the big free-tailed bat, and passes identified as pocketed free-tailed bat were lumped together with those identified as big free-tailed bats under their genus, *Nyctinomops*.

The seasonal shift in species composition appears to correspond to a seasonal shift in habitat use. The early season bat community was especially active at LK-TNK (87% of activity in June) and the late-season bat community was especially active at TOM-TNK (73% of activity in September) (Table 7). Both these detectors were at stock tanks. LK-TNK was noteworthy for its grassy habitat in the context of mature pinyon-juniper woodland. Vegetation was generally more open and drier around TOM-TNK, though the tank may have retained additional moisture following the midsummer monsoon. Habitat value (e.g. food, roost sites, etc.) probably did not decline at LK-TNK following the monsoon, so it seems likely the change in species composition was driving the change in habitat use. The data suggests the early-season and late-season bat communities use different habitats in the analysis area (and the greater landscape) in the summer and fall stages of different loop migrations.

Table 7. Activity by Station per Month and Season, 2021

Station	Microphone placement	Winter	Spring			Summer			Fall			Total
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	
LK-TNK	Low	0.5	0.29	15.47	107.97	347.63	110.32	86.97	66.73	22.65	0.73	83.36
TOM-TNK	Low	1.4	1.77	8.33	5.55	22.87	49.94	164.74	198.47	10.45	2.14	51.11
MET	High	0.0	0.03	0.83	0.39	4.23	3.84	1.95	3.33	5.1	0.5	2.27
	Low	0.0	0	1.7	2.39	23.87	21.16	11.16	9.6	3.97	0.45	8.32
Monthly overall total		0.63	0.52	6.58	29.07	99.65	46.31	73.09	69.53	10.54	0.95	36.93
Seasonal overall total		0.63	12.12			72.72			29.32			

Note: Data include all bat passes (40,101 files). Activity = the number of bat passes/station-night. Dashes indicate months when no data were collected.

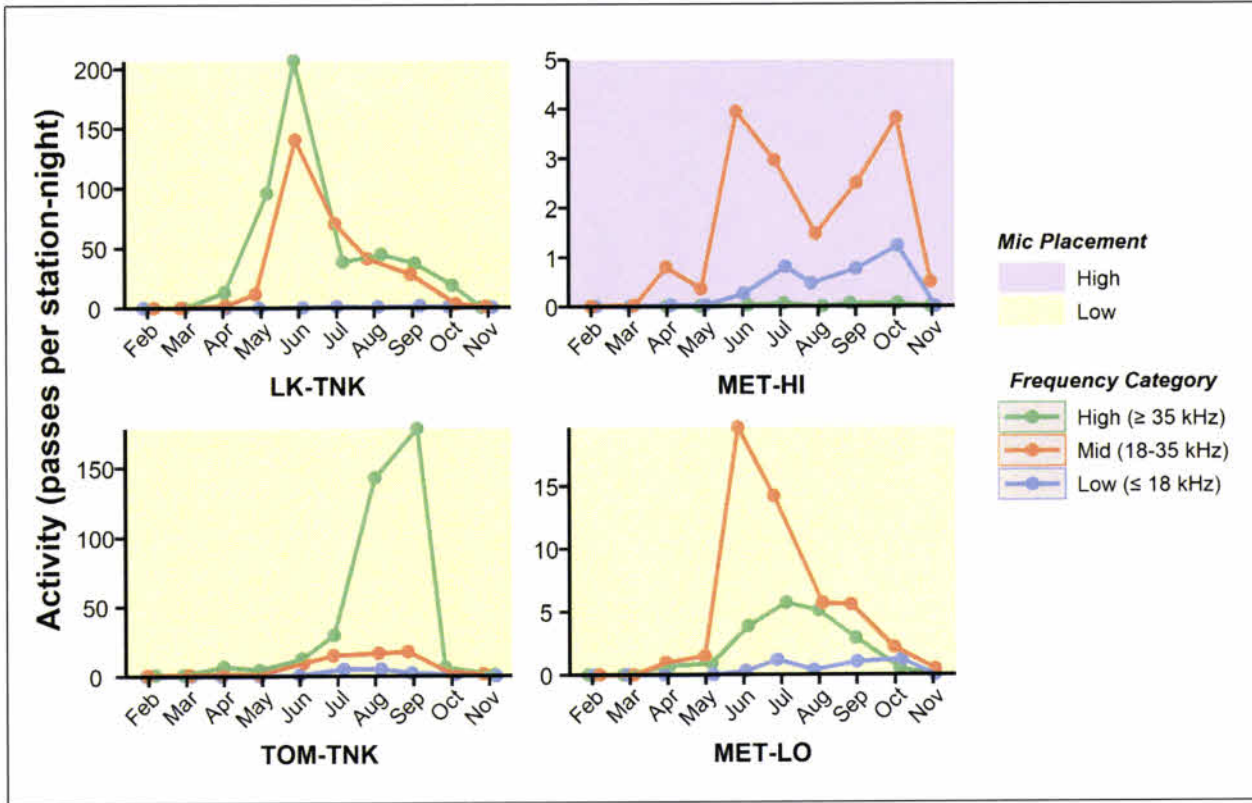


Figure 4. Monthly frequency group activity recorded by station and year. Breaks in data represent months with no station-nights.

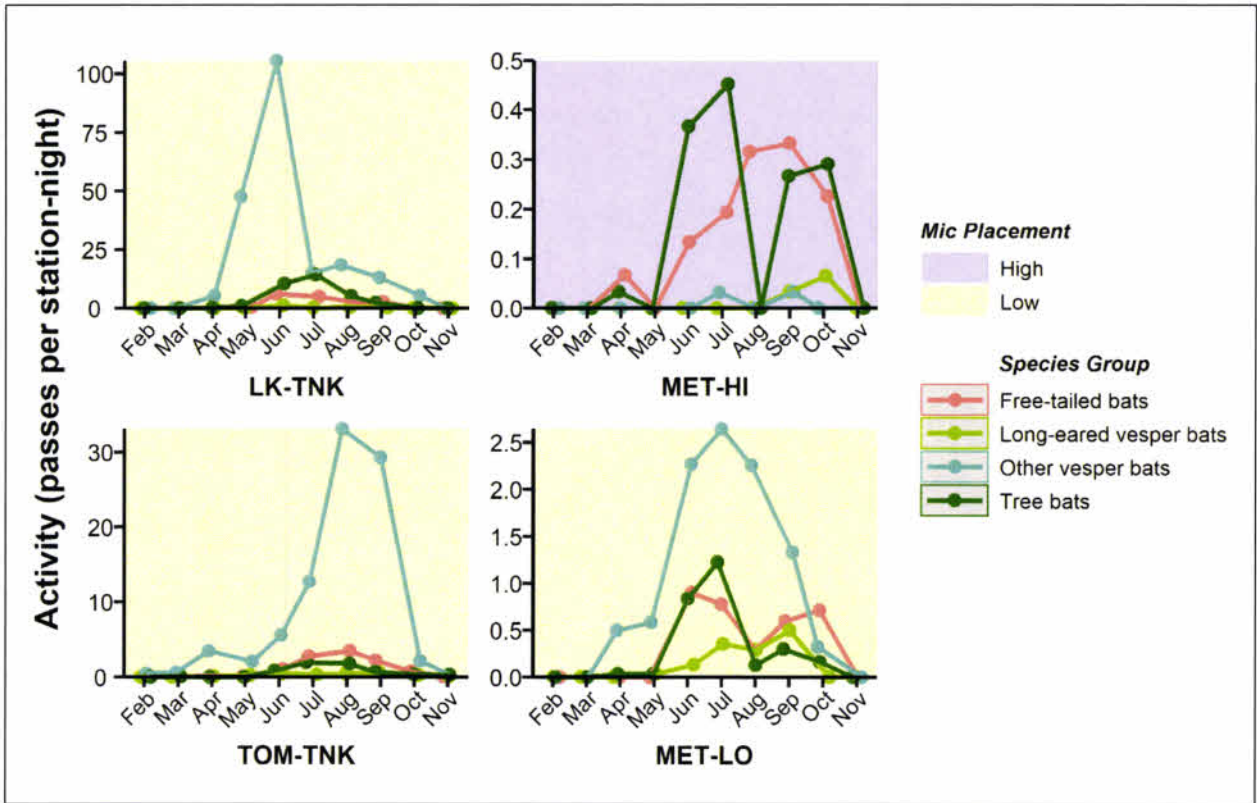


Figure 5. Monthly species group activity recorded by station and year. Breaks in data represent months with no station-nights.

3.3.2 Spatial Patterns

The MET detectors (both high and low microphones) detected less activity of all species and frequency groups, compared with the other detectors deployed near stock tanks (LK-TNK and TOM-TNK) (Table 8).

Mid frequency bats were over three times more active at LK-TNK than TOM-TNK (Table 8). Species that were over three times more active at TK-TNK included silver-haired bat, big brown bat, Arizona myotis, Mexican free-tailed bat, long-legged myotis, Western small-footed myotis, hoary bat, and fringed myotis.

However, some species were over three times more active at TOM-TNK: Townsend's big-eared bat, Allen's big-eared bat, long-eared myotis/Southwestern myotis (these were not distinguishable with confidence), Yuma myotis, *Nyctinomops*, canyon bat, and greater bonneted bat. All these species peaked in activity between July and September (Table 6, see discussion of the late-season bat community in 3.3.1). Species that were similarly active at both stock tanks were California myotis, pallid bat, and spotted bat.

Table 8. Activity by Species, Species Groups, and Frequency Groupings per Station, 2021

Name	LK-TNK	TOM-TNK	MET-HI	MET-LO	Total
Free-tailed bats					
Mexican free-tailed bat	1.81	0.39	0.07	0.16	0.62
<i>Nyctinomops</i> species*	0.07	0.55	0.05	0.15	0.21
greater bonneted bat	0.06	0.21	0.01	0.05	0.08
Free-tailed bats	1.93	1.16	0.13	0.37	0.91
Long-eared vesper bats					
pallid bat	0.28	0.14	0.00	0.12	0.14
Townsend's big-eared bat	0.00	0.07	0.00	0.00	0.02
spotted bat	0.01	0.01	0.00	0.02	0.01
Allen's big-eared bat	0.00	0.02	0.01	0.00	0.01
Long-eared vesper bats	0.29	0.24	0.01	0.15	0.17
Other vesper bats					
western small-footed myotis	17.89	4.7	<0.01	0.69	5.94
big brown bat	3	0.35	<0.01	0.25	0.92
yuma myotis	0.29	2.71	0.00	<0.01	0.77
California myotis	0.6	0.69	0.00	0.08	0.35
canyon bat	0.18	1.05	0.00	0.01	0.32

Name	LK-TNK	TOM-TNK	MET-HI	MET-LO	Total
long-legged myotis	0.7	0.16	0.00	0.02	0.22
fringed myotis	0.26	0.08	0.00	0.03	0.09
Arizona myotis	0.16	0.03	0.00	0.01	0.05
long-eared myotis / Southwestern myotis	0.01	0.1	0.00	0.01	0.03
cave myotis	0.05	<0.01	0.00	0.00	0.01
Other vesper bats	23.14	9.88	0.01	1.11	8.7
Tree bats					
silver-haired bat	2.23	0.22	0.01	0.04	0.64
hoary bat	1.5	0.42	0.15	0.26	0.59
Tree bats	3.73	0.64	0.17	0.31	1.23
Total	29.08	11.92	0.32	1.93	11.02
Frequency Groups					
High (≥ 35 kHz)	50.09	42.16	0.03	2.24	24.09
Mid (18-35 kHz)	32.72	7.32	1.84	5.62	12.06
Low (≤ 18 kHz)	0.55	1.63	0.4	0.47	0.77
Total	83.36	51.11	2.27	8.32	36.93

Note: Species and species group data include confident species identifications only (11,967 files). Frequency group data include all bat passes (40,101 files). Activity = the number of bat passes per species or species group/station-night. Shaded rows indicate species with an activity value ≥ 0.1 .

* Call characteristics of the pocketed free-tailed bat overlap with those of the big free-tailed bat and passes identified as pocketed free-tailed bat were lumped together with those identified as big free-tailed bats under their genus, *Nyctinomops*.

4 INTERPRETATION

Data provided in this report are meant to provide a summary of baseline conditions for the project and should otherwise be interpreted with caution.

Under the premise that wind turbine collision risk to bats (and birds) is related to activity and exposure, pre-construction activity surveys are commonly performed to support Wind Energy Guidelines Tier 3 decisions.⁷ However, for bats (and most birds), relating pre-construction activity data to post-construction fatality rates remains tenuous (Allison et al. 2019; Bennett and Hale 2018; American Wind Wildlife Institute 2019; Ferrer et al. 2012; Hein et al. 2013; Loss et al. 2013). Studies have also not been able to demonstrate a clear relationship between perceived resources and bat fatalities (Bennett and Hale 2018). This lack of predictive power may be a consequence of the highly variable data (e.g., high night-to-night, detector-to-detector, and project-to-project variability) associated with bat acoustic detection, and collisions may also be non-random (e.g., certain bats appear to be more at risk because they are attracted

⁷ Tier 3 site-specific survey data provide quantitative and qualitative assessments used to determine 1) whether a project should be developed or abandoned, 2) avoidance and minimization measures, and 3) compensatory mitigation measures if adverse impacts cannot acceptably be avoided (USFWS 2012).

to turbines or are seasonally flying at the same height as turbine rotors) (American Wind Wildlife Institute 2018; Frick 2013; Hein et al. 2013; Horn et al. 2008; Kunz et al. 2007; Roemer et al. 2017). Further impeding risk assessments is the general paucity of information pertaining to population estimates and demographics (Allison et al. 2019; Arnett et al. 2008; Hein et al. 2013; Kunz et al. 2007; Nocera et al. 2019; O'Shea et al. 2003).

Acoustic methods are subject to several constraints and biases; for example, acoustic data do not provide information on species abundance (i.e., it is unclear whether one individual is recorded numerous times or numerous individuals are recorded single times in a given night) (Kunz et al. 2007; Nocera et al. 2019). Other limitations (reviewed in Frick 2013, Kunz et al. 2007, Müller et al. 2012, Nocera et al. 2019, and Reichert et al. 2018) include 1) species may be misclassified,⁸ 2) many calls cannot be assigned to a species, 3) species and individual detectability may vary,⁹ and 4) individuals may become “lost” in a group of vocalizing individuals. Biases in detectability based on placement,¹⁰ type, and settings of microphones and detectors may also lead to highly variable survey results, rendering comparisons among projects difficult (Kunz et al. 2007; Lausen et al. 2010; Adams et al. 2012). With these limitations in mind however, acoustic data do provide general baseline patterns of bat activity within the analysis area.

5 KEY FINDINGS

- During the 2021 bat acoustic surveys, 20 species representing four species groups were detected. According to their distributional ranges, no federally listed bats would occur within the analysis area, and none were detected during the surveys. Survey results indicate it is likely that up to eight Tier 1B SGCN species occur within the analysis area.
- The most active species were Western small-footed myotis (53.9% of all detections), big brown bat (8.3%), Yuma myotis (7.0%), silver-haired bat (5.8%), Mexican free-tailed bat (5.6%), and hoary bat (5.4%).
- The majority (79%) of passes confidently identified were other vesper bats, followed by tree bats (11%) free-tailed bats (8%) and long-eared vesper bats (2%). The high-frequency (≥ 35 kHz) group represented the majority of all bat passes (65%). Mid-frequency passes (18–35 kHz) were also common (33%), particularly at LK-TNK. Low-frequency (≤ 18 kHz) bat passes were rarely recorded (2%).
- Bat activity in the evaluation area was far greater at detectors placed near earthen stock tanks than at the MET tower. LK-TNK recorded 83.4 passes/station-night, TOM-TNK recorded 51.1 passes/station-night, and MET recorded just 10.6 passes/station-night (8.3 with the low microphone, and 2.3 with the high microphone).
- A season of relatively high overall bat activity extended from June to September (80-185 passes/station-night monthly average at LK-TNK and TOM-TNK).

⁸ Species may be misclassified due to considerable inter-specific overlap and intra-species variation in bat echolocation signatures (Nocera et al. 2019; Reichert et al. 2018). Approach calls, social calls, call quality, cluttered environments, and presence of multiple individuals or species may all lead to species misclassifications (Müller et al. 2012).

⁹ Certain species and individuals may be more detectable than others (Kunz et al. 2007). For example, migrating bats may not echolocate independent of time spent searching for and capturing insects. High-frequency (e.g., *Myotis* species) and low-intensity (e.g., *Corynorhinus*) echolocators may be less detectable from distance due to rapid aerial attenuation of their calls. Bat species may not call at the same rates.

¹⁰ For example, a 10-m shift in microphone placement can make the difference between acquiring useful and useless acoustic data (Kunz et al. 2007).

- There was a dramatic shift in species composition and spatial distribution from June to August. An early-season community dominated by western small-footed myotis, big brown bat, and Mexican free-tailed bat was very active at LK-TNK, peaking in June. LK-TNK also recorded many silver-haired bats and hoary bats, peaking in July. After July, the greatest bat activity was recorded at TOM-TNK, and the late-season (peaking in August and September) bat species community featured Yuma myotis, California myotis, canyon bat, long-legged myotis, fringed myotis, *Nyctinomops* sp., Townsend's big-eared bat, and Allen's big-eared bat.
- While the high (~40 meters) microphone at the MET tower detected little activity overall, it identified two distinct peaks of activity of mid-frequency bats (likely high-flying tree bats) in June and October that were not detected at the low (~5 meters) microphones.

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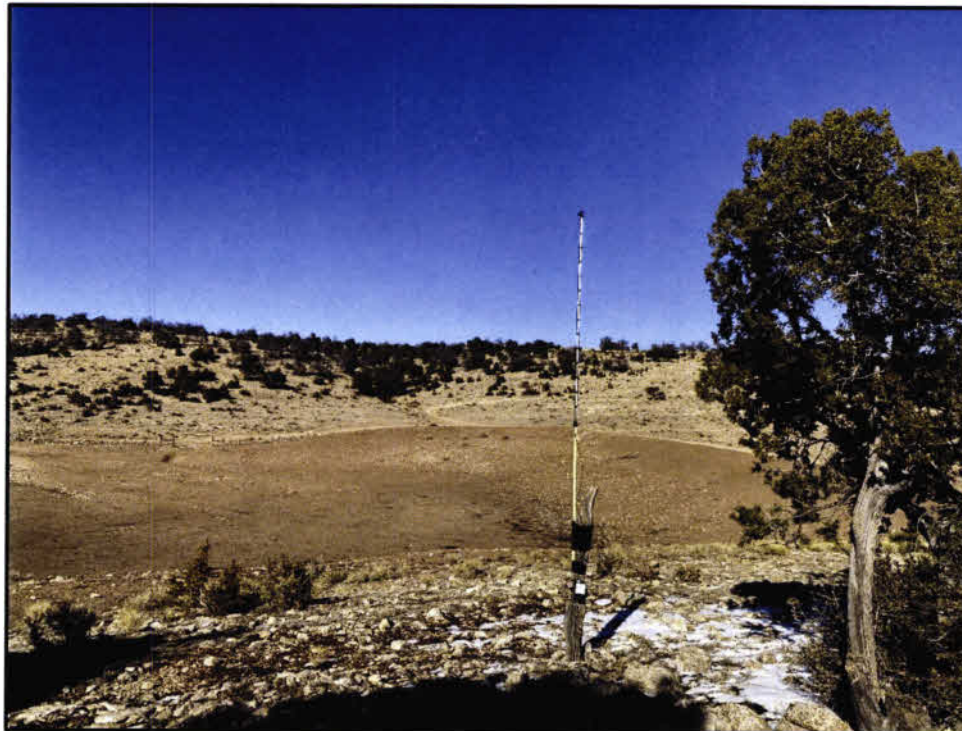
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APPENDIX A

Bat Acoustic Station Photographs



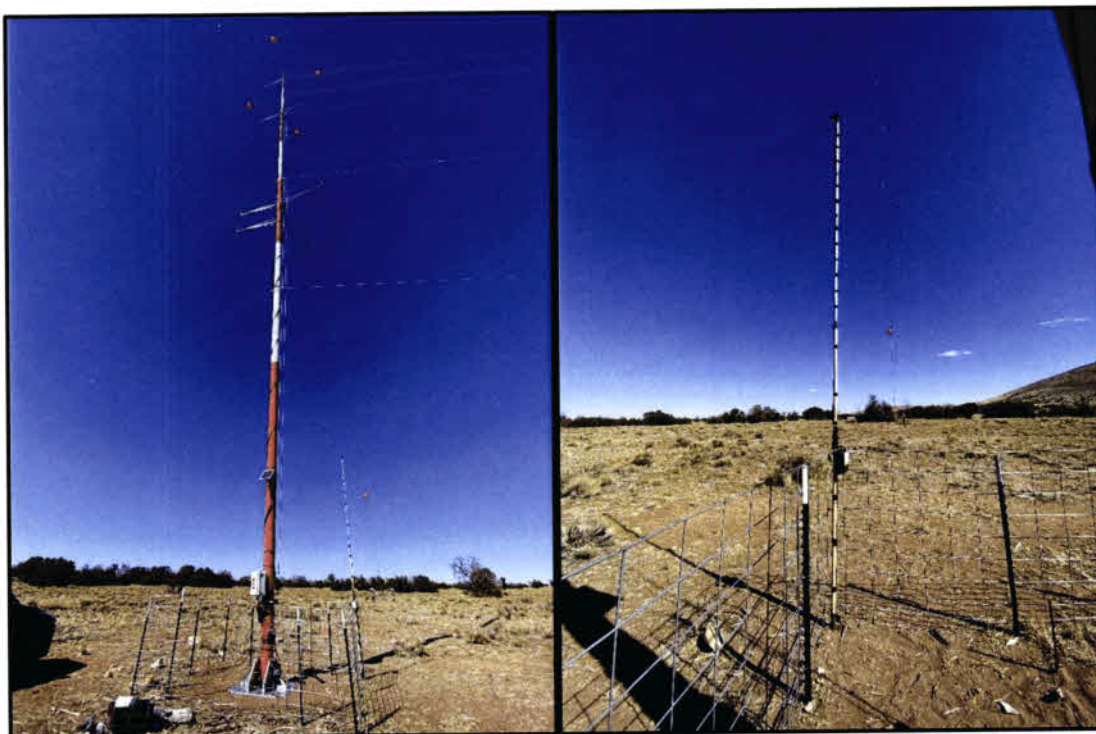
Photograph A-1. ZEUS-LK-TNK station, February 2021.



Photograph A-2. ZEUS-LK-TNK station, February 2021.



Photograph A-3. ZEUS-TOM-TNK, February 2021.



Photograph A-2. Left: ZEUS-MET-HI microphone mounted on a pulley system on the MET tower with ZEUS-MET-LO microphone on a painter's pole in the background, February 2021. Right: ZEUS-MET-LO station next to the MET tower, February 2021.

Exhibit B – Attachment B-4

Eagle and Other Raptor Species Nest Surveys, Zeus Wind Energy Facility,
2021 and 2022 Nesting Seasons; July 2022



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TECHNICAL MEMORANDUM

To: Morgan Schwenn
 RWE Renewables Development, LLC
 701 Brazos Street, Suite 1400
 Austin, Texas 87701

From: Allen Graber, Ecologist, SWCA Environmental Consultants

Date: July 12, 2021

Re: **Eagle and Other Raptor Species Nest Surveys, Zeus Wind Energy Facility,
 2021 Nesting Season / SWCA Project No. 61509**

INTRODUCTION

RWE Renewables Development, LLC (RWE) is proposing to develop the Zeus Wind Energy Project (project), a proposed 300-megawatt nameplate capacity wind energy facility. The project would be located on private and state land within a 35,409-acre analysis area approximately 25 miles north of Flagstaff, Arizona (Figure 1). Within the analysis area, RWE has identified a 17,793-acre buildable area which informed the 2021 1-mile and 2-mile nest survey buffers. Eagle nest inventory, occupancy, and productivity surveys have been conducted within portions of the analysis area and its vicinity since 2011 by the landowner (Babbitt Ranches), SWCA Environmental Consultants (SWCA), and the Arizona Game and Fish Department (AGFD).

The 2021 nest surveys were conducted in accordance with federal and state wind energy guidelines (AGFD 2012; U.S. Fish and Wildlife Service [USFWS] 2012, 2013, 2020) and the project's preconstruction wildlife survey plan (SWCA 2020). SWCA conducted 1) two eagle nest inventory and occupancy¹ surveys within 2 miles of the buildable area (Figure 1), and 2) in conjunction with the second eagle nest survey, a search for all raptor² species nests within 1 mile of the buildable area. Ground-based observers conducting avian use surveys (initiated in June 2021) within the analysis area also added to the nest dataset.

¹ The term *nest occupancy* is defined as a nest in which one or more of the following occur: 1) young are raised; 2) eggs are laid; 3) an adult is observed sitting, presumably in incubation or brooding posture, in the nest; 4) two adults are observed perched on or near the nest; 5) an adult and a bird in immature plumage are observed on or near the nest and mating behavior was observed (e.g., display flights, copulation); or 6) recent repairs (e.g., fresh greenery, sticks with fresh breaks), mutes (i.e., whitewash), or feathers are visible at or near the nest (Driscoll 2010; Postupalsky 1974; Steenhof and Newton 2007).

² Common raven (*Corvus corax*) nests are also commonly recorded using the method described herein.

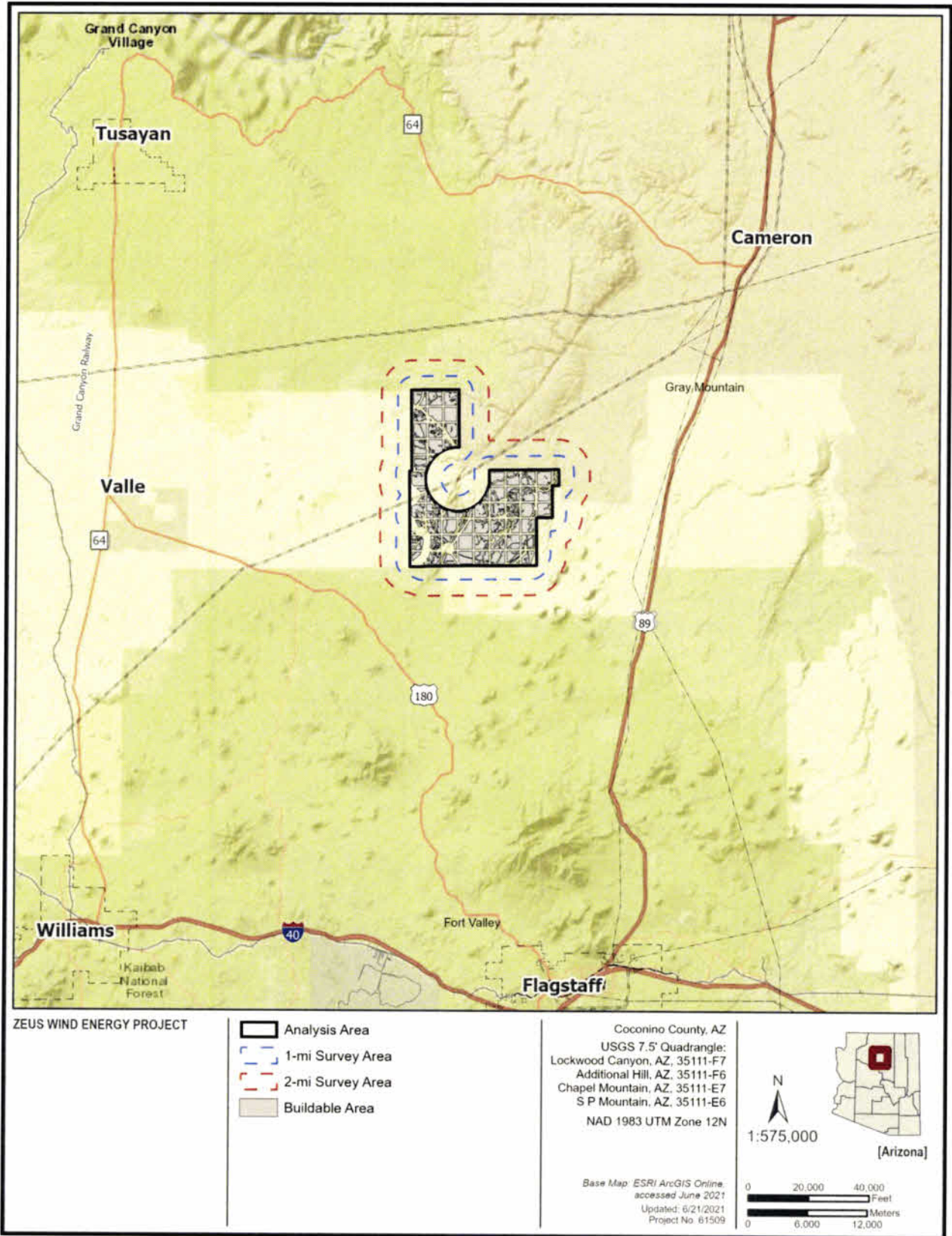


Figure 1. Project location and 2021 nest survey buffers.

Objectives were to document the number of nesting raptor pairs and their specific nest locations within and proximal to the analysis area (AGFD 2012; USFWS 2012) and to identify nesting pairs of eagles that might be disturbed or subject to potential lethal take (USFWS 2013, 2020).

METHODS

The eagle nest inventory and occupancy surveys within 2 miles of the buildable area were timed around golden eagle (*Aquila chrysaetos*) peak laying (Survey 1) and peak hatching (Survey 2) dates, as reported by McCarty et al. (2018), to maximize detection of eagle nest occupancy data as follows:

- Survey 1 (inventory and early nest occupancy): late February, when most nesting eagles were expected to have initiated courtship and nest maintenance/ornamentation, and a subset of nesting eagles was expected to be engaged in incubation activities.
- Survey 2 (continued inventory and late nest occupancy): late March, when all nesting eagles were expected to have initiated nesting activities.

The search for non-eagle raptor species nests within 1 mile of the buildable area was conducted in conjunction with eagle nest Survey 2 (in late March) and, due to weather delays, was completed in late April.

The eagle nest survey timing was vetted by wildlife agency representatives as part of early project coordination that included review of the project's wildlife survey plan (SWCA 2020) and a follow-up coordination meeting held on March 27, 2020. The timing prioritized *eagle* nest occupancy over that of other raptor species and common raven (*Corvus corax*). The subset of non-eagle raptor and common raven nests that were visited in late March were visited outside of peak nesting for those species, whereas those that were visited in late April were visited during peak nesting.

The surveys were conducted by helicopter (Bell 206L-series "Long Ranger"), which allowed for efficient coverage of vast, rugged landscapes and for a close (typically 40–100 m), above-nest approach to accurately determine nest contents.

Survey 1 (February 2021) involved a full inventory of potential eagle nesting habitats. During the March 2021 Survey 2 surveys, all nests categorized as eagle or possible eagle nest structures in Survey 1 were revisited to document nest contents. During this second survey, surveyors thoroughly investigated appropriate nesting substrates in proximity to the previously identified nests to document any newly built nests or nests that may have been missed during Survey 1. During both surveys, surveyors recorded any non-eagle raptor or common raven nests found within the surveyed eagle nesting habitats.

The project proximity-focused (i.e., 1-mile), non-eagle raptor nest inventory and nest occupancy surveys in March and April 2021 involved transect and strategic searches. During these surveys, surveyors also revisited non-eagle raptor and raven nest structures that were previously discovered in Survey 1 within 1 mile of the buildable area.

Eagle Nest Surveys within 2 Miles of the Buildable Area

Survey preparation involved 1) delineating potentially suitable golden eagle nesting habitats within the survey area, and 2) reviewing previously identified nests discovered during past, unrelated surveys of the survey area. Figure 2 illustrates the potential golden eagle nesting habitats (i.e., rugged terrain, rock faces, large trees and snags, and transmission towers) mapped by SWCA. Bald eagle (*Haliaeetus leucocephalus*) nesting habitats (i.e., large trees, snags, and cliffs <2 km [1.2 miles] from fish-bearing waters) were not expected to be present. An SWCA biologist qualified as an experienced helicopter eagle

nest surveyor (Pagel et al. 2010)³ delineated the potential golden eagle nesting habitats and led the survey effort. The nesting habitats were manually digitized using a combination of aerial imagery (National Agriculture Imagery Program) and U.S. Geological Survey topographic maps viewed at 1:12,000 and 1:24,000 scales using ArcGIS software.

Methods generally followed those outlined by Pagel et al. (2010). The surveys were sensitive to local nesting chronologies and disturbance at nests and were conducted during weather conditions favorable for aerial surveys. To ensure full coverage of the survey area during the eagle nest inventories, surveyors—guided by the desktop delineation layer—identified additional eagle nesting habitats while in the air and, conversely, limited surveys in areas that did not exhibit appropriate characteristics once observed. During refueling, the surveyors and pilot evaluated survey coverage and updated the plan for the remainder of the surveys, if necessary, to achieve full coverage of potential nesting habitats.

For each nest found, surveyors recorded the date and time of the observation, a nest identification number, nest substrate (i.e., cliff, tree, transmission tower), nest condition and contents, and species, if known. “Undetermined species” nests included any nests that were too deteriorated to be confidently identified to species or that exhibited qualities characteristic of several species. For these nests, surveyors recorded an informed opinion regarding which species or species group was most likely to use the nest based on nest structure and placement (e.g., “undetermined: resembles *Buteo* spp. or golden eagle,” or “undetermined: resembles *Buteo* spp. or raven”). Species determinations were also noted for nests being used by species that presumably did not construct them (i.e., several species are known to use heterospecific nest structures). A species determination for a given nest could change after a subsequent visit if surveyors observed species activity or nest contents or observed the nest structure under different conditions (e.g., distance, lighting).

The following nest conditions/contents were recorded: 1) sticks—intact, 2) sticks—deteriorating, 3) greenery/ornamentation, 4) adult in incubation/brooding posture, or 5) number of egg(s)/nestling(s). Surveyors noted specific nest structure characteristics and diagramed specific nests within nest clusters to ease relocation of nests during subsequent visits. All nests were photographed using a full-frame DSLR camera with a 200–500-mm lens. Following the surveys, photographs of each nest were thoroughly examined to accurately determine species and nest occupancy/contents.

In addition to the terms footnoted above, the following term is used to describe nests within golden eagle territories in the results of this report:

Alternate, or supernumerary nest: one of potentially several nests within a golden eagle nesting territory that is not being used for laying eggs in the current or given year (Katzner et al. 2020). Some eagle pairs use the same nest every year but may repair and add material to alternate nests situated within the same territory until eggs are laid (Boeker and Ray 1971; McGahan 1968). Some pairs may use the same nest every year or may switch nest sites from year to year (Boeker and Ray 1971; Katzner et al. 2020; McGahan 1968). Golden eagles use an average of two to three alternate nests, with some territories containing only one nest (range: 0–38 alternate nests) (Katzner et al. 2020). Golden eagle alternate nests can be placed less than 3 feet or more than 3.7 miles (<1 m or >6 km) apart (McGahan 1968).

³ Pagel et al. (2010) recommend that aerial golden eagle nest surveys be conducted by raptor specialists who have at least three field seasons of experience in helicopter-borne raptor surveys around cliff ecosystems.

Golden eagle and possible golden eagle nests were assigned to unique territories by first identifying simultaneously active⁴ nests. The remaining nests/nest clusters were assigned to unique territories if they were separated by more than 1.9 miles (3.1 km) (Phillips et al. 1984).⁵

Non-Eagle Species Nest Surveys within 1-mile of the Buildable Area

SWCA also prepared for the non-eagle species nest surveys by reviewing non-eagle species nests that had been previously found in the survey area during past, unrelated surveys.

To inventory non-eagle raptor species and raven nests within 1 mile of the buildable area, surveyors used a combination of transect (e.g., in densely treed habitats) and strategic (e.g., in lightly treed habitats) searches. North–south transects were spaced at 500-m intervals. In lightly treed habitats, and where certain habitats and features (e.g., treed drainages, cliff walls, transmission towers) required closer inspection, the surveyors led the pilot to veer off transects.

An effort was made to relocate each of the previously identified nests, most of which had been discovered in 2011. These previously identified nest structures, if still present during the 2021 surveys, were given a “CO###” naming convention; newly discovered nests were given a “ZE###” naming convention.

Surveyors recorded the same data fields as those described above using this survey method.

⁴ An *active* nest is one in which an egg or eggs are laid and/or young are raised (Driscoll 2010; Postupalsky 1974).

⁵ Assigning nest structures to certain territories can be refined over multiple years of survey; this exercise often requires some judgement calls based on historical and current nest use, general understanding of nearest-neighbor distances in a given region, topographic features, and viewsheds.

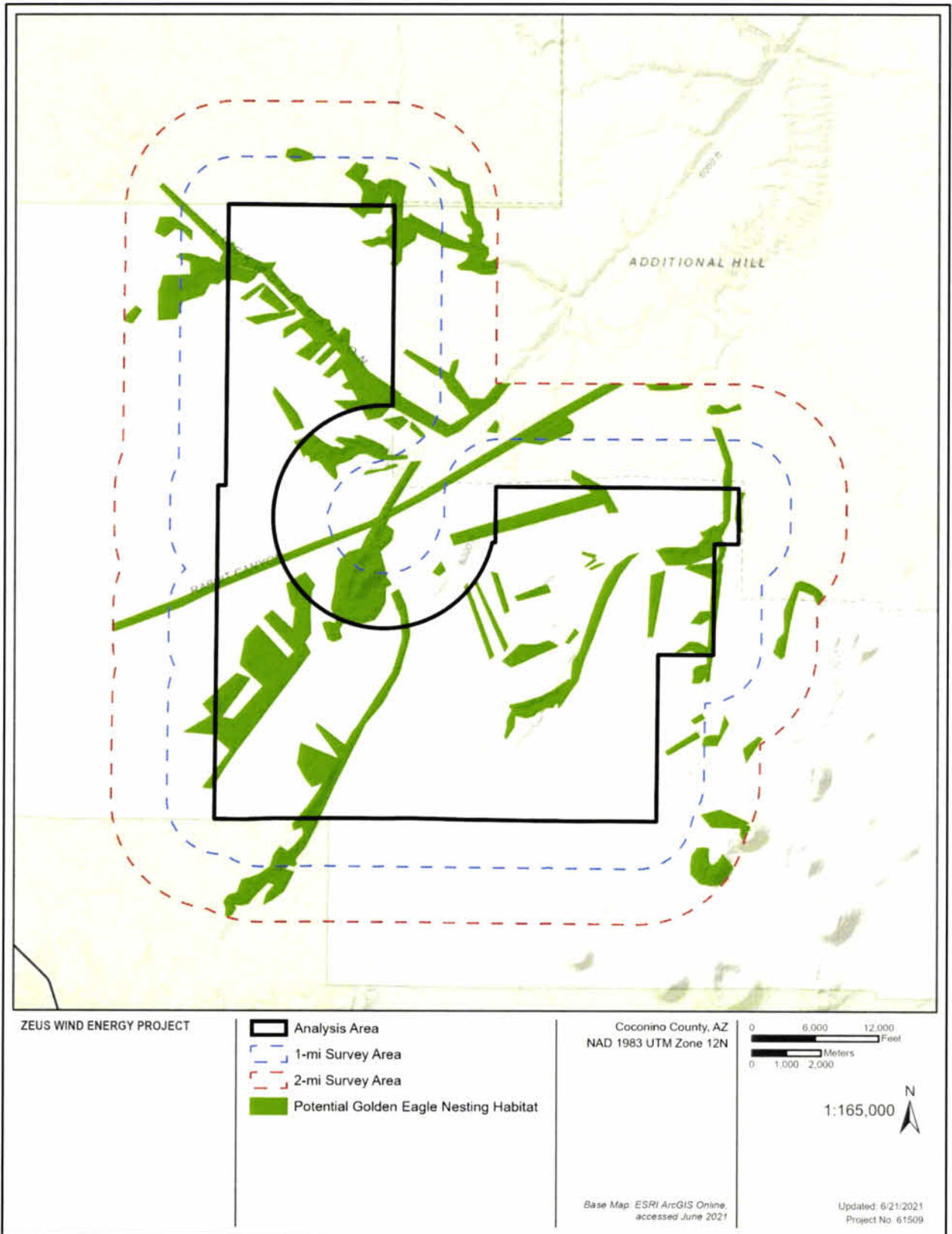


Figure 2. Potential golden eagle nesting habitats mapped by SWCA.

RESULTS

Survey Preparation

SWCA delineated 12,991 acres of potential golden eagle nesting habitats within the 112,276-acre, 2-mile survey area (see Figure 2). Previously identified nest structures were reviewed prior to the surveys; those that were still present during the 2021 surveys are included in the survey results presented below.

Nests Found by Ground-based Observers

In accordance with the project's wildlife survey plan (SWCA 2020), all SWCA biologists conducting on-site preconstruction surveys (i.e., bat acoustics monitoring, avian use surveys), which commenced in June 2021 (i.e., after the aerial nest surveys were completed) have been instructed to record any nests encountered. After the nest surveys were completed, on June 15, 2021, a ground-based observer documented two near fledged-age ferruginous hawk (*Buteo regalis*) nestlings in a nest (CO004) that had been documented by the helicopter surveyors as having an adult in incubation posture on April 23, 2021. This ground-based observation is reflected in the survey results presented below.

Nests within 2 Miles of the Buildable Area

SWCA conducted the surveys on February 22 (Survey 1), March 22 and March 24 (Survey 2), and April 23 (completion of the non-eagle nest inventory). Figure 3 illustrates the survey coverage in relation to the delineated potential eagle nesting habitats. In total, 47 nests were recorded within the 2-mile survey area (Figure 4). Species determinations were as follows:

Eagle or possible eagle nest structures (4):

- Golden eagle (1)
- Prairie falcon (*Falco mexicanus*); structure resembles *Buteo* spp. or golden eagle (1)
- Undetermined; structure resembles *Buteo* spp. or golden eagle (2)

Non-eagle species nest structures (43):

- Common raven (1)
- Ferruginous hawk (5)
- Undetermined; structure resembles *Buteo* spp. or common raven (34)
- Undetermined; structure resembles *Buteo* spp., including ferruginous hawk, or common raven (3)

Among the 47 nest structures, six (CO004, CO012, ZE014, ZE036, ZE041, ZE109) were documented as occupied or active (see Figure 4). In addition to the 47 nest structures, one previously identified golden eagle nest (CO007; see Figures 4, 5, and A.1, Appendix A) located directly on the 2-mile survey boundary was revisited. This nest was also active.

Nests within 1 Mile of the Buildable Area

Among the 47 nest structures, 40 were located within 1 mile of the buildable area (see Figure 4). These were categorized as follows:

Eagle or possible eagle nest structures (2):

- Prairie falcon; structure resembles *Buteo* spp. or golden eagle (1)
- Undetermined; structure resembles *Buteo* spp. or golden eagle (1)

Non-eagle species nest structures (38):

- Common raven (1)
- Ferruginous hawk (5)
- Undetermined; structure resembles *Buteo* spp. or common raven (29)
- Undetermined; structure resembles *Buteo* spp., including ferruginous hawk, or common raven (3)

Among the 40 nest structures, five were documented as occupied or active (see Table 1; see Figure 4).

Table 1. Occupied/Active Nests Within 1-Mile Survey Area, 2021

Nest ID	Species	Nest Occupancy/ Activity Status	Status Notes
Within 1-Mile Survey Area			
CO004	Ferruginous hawk	Occupied - Active	Adult in incubation posture (April 23), later observed by ground-based observers containing two near fledgling nestlings (June 15)
CO012	Prairie falcon; resembles <i>Buteo</i> spp. or golden eagle	Occupied - Active	Prairie falcon adult in incubation posture on a possible golden eagle nest structure
ZE036	Ferruginous hawk	Occupied - Active	Adult in incubation posture
ZE041	Ferruginous hawk	Occupied - Active	Adult in incubation posture
ZE109	Common raven	Occupied - Active	Adult in incubation posture

Note: see Figures 4 and 5.

Eagle and Possible Eagle Nests

The four nest structures identified as golden eagle (1) or possible golden eagle (3) within the 2-mile survey area were assigned to two golden eagle territories and one possible golden eagle territory (Table 2; Figure 5). One of the possible golden eagle nests (CO012; see Figure A.2, Appendix A) was assigned to the Powerline territory, which contains a previously identified golden eagle nest (CO007; see Figure A.1, Appendix A) located directly on the boundary of the 2-mile survey area. The CO12 nest (see Figure A.2, Appendix A) contained an incubating prairie falcon adult. The CO007 nest failed (an incubating adult was observed on February 22 and March 22, but the nest was empty on April 23). The other golden eagle territory (Lava Point) contained an active golden eagle nest (ZE014; see Figure A.3, Appendix A). The possible golden eagle territory contained an unoccupied, deteriorated nest (ZE012; see Figure A.4, Appendix A).

Whether the Lava Point nest (ZE014) successfully fledge young was unclear (an incubating adult was observed on February 22 and March 22, and an incubating or brooding adult was observed on April 23).⁶ If it were successful, it would have fledged between late May and early-June.

Table 2. Occupancy/Activity Status of Golden Eagle and Possible Golden Eagle Nests within 2-Mile Survey Area, 2021

SWCA Territory Name	Nest ID	Nest Occupancy/Activity Status 2021 Season
Lava Point	ZE013*	Not Occupied
	ZE014	Occupied - Active
Powerline	CO012*	Prairie falcon observed in incubation posture
Tom Tanks	ZE012*	Not Occupied

Note: The Tom Tanks territory was categorized as a possible golden eagle territory (it contained a possible eagle nest only). The Powerline territory contains a previously identified golden eagle nest (CO007) located directly on the 2-mile survey area boundary. That nest was active but failed in 2021. The CO012 nest was considered a possible alternate nest within that territory.

* Nests identified as possible eagle structures, meaning these nests are not necessarily alternate nests within an eagle territory (see Figures 5).

⁶ Given golden eagles have a 42-day (range: 41–45-day) incubation period and a 64-day (range: 45–77-day) nestling period, and adults brood or shade nestlings from hatching to about 45 days of age (Callopy 1984, Katzner et al. 2020), the adult observed on April 23 was either incubating an infertile egg or eggs or brooding a ≥ 16 -day old nestling or nestlings (i.e., nestling(s) were not observed but may have been obstructed from the observer's view by the adult; hatching success was unclear).

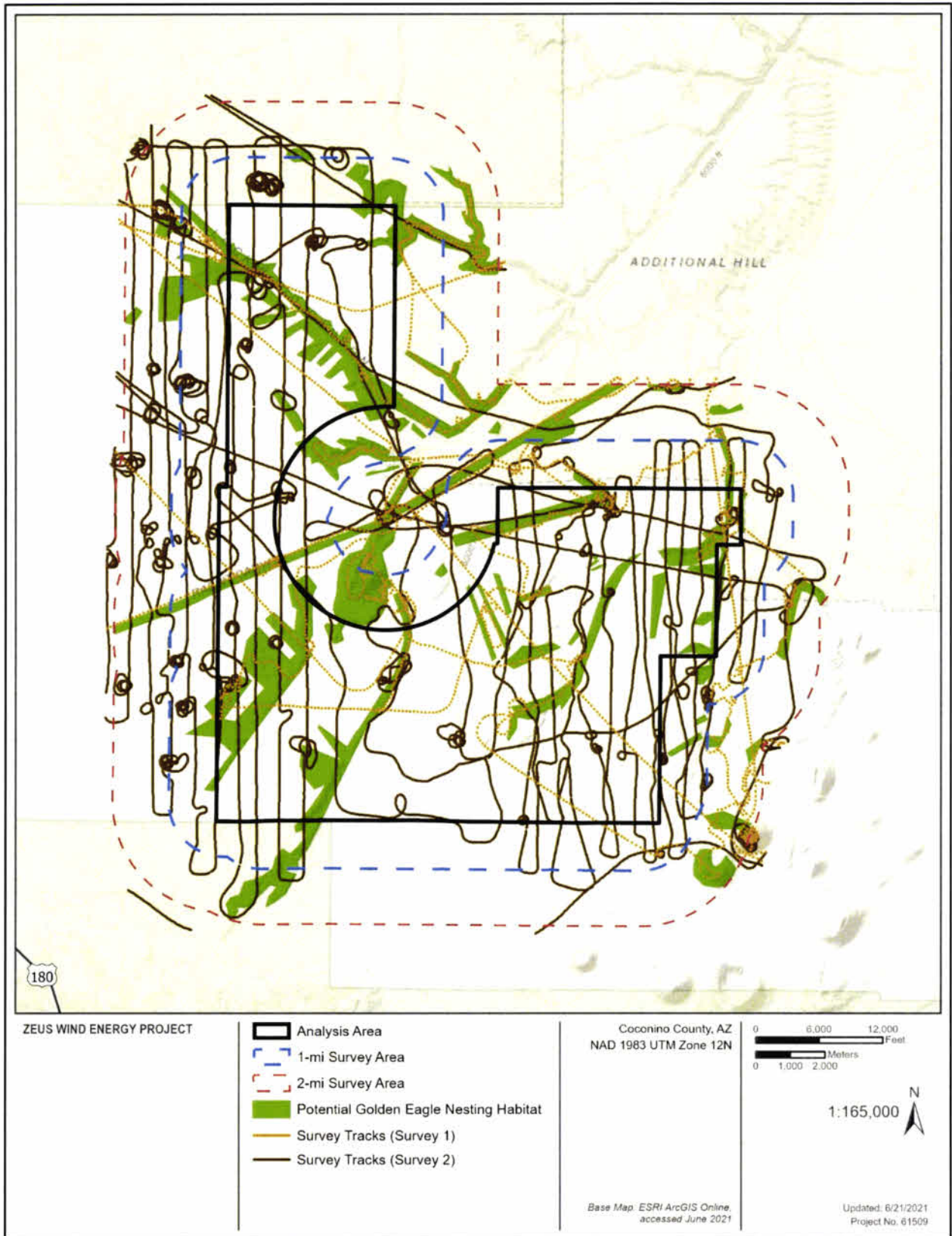


Figure 3. 2021 nest survey tracks.

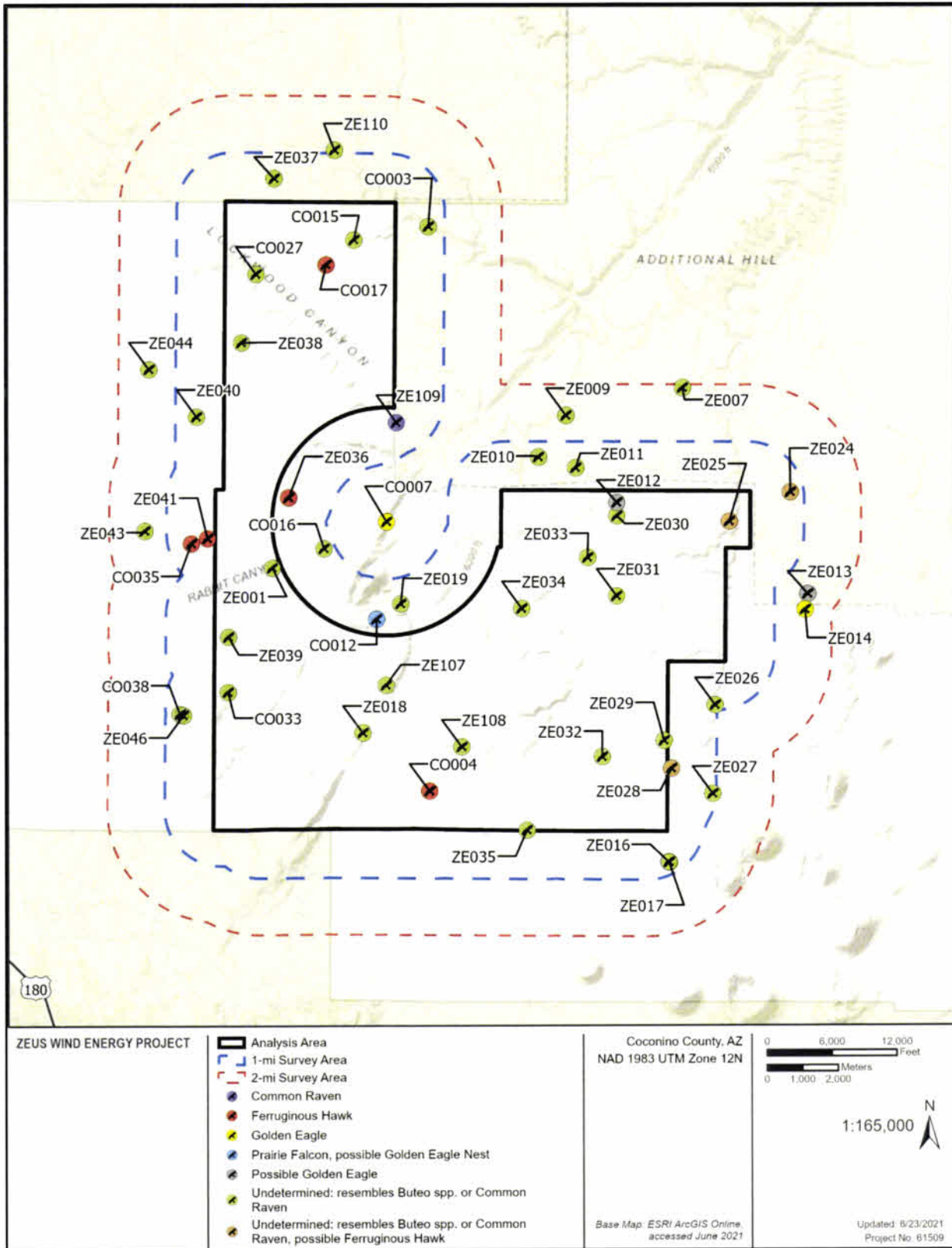


Figure 4. Raptor and common raven nests within 2 miles of the buildable area.

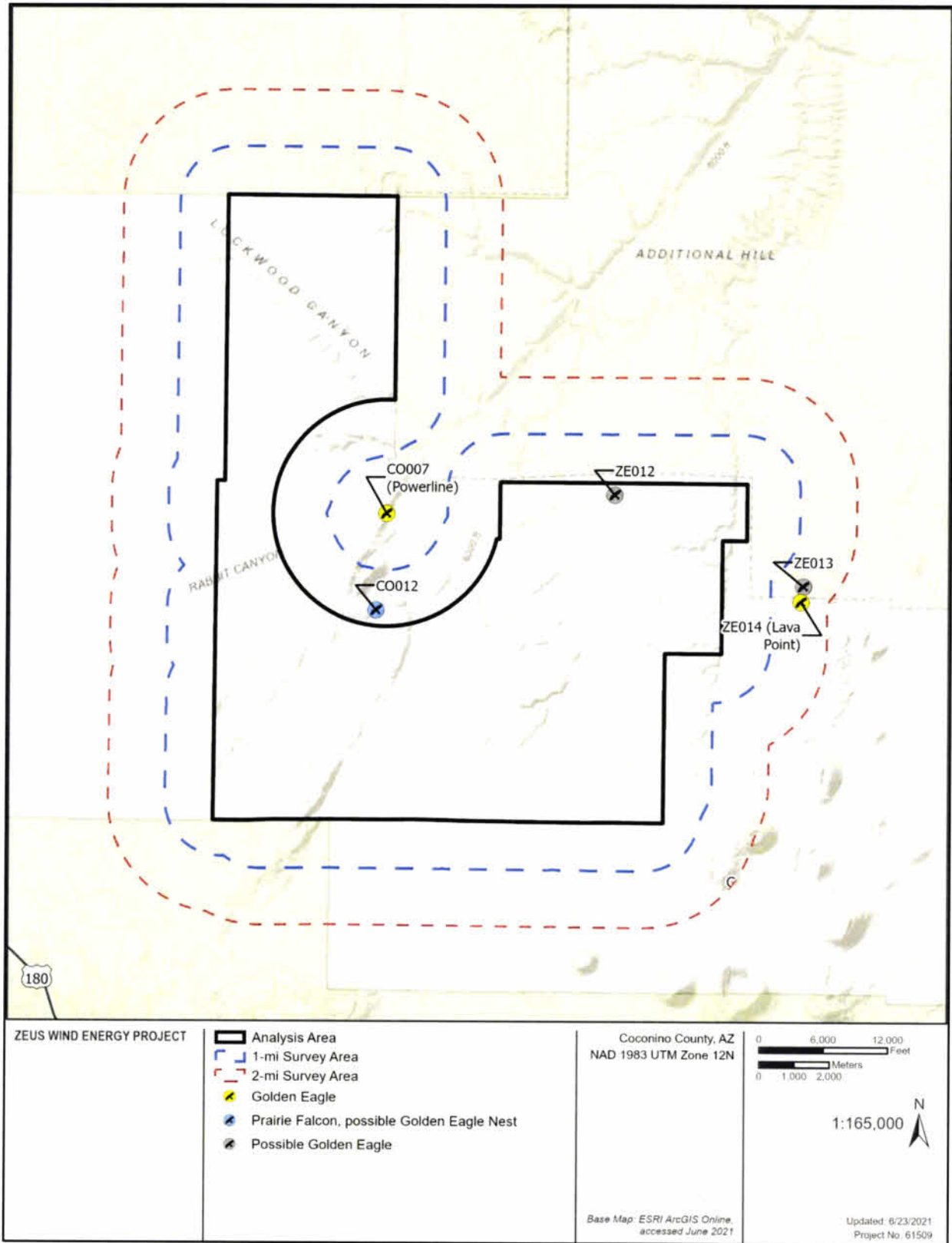


Figure 5. Golden eagle nests within 2 miles of the buildable area.

CO007 was located directly on the 2-mile survey area boundary.

PROJECT SITING AND NEST MANAGEMENT CONSIDERATIONS

Eagle Nest Avoidance Considerations

One golden eagle nesting pair (Lava Point) was documented within 2 miles of the buildable area. This pair's active nest (ZE014) was newly found in 2021; it was located 1.5 miles east of the buildable area. Based on USFWS (2013, 2020) language, the pair may be disturbed or subject to potential lethal take pending the project's design. Because the Powerline pair's active nest (CO007) was previously identified (the nest was discovered in 2011), that nest had already been avoided by 2 miles when the analysis area boundary was developed. Proximity of these important eagle-use area⁷ to the project's footprint,⁸ in part, can inform whether a project meets eagle take permit issuance criteria and measures taken to avoid or minimize potential adverse impacts.

Non-Eagle Raptor Nest Avoidance and Management Considerations

Four non-eagle raptor pairs (three ferruginous hawk and one prairie falcon) were observed nesting within 1 mile of the buildable area, one of which (ferruginous hawk nest CO004) was within the analysis area. To limit turbine collision potential for non-eagle raptors that may use these and other documented nest structures, SWCA recommends that RWE consider avoidance over inactive nest destruction. If needed, nest destruction would comply with Migratory Bird Treaty Act standards⁹ and AGFD's interpretation and implementation of Arizona Revised Statutes 17-236.¹⁰

KEY FINDINGS

- 47 nest structures were identified within the 2-mile survey area during the 2021 nest surveys, 40 of which were located within 1 mile of the buildable area.
- Four golden eagle (1) or possible golden eagle (3) nest structures were found within the 2-mile survey area. The golden eagle nest, which was located 1.5 miles east of the buildable area boundary, was active.
- Four nesting non-eagle raptor pairs—ferruginous hawk (3) and prairie falcon (1)—were documented within 1 mile of the buildable area, one of which was found within the analysis area.

⁷ An *important eagle-use area* is defined by the USFWS (2009) as an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles. The term refers to particular areas within a broader landscape where eagles are more likely to be disturbed by an activity because of the higher probability of interference with breeding, feeding, or sheltering behaviors.

⁸ USFWS (2013) defines *project footprint* as the minimum convex polygon encompassing turbines and any associated infrastructure.

⁹ A permit is not required to destroy inactive migratory bird nests (i.e., those without viable eggs or nestlings), provided that no possession occurs, and no permit or other regulatory authorization is required (USFWS 2018).

¹⁰ In Arizona, it is unlawful to "remove the nests or eggs of any bird, except as may occur in normal horticultural and agricultural practices and except as authorized by commission order". The intention of the statute is to prohibit removal of active nests, rather than inactive nests; a state permit is not required to remove an inactive nest (personal communication, Christina Kondrat-Smith, Permitting Specialist, AGFD, with Allen Graber, Ecologist, SWCA, December 3, 2019; personal communication, Kenneth "Tuk" Jacobson, Raptor Program Coordinator, AGFD, with Allen Graber, Ecologist, SWCA, January 28, 2021).

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APPENDIX A
Select Nest Photographs



Figure A.1. Active golden eagle nest CO007 (Powerline), February 22, 2021.

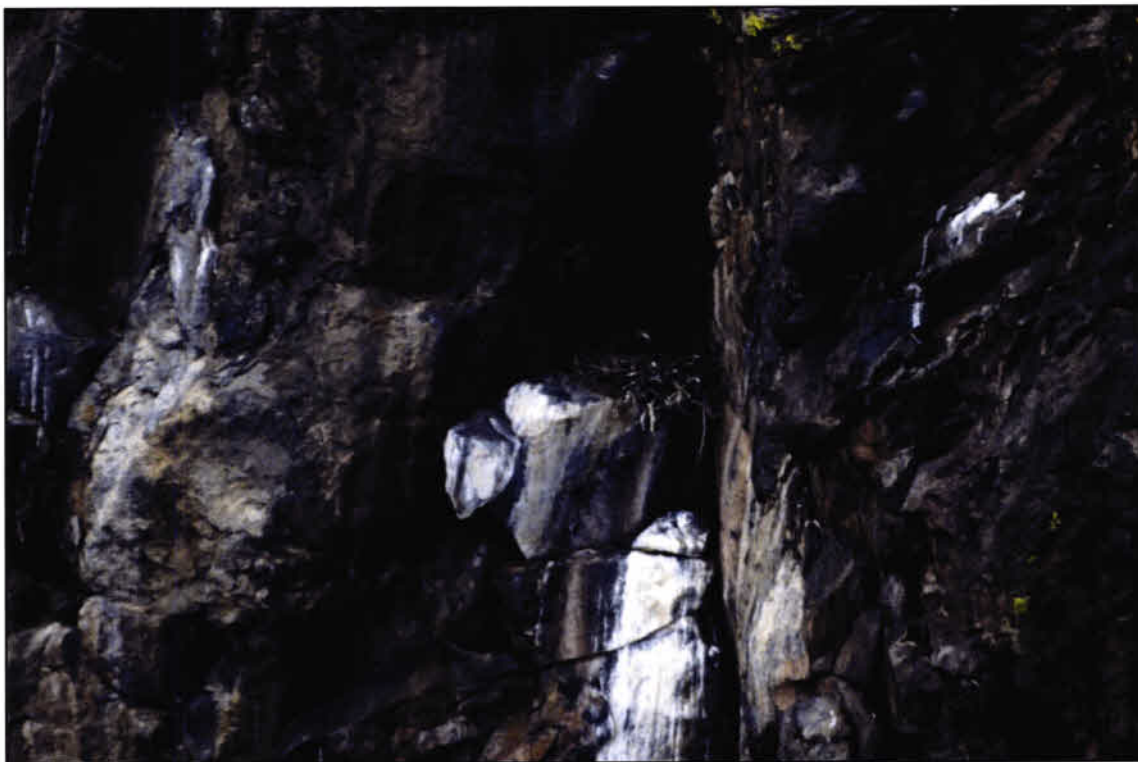


Figure A.2. Active prairie falcon on possible golden eagle nest CO012, April 23, 2021.



Figure A.3. Active golden eagle nest ZE014 (Lava Point), April 23, 2021.



Figure A.4. Unoccupied, possible golden eagle nest ZE012, February 22, 2021.



Figure A.5. Active ferruginous hawk nest ZE036, April 23, 2021.



Figure A.6. Active ferruginous hawk nest CO004, April 23, 2021.

TECHNICAL MEMORANDUM

To: Morgan Schwenn
RWE Renewables Development, LLC
701 Brazos Street, Suite 1400
Austin, Texas 87701

From: Jenn Katalinich, Project Manager, SWCA Environmental Consultants

Date: July 19, 2022

Re: **Eagle and Other Raptor Species Nest Surveys, Zeus Wind Energy Facility, 2022 Nesting Season / SWCA Project No. 61509**

INTRODUCTION

RWE Renewables Development, LLC (RWE) is proposing to develop the Zeus Wind Energy Project (project), a proposed 300-megawatt nameplate capacity wind energy facility. The project would be located on private and state land within a 35,409-acre analysis area approximately 25 miles north of Flagstaff, Arizona (Figure 1). Within the analysis area, RWE has identified a 17,793-acre buildable area that informed the 2021 1-mile and 2-mile nest survey buffers. Eagle nest inventory, occupancy, and productivity surveys have been conducted within portions of the analysis area and its vicinity since 2011 by the landowner (Babbitt Ranches), SWCA Environmental Consultants (SWCA), and the Arizona Game and Fish Department (AGFD).

The 2022 nest surveys were conducted in accordance with federal and state wind energy guidelines (AGFD 2012; U.S. Fish and Wildlife Service [USFWS] 2012, 2013, 2020) and the project's preconstruction wildlife survey plan (SWCA 2020). SWCA conducted 1) two eagle nest inventory and occupancy¹ surveys within 2 miles of the buildable area (see Figure 1), and 2) in conjunction with the second eagle nest survey, a search for all raptor² species nests within 1 mile of the buildable area.

The objectives were to document the number of nesting raptor pairs and their specific nest locations within and proximal to the analysis area (AGFD 2012; USFWS 2012) and to identify nesting pairs of eagles that might be disturbed or subject to potential lethal take (USFWS 2013, 2020) as a result of the proposed project.

¹ The term *nest occupancy* is defined as a nest in which one or more of the following occur: 1) young are raised; 2) eggs are laid; 3) an adult is observed sitting, presumably in incubation or brooding posture, in the nest; 4) two adults are observed perched on or near the nest; 5) an adult and a bird in immature plumage are observed on or near the nest and mating behavior was observed (e.g., display flights, copulation); or 6) recent repairs (e.g., fresh greenery, sticks with fresh breaks), mutes (i.e., whitewash), or feathers are visible at or near the nest (Driscoll 2010; Postupalsky 1974; Steenhof and Newton 2007).

² Common raven (*Corvus corax*) nests are also commonly recorded using the method described herein.

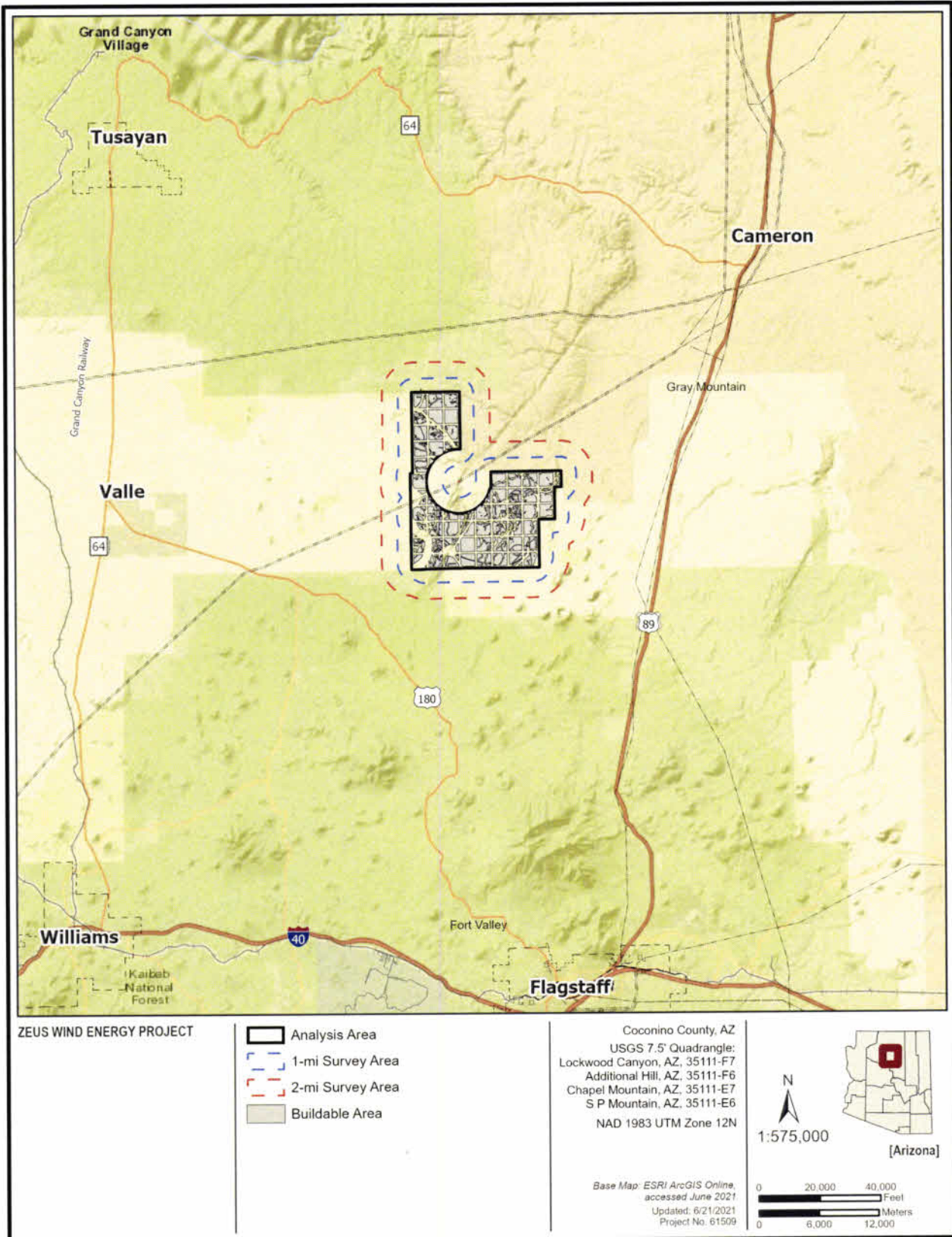


Figure 1. Project location and 2022 nest survey buffers.

METHODS

The eagle nest inventory and occupancy surveys within 2 miles of the buildable area were timed around golden eagle (*Aquila chrysaetos*) peak laying (Survey 1) and peak hatching (Survey 2) dates, as reported by McCarty et al. (2018), to maximize detection of eagle nest occupancy data as follows:

- Survey 1 (inventory and early nest occupancy): late February, when most nesting eagles were expected to have initiated courtship and nest maintenance/ornamentation, and a subset of nesting eagles was expected to be engaged in incubation activities.
- Survey 2 (continued inventory and late nest occupancy): late March, when all nesting eagles were expected to have initiated nesting activities.

The search for non-eagle raptor species nests within 1 mile of the buildable area was conducted in conjunction with eagle nest Survey 2 (in late March).

The eagle nest survey timing was vetted by wildlife agency representatives as part of early project coordination that included review of the project's wildlife survey plan (SWCA 2020) and a follow-up coordination meeting held on March 27, 2020. The timing prioritized eagle nest occupancy over that of other raptor species and common raven (*Corvus corax*). The subset of non-eagle raptor and common raven nests that were visited in late March were visited outside of peak nesting for those species, whereas those that were visited in late April were visited during peak nesting.

The surveys were conducted by helicopter (Bell 206L-series "Long Ranger"), which allowed for efficient coverage of vast, rugged landscapes and for a close (typically 40–100 meters), above-nest approach to accurately determine nest contents.

Survey 1 (February 2022) involved a full inventory of potential eagle nesting habitats. During the March 2022 (Survey 2) survey, all nests categorized as eagle or possible eagle nest structures in Survey 1 were revisited to document nest contents. During this second survey, surveyors thoroughly investigated appropriate nesting substrates in proximity to the previously identified nests to document any newly built nests or nests that may have been missed during Survey 1. During both surveys, surveyors recorded any non-eagle raptor or common raven nests found within the surveyed eagle nesting habitats.

Transect and strategic searches were conducted during the non-eagle raptor nest inventory and nest occupancy surveys (Survey 2) in March. During these surveys, surveyors also revisited non-eagle raptor and raven nest structures that were previously discovered in Survey 1 within 1 mile of the buildable area.

Eagle Nest Surveys within 2 Miles of the Buildable Area

Survey preparation involved 1) delineating potentially suitable golden eagle nesting habitats within the survey area, and 2) reviewing previously identified nests discovered during past, unrelated surveys of the survey area. Figure 2 illustrates the potential golden eagle nesting habitats (i.e., rugged terrain, rock faces, large trees and snags, and transmission towers) mapped by SWCA. Bald eagle (*Haliaeetus leucocephalus*) nesting habitats (i.e., large trees, snags, and cliffs 1.2 miles (<2 km) from fish-bearing waters) were not expected to be present. An SWCA biologist qualified as an experienced helicopter eagle nest surveyor (Pagel et al. 2010)³ delineated the potential golden eagle nesting habitats and led the survey effort. The nesting habitats were manually digitized using a combination of aerial imagery (National Agriculture Imagery Program) and U.S. Geological Survey topographic maps viewed at 1:12,000 and 1:24,000 scales using ArcGIS software.

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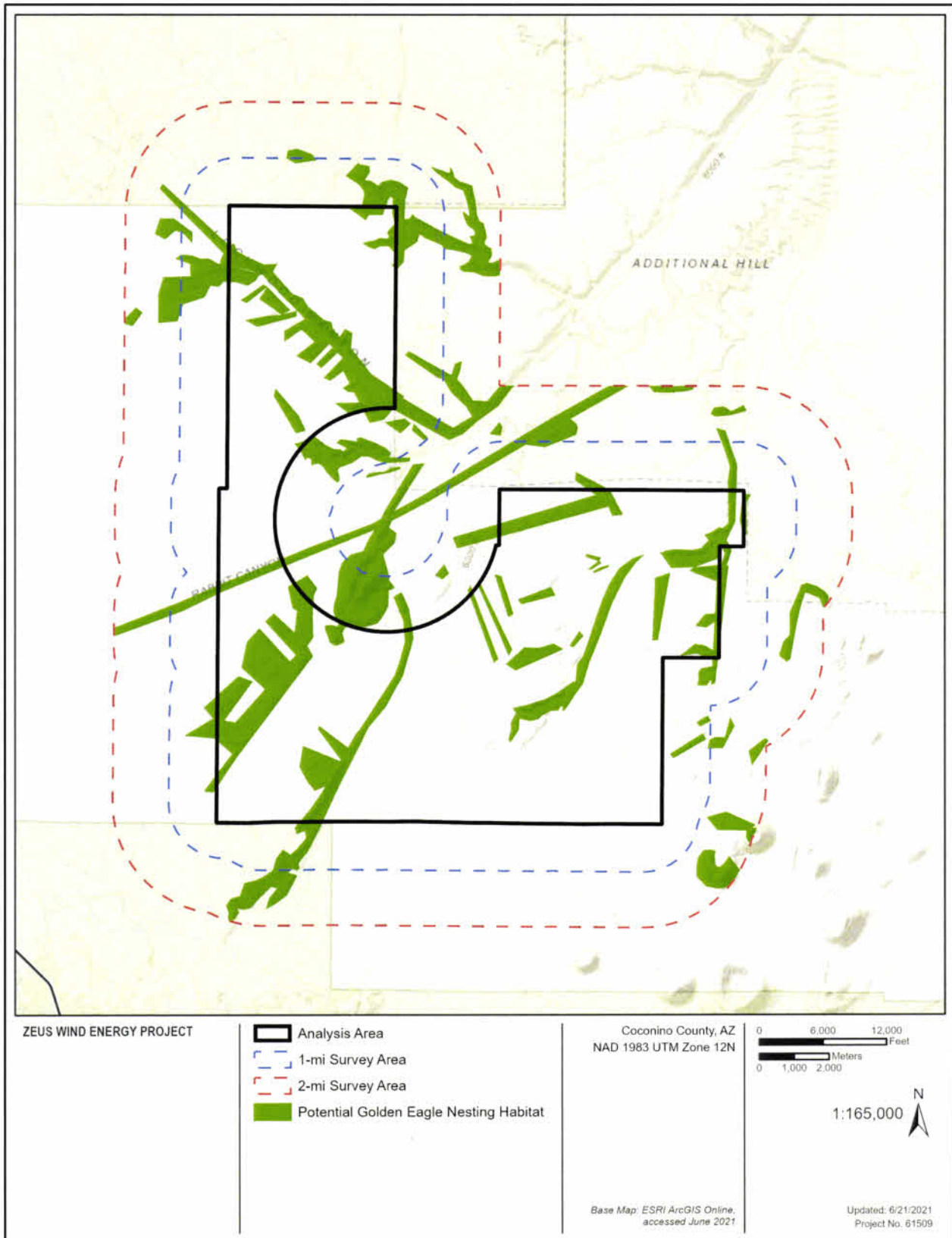


Figure 2. Potential golden eagle nesting habitats mapped by SWCA.

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For each nest found, surveyors recorded the date and time of the observation, a nest identification number, nest substrate (i.e., cliff, tree, transmission tower), nest condition and contents, and species, if known. “Undetermined species” nests included any nests that were too deteriorated to be confidently identified to species or that exhibited qualities characteristic of several species. For these nests, surveyors recorded an informed opinion regarding which species or species group was most likely to use the nest based on nest structure and placement (e.g., “undetermined: resembles *Buteo* spp. or golden eagle,” or “undetermined: resembles *Buteo* spp. or raven”). Species determinations were also noted for nests being used by species that presumably did not construct them (i.e., several species are known to use heterospecific nest structures). A species determination for a given nest could change after a subsequent visit if surveyors observed species activity or nest contents or observed the nest structure under different conditions (e.g., distance, lighting).

The following nest conditions/contents were recorded: 1) sticks—intact, 2) sticks—deteriorating, 3) greenery/ornamentation, 4) adult in incubation/brooding posture, or 5) number of egg(s)/nestling(s). Surveyors noted specific nest structure characteristics and diagramed specific nests within nest clusters to ease relocation of nests during subsequent visits. All nests were photographed using a full-frame DSLR camera with a 200–500-mm lens. Following the surveys, photographs of each nest were thoroughly examined to accurately determine species and nest occupancy/contents.

In addition to the terms footnoted above, the following term is used to describe nests within golden eagle territories in the results of this report:

Alternate, or supernumerary nest: one of potentially several nests within a golden eagle nesting territory that is not being used for laying eggs in the current or given year (Katzner et al. 2020). Some eagle pairs use the same nest every year but may repair and add material to alternate nests situated within the same territory until eggs are laid (Boeker and Ray 1971; McGahan 1968). Some pairs may use the same nest every year or may switch nest sites from year to year (Boeker and Ray 1971; Katzner et al. 2020; McGahan 1968). Golden eagles use an average of two to three alternate nests, with some territories containing only one nest (range: 0–38 alternate nests) (Katzner et al. 2020). Golden eagle alternate nests can be placed less than 3 feet or more than 3.7 miles (<1 m or >6 km) apart (McGahan 1968).

Golden eagle and possible golden eagle nests were assigned to unique territories by first identifying simultaneously active⁴ nests. The remaining nests/nest clusters were assigned to unique territories if they were separated by more than 1.9 miles (3.1 km) (Phillips et al. 1984).⁵

⁴ An *active* nest is one in which an egg or eggs are laid and/or young are raised (Driscoll 2010; Postupalsky 1974).

⁵ Assigning nest structures to certain territories can be refined over multiple years of survey; this exercise often requires some judgement calls based on historical and current nest use, general understanding of nearest-neighbor distances in a given region, topographic features, and viewsheds.

Non-Eagle Species Nest Surveys within 1 Mile of the Buildable Area

SWCA also prepared for the non-eagle species nest surveys by reviewing non-eagle species nests that had been previously found in the survey area during past, unrelated surveys.

To inventory non-eagle raptor species and raven nests within 1 mile of the buildable area, surveyors used a combination of transect (e.g., in densely treed habitats) and strategic (e.g., in lightly treed habitats) searches. North–south transects were spaced at 500-m intervals. In lightly treed habitats, and where certain habitats and features (e.g., treed drainages, cliff walls, transmission towers) required closer inspection, the surveyors led the pilot to veer off transects.

An effort was made to relocate each of the previously identified nests, most of which had been discovered in 2011 and 2021. These previously identified nest structures from 2011, if still present during the 2021 and 2022 surveys, were given a “CO###” naming convention; nests discovered in 2021 were given a “ZE###” naming convention.

Surveyors recorded the same data fields as those described above using this survey method.

RESULTS

Survey Preparation

SWCA delineated 12,991 acres of potential golden eagle nesting habitats within the 112,276-acre, 2-mile survey area (see Figure 2). Previously known or potential ferruginous hawk (*Buteo regalis*; a state species of concern, SGCN 1B) and golden eagle nest structures were reviewed prior to the surveys; those that were still present during the 2022 surveys are included in the survey results presented below.

SWCA conducted the surveys on February 27 (Survey 1) and March 26 (Survey 2). Figure 3 illustrates the survey coverage in relation to the delineated potential eagle nesting habitats. In total, 13 nests/nest structures were identified (Figure 4; see Appendix A). Species determinations and locations were as follows.

Within 2-mile survey area:

- Golden eagle (2)
- Undetermined; structure resembles golden eagle (1)

Within 1-mile survey area:

- Ferruginous hawk (3)
- Prairie falcon (*Falco mexicanus*); structure resembles golden eagle (1)
- Undetermined; structure resembles *Buteo* spp. (possible ferruginous hawk) or common raven (2)

Inside analysis area:

- Ferruginous hawk (2)
- Undetermined; structure resembles *Buteo* spp. or common raven (1)
- Undetermined; structure resembles *Buteo* spp. (possible ferruginous hawk) or common raven (1)

Among the 13 nest structures, four (CO007, CO012, CO017, CO035) were documented as occupied or with an occupancy status that was undetermined (see Figure 4 and Table 1).

Table 1. Occupied/Active Nests, 2022

Nest ID	Location	Species	2022 Nest Occupancy/ Activity Status	Status Notes
CO007	2-mile survey area	Golden eagle	Occupied - active	Adult in incubation/brooding position.
CO012	1-mile survey area	Prairie falcon: possible golden eagle	Occupancy status unknown	Rebuilt from 2021; new material observed during Survey 2 in 2022.
CO017	Analysis area	Ferruginous hawk	Occupancy status unknown	Adult perched nearby; did not flush.
CO035	1-mile survey area	Ferruginous hawk	Occupancy status unknown	More material observed during Survey 2.

Eagle and Possible Eagle Nests

The three nest structures identified as golden eagle (2), or possible golden eagle (1) were assigned to two golden eagle territories (Table 2 and Figure 5). Nests ZE013 and ZE014 are within the Lava Point territory. Although materials had been moved between surveys, ZE013 appeared relatively unchanged and no adults were observed nearby; therefore, the nest was considered not occupied for the 2022 nesting season. ZE014 was an occupied golden eagle nest in 2021, and new nest material (compared to 2021 photos) was observed during Survey 1. However, the nest was subsequently unoccupied and unchanged during Survey 2; this nest is considered “not occupied” for the 2022 nesting season. CO007 is a previously discovered golden eagle nest located directly on the boundary of the 2-mile survey area and is considered part of the Powerline territory. An adult golden eagle was observed in incubating/brooding posture during both 2022 surveys. The success of the nest is unknown. CO012 is also considered part of the Powerline territory; the nest was occupied by a prairie falcon in 2021 and was unoccupied in 2022.

Table 2. Occupancy/Activity Status of Golden Eagle and Possible Golden Eagle Nests within the 1- and 2-Mile Buffer Areas

SWCA Territory Name	Nest ID	2022 Nest Occupancy/Activity Status
Lava Point	ZE013*	Not occupied
	ZE014	Not occupied
Powerline	CO007	Occupied – active
	CO012*	Not occupied

* Nests identified as possible eagle structures, meaning these nests are not necessarily alternate nests within an eagle territory (see Figure 5).

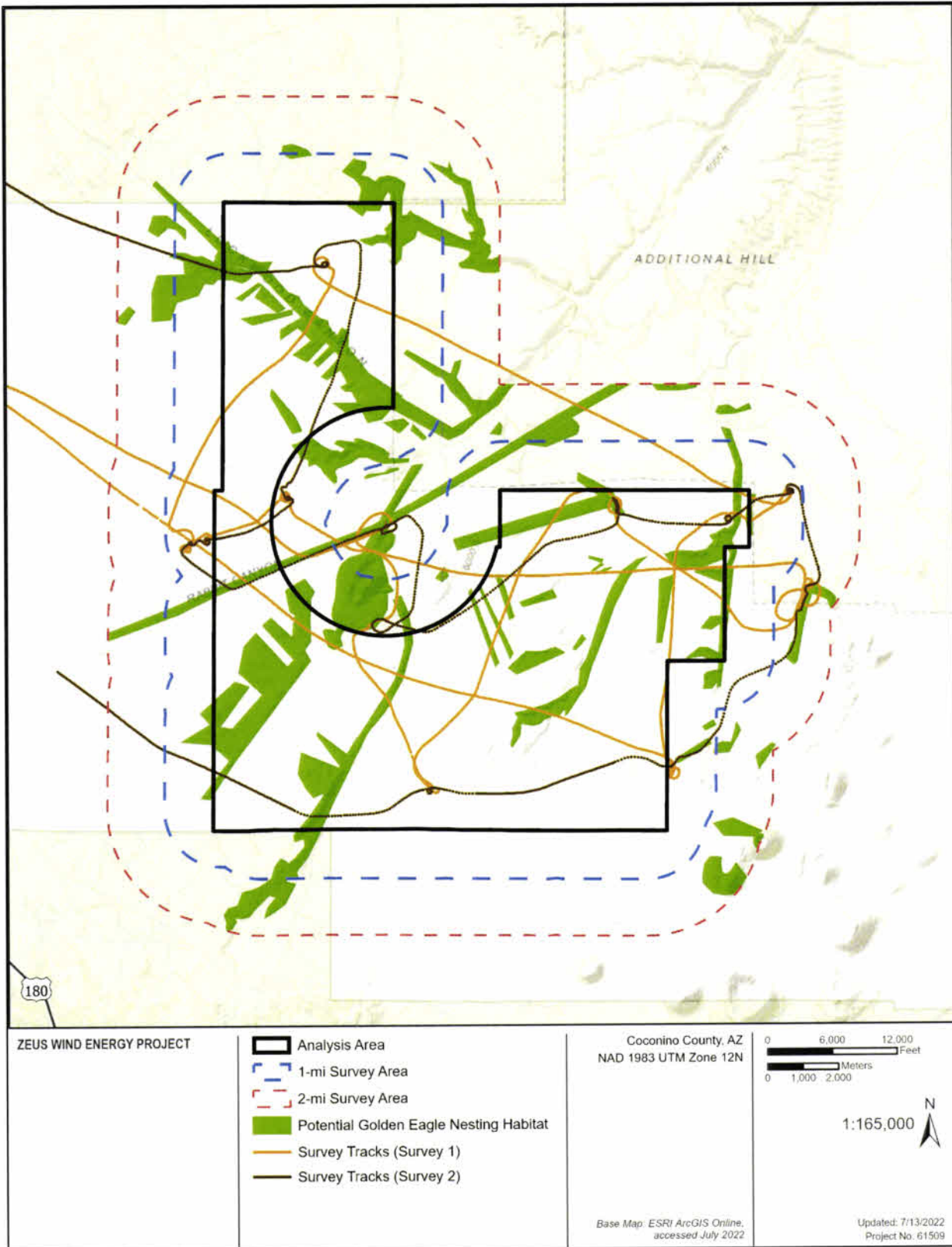


Figure 3. 2022 nest survey tracks.

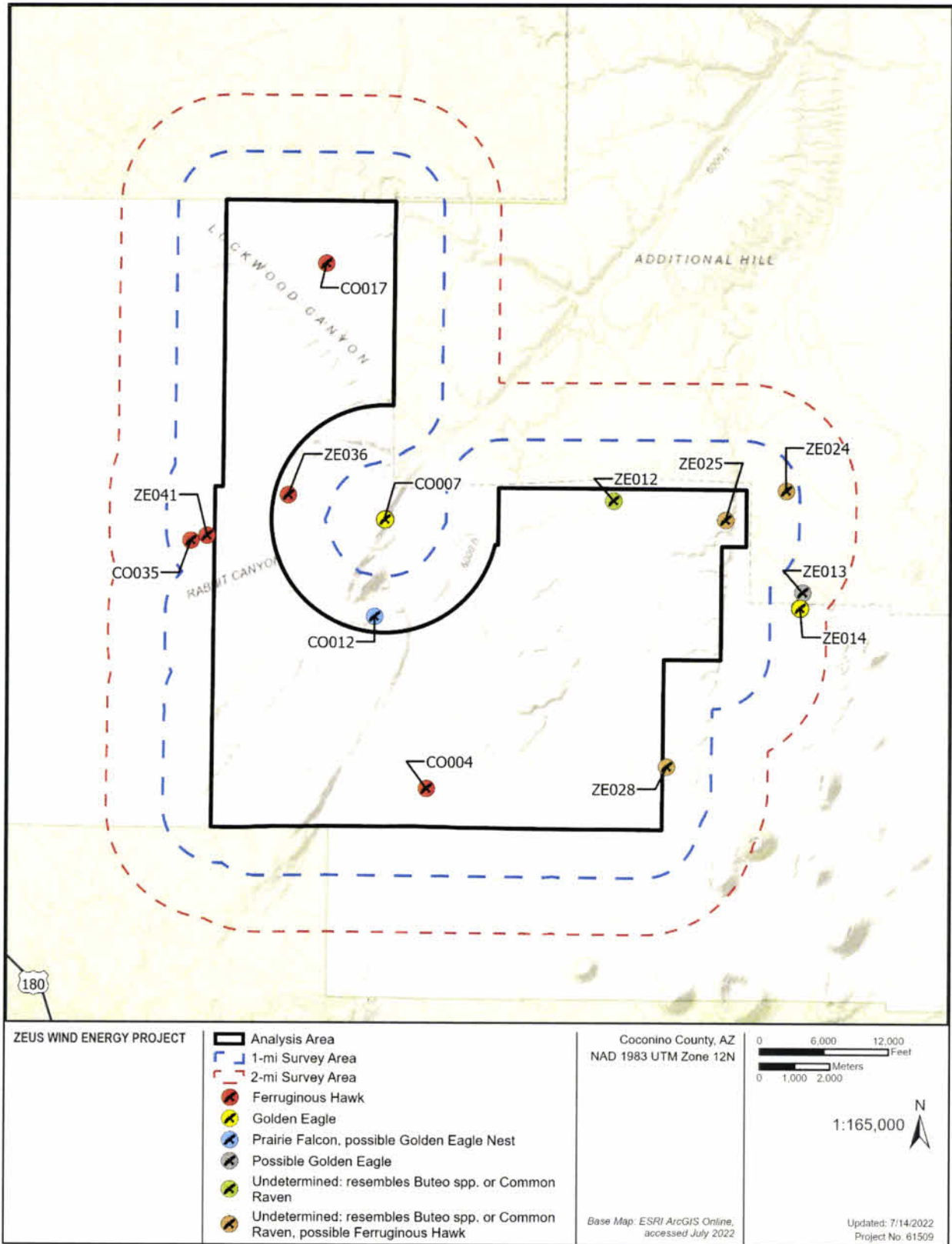


Figure 4. Eagle, raptor, and undetermined species nests inside the analysis area and within 2 miles.

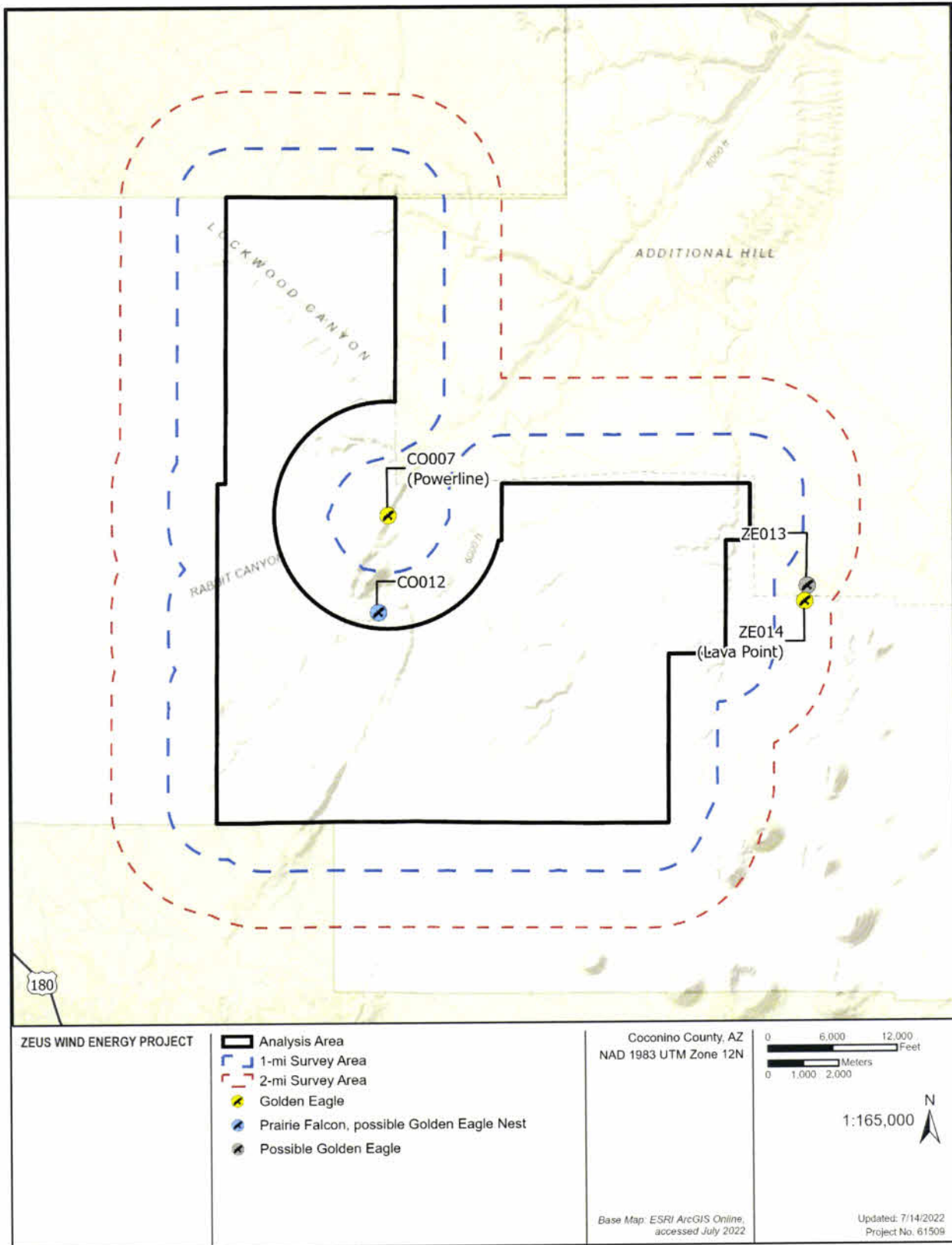


Figure 5. Known and possible golden eagle nests within 2 miles of the buildable area.

CO007 was located directly on the 2-mile survey area boundary.

PROJECT SITING AND NEST MANAGEMENT CONSIDERATIONS

Eagle Nest Avoidance Considerations

One golden eagle nesting pair (Powerline) was documented within 2 miles of the buildable area. Because this pair's active nest (CO007) was previously identified (discovered in 2011), that nest had already been avoided by 2 miles when the analysis area boundary was developed. Proximity of this important eagle-use area⁶ to the project's footprint,⁷ in part, can inform whether a project meets eagle take permit issuance criteria and measures taken to avoid or minimize potential adverse impacts.

During the 2021 surveys, one golden eagle nesting pair (Lava Point) was documented within 2 miles of the buildable area. This pair's nest (ZE014) was newly found in 2021 but was unoccupied in 2022; it is located 1.5 miles east of the buildable area. Based on USFWS (2013, 2020) language, the pair may be disturbed or subject to potential lethal take pending the project's design.

Non-Eagle Raptor Nest Avoidance and Management Considerations

Although a single adult ferruginous hawk was observed near nest CO017, no occupied non-eagle nests were observed during the 2022 surveys. To limit turbine collision potential for non-eagle raptors that may use this and other previously documented nest structures, SWCA recommends that RWE consider avoidance over inactive nest destruction. If needed, nest destruction would comply with Migratory Bird Treaty Act standards⁸ and AGFD's interpretation and implementation of Arizona Revised Statutes 17-236.⁹

KEY FINDINGS

- In total, 13 nest structures were identified within the 2-mile survey area during the 2022 nest surveys, six of which were located within 1 mile of the buildable area and four of which were within the analysis area.
- Three golden eagle (2) or possible golden eagle (1) nest structures were found within the 2-mile survey area, and one possible golden eagle nest (previously occupied by a prairie falcon) was found within the 1-mile survey area. The only active golden eagle nest (CO007) was located along the 2-mile survey boundary.
- No actively nesting non-eagle raptor pairs were documented inside the analysis area or within 1 mile.

⁶ An *important eagle-use area* is defined by the USFWS (2009) as an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles. The term refers to particular areas within a broader landscape where eagles are more likely to be disturbed by an activity because of the higher probability of interference with breeding, feeding, or sheltering behaviors.

⁷ USFWS (2013) defines *project footprint* as the minimum convex polygon encompassing turbines and any associated infrastructure.

⁸ A permit is not required to destroy inactive migratory bird nests (i.e., those without viable eggs or nestlings), provided that no possession occurs, and no permit or other regulatory authorization is required (USFWS 2018).

⁹ In Arizona, it is unlawful to "remove the nests or eggs of any bird, except as may occur in normal horticultural and agricultural practices and except as authorized by commission order". The intention of the statute is to prohibit removal of active nests, rather than inactive nests; a state permit is not required to remove an inactive nest (personal communication, Christina Kondrat-Smith, Permitting Specialist, AGFD, with Allen Graber, Ecologist, SWCA, December 3, 2019; personal communication, Kenneth "Tuk" Jacobson, Raptor Program Coordinator, AGFD, with Allen Graber, Ecologist, SWCA, January 28, 2021).

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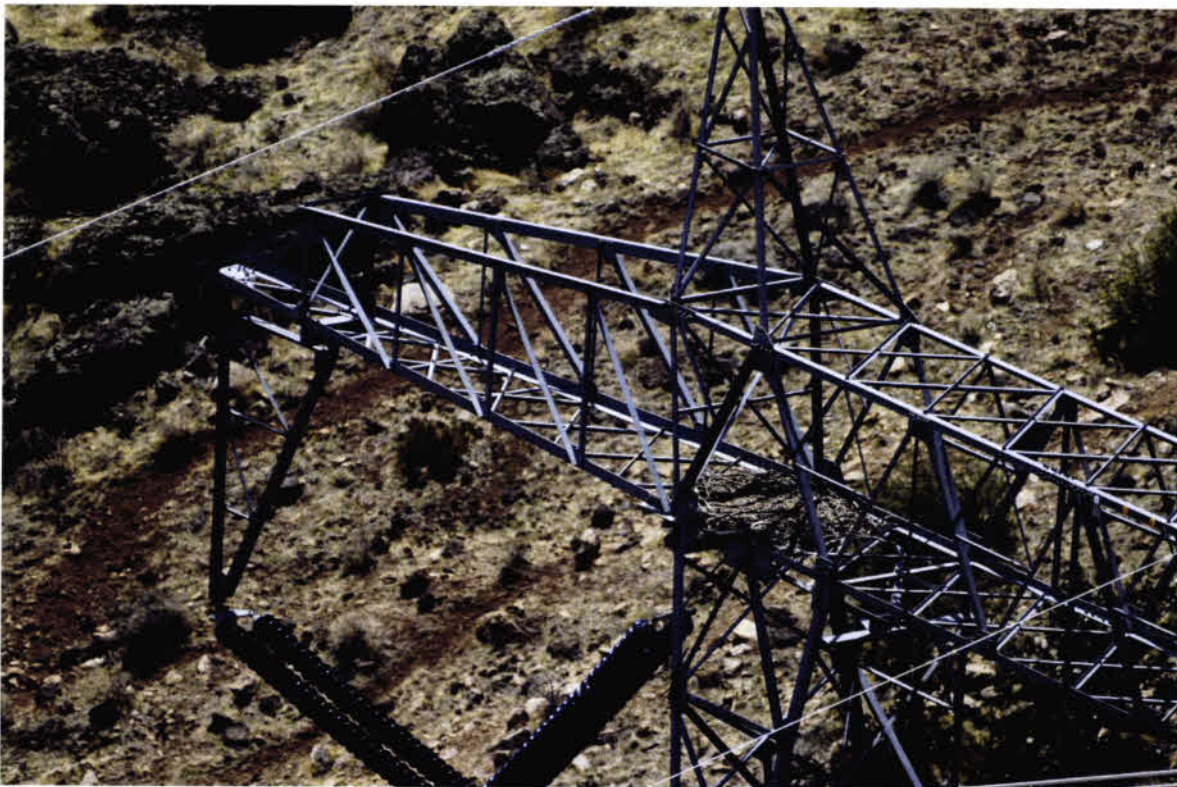
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APPENDIX A
Select Nest Photographs



A-1. CO004- Ferruginous hawk.



A-2. CO007- Golden eagle (active; Survey 1, 2022).



A-3. CO012- Undetermined; prairie falcon in 2021 (empty, deteriorated; Survey 1, 2022).



A-4. CO017- Ferruginous hawk.



A-5. CO035- Ferruginous hawk.



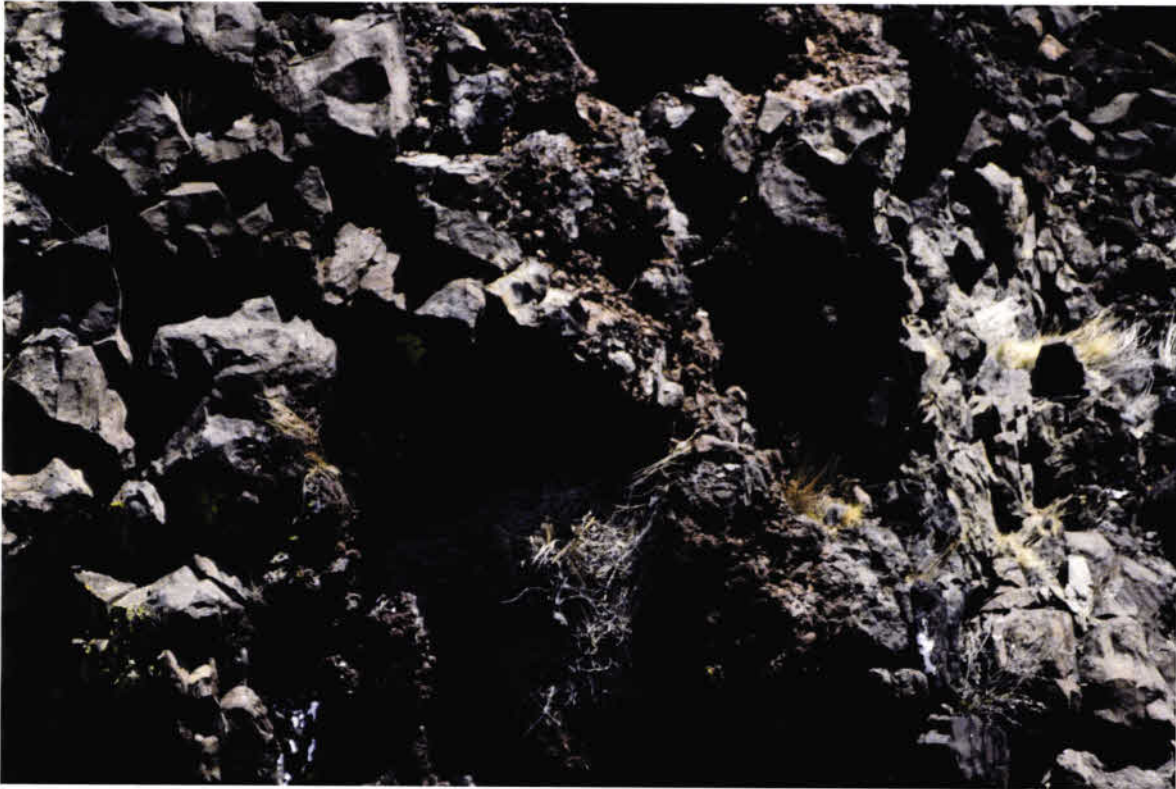
A-6. ZE012- Undetermined; possible *Buteo* or common raven (nest appears rebuilt; Survey 1, 2022).



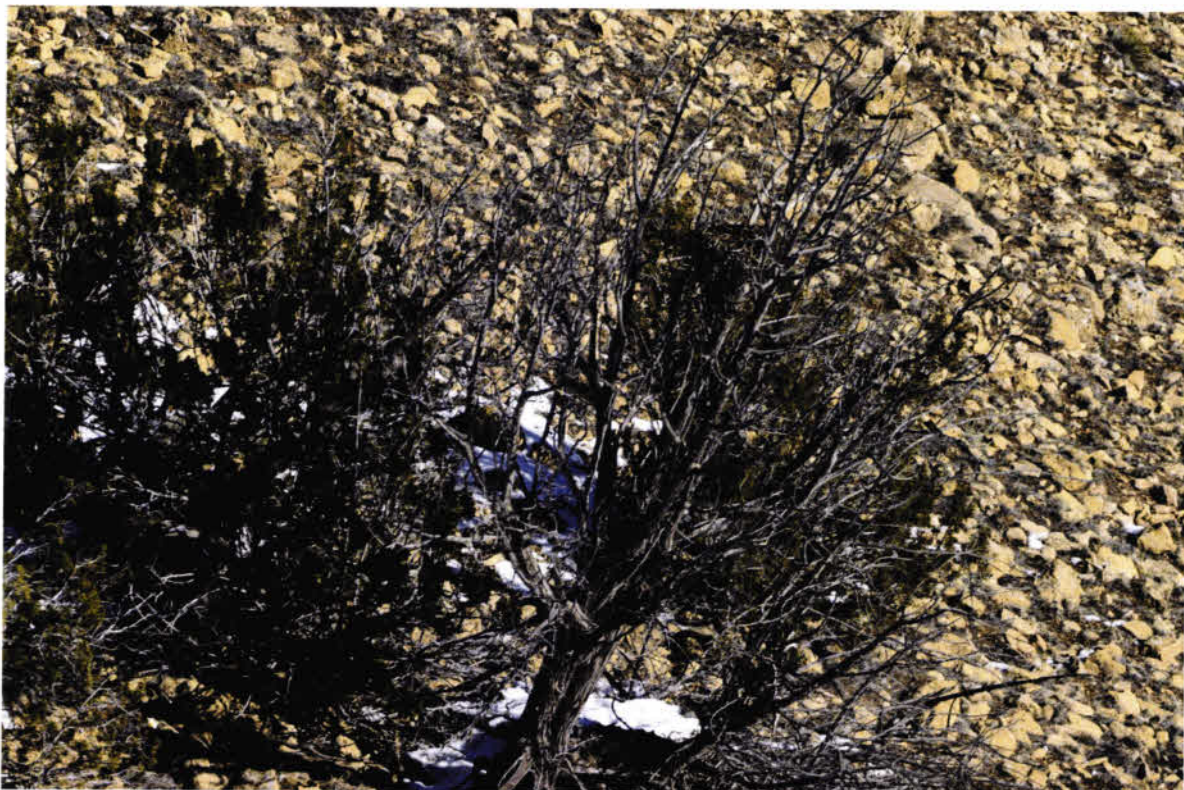
A-7. ZE012- Possible golden eagle (pre-2022).



A-8. ZE013- Possible golden eagle (not active, 2022).



A-9. ZE014- Golden eagle (not active, 2022).



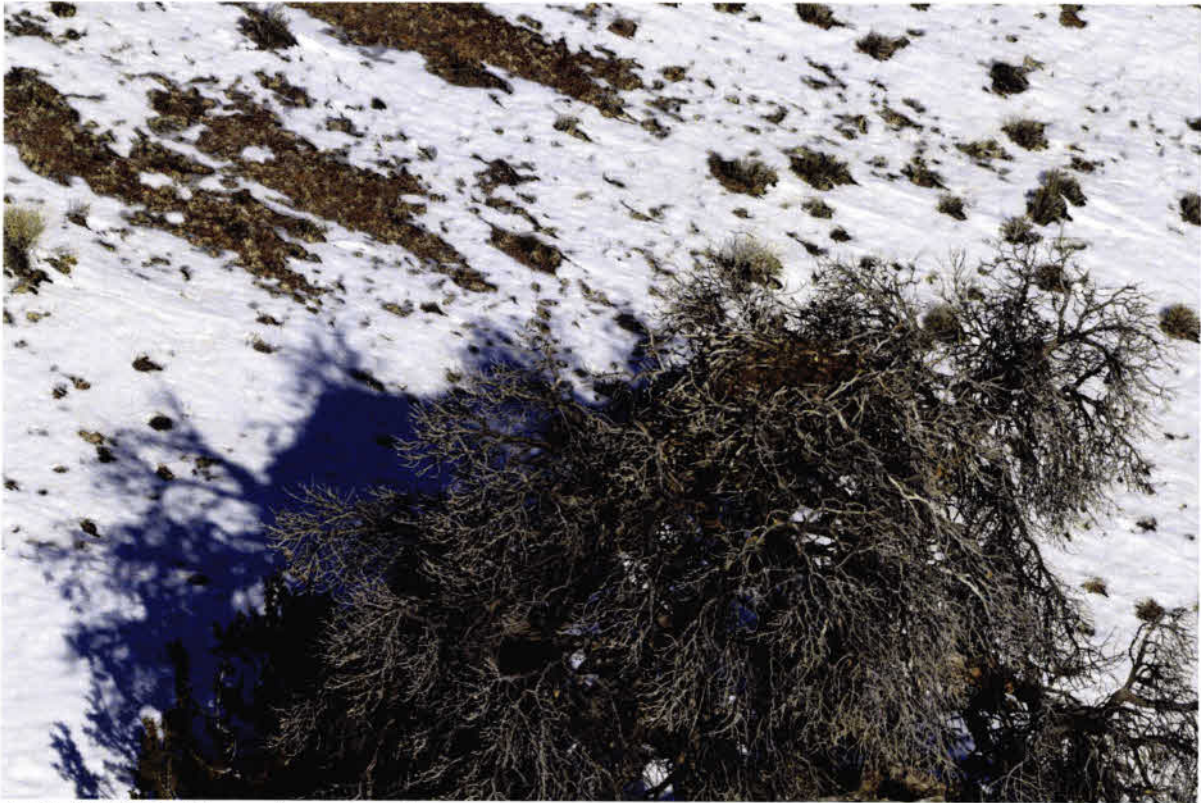
A-10. ZE024 - Undetermined: resembles *Buteo* or common raven, possible ferruginous hawk.



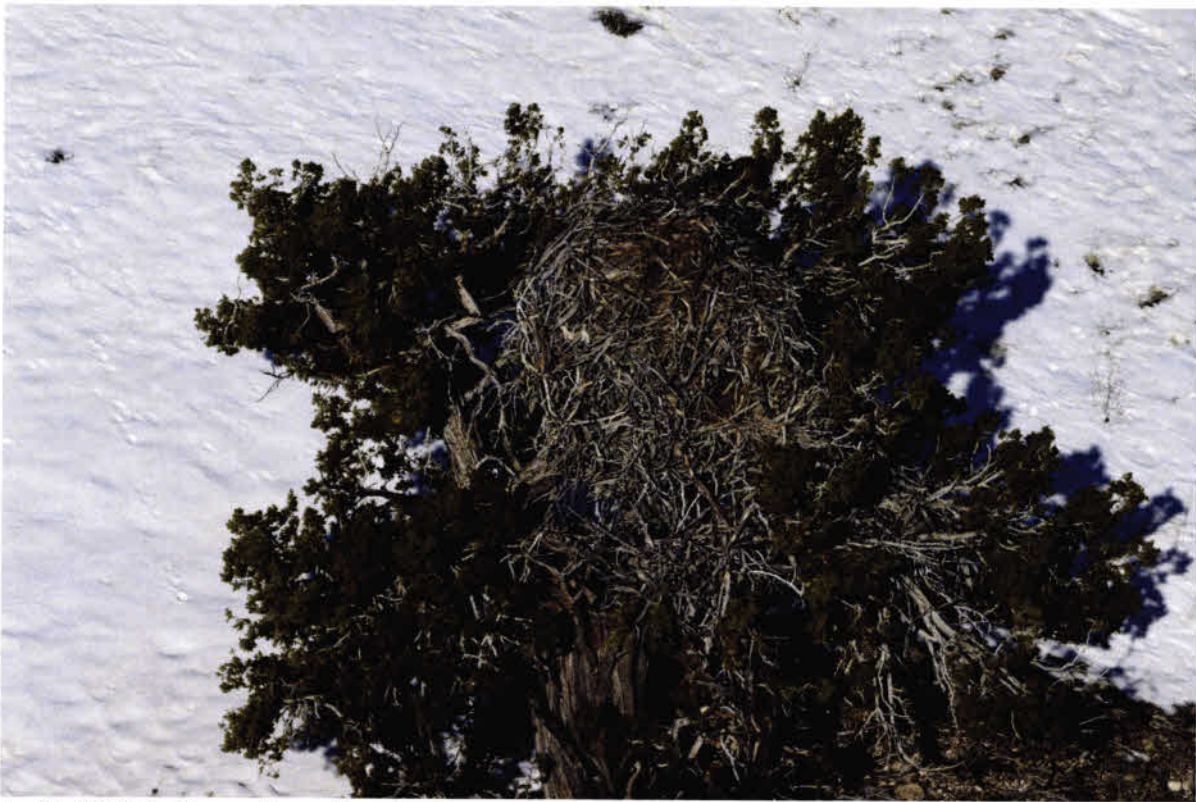
A-11. ZE025 - Undetermined: resembles *Buteo* or common raven, possible ferruginous hawk.



A-12. ZE028 - Undetermined: resembles *Buteo* or common raven, possible ferruginous hawk.



A-13. ZE036 – Ferruginous hawk.



A-14. ZE041- Ferruginous hawk.

Exhibit B – Attachment B-5

Avian Use Surveys for the Proposed Forged Ethic Wind Energy Project,
June 2021–June 2022 [Year 1]; August 2022

SWCA

Avian Use Surveys for the Proposed Forged Ethic Wind Energy Project, June 2021–June 2022

AUGUST 2022

PREPARED FOR

RWE Renewables Development, LLC

PREPARED BY

SWCA Environmental Consultants

**AVIAN USE SURVEYS FOR THE PROPOSED
FORGED ETHIC WIND ENERGY PROJECT,
JUNE 2021–JUNE 2022**

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SWCA Project No. 61509

August 2022

EXECUTIVE SUMMARY

RWE Renewables Development, LLC (RWE) is proposing to develop the Forged Ethic Wind Energy Project (project), formerly known as Zeus Wind, a proposed maximum 323-megawatt wind energy facility. The project would be located on privately owned Babbitt Ranches and Arizona State Land Department Trust lands on portions of an approximate 17,793-acre buildable area (i.e., analysis area) approximately 25 miles north of Flagstaff, in Coconino County, Arizona.

As part of pre-construction surveys for the project, SWCA Environmental Consultants (SWCA) has been conducting avian use counts within and adjacent to the analysis area beginning in June of 2021. This report presents the results of the first year of surveys (Year 1), completed on June 23, 2022.

Surveys were conducted 24 times (approximately twice per calendar month) at each of 25 plots.

Surveyors confirmed the presence of 83 bird species in the analysis area. Eleven were species of concern (i.e., Eagle Rule (U.S. Fish and Wildlife Service [USFWS] 2016), Birds of Conservation Concern [2021], Species of Greatest Conservation Need [Arizona Game and Fish Department 2012b]). None are threatened or endangered.

Large bird species richness and diversity was moderate. Six different raptor species of concern were documented, along with the common nighthawk (*Chordeiles minor*). Common ravens (*Corvus corax*) accounted for 84% of large bird detections and the four most common species accounted for 93.8% of detections.

Bald eagles (*Haliaeetus leucocephalus*) were detected within the fixed-radius survey plots seven times in the nonbreeding season (September to March) for a total of 24 eagle minutes in 600 hours of surveys. Golden eagles (*Aquila chrysaetos*) were detected within the fixed-radius survey plots 13 times (in all seasons) for a total of 49 eagle minutes in 600 hours of surveys. Ferruginous hawks (*Buteo regalis*) are breeding residents in the analysis area, predominantly seen in the vicinity of several known nests (SWCA 2021). Common nighthawks were detected in June and July across much of the analysis area. No more than three were seen in an hour.

Small bird use and species richness was relatively low. Ten minutes spent surveying per plot for small birds yielded less than three birds on average, and horned larks (*Eremophila alpestris*) alone accounted for 57.2% of detections. Only two species of concern were detected on small bird surveys. Pinyon jays (*Gymnorhinus cyanocephalus*) were locally common in the analysis area and were occasionally observed in large flocks.

Additional detailed key findings and interpretation are provided within the report.

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1 INTRODUCTION

In accordance with the U.S. Fish and Wildlife Service’s (USFWS’s) *Land-Based Wind Energy Guidelines* (WEG) (USFWS 2012), *Eagle Conservation Plan Guidance* (ECPG) (USFWS 2013), and Eagle Rule (USFWS 2016), as well as Arizona Game and Fish Department’s (AGFD’s) *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona* (AGFD 2012a), SWCA Environmental Consultants (SWCA) conducted avian use counts within the Forged Ethic Wind Energy Project analysis area (Figure 1) beginning in June 2021. The objective was to document avian species composition and patterns of use within the analysis area. This report presents the results of the first year of surveys (Year 1; June 15, 2021–June 23, 2022). Avian use surveys are planned to continue until June of 2023.

1.1 Environmental Setting

The analysis area is located on the Colorado Plateau in north-central Arizona, approximately 25 miles southeast of the Grand Canyon (Figure 1). The analysis area is flat to moderately rolling grassland and pinyon-juniper woodland between 5,000 and 6,500 feet elevation above mean sea level (amsl), transected by numerous ephemeral washes, generally draining to the northeast. There are many human-made stock tanks within the analysis area. The Little Colorado River is located approximately 18 miles northeast of the analysis area. Vegetation within the analysis area largely consists of Intermountain Basins Semi-Desert Shrub-Steppe and Semi-Desert Grassland cover types (SWCA 2019). Pinyon-juniper woodland is generally restricted to the western half of the analysis area.

Notable landforms include Lockwood Canyon, a shallow canyon (approximately 150 feet deep) with gently to moderately sloping walls in the northwest portion of the analysis area and Mesa Butte (elevation 7148 feet amsl), a cinder cone centrally located outside the analysis area, immediately south of the transmission line that bisects the analysis area (Figure 2; see Figure 1). Earthen and metal stock tanks are scattered within the site. Water levels in the earthen tanks fluctuate between years. Land uses include cattle ranching/grazing and outdoor recreation (SWCA 2019).

Twenty bird species of concern may occur within the analysis area (Table 1). Of these, only the California condor (*Gymnogyps californicus*) is federally listed as threatened or endangered, and the local population is classified as experimental and non-essential (see Table 1).

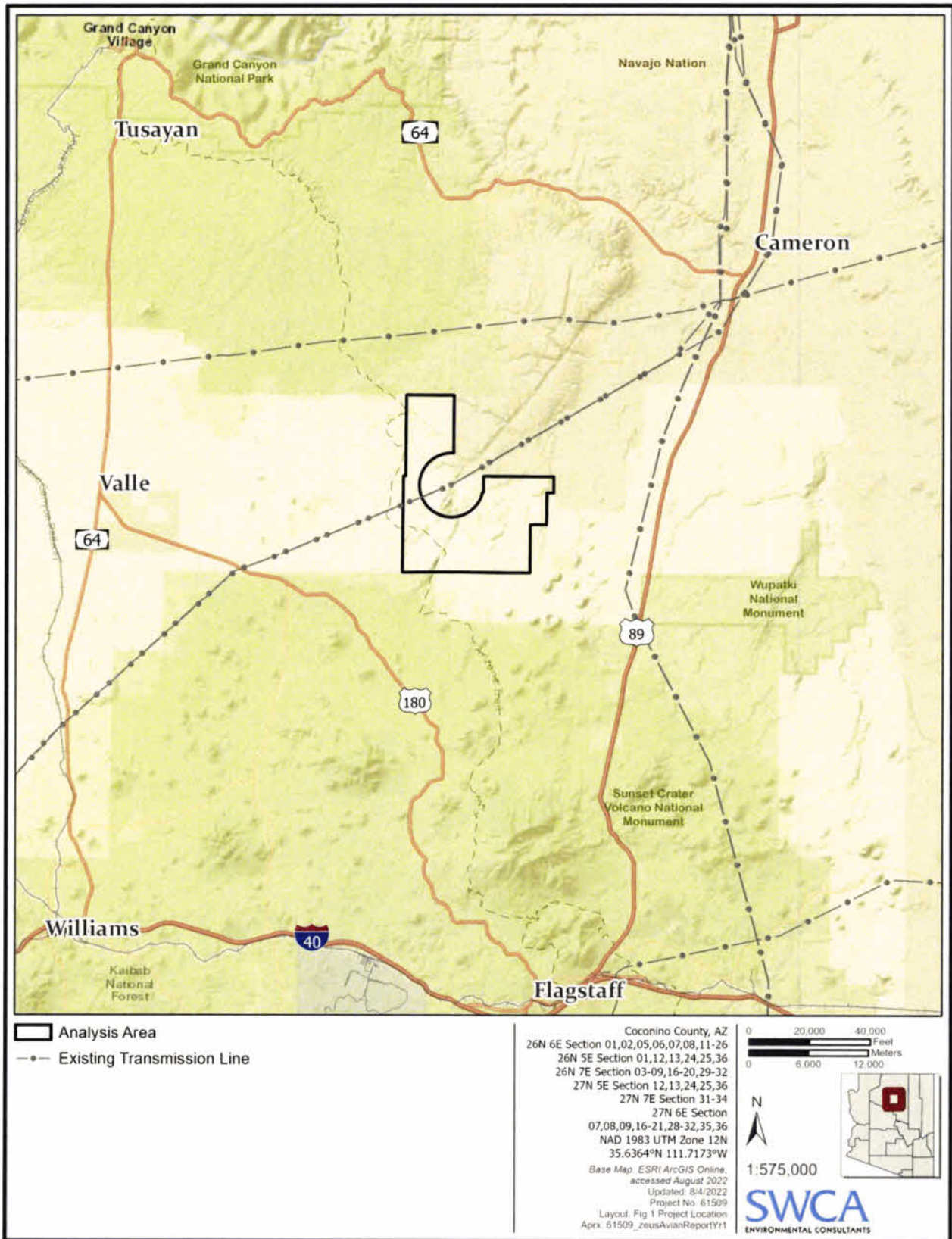


Figure 1. Proposed location of the Forged Ethic Wind Energy Project, Coconino County, Arizona.

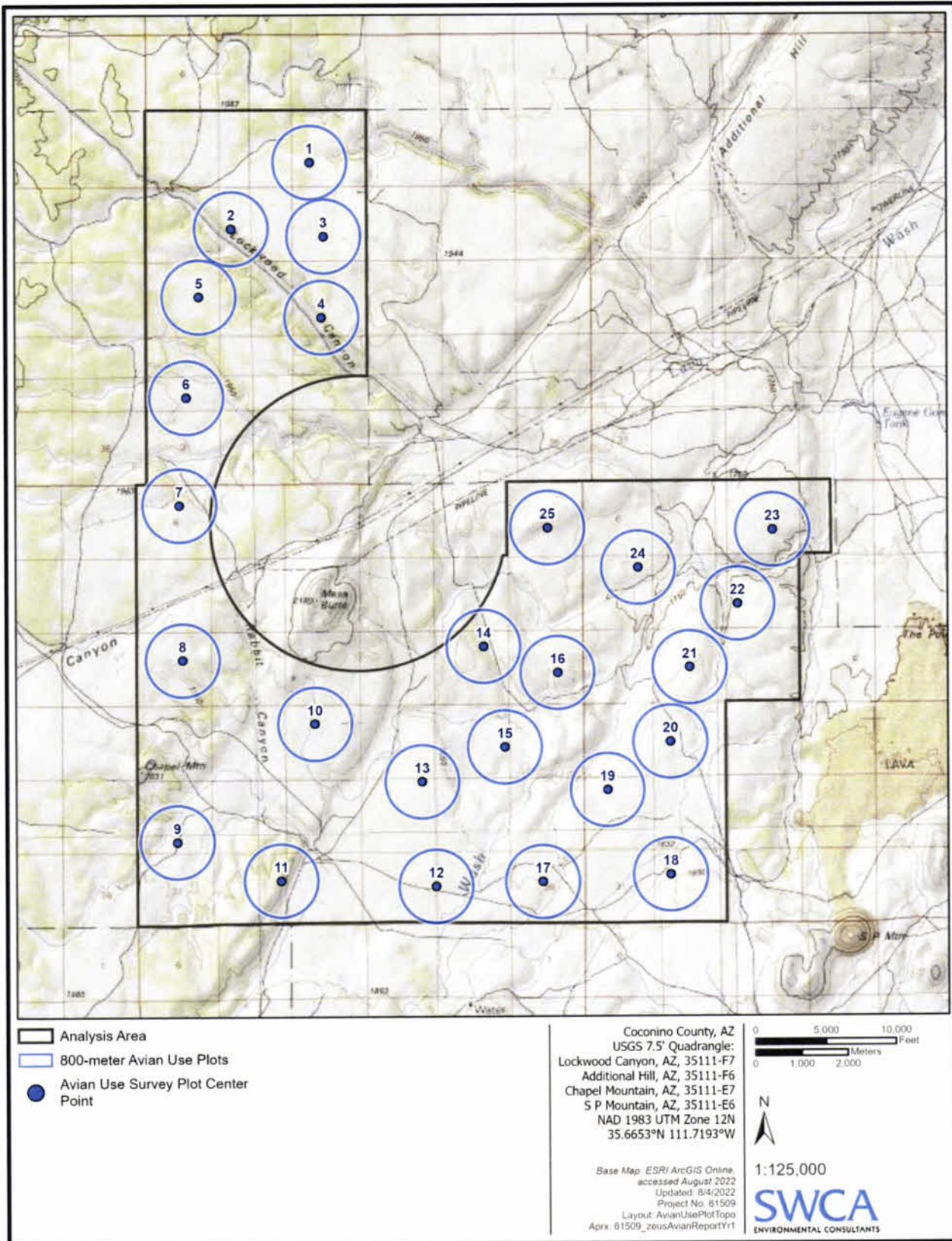


Figure 2. Avian use count plots in the Forged Ethic Wind Energy Analysis Area, Coconino County, Arizona, topographic background.

Table 1. Bird Species of Concern That May Occur or Are Known to Occur in the Analysis Area

Common Name (<i>Scientific Name</i>)	Status*	
	Federal	State
Bald eagle (<i>Haliaeetus leucocephalus</i>)	BGEPA	SGCN (1A)
Bendire's thrasher (<i>Toxostoma bendirei</i>)	BCC	SGCN (1C)
Black-chinned sparrow (<i>Spizella atrogularis</i>)	BCC	SGCN (1C)
Black-throated gray warbler (<i>Setophaga nigrescens</i>)	BCC	SGCN (1C)
Broad-tailed hummingbird (<i>Selasphorus platycercus</i>)	BCC	–
Burrowing owl, Western burrowing owl (<i>Athene cunicularia hypugaea</i>)	–	SGCN (1B)
California condor (<i>Gymnogyps californicus</i>)	E, EXPN	SGCN (1A)
Chestnut-collared longspur (<i>Calcarius ornatus</i>)	BCC	SGCN (1C)
Common nighthawk (<i>Chordeiles minor</i>)	–	SGCN (1B)
Evening grosbeak (<i>Coccothraustes vespertinus</i>)	–	SGCN (1B)
Ferruginous hawk (<i>Buteo regalis</i>)	BCC	SGCN (1B)
Golden eagle (<i>Aquila chrysaetos</i>)	BGEPA	SGCN (1B)
Lewis's woodpecker (<i>Melanerpes lewis</i>)	BCC	SGCN (1C)
Lincoln's sparrow (<i>Melospiza lincolni</i>)	–	SGCN (1B)
MacGillivray's warbler (<i>Geothlypis tolmiei</i>)	–	SGCN (1B)
Northern goshawk (<i>Accipiter gentilis</i>)	–	SGCN (1B)
Peregrine falcon, American peregrine falcon (<i>Falco peregrinus anatum</i>)	–	SGCN (1A)
Pinyon jay (<i>Gymnorhinus cyanocephalus</i>)	BCC	SGCN (1B)
Plumbeous vireo (<i>Vireo plumbeus</i>)	BCC	–
Yellow-headed blackbird (<i>Xanthocephalus xanthocephalus</i>)	BCC	–

Note: Table includes those species listed the Eagle Rule (USFWS 2016; BGEPA), Tier 1A and 1B species listed in AGFD (2012b), and Birds of Conservation Concern (USFWS 2021) that may occur or are known to occur within the analysis area.

* Federal Status Definitions: BCC = Bird of Conservation Concern; E = Endangered (species in danger of extinction throughout all or a significant portion of their range); EXPN = Experimental population, non-essential.

State Status Definitions: _SGCN = Species of Greatest Conservation Need; species identified by AGFD (2012b) as having conservation priority. Tier 1A species are those categorized by AGFD (2012b) as "highest priority vulnerable" species. Tier 1B species are those categorized as "vulnerable" but not fitting the Tier 1A criteria for highest priority. Tier 1C species are those for which existing data were insufficient for AGFD (2012b) to score one or more vulnerability criteria.

2 METHODS

2.1 Large Bird Use Surveys

Twenty-five 800-m-radius (875-yard-radius) survey plots were established and surveyed beginning in June 2021 (Figure 3; see Figure 2). These 25 plots cover approximately 33% of the analysis area.¹

The plots were distributed randomly to represent the site spatially and its habitat conditions (i.e., plots represented grassland/shrub steppe and juniper savanna habitats, water and topographic features, and potential eagle use areas). Plots were micro-sited in the field to maximize views of the surrounding airspace.

¹ A maximum buildable area for the project was provided by RWE Renewables to SWCA in January of 2021. This area was used to allocate survey effort, pending a final design.

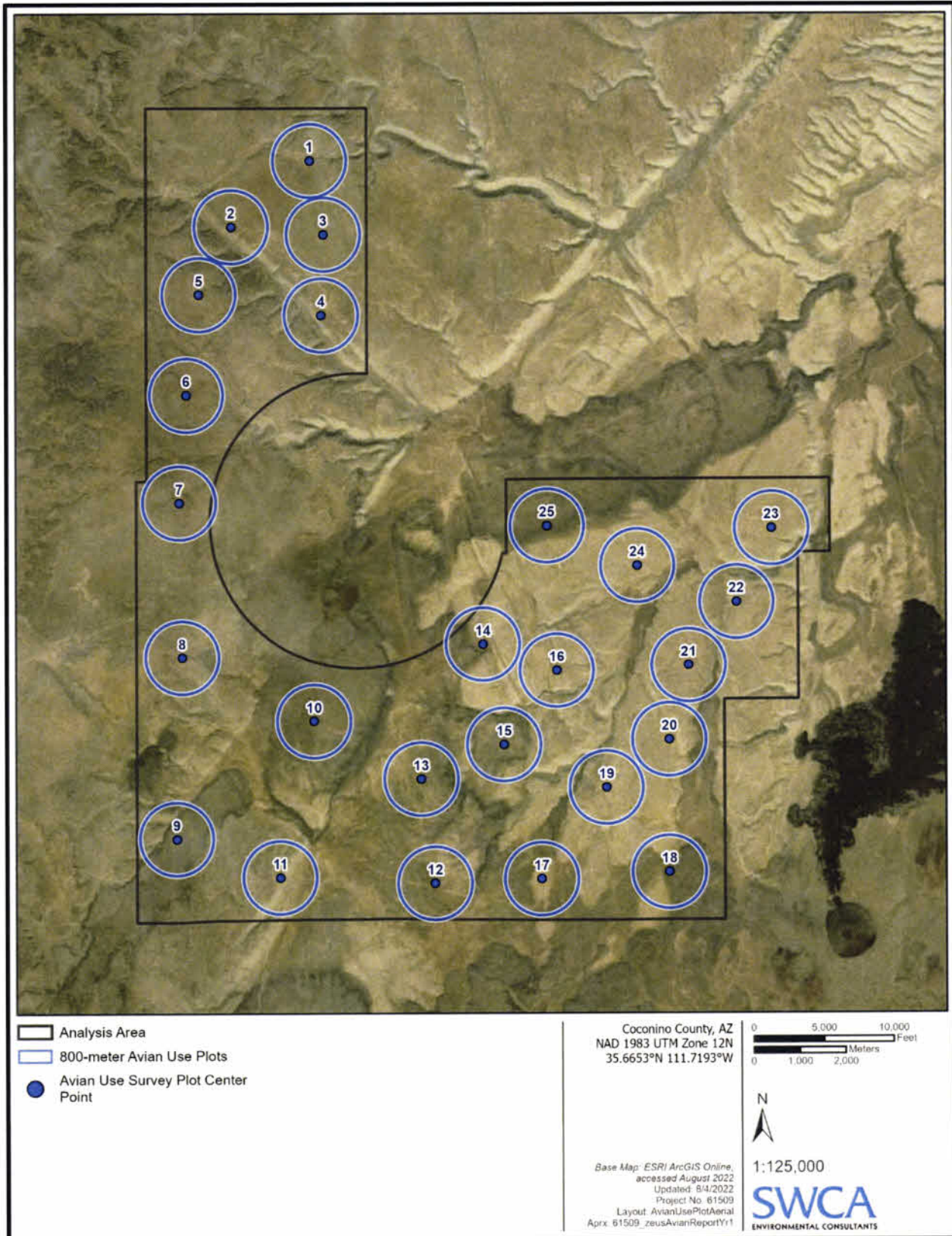


Figure 3. Avian use count plots in the Forged Ethic Wind Energy Analysis Area, Coconino County, Arizona, aerial imagery background.

Plots were surveyed for 1 hour twice per month in Year 1.² Start times represented all daylight hours, with plots scheduled to alternate between morning (i.e., < 10:00 a.m.) and late morning/afternoon time slots. Surveyors adhered to the schedule as logistics, weather, and safety issues (e.g., lightning, visibility³) allowed. From the central point of each plot, surveyors scanned for large birds—at any height within the 800-m-radius plot—by alternating use of binoculars and unaided eye. Large birds were roughly defined as those >31.8 cm (12.5 inches) long and >397 g (14 ounces),⁴ including the following:

- birds of prey and vultures (Accipitriformes, Falconiformes, Strigiformes)
- large corvids (ravens and crows; Passeriformes, family Corvidae, genus *Corvus*)
- waterfowl (i.e., ducks, geese, and swans; Anseriformes)
- other large waterbirds (e.g., bitterns, coots, cranes, egrets, grebes, herons; Gruiformes, Podicipediformes, Pelecaniformes)
- large upland gamebirds (e.g., grouse, turkey; Galliformes)
- nightjars (Caprimulgiformes)

For each large bird/bird group seen or heard (within the 800-m-radius plot), surveyors recorded start and end times (to the nearest second), species, number of birds per observation, distance from the observer (estimated to the nearest meter), flight height (estimated to the nearest meter), and behavior. Distance and height measurements were recorded when a bird/bird group was first observed (Reynolds et al. 1980, as cited in USFWS 2012). If a given bird/bird group was initially detected above 200 m (219 yards), surveyors also recorded whether the bird/bird group flew below 200 m. Observations of perched birds were distinguished from observations of those in flight. To minimize double-counting of individuals, individuals were tracked (to the extent practicable), as, for example, they left the plot and then re-entered.

Surveyors used a rangefinder, accurate to more than 800 m (875 yards); printed topographic maps zoomed to each plot depicting 100-, 200-, 400-, 600-, and 800-m (109-, 219-, 437-, 656-, and 875-yard) concentric circles; and vertical landmarks (e.g., meteorological towers and trees of known height) to estimate horizontal and vertical distances. Specific behavioral activities included soaring flight, unidirectional flapping-gliding, kiting-hovering, stooping/diving at prey, undulating/territorial flight, and perching (USFWS 2013).

2.1.1 *Eagle-Specific Data*

During large bird use surveys, additional data attributes and flight paths were recorded for eagles in accordance with the Eagle Rule (USFWS 2016) and ECPG (USFWS 2013). In addition to all data collected for observations during large bird use surveys, at least every 60 seconds an eagle was in view during a large bird survey, flight direction, bearing to the bird, sex, and age were also recorded. Age of each eagle was categorized as juvenile (<1 year of age), subadult (1–5 years of age), adult (>5 years of age), or unknown. New observation records including all data fields were also recorded every time an

² The Eagle Rule (USFWS 2016) calls for each plot to be surveyed at least 1 hour once per month. The ECPG (USFWS 2013) recommends 1 or 2 hours per month, depending on site characterization (expected eagle use). Each plot was surveyed for 1 hour twice per month to ensure precision when calculating eagle take estimates.

³ In accordance with the ECPG (USFWS 2013), surveys were not conducted when visibility was <800 m (875 yards) horizontally and <200 m (219 yards) vertically.

⁴ Exceptions to this rough length and weight definition included small birds of prey (e.g., American kestrel [*Falco sparverius*], merlin [*Falco columbarius*]), nightjars (e.g., common nighthawk [*Chordeiles minor*]), and large shorebirds (e.g., American avocet [*Recurvirostra americana*]), as those species are easier to detect using the large bird versus small bird survey technique (see Section 2.2) and/or match the large bird surrogate definition used for post-construction fatality surveys.

individual eagle was deemed to have moved into or out of an 800-m-radius × 200-m-high (875-yard × 219-yard) cylinder centered on the large bird use survey point, or whenever an eagle changed behavior significantly (e.g., from flight to perching). Flight paths were drawn on a topographic map of the area by surveyors while in the field indicating where an eagle flew while it was observed, and which part of the flight path was inside or outside the 800-m-radius × 200-m-high cylinder.

2.2 Small Bird Use Surveys

Small bird use surveys were conducted in Year 1 on the same days as the large bird use surveys and at the same points (see Section 2.1, and Figures 2 and 3).⁵ Small bird survey plots were smaller (100-m-radius [109-yard-radius]) and small birds were counted for 10 minutes (Matsuoka et al. 2014; Ralph et al. 1993, 1995; Reynolds et al. 1980) immediately prior to the large bird use surveys. Small birds were roughly defined as those <31.8 cm (12.5 inches) long and <397 g (14 ounces), including the following:

- passerines (Passeriformes)
- doves (Columbiformes)
- hummingbirds (Apodiformes)
- small corvids (i.e., jays; Passeriformes, family Corvidae, genera *Aphelocoma*, *Cyanocitta*, and *Gymnorhinus*)
- small shorebirds (Charadriiformes)
- woodpeckers (Piciformes)

For each small bird/bird group seen or heard within the plot, surveyors recorded species, number of birds per observation, distance from the observer (estimated to the nearest meter), and flight height (estimated to the nearest meter). Distance and height measurements were estimated using a rangefinder and vertical landmarks.

2.3 Incidental Observations

Incidental observations of avian species outside of the survey parameters were recorded to develop a comprehensive species list for the analysis and to generally qualify concentrated use (e.g., flocks, waterfowl use of the site's water features). Incidental observations were recorded when traveling to/from survey plots (and during other pre-construction activities) and included small birds observed during large bird observation periods and large birds observed during small bird observation periods; these observations were not used for data analysis. Additionally, flight paths, along with notes on the age, sex, and behavior, were also recorded for any individual eagles observed incidentally.

2.4 Analysis

Avian use count data are used to estimate relative abundance of diurnal birds using the analysis area over space and time (USFWS 2012, 2013). Compilations of the data included species/species group composition, total detections, relative abundance, frequency of occurrence, and mean use. These terms were defined as follows:

- Species/species group composition: a list of species or species groups; the results provided in this report distinguish those species detected incidentally on-site from those detected during the

⁵ In accordance with USFWS (2013), small bird counts were exclusive of those for eagles and other large birds.

formal counts. Species groups were defined by taxonomic orders by default, with a few exceptions⁶

- Detections: the number of unique observations of individual birds by species or species group; during a given count, surveyors took care to avoid double-counting individuals to the extent possible (see Sections 2.1. and 2.2)
- Relative abundance: number of observed detections of a species or species group/number of total detections of all species or species groups combined $\times 100$ (expressed as a percentage)
- Frequency of occurrence: number of surveys during which a species or species group was recorded/number of total surveys $\times 100$ (expressed as a percentage)
- Mean use: number of detections of a species or species group/the number of total surveys (i.e., detections per unit time [1-hour period for large birds, 10-minute period for small birds])

Use data were grouped by season, plot, and height categories to characterize baseline bird activity patterns of the analysis area. Seasons were defined as spring (March–May), summer (June–August), fall (September–November), and winter (December–February). Heights were categorized as low (<20 m [<22 yards]), mid (20–200 m [22–219 yards]), and high (>200 m [>219 yards]). If an individual bird was detected in multiple height categories, it was reported once in each category. Birds observed not flying for the entire survey (e.g., ducks swimming) were recorded with a null height.

2.4.1 *Eagle-Specific Data*

Eagle observation data gathered during large bird use surveys were used to calculate the number of eagle minutes. Eagle minutes are defined as the amount of time eagles spend flying, rounded up to the nearest minute, within 800 m of the survey point and at or less than 200 m above the ground (USFWS 2013). Incidental and perching observations are not included in eagle minute analyses.

3 RESULTS

3.1 Sampling Effort

Surveys were conducted 24 times from June 15, 2021 to June 23, 2022. Surveyors attempted to conduct two surveys in each calendar month, but scheduling and/or inclement weather conflicts occasionally delayed completion of some surveys, resulting in monthly overruns of up to five days and an eight-day overrun for Year 1. To use equal sample sizes in analyses, months were based on the order of survey completion for each plot, instead of the calendar date recorded (Table 2).

⁶ The species groups are: corvids (family Corvidae), cuckoos (Cuculiformes), diurnal birds of prey (Falconiformes and Accipitriformes not Cathartidae), doves (Columbiformes), ground birds (Galliformes), hummingbirds (family Trochilidae), nightjars (Caprimulgiformes), owls (Strigiformes), passerines (Passeriformes not Corvidae or Hirundinidae), shorebirds (Charadriiformes), swallows and swifts (families Hirundinidae family Apodidae), vultures (family Cathartidae), waterfowl/waterbirds (Anseriformes and Suliformes), and woodpeckers (Piciformes).

Table 2. Monthly Survey Effort, Year 1

Season	Month	Survey number	Earliest date	Median date	Latest date
Summer	June 2021	1	15-Jun-21	16-Jun-21	21-Jun-21
	July 2021	2, 3	09-Jul-21	22-Jul-21	29-Jul-21
	August 2021	4, 5	03-Aug-21	19-Aug-21	02-Sep-21
Fall	September 2021	6, 7	09-Sep-21	22-Sep-21	29-Sep-21
	October 2021	8, 9	07-Oct-21	28-Oct-21	03-Nov-21
	November 2021	10, 11	05-Nov-21	19-Nov-21	30-Nov-21
Winter	December 2021	12, 13	01-Dec-21	03-Jan-22	05-Jan-22
	January 2022	14, 15	05-Jan-22	21-Jan-22	31-Jan-22
	February 2022	16, 17	02-Feb-22	09-Feb-22	18-Feb-22
Spring	March 2022	18, 19	03-Mar-22	10-Mar-22	01-Apr-22
	April 2022	20, 21	01-Apr-22	23-Apr-22	28-Apr-22
	May 2022	22, 23	03-May-22	20-May-22	03-Jun-22
Summer	June 2022	24	15-Jun-22	18-Jun-22	23-Jun-22

3.2 Large Bird Use Surveys

3.2.1 Species and Species Group Composition

Including incidental observations, surveyors recorded 22 large bird species (Table 3) comprising six species groups, including seven species of concern—bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), Northern goshawk (*Accipiter gentilis*), peregrine falcon (*Falco peregrinus*), burrowing owl (*Athene cunicularia*), and common nighthawk (*Chordeiles minor*)—none are listed as threatened or endangered (see Table 1).

Of 1,414 large bird survey detections, eight were only identifiable to a species group (unidentified hawks), and five were not identified (Table 4). Corvids comprised the majority (84.2%) of detections, followed by diurnal birds of prey (11.2%), vultures (3.0%), nightjars (1.1%), and owls (0.1%). Common ravens (*Corvus corax*) were, on at least four occasions in late September, observed soaring in groups (kettles) of ten to over 100 individuals.

Species diversity was very uneven—87% of survey hours yielded one or fewer large bird species detected. The most common species were common raven; (1,190 detections, recorded on 54% of surveys), American kestrel (*Falco sparverius*; 51 detections, recorded on 5% of surveys), red-tailed hawk (*Buteo jamaicensis*; 43 detections, recorded on 6% of surveys), and turkey vulture (*Cathartes aura*; 43 detections, recorded in 3% of surveys). These four species accounted for 93.8% of detections (relative abundance; see Table 4).

Of the seven species of concern, three were detected only on a single occasion (burrowing owl, northern goshawk, and peregrine falcon). Bald eagle, golden eagle, ferruginous hawk, and common nighthawk were each observed between seven and 15 times, representing between 0.5% and 1.0% of the total count of large birds in Year 1 (see Table 4).

Table 3. All Large Birds Detected Incidentally or During Formal Large Bird Surveys, Year 1

Species Group	Species Common Name (Scientific Name)
Corvids	
American crow (<i>Corvus brachyrhynchos</i>)	Common raven (<i>Corvus corax</i>)
Diurnal Birds of Prey	
American kestrel (<i>Falco sparverius</i>)	Peregrine falcon (<i>Falco peregrinus</i>)*
Bald eagle (<i>Haliaeetus leucocephalus</i>)*	Prairie falcon (<i>Falco mexicanus</i>)
Cooper's hawk (<i>Accipiter cooperii</i>)	Red-tailed hawk (<i>Buteo jamaicensis</i>)
Ferruginous hawk (<i>Buteo regalis</i>)*	Rough-legged hawk (<i>Buteo lagopus</i>)
Golden eagle (<i>Aquila chrysaetos</i>)*	Sharp-shinned hawk (<i>Accipiter striatus</i>)
Northern harrier (<i>Circus hudsonius</i>)	Swainson's hawk (<i>Buteo swainsoni</i>)
Northern goshawk (<i>Accipiter gentilis</i>)*	
Nightjars	
Common nighthawk (<i>Chordeiles minor</i>)*	
Owls	
Burrowing owl (<i>Athene cunicularia</i>)*†	Great horned owl (<i>Bubo virginianus</i>)
Vultures	
Turkey vulture (<i>Cathartes aura</i>)	
Waterfowl/Waterbirds	
Blue-winged teal (<i>Anas discors</i>)†	Green-winged teal (<i>Anas crecca</i>)†
Mallard (<i>Anas platyrhynchos</i>)†	

* Species of concern (see Table 1).

† Species recorded incidentally only (not during formal surveys or at survey plots not included in the analysis).

Table 4. Large Bird Species/Species Group Detections and Use Metrics During Formal Large Bird Surveys, Year 1.

Species Group Species Common Name	Detections	Relative Abundance (%)	Frequency of Occurrence (%)	Mean Use
Corvids	1,191	84.23	54.46	2.00
Common raven	1,190	84.16	54.46	1.99
American crow	1	0.07	0.17	<0.01
Diurnal Birds of Prey	159	11.24	15.58	0.27
American kestrel	51	3.61	4.86	0.09
Red-tailed hawk	43	3.04	5.70	0.07
Golden eagle *	15	1.06	2.01	0.03
Ferruginous hawk *	9	0.64	0.84	0.02
Sharp-shinned hawk	9	0.64	1.17	0.02
Unidentified hawk	8	0.57	1.34	0.01
Bald eagle *	7	0.50	0.84	0.01
Cooper's hawk	5	0.35	0.50	0.01

Species Group Species Common Name	Detections	Relative Abundance (%)	Frequency of Occurrence (%)	Mean Use
Prairie falcon	4	0.28	0.67	0.01
Northern harrier	3	0.21	0.50	0.01
Swainson's hawk	2	0.14	0.34	<0.01
Northern goshawk *	1	0.07	0.17	<0.01
Peregrine falcon *	1	0.07	0.17	<0.01
Rough-legged hawk	1	0.07	0.17	<0.01
Nightjars	15	1.06	1.84	0.03
Common nighthawk *	15	1.06	1.84	0.03
Owls	1	0.07	0.17	<0.01
Great horned owl	1	0.07	0.17	<0.01
Vultures	43	3.04	3.02	0.07
Turkey vulture	43	3.04	3.02	0.07
Unidentified birds	5	0.35	0.34	0.01
Total	1,414	100.00	62.96	2.37

Note: Shaded rows indicate species with a mean use ≥ 0.05 . Detections are the number of unique observations of individual birds by species/species group. Relative abundance = number of observed detections of a species or species group/number of total detections of all species or species groups combined $\times 100$ (expressed as a percentage). Frequency of occurrence = number of surveys during which a species or species group was recorded/number of total surveys $\times 100$ (expressed as a percentage). Mean use = number of detections by species/species group/number of total surveys.

3.2.2 Temporal Distribution

A dramatic seasonal peak in large bird use occurred in fall, specifically in September and October, featuring the highest species richness of diurnal birds of prey (8 species, including the only observation of northern goshawk) and the highest numbers of large corvids and turkey vultures (7.81 detections per survey in September, compared with 2.37 detections per survey in an average month; Table 5).

June was also an above-average month for large bird use (2.62 detections per survey; see Table 5), and for diurnal birds of prey in particular. Ferruginous hawks were observed most often in June, and the species was not counted in most months. Common nighthawks arrived in June but peaked in July (0.22 detections per survey) before disappearing again for the remainder of the year (see Table 5).

The spring migratory pulse was much less noticeable than the fall peak and appears to begin in February (ferruginous hawk and bald eagle) and to largely be complete by the end of April (northern harrier and Swainson's hawk). However, the peregrine falcon observed in May might also be a transient spring migrant, as it was the only detection of this species in Year 1 (see Table 5).

The seasonal patterns of eagle use will be discussed further in section 3.2.4.

Table 5. Large Bird Species/Species Group Mean Use by Season During Formal Large Bird Surveys, Year 1

Species Group Species Common Name	Spring			Summer			Fall			Winter			Mean
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Corvids	2.18	1.32	1.04	1.94	1.38	2.34	6.24	2.40	1.40	0.70	1.34	1.70	2.00
Common raven	2.18	1.32	1.04	1.94	1.38	2.34	6.24	2.38	1.40	0.70	1.34	1.70	1.99
American crow	–	–	–	–	–	–	–	0.02	–	–	–	–	<0.01
Diurnal Birds of Prey	0.27	0.06	0.14	0.36	0.12	0.06	1.13	0.60	–	0.12	0.12	0.22	0.27
American kestrel	0.08	–	0.08	0.08	0.02	0.02	0.58	0.16	–	–	–	–	0.09
Red-tailed hawk	0.10	0.02	0.04	0.10	0.08	0.04	0.14	0.26	–	0.06	–	0.02	0.07
Golden eagle	0.02	–	–	–	–	–	0.04	0.06	–	0.02	0.06	0.10	0.03
Ferruginous hawk	0.04	–	–	0.12	–	–	–	–	–	–	–	0.02	0.02
Sharp-shinned hawk	–	–	–	–	–	–	0.16	0.02	–	–	–	–	0.02
Unidentified hawk	–	–	–	0.04	–	–	0.06	0.04	–	0.02	–	–	0.01
Bald eagle	0.02	–	–	–	–	–	–	0.02	–	–	0.02	0.08	0.01
Cooper's hawk	–	–	–	–	–	–	0.10	–	–	–	–	–	0.01
Prairie falcon	–	–	–	0.02	0.02	–	0.02	–	–	–	0.02	–	0.01
Northern harrier	–	0.02	–	–	–	–	–	0.02	–	–	0.02	–	0.01
Swainson's hawk	–	0.02	–	–	–	–	0.02	–	–	–	–	–	<0.01
Northern goshawk	–	–	–	–	–	–	–	0.02	–	–	–	–	<0.01
Peregrine falcon	–	–	0.02	–	–	–	–	–	–	–	–	–	<0.01
Rough-legged hawk	–	–	–	–	–	–	–	–	–	0.02	–	–	<0.01
Nightjars	–	–	–	0.08	0.22	–	–	–	–	–	–	–	0.03
Common nighthawk	–	–	–	0.08	0.22	–	–	–	–	–	–	–	0.03
Owls	0.02	–	–	–	–	–	–	–	–	–	–	–	<0.01
Great horned owl	0.02	–	–	–	–	–	–	–	–	–	–	–	<0.01
Vultures	–	0.02	0.14	0.24	0.02	0.08	0.36	–	–	–	–	–	0.07
Turkey vulture	–	0.02	0.14	0.24	0.02	0.08	0.36	–	–	–	–	–	0.07
Unidentified birds	–	–	–	–	–	–	0.08	–	–	–	0.02	–	0.01
Monthly Mean Use	2.47	1.40	1.32	2.62	1.74	2.48	7.81	3.00	1.40	0.82	1.48	1.92	2.37
Seasonal Mean Use		1.72			2.28			4.06			1.41		2.37

Note: Mean use = number of detections by species or species group/number of surveys. Shaded rows indicate species with a monthly mean use ≥ 0.05 . Small discrepancies in the totals may be present due to rounding.

3.2.3 Spatial Distribution

Use at Plots 2, 7, 8, and 9 was >1 standard deviation higher than average (3.8–5.7 per survey), showing greater large bird use of habitats along the western margin of the analysis area, where a mix of woodland and shrub-steppe habitats can be found (Table 6, see Figure 3). Use at Plots 21 and 23 was >1 standard deviation lower than average (0.7–1.0 per survey), typifying a general pattern of lower-than-average large bird use of the dry grasslands in the southeast portion of the analysis area (see Table 6, Figure 3).

Interestingly, when both species richness and mean use are considered, Plots 4 and 5 appear exceptional

(8–9 species and mean use 2.6–2.9; see Table 6). Plots 4 and 5 are adjacent to Lockwood Canyon, emphasizing the effects of topography on habitat use by diurnal birds of prey (see Figure 3).

Common nighthawk detections were broadly dispersed. In contrast, the bird of prey species of concern (eagles, ferruginous hawks, and northern goshawk) were relatively concentrated at a few plots (see Table 6). Eagles were most often counted at Plots 2, 3, and 4 near Lockwood Canyon. Northern goshawk was only counted at Plot 4. Ferruginous hawks were observed most often at Plots 7 and 12. Ferruginous hawk nests were found in these areas on aerial nest surveys (SWCA 2021).

Large birds flew more often at the low height category (1.3 per survey, 57%) than at the mid (0.9 per survey, 41%) or high (<0.1 per survey, 2%) height categories (Table 7). Vultures and nighthawks were more likely to fly at mid height (72% and 88%, respectively) than other groups, and corvids were more likely to be seen at low height (59%). Only common ravens and red-tailed hawks were observed flying at heights above 200 m (2% and 9%, respectively).

Table 6. Large Bird Species/Species Group Mean Use by Survey Plot During Large Bird Surveys, Year 1

Species Group Species Common Name	Survey Plot																									Mean
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Corvids	1.58	4.04	2.4	2.04	1.21	1.1	5.33	3.62	3.62	2.54	3.16	0.79	1.04	2.25	1.03	1.04	0.78	1.79	1.17	1.5	0.54	2.03	0.92	2.71	1.58	2.00
Common raven	1.58	4.04	2.4	2.04	1.21	1.1	5.33	3.62	3.62	2.54	3.12	0.79	1.04	2.25	1.03	1.04	0.78	1.79	1.17	1.5	0.54	2.03	0.92	2.71	1.58	1.99
American crow	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Diurnal Birds of Prey	0.21	0.88	0.38	0.54	0.54	0.21	0.21	0.29	0.04	0.12	0.17	0.46	-	0.5	0.26	0.33	0.26	0.12	0.08	0.12	0.21	0.17	0.04	0.12	0.38	0.27
American kestrel	0.04	0.21	0.17	0.13	0.08	0.04	0.08	0.21	0.04	0.04	0.08	0.12	-	0.25	0.17	0.08	-	-	-	0.04	0.04	0.09	-	-	0.21	0.09
Red-tailed hawk	0.04	0.42	0.04	0.04	0.21	-	0.04	0.04	-	0.08	0.04	0.08	-	0.12	0.04	0.12	0.22	-	-	0.04	0.04	0.09	-	0.04	0.04	0.07
Golden eagle	-	0.17	0.08	0.13	-	0.04	-	-	-	-	-	-	-	-	-	-	-	0.04	-	0.04	0.04	-	0.04	-	0.04	0.03
Ferruginous hawk	-	-	-	-	-	-	0.08	-	-	-	-	0.21	-	-	-	0.04	-	-	-	-	-	-	-	-	0.04	0.02
Sharp-shinned hawk	0.08	0.08	0.04	-	0.04	-	-	-	-	-	-	-	-	0.04	0.04	-	-	0.04	-	-	-	-	-	-	-	0.02
Unidentified hawk	-	-	0.04	-	0.04	-	-	-	-	-	-	0.04	-	0.04	-	-	0.04	-	-	0.04	-	0.08	-	-	-	0.01
Bald eagle	-	-	-	0.13	0.04	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Cooper's hawk	-	-	-	-	0.08	0.08	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	0.01
Prairie falcon	0.04	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Northern harrier	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	0.04	0.01
Swainson's hawk	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	<0.01
Northern goshawk	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Peregrine falcon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	<0.01
Rough-legged hawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	<0.01
Nightjars	-	-	-	-	-	-	0.08	0.12	-	-	0.08	-	0.04	0.04	-	-	0.09	0.04	-	-	-	0.09	0.04	-	-	0.03
Common nighthawk	-	-	-	-	-	-	0.08	0.12	-	-	0.08	-	0.04	0.04	-	-	0.09	0.04	-	-	-	0.09	0.04	-	-	0.03
Owls	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Great horned owl	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Vultures	0.04	0.12	0.04	0.29	0.83	0.08	0.04	-	0.12	-	0.04	-	-	0.08	-	0.04	0.04	-	-	-	-	-	-	-	-	0.07
Turkey vulture	0.04	0.12	0.04	0.29	0.83	0.08	0.04	-	0.12	-	0.04	-	-	0.08	-	0.04	0.04	-	-	-	-	-	-	-	-	0.07
Unidentified birds	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Total	1.83	5.04	2.82	2.92	2.58	1.39	5.67	4.04	3.83	2.67	3.46	1.25	1.08	3.04	1.28	1.42	1.17	1.96	1.25	1.62	0.75	2.29	1.00	2.83	1.96	2.37

Note: Mean use = number of detections by species or species group / number of surveys. Shaded rows indicate species with a mean use ≥ 0.05. Small discrepancies in the totals may be present due to rounding.

Table 7. Large Bird Species/Species Group Mean Use (Total Detections) by Flight Height, Year 1

Species Group Species Common Name	Flight Height (m)			Mean Use (Total)
	0-<20	20-200	>200	
Corvids	1.11 (661)	0.73 (434)	0.05 (28)	1.88 (1123)
Common raven	1.11 (661)	0.73 (434)	0.05 (27)	1.88 (1122)
American crow	0.00 (0)	0.00 (0)	<0.01 (1)	<0.01 (1)
Diurnal Birds of Prey	0.13 (79)	0.12 (74)	0.01 (4)	0.26 (157)
American kestrel	0.06 (35)	0.02 (11)	0.00 (0)	0.08 (46)
Red-tailed hawk	0.03 (17)	0.04 (23)	0.01 (4)	0.07 (44)
Golden eagle	0.01 (5)	0.02 (13)	0.00 (0)	0.03 (18)
Bald eagle	0.01 (4)	0.01 (6)	0.00 (0)	0.02 (10)
Sharp-shinned hawk	0.01 (3)	0.01 (6)	0.00 (0)	0.02 (9)
Cooper's hawk	0.01 (4)	<0.01 (1)	0.00 (0)	0.01 (5)
Ferruginous hawk	<0.01 (2)	0.01 (4)	0.00 (0)	0.01 (6)
Northern harrier	<0.01 (1)	<0.01 (2)	0.00 (0)	0.01 (3)
Prairie falcon	<0.01 (1)	0.01 (3)	0.00 (0)	0.01 (4)
Unidentified hawk	0.01 (4)	0.01 (3)	0.00 (0)	0.01 (7)
Northern goshawk	<0.01 (1)	0.00 (0)	0.00 (0)	<0.01 (1)
Peregrine falcon	<0.01 (1)	0.00 (0)	0.00 (0)	<0.01 (1)
Rough-legged hawk	<0.01 (1)	0.00 (0)	0.00 (0)	<0.01 (1)
Swainson's hawk	0.00 (0)	<0.01 (2)	0.00 (0)	<0.01 (2)
Nightjars	<0.01 (1)	0.01 (7)	0.00 (0)	0.01 (8)
Common nighthawk	<0.01 (1)	0.01 (7)	0.00 (0)	0.01 (8)
Vultures	0.02 (12)	0.05 (31)	0.00 (0)	0.07 (43)
Turkey vulture	0.02 (12)	0.05 (31)	0.00 (0)	0.07 (43)
Unidentified birds	<0.01 (2)	<0.01 (2)	0.00 (0)	0.01 (4)
Total	1.27 (755)	0.92 (548)	0.05 (32)	2.24 (1335)

Note: Shaded rows indicate species with a mean use ≥ 0.05 . The data exclude observations for which a flight height was unknown. Height data are presented to fully describe baseline conditions; however, they should be interpreted with caution given that no clear link has been established between flight heights recorded during pre-construction diurnal surveys and post-construction fatalities. Mean use = number of detections by species or species group / number of total surveys.

3.2.4 Eagle-Specific Results

Bald eagles were detected within the strict definition of the survey (the one-hour duration and 200m height \times 800m fixed-radius “survey cylinder”) on seven occasions, for a total of 24 minutes in flight (eagle minutes; Table 8). Golden eagles were detected within the strict definition of the survey on 13 occasions, for a total of 49 minutes in flight.

Bald eagles were not detected from April through August (Table 9) supporting previous reports that no bald eagle breeding territories exist in the analysis area. Golden eagles were detected in all seasons, and all age classes were observed (juvenile, subadult, and adult), indicating migratory and overwintering golden eagles are present, along with the breeding adults identified in the nest survey (SWCA 2021).

Bald eagle flight paths were mostly observed along a rough north-south axis from Lockwood Canyon to Rabbit Canyon, in the western half of the analysis area (Figure 4). Golden eagle flight paths were more widespread, observed in a broad belt curving northwest to west connecting Lockwood Canyon, Mesa Butte, and the lava fields immediately to the west of the analysis area (Figure 5).

Table 8. Details of Eagle Minute Observations, Year 1

Species *	Plot	Date	Number and Age	Eagle minutes †	Behavior(s)	Height (m)
BAEA	8	02-Nov-21	1 subadult	1	Soaring	180
BAEA	5	28-Jan-22	1 unknown	5	Soaring, direct flapping/gliding	7–20
BAEA	11	08-Feb-22	1 adult	4	Soaring, direct flapping/gliding	70–100
BAEA	4	11-Feb-22	1 adult	3	Soaring	4–30
BAEA	4	11-Feb-22	1 adult	5	Soaring	8–140
BAEA	4	11-Feb-22	1 adult	5	Soaring, direct flapping/gliding	7–100
BAEA	25	17-Mar-22	1 adult	1	Soaring	15–100
GOEA	2	21-Sep-21	1 adult	3	Soaring	120–180
GOEA	25	29-Sep-21	1 adult	1	Soaring	150–170
GOEA	20	07-Oct-21	1 subadult	12	Soaring	50–235
GOEA	18	18-Oct-21	1 subadult	2	Direct flapping/gliding	15–25
GOEA	23	28-Oct-21	1 adult	5	Soaring	3–100
GOEA	3	23-Dec-21	1 adult	2	Soaring, direct flapping/gliding	35–50
GOEA	2	20-Jan-22	1 adult	4	Direct flapping/gliding	5–60
GOEA	2	25-Jan-22	2 unknown	6	Soaring	30–80
GOEA	4	11-Feb-22	1 unknown	1	Soaring, direct flapping/gliding, chased adult bald eagle	8
GOEA	4	11-Feb-22	1 unknown	1	Direct flapping/gliding	40
GOEA	4	11-Feb-22	1 unknown	5	Soaring, direct flapping/gliding	60–150
GOEA	21	14-Feb-22	1 adult	5	Direct flapping/gliding, soaring	5–60
GOEA	6	17-Mar-22	1 juvenile	2	Soaring	110–125

*BAEA= bald eagle, GOEA= golden eagle

†Eagle minutes are the elapsed time eagles were observed inside the 800-meter fixed-radius survey plot during the one-hour survey period flying between ground level and 200 m above ground level, rounded up to the nearest full minute.

Table 9. Temporal Distribution of Eagle Observations (recorded incidentally and during use surveys), Year 1

Species	Spring			Summer			Fall			Winter		
	Mar	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Bald eagle	S	–	–	–	–	–	I	–	S	–	S	S, I
Golden eagle	S	–	I	–	S, I	–	S, I	S, I	–	S	S, I	S, I

Note: S: Observations recorded during one-hour large bird surveys. I: Incidental observations during transit between plots or on small bird surveys. Dash (–) indicates no observations occurred in the calendar month.

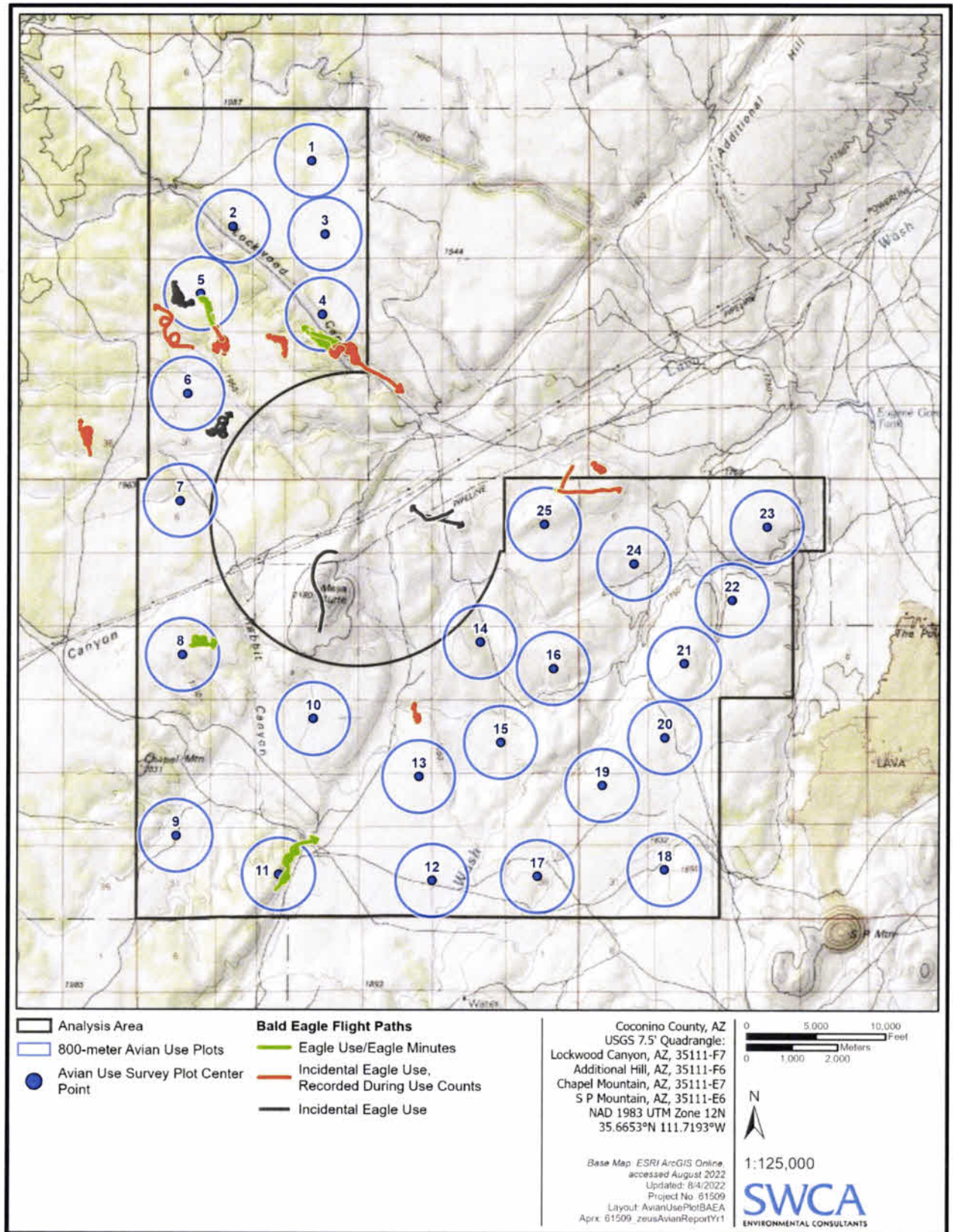


Figure 4. Bald eagle flight paths observed during Year 1 of study at the Forged Ethic Wind Energy Analysis Area, Coconino County, Arizona.

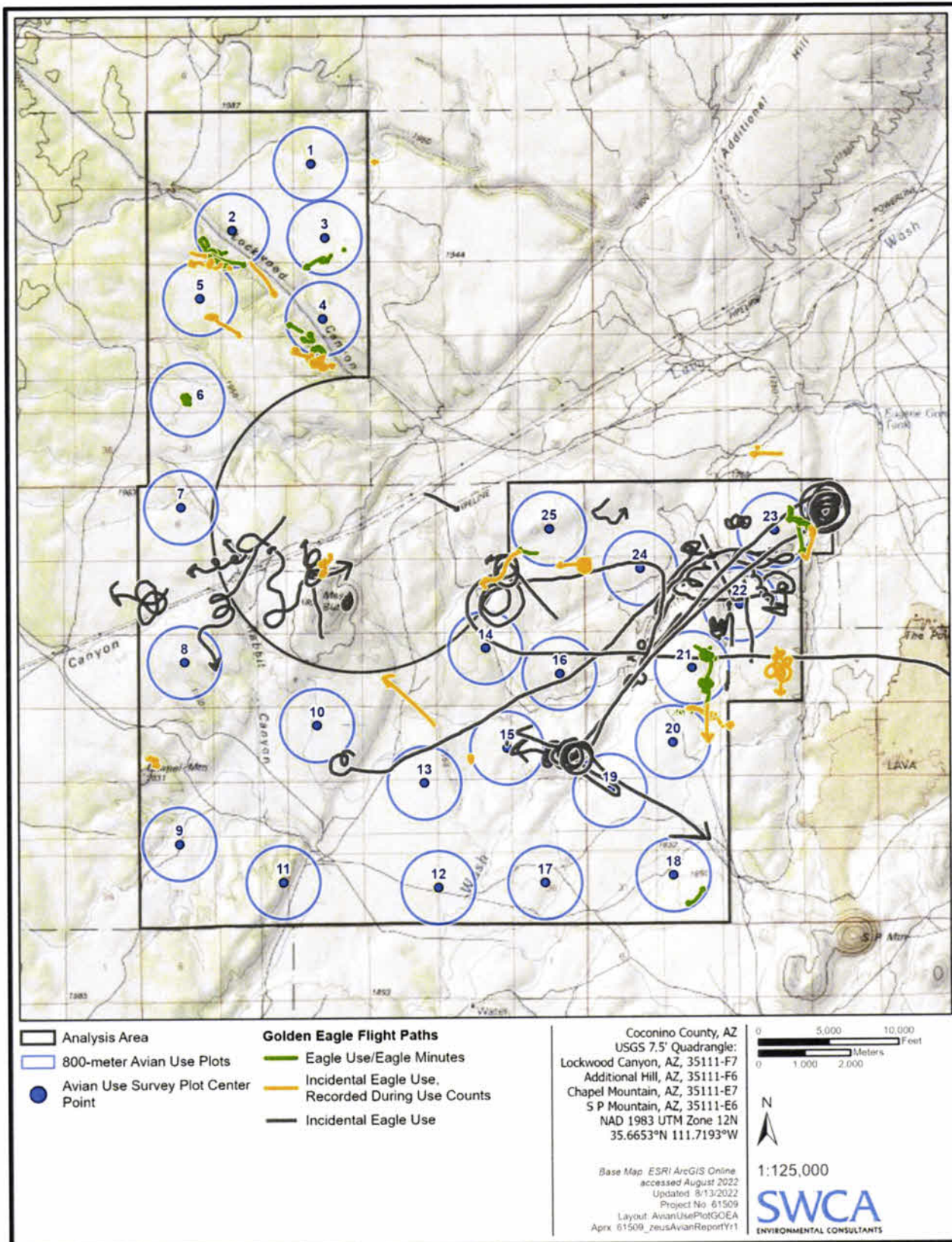


Figure 5. Golden eagle flight paths observed during Year 1 of study at the Forged Ethic Wind Energy Analysis Area, Coconino County, Arizona.

3.3 Small Bird Use Surveys

3.3.1 Species and Species Group Composition

Including incidental observations, surveyors recorded 61 small bird species including four species of concern (Table 10; see Table 1)—pinyon jay (*Gymnorhinus cyanocephalus*), broad-tailed hummingbird (*Selasphorus platycercus*), chestnut-collared longspur (*Calcarius ornatus*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*)—none of which are threatened or endangered.

Ninety-eight percent of 1,437 small bird detections (recorded during the formal surveys) were successfully identified to species (55 species; Table 11). Of the remaining detections, 18 were identified to a species group (e.g., unidentified sparrow) and eight were not identified. Passerines represented the majority (83.4%) of detections, followed by corvids (9.0%), and swallows and swifts (4.4%). Woodpeckers, doves, hummingbirds, and cuckoos each composed less than 1% of the total count. Horned lark (*Eremophila alpestris*; 822 detections, recorded in 41.3% of surveys) was the most common species in terms of total detections and mean use (2.0 detections per survey). Other relatively common species included pinyon jay (127 detections, recorded in 2.0% of surveys), rock wren (*Salpinctes obsoletus*, 52 detections, recorded in 7.2% of surveys), mountain bluebird (*Sialia currucoides*; 37 detections, recorded in 3.3% of surveys), black-throated sparrow (*Amphispiza bilineata*, 34 detections, recorded in 3.8% of surveys), house finch (*Haemorhous mexicanus*, 32 detections, recorded in 2.8% of surveys), violet green swallow (*Tachycineta thalassina*, 30 detections, recorded in 2.5% of surveys), and western bluebird (*Sialia mexicana*; 28 detections, recorded in 2.0% of surveys). These eight species accounted for 80.9% of the total count of small birds.

Pinyon jay was the only locally common species of concern. Two species of concern were not recorded during formal surveys (chestnut-collared longspur and yellow-headed blackbird). Broad-tailed hummingbird was recorded relatively infrequently (<1% of all surveys) and in low relative abundance (<1% of all detections).

Small birds observed in large flocks in the analysis area included pinyon jays (24–125 birds on five occasions between August 19 and February 15), horned larks (numerous flocks of 10–45 between October 29 and January 1, a flock of 30 on July 19, and a flock of at least 150 observed on September 16), and white-throated swifts (*Aeronautes saxatalis*; 25 observed on April 25).

Table 10. All Small Birds Detected Incidentally or During Formal Small Bird Surveys, Year 1

Species (Scientific Name)	
Corvids	
Pinyon jay (<i>Gymnorhinus cyanocephalus</i>) *	Woodhouse's scrub-jay (<i>Aphelocoma woodhouseii</i>)
Cuckoos	
Greater roadrunner (<i>Geococcyx californianus</i>)	
Doves	
Mourning dove (<i>Zenaida macroura</i>)	
Hummingbirds	
Black-chinned hummingbird (<i>Archilochus alexandri</i>)	Broad-tailed hummingbird (<i>Selasphorus platycercus</i>) *
Passerines	
American pipit (<i>Anthus rubescens</i>) †	Loggerhead shrike (<i>Lanius ludovicianus</i>)

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Species (Scientific Name)	
American robin (<i>Turdus migratorius</i>)	Mountain bluebird (<i>Sialia currucoides</i>)
Ash-throated flycatcher (<i>Myiarchus cinerascens</i>)	Mountain bluebird (<i>Sialia currucoides</i>)
Bewick's wren (<i>Thryomanes bewickii</i>)	Mountain chickadee (<i>Poecile gambeli</i>)
Black-throated sparrow (<i>Amphispiza bilineata</i>)	Nashville Warbler (<i>Oreothlypis ruficapilla</i>)
Blue-gray gnatcatcher (<i>Poliophtila caerulea</i>)	Northern mockingbird (<i>Mimus polyglottos</i>)
Brewer's blackbird (<i>Euphagus cyanocephalus</i>)	Pine siskin (<i>Spinus pinus</i>)
Brewer's sparrow (<i>Spizella breweri</i>)	Red-winged blackbird (<i>Agelaius phoeniceus</i>)
Bullock's oriole (<i>Icterus bullockii</i>)	Rock wren (<i>Salpinctes obsoletus</i>)
Bushtit (<i>Psaltriparus minimus</i>)	Ruby-crowned kinglet (<i>Regulus calendula</i>)
Cassin's kingbird (<i>Tyrannus vociferans</i>)	Sage thrasher (<i>Oreoscoptes montanus</i>)
Chestnut-collared longspur (<i>Calcarius ornatus</i>) *†	Say's phoebe (<i>Sayornis saya</i>)
Chipping sparrow (<i>Spizella passerina</i>)	Scott's oriole (<i>Icterus parisorum</i>)
Crissal thrasher (<i>Toxostoma crissale</i>)	Spotted towhee (<i>Pipilo maculatus</i>)
Dark-eyed junco (<i>Junco hyemalis</i>)	Townsend's solitaire (<i>Myadestes townsendi</i>)
Eastern meadowlark (<i>Sturnella magna</i>)	Townsend's warbler (<i>Setophaga townsendi</i>) †
European starling (<i>Sturnus vulgaris</i>) †	Vesper sparrow (<i>Pooecetes gramineus</i>)
Gray flycatcher (<i>Empidonax wrightii</i>)	Western bluebird (<i>Sialia mexicana</i>)
Horned lark (<i>Eremophila alpestris</i>)	Western kingbird (<i>Tyrannus verticalis</i>)
House finch (<i>Haemorhous mexicanus</i>)	Western tanager (<i>Piranga ludoviciana</i>)
House wren (<i>Troglodytes aedon</i>)	Wilson's warbler (<i>Cardellina pusilla</i>)
Juniper titmouse (<i>Baeolophus ridgwayi</i>)	Yellow-headed blackbird (<i>Xanthocephalus xanthocephalus</i>) *†
Lark sparrow (<i>Chondestes grammacus</i>)	Yellow-rumped warbler (<i>Setophaga coronata</i>)
Swallows and Swifts	
Barn swallow (<i>Hirundo rustica</i>) †	Violet-green swallow (<i>Tachycineta thalassina</i>)
Cliff swallow (<i>Petrochelidon pyrrhonota</i>)	White-throated swift (<i>Aeronautes saxatalis</i>)
Tree swallow (<i>Tachycineta bicolor</i>)	
Woodpeckers	
Downy woodpecker (<i>Picoides pubescens</i>)	Ladder-backed woodpecker (<i>Picoides scalaris</i>)
Hairy woodpecker (<i>Dryobates villosus</i>)	Northern flicker (<i>Colaptes auratus</i>)

* Species of concern (see Table 1).

† Species recorded incidentally only (not during formal surveys).

Table 11. Small Bird Species/Species Group Use Metrics During Formal Small Bird Surveys, Year 1

Species Group Species Common Name	Detections	Relative Abundance (%)	Frequency of Occurrence (%)	Mean Use
Corvids	129	8.98	2.33	0.22
Pinyon jay	127	8.84	2.00	0.21
Woodhouse's scrub-jay	2	0.14	0.33	<0.01

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Species Group Species Common Name	Detections	Relative Abundance (%)	Frequency of Occurrence (%)	Mean Use
Cuckoos	1	0.07	0.17	<0.01
Greater roadrunner	1	0.07	0.17	<0.01
Doves	13	0.90	1.50	0.02
Mourning dove	13	0.90	1.50	0.02
Hummingbirds	9	0.63	1.50	0.01
Black-chinned hummingbird	4	0.28	0.67	0.01
Broad-tailed hummingbird	4	0.28	0.67	0.01
Unidentified hummingbird	1	0.07	0.17	<0.01
Passerines	1,199	83.44	59.50	2.00
Horned lark	822	57.20	41.33	1.37
Rock wren	52	3.62	7.17	0.09
Mountain bluebird	37	2.57	3.33	0.06
Black-throated sparrow	34	2.37	3.83	0.06
House finch	32	2.23	2.83	0.05
Western bluebird	28	1.95	2.00	0.05
Lark sparrow	23	1.60	2.83	0.04
Bushtit	14	0.97	0.83	0.02
Chipping sparrow	13	0.90	0.83	0.02
Northern mockingbird	12	0.84	1.83	0.02
Juniper titmouse	11	0.77	1.67	0.02
Unidentified sparrow	11	0.77	0.33	0.02
Western meadowlark	11	0.77	1.83	0.02
Ash-throated flycatcher	10	0.70	1.67	0.02
Brewer's sparrow	10	0.70	0.67	0.02
Blue-gray gnatcatcher	8	0.56	1.00	0.01
Loggerhead shrike	8	0.56	1.33	0.01
Scott's oriole	6	0.42	1.00	0.01
Vesper sparrow	6	0.42	0.67	0.01
Say's phoebe	5	0.35	0.83	0.01
Sage thrasher	5	0.35	0.67	0.01
Eastern meadowlark	4	0.28	0.67	0.01
Gray flycatcher	3	0.21	0.50	<0.01
House wren	3	0.21	0.17	<0.01
Spotted towhee	3	0.21	0.33	<0.01
Western kingbird	3	0.21	0.33	<0.01
American robin	2	0.14	0.33	<0.01
Bullock's oriole	2	0.14	0.17	<0.01

Avian Use Surveys for the Proposed Forged Ethic Wind Energy Project, June 2021–June 2022

Species Group Species Common Name	Detections	Relative Abundance (%)	Frequency of Occurrence (%)	Mean Use
Cassin's kingbird	2	0.14	0.33	<0.01
Crissal thrasher	2	0.14	0.33	<0.01
Dark-eyed junco	2	0.14	0.33	<0.01
Mountain chickadee	2	0.14	0.33	<0.01
Nashville warbler	2	0.14	0.17	<0.01
Townsend's solitaire	2	0.14	0.33	<0.01
Bewick's wren	1	0.07	0.17	<0.01
Brewer's blackbird	1	0.07	0.17	<0.01
Pine siskin	1	0.07	0.17	<0.01
Ruby-crowned kinglet	1	0.07	0.17	<0.01
Red-winged blackbird	1	0.07	0.17	<0.01
Unidentified thrasher	1	0.07	0.17	<0.01
Western tanager	1	0.07	0.17	<0.01
Wilson's warbler	1	0.07	0.17	<0.01
Yellow-rumped warbler	1	0.07	0.17	<0.01
Shorebirds	1	0.07	0.17	<0.01
Unidentified plover	1	0.07	0.17	<0.01
Swallows and Swifts	64	4.45	3.33	0.11
Violet-green swallow	30	2.09	2.50	0.05
White-throated swift	27	1.88	0.33	0.04
Unidentified swallow	4	0.28	0.33	0.01
Cliff swallow	2	0.14	0.17	<0.01
Northern rough-winged swallow	1	0.07	0.17	<0.01
Woodpeckers	13	0.90	2.00	0.02
Northern flicker	7	0.49	1.17	0.01
Hairy woodpecker	3	0.21	0.50	<0.01
Ladder-backed woodpecker	2	0.14	0.33	<0.01
Downy woodpecker	1	0.07	0.17	<0.01
Unidentified bird	8	0.56	1.17	0.01
Overall Total	1,437	100.00	62.50	2.40

Note: Shaded rows indicate species with a mean use ≥ 0.05 . Small discrepancies in the totals may be present due to rounding. Detections are the number of unique observations of individual birds by species/species group. Relative abundance = number of observed detections of a species or species group / number of total detections of all species or species groups combined $\times 100$ (expressed as a percentage). Frequency of occurrence = number of surveys during which a species or species group was recorded / number of total surveys $\times 100$ (expressed as a percentage). Mean use = number of detections by species/species group / number of total surveys.

* Species of concern (see Table 1).

3.3.2 Temporal Distribution

Small bird use was, overall, relatively consistent across seasons (spring: 2.2 small birds per survey; summer: 2.3 small birds per survey; fall: 2.8 small birds per survey; winter: 2.4 small birds per survey) (Table 12). These overall mean use figures are heavily influenced by observations of large flocks of a few species (e.g., January had the highest mean use [3.76 per survey] but the lowest species richness [4 species]; see section 3.3.1 above). Species richness was the highest (>20 species) in April and from July through September.

Individual species of concern may have unique patterns of seasonal use. Pinyon jays were observed in all seasons. Broad-tailed hummingbirds were observed only from April through August (Table 12).

Table 12. Small Bird Species/Species Group Mean Use by Season During Formal Small Bird Surveys, Year 1

Species Group Species Common Name	Spring			Summer			Fall			Winter			Mean
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Corvids	0.06	0.14	0.06	0.04	0.02	–	0.06	0.58	0.02	–	1.60	–	0.22
Pinyon jay	0.06	0.14	0.06	0.04	0.02	–	0.04	0.58	–	–	1.60	–	0.21
Woodhouse's scrub-jay	–	–	–	–	–	–	0.02	–	0.02	–	–	–	<0.01
Cuckoos	–	–	–	–	–	–	0.02	–	–	–	–	–	<0.01
Greater roadrunner	–	–	–	–	–	–	0.02	–	–	–	–	–	<0.01
Doves	–	0.04	0.10	0.04	–	–	0.04	–	–	–	0.04	–	0.02
Mourning dove	–	0.04	0.10	0.04	–	–	0.04	–	–	–	0.04	–	0.02
Hummingbirds	–	0.04	0.04	–	0.06	0.04	–	–	–	–	–	–	0.01
Black-chinned hummingbird	–	0.02	0.02	–	0.04	–	–	–	–	–	–	–	0.01
Broad-tailed hummingbird	–	0.02	0.02	–	0.02	0.02	–	–	–	–	–	–	0.01
Unidentified hummingbird	–	–	–	–	–	0.02	–	–	–	–	–	–	<0.01
Passerines	2.28	1.76	1.32	2.06	2.30	1.68	2.28	1.72	3.10	1.96	2.12	1.40	2.00
Horned lark	1.70	0.88	0.58	1.32	1.42	0.82	1.16	1.16	2.56	1.90	2.06	0.88	1.37
Rock wren	0.10	0.18	0.16	0.16	0.14	0.16	0.06	0.06	–	–	–	0.02	0.09
Mountain bluebird	0.10	0.02	–	–	0.12	–	0.08	0.14	0.18	–	–	0.10	0.06
Black-throated sparrow	0.08	0.08	0.10	0.14	0.20	0.08	–	–	–	–	–	–	0.06
House finch	0.06	0.08	–	–	0.02	0.06	0.18	–	0.14	–	–	0.10	0.05
Western bluebird	0.02	–	–	0.02	0.04	0.02	0.06	0.24	0.16	–	–	–	0.05
Lark sparrow	–	0.10	0.24	0.06	0.04	0.02	–	–	–	–	–	–	0.04
Bushtit	–	0.04	–	0.04	–	–	–	–	–	–	0.06	0.14	0.02
Chipping sparrow	–	0.16	–	–	–	0.02	0.06	–	0.02	–	–	–	0.02
Northern mockingbird	–	0.02	0.10	0.08	0.04	–	–	–	–	–	–	–	0.02
Juniper titmouse	–	–	0.02	–	–	0.02	0.02	–	0.04	0.02	–	0.10	0.02
Unidentified sparrow	–	–	–	–	–	–	0.22	–	–	–	–	–	0.02
Western meadowlark	0.06	0.02	0.02	0.04	0.08	–	–	–	–	–	–	–	0.02
Ash-throated flycatcher	–	0.04	0.06	0.06	0.04	–	–	–	–	–	–	–	0.02
Brewer's sparrow	–	–	–	–	–	0.20	–	–	–	–	–	–	0.02

Avian Use Surveys for the Proposed Forged Ethic Wind Energy Project, June 2021–June 2022

Species Group Species Common Name	Spring			Summer			Fall			Winter			Mean
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Blue-gray gnatcatcher	–	0.04	–	–	–	–	0.12	–	–	–	–	–	0.01
Loggerhead shrike	0.06	–	–	0.02	0.02	–	0.04	–	–	0.02	–	–	0.01
Scott's oriole	–	0.04	0.02	0.04	0.02	–	–	–	–	–	–	–	0.01
Vesper sparrow	–	–	–	–	–	–	0.12	–	–	–	–	–	0.01
Sage thrasher	0.02	–	–	–	–	–	0.04	0.02	–	–	–	0.02	0.01
Say's phoebe	0.04	0.02	–	–	0.02	0.02	–	–	–	–	–	–	0.01
Eastern meadowlark	0.02	0.02	–	–	0.02	–	0.02	–	–	–	–	–	0.01
Gray flycatcher	–	0.02	–	–	–	0.02	0.02	–	–	–	–	–	<0.01
House wren	–	–	–	–	–	0.06	–	–	–	–	–	–	<0.01
Spotted towhee	–	–	–	–	0.04	–	0.02	–	–	–	–	–	<0.01
Western kingbird	–	–	–	–	–	0.04	–	0.02	–	–	–	–	<0.01
American robin	–	–	–	–	–	0.02	0.02	–	–	–	–	–	<0.01
Bullock's oriole	–	–	–	–	–	0.04	–	–	–	–	–	–	<0.01
Cassin's kingbird	–	–	–	0.04	–	–	–	–	–	–	–	–	<0.01
Crissal thrasher	–	–	–	–	–	0.02	–	–	–	–	–	0.02	<0.01
Dark-eyed junco	–	–	–	–	–	–	–	0.02	–	0.02	–	–	<0.01
Mountain chickadee	–	–	–	–	0.02	0.02	–	–	–	–	–	–	<0.01
Nashville warbler	–	–	–	–	–	0.04	–	–	–	–	–	–	<0.01
Townsend's solitaire	–	–	–	–	–	–	0.02	0.02	–	–	–	–	<0.01
Bewick's wren	–	–	–	–	–	–	–	–	–	–	–	0.02	<0.01
Brewer's blackbird	–	–	–	0.02	–	–	–	–	–	–	–	–	<0.01
Pine siskin	–	–	–	–	–	–	–	0.02	–	–	–	–	<0.01
Red-winged blackbird	–	–	–	–	–	–	–	0.02	–	–	–	–	<0.01
Ruby-crowned kinglet	0.02	–	–	–	–	–	–	–	–	–	–	–	<0.01
Unidentified thrasher	–	–	–	0.02	–	–	–	–	–	–	–	–	<0.01
Western tanager	–	–	–	–	0.02	–	–	–	–	–	–	–	<0.01
Wilson's warbler	–	–	0.02	–	–	–	–	–	–	–	–	–	<0.01
Yellow-rumped warbler	–	–	–	–	–	–	0.02	–	–	–	–	–	<0.01
Shorebirds	–	–	–	–	–	–	0.02	–	–	–	–	–	<0.01
Unidentified plover	–	–	–	–	–	–	0.02	–	–	–	–	–	<0.01
Swallows and Swifts	–	0.50	0.02	–	0.10	0.46	0.20	–	–	–	–	–	0.11
Violet-green swallow	–	–	–	–	0.06	0.42	0.12	–	–	–	–	–	0.05
White-throated swift	–	0.50	–	–	–	0.04	–	–	–	–	–	–	0.04
Unidentified swallow	–	–	–	–	–	–	0.08	–	–	–	–	–	0.01
Cliff swallow	–	–	–	–	0.04	–	–	–	–	–	–	–	<0.01
Northern rough-winged swallow	–	–	0.02	–	–	–	–	–	–	–	–	–	<0.01
Woodpeckers	0.02	0.02	–	–	0.02	0.04	0.08	0.04	0.02	0.02	–	–	0.02
Northern flicker	0.02	0.02	–	–	0.02	–	0.06	0.02	–	–	–	–	0.01
Hairy woodpecker	–	–	–	–	–	0.02	–	0.02	0.02	–	–	–	<0.01

Species Group Species Common Name	Spring			Summer			Fall			Winter			Mean
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Ladder-backed woodpecker	–	–	–	–	–	0.02	0.02	–	–	–	–	–	<0.01
Downy woodpecker	–	–	–	–	–	–	–	–	–	0.02	–	–	<0.01
Unidentified birds	–	–	0.04	–	–	–	0.08	0.04	–	–	–	–	0.01
Monthly Mean Use	2.36	2.50	1.58	2.14	2.50	2.22	2.78	2.38	3.14	1.98	3.76	1.40	2.40
Seasonal Mean Use	2.15			2.29			2.77			2.38			2.40

Note: Mean use = number of detections by species or species group/number of surveys. Shaded rows indicate species with a monthly mean use ≥ 0.05 . Small discrepancies in the totals may be present due to rounding.

3.3.3 *Spatial Distribution*

The highest small bird use was observed at Plots 18 and 25 (5.5 small birds per survey), attributable to flocks of horned larks (Table 13). Similarly, Plot 1 had high use (4.5 per survey) because of the many pinyon jays detected. Broad-tailed hummingbirds were detected at Plot 9, near Chapel Tank, on three out of four occasions. Other hydrologic features that may have contributed to small bird species richness include Dent and Sayer Tank (near Plot 1), Lockwood Tank (near Plot 2), Lower Lockwood Tank (near Plot 4), and an unnamed tank between Plots 14 and 16.

Table 13. Small Bird Mean Use by Survey Plot, Year 1

Species Group Species Common Name	Survey Plot																									Mean
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Corvids	3.33	0.12	-	1.12	-	0.12	-	0.12	-	0.04	0.21	-	-	-	-	-	-	0.04	-	0.25	-	-	-	-	-	0.22
Pinyon jay	3.33	0.12	-	1.12	-	0.12	-	0.08	-	0.21	-	-	-	-	-	-	-	0.04	-	0.25	-	-	-	-	-	0.21
Woodhouse's scrub-jay	-	-	-	-	-	-	-	0.04	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Cuckoos	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Greater roadrunner	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Doves	-	0.04	-	0.17	-	-	-	-	-	-	0.12	-	-	-	-	-	-	0.04	0.08	-	0.04	-	-	-	-	0.02
Mourning dove	-	0.04	-	0.17	-	-	-	-	-	-	0.12	-	-	-	-	-	-	0.04	0.08	-	0.04	-	-	-	-	0.02
Hummingbirds	-	-	-	-	-	-	-	-	0.04	0.12	0.08	0.04	0.04	0.04	-	0.04	-	-	-	-	-	0.04	-	-	-	0.01
Black-chinned hummingbird	-	-	-	-	-	-	-	0.04	-	0.04	0.04	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	0.01
Broad-tailed hummingbird	-	-	-	-	-	-	-	-	0.12	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	0.01
Unidentified hummingbird	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Passerines	0.88	1.96	1.08	1.54	0.92	1.21	1.17	1.33	0.88	1.75	1.75	1.58	4.71	3.25	3.38	1.71	2.12	5.38	1.17	1.38	1.46	1.79	1.67	1.54	4.38	2.00
Horned lark	0.08	-	0.46	0.42	0.42	0.58	0.08	0.29	0.67	1.00	0.21	1.25	4.71	2.46	3.29	0.88	2.04	4.83	0.92	1.00	1.17	0.88	1.58	1.00	4.04	1.37
Rock wren	-	0.17	-	0.17	-	-	-	-	-	0.17	-	-	-	0.08	0.04	0.38	-	0.50	0.04	-	0.08	0.29	-	-	0.08	0.09
Mountain bluebird	0.04	0.42	-	0.08	0.33	0.12	0.08	0.12	-	0.08	0.12	-	-	0.08	-	0.04	-	-	-	-	-	-	-	-	-	0.06
Black-throated sparrow	-	0.08	0.21	0.12	-	-	-	0.08	-	0.04	0.42	-	-	0.04	-	0.12	-	-	0.08	-	0.12	0.29	0.04	0.17	-	0.06
House finch	0.04	0.17	0.04	0.04	-	-	-	-	0.08	0.04	0.42	-	-	0.25	0.04	-	0.08	-	-	-	-	-	-	-	0.04	0.05
Western bluebird	0.17	0.33	0.04	-	0.12	0.04	0.21	0.04	0.12	0.04	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	0.05
Lark sparrow	-	-	0.04	0.12	-	0.21	0.21	0.12	-	0.08	0.04	-	-	-	-	-	-	-	0.08	-	-	-	-	-	0.04	0.04
Bush-tit	-	-	-	-	-	-	-	0.08	-	-	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Chipping sparrow	-	-	-	-	-	-	-	0.04	-	0.04	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	0.02
Northern mockingbird	0.04	-	-	0.08	-	0.08	0.12	0.12	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Juniper titmouse	0.04	0.17	-	0.04	-	0.08	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Unidentified sparrow	-	-	-	-	-	-	0.33	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Western meadowlark	0.21	0.04	0.12	-	-	-	0.04	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Ash-throated flycatcher	0.04	0.08	-	0.08	-	-	-	-	-	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Brewer's sparrow	-	-	-	-	-	-	-	-	-	-	-	-	0.17	-	-	0.04	-	-	-	-	-	-	-	-	-	0.02
Blue-gray gnatcatcher	0.04	-	-	0.17	-	-	-	-	-	0.04	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Loggerhead shrike	-	-	0.08	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	0.04	0.04	-	-	-	-	-	-	0.01
Scott's oriole	-	0.04	-	0.08	-	-	0.04	0.04	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Vesper sparrow	-	-	-	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Sage thrasher	-	0.04	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Say's phoebe	-	-	0.08	-	-	-	-	-	-	0.04	0.04	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	0.01
Eastern meadowlark	0.04	0.04	-	-	-	0.04	-	-	-	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Gray flycatcher	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
House wren	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Spotted towhee	0.04	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Western kingbird	-	-	-	-	-	-	0.04	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01

Species Group Species Common Name	Survey Plot																									Mean
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
American robin	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Bullock's oriole	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Cassin's kingbird	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	<0.01
Crissal thrasher	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Dark-eyed junco	-	-	-	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Mountain chickadee	0.04	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Nashville warbler	-	-	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Townsend's solitaire	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	<0.01
Bewick's wren	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Brewer's blackbird	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Pine siskin	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Red-winged blackbird	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	<0.01
Ruby-crowned kinglet	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Unidentified thrasher	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Western tanager	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Wilson's warbler	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Yellow-rumped warbler	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	<0.01
Shorebirds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	<0.01
Unidentified plover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	<0.01
Swallows and Swifts	0.17	0.12	0.08	0.12	0.17	0.12	0.08	0.08	0.12	0.08	0.04	0.04	0.08	0.08	0.04	0.17	0.04	0.04	0.04	0.08	0.08	0.08	0.08	0.25	1.04	0.11
Violet-green swallow	0.17	-	0.08	0.12	-	0.12	-	0.08	-	0.08	0.04	-	-	-	-	0.17	-	0.04	0.04	0.04	-	-	-	0.25	-	0.05
White-throated swift	-	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	1.04	0.04
Unidentified swallow	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	0.01
Cliff swallow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	-	-	<0.01
Northern rough-winged swallow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Woodpeckers	0.17	0.12	0.08	0.04	0.04	0.12	0.08	0.12	0.08	0.08	0.08	0.04	0.08	0.08	0.04	0.08	0.04	0.04	0.04	0.08	0.08	0.08	0.04	0.04	0.04	0.02
Northern flicker	0.08	0.12	-	-	-	-	-	0.04	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Hairy woodpecker	0.04	-	-	0.04	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Ladder-backed woodpecker	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Downy woodpecker	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Unidentified bird	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.08	-	-	-	0.04	-	-	-	0.04	0.04	0.01
Total	4.54	2.25	1.17	3.00	0.92	1.50	1.17	1.71	1.12	1.96	2.33	1.58	4.79	3.33	3.38	2.04	2.21	5.46	1.29	1.71	1.62	1.79	1.71	1.83	5.46	2.40

Note: Mean use = number of detections by species or species group/number of surveys. Shaded rows indicate species with a mean use ≥0.05. Small discrepancies in the totals may be present due to rounding.

4 INTERPRETATION

Under the premise that wind turbine collision risk to birds (and bats) is related to activity and exposure, pre-construction use surveys are commonly performed to support WEG Tier 3 decisions.⁷ However, for most birds (and bats), relating pre-construction activity data to post-construction fatality rates remains elusive (Allison et al. 2019; American Wind Wildlife Institute 2019; Ferrer et al. 2012; Hein et al. 2013; Loss et al. 2013). Contradictory evidence linking raptor abundance to raptor fatality rates further underscores that the premise may be too simplistic (Allison et al. 2019; American Wind Wildlife Institute 2019; Carrete et al. 2012; Ferrer et al. 2012; Strickland et al. 2011). Instead, factors influencing non-random use of the landscape (e.g., species-specific behavior, weather, and topography) may be just as important as bird abundance (Barrios and Rodriguez 2004; de Lucas et al. 2008; Ferrer et al. 2012; Marques et al. 2014). This, along with other limitations, challenges the notion that these use surveys have predictive power (Carrete et al. 2012). However, the results presented do provide baseline species composition and general use of the analysis area by small and large, including eagles.

5 KEY FINDINGS

- Surveyors confirmed the presence of 83 bird species in the analysis area. Eleven were species of concern (i.e., Eagle Rule, Birds of Conservation Concern, Species of Greatest Conservation Need). None are threatened or endangered.
- Large bird species richness and diversity was moderate. Six different raptor species of concern were documented, along with the common nighthawk. Common ravens accounted for 84% of large bird detections and the four most common species accounted for 93.8% of detections.
- Small bird use and species richness was relatively low. Ten minutes spent surveying for small birds yielded less than three birds on average, and horned larks alone accounted for 57.2% of detections. Only two species of concern were detected on small bird surveys.
- Bald eagles were detected within the fixed-radius survey seven times in the nonbreeding season (September to March) for a total of 24 eagle minutes in 600 hours of surveys.
- Golden eagles were detected within the fixed-radius survey 13 times and in all seasons for a total of 49 eagle minutes in 600 hours of surveys.
- Pinyon jays were locally common in the analysis area and were occasionally observed in large flocks.
- Common nighthawks were detected in June and July across much of the analysis area. No more than three were seen in an hour.
- Ferruginous hawks are breeding residents in the analysis area and predominantly seen in the vicinity of several known nests (SWCA 2021).
- The other six species of concern (peregrine falcon, burrowing owl, northern goshawk, broad-tailed hummingbird, chestnut-collared longspur, and yellow-headed blackbird) were either recorded incidentally or rarely recorded during formal surveys (<1% of all detections on <1% of all formal surveys).

⁷ Tier 3 site-specific survey data provide quantitative and qualitative assessments used to determine 1) whether a project should be developed or abandoned, 2) avoidance and minimization measures, and 3) compensatory mitigation measures if adverse impacts cannot acceptably be avoided (USFWS 2012).

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Exhibit B – Attachment B-6

Tier 1 Preliminary Site Evaluation and Tier 2 Site Characterization Report,
Forged Ethic Wind Energy Project,
Coconino County, Arizona; October 2022

Tier 1 Preliminary Site Evaluation and Tier 2 Site Characterization Report, Forged Ethic Wind Energy Project, Coconino County, Arizona

OCTOBER 2022

PREPARED FOR

RWE Renewables Development, LLC

PREPARED BY

SWCA Environmental Consultants

**TIER 1 PRELIMINARY SITE EVALUATION AND
TIER 2 SITE CHARACTERIZATION REPORT,
FORGED ETHIC WIND ENERGY PROJECT,
COCONINO COUNTY, ARIZONA**

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SWCA Project No. 61509

October 2022

EXECUTIVE SUMMARY

RWE Renewables, LLC (RWE), is proposing to develop the Forged Ethic Wind Energy Facility (project), an approximately 323-megawatt wind energy facility located on approximately 29,106 acres located within checkerboarded private land and Arizona State Trust Land in Coconino County, Arizona (analysis area). In 2019, SWCA Environmental Consultants (SWCA) developed a preconstruction wildlife survey plan for the project (then referred to as Zeus Wind Energy Facility), which included a preliminary desktop review of the project area. The survey plan and preliminary desktop data were presented to the U.S. Fish and Wildlife Service (USFWS) and Arizona Game and Fish Department (AGFD) in 2020.

SWCA has prepared this report to provide a landscape-scale screening and site-level characterization of the proposed project, including gathering an understanding of the wildlife community potentially using the site. The report addresses the USFWS's *Land-Based Wind Energy Guidelines* Tiers 1 and 2 (preliminary site evaluation and site characterization) and *Eagle Conservation Plan Guidance* Stage 1 (site assessment) and the AGFD's *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona*.

Objectives were addressed through desktop evaluation of publicly available information, communication with AGFD's experts, and repeated visits to the site (on foot and by helicopter) during initial preconstruction wildlife surveys (June 2021 to present).

Three of the six species listed by the USFWS as Threatened, Endangered, Candidate, or Non-essential Experimental Populations for the project, California condor (*Gymnogyps californianus*), monarch butterfly (*Danaus plexippus*), and Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*), may occur within the analysis area. The analysis area is clearly beyond the known geographic or elevational range of the other three federally listed species, or it does not contain vegetation or landscape features known to support these species, or both.

Additional Species of Concern included in the evaluation are bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*), USFWS Birds of Conservation Concern for Bird Conservation Regions 16 and 34, AGFD's Species of Greatest Conservation Need categorized as Tier 1A and 1B. Forty-one of these species were determined to have some likelihood of occurrence within the analysis area or 2-mile buffer. Golden eagles are known to occur within the analysis area year-round. Bald eagle use of the analysis area is occasional. Tier 3 preconstruction wildlife surveys and reporting, which provide quantitative and qualitative assessments used to further evaluate risk and make siting and operational decisions, are ongoing.

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1 INTRODUCTION

RWE Renewables, LLC (RWE), is proposing to develop the Forged Ethic Wind Energy Facility (project), an approximately 323-megawatt (MW) wind energy facility located on approximately 29,106 acres located within checkerboarded private land and Arizona State Trust Land in Coconino County, Arizona (Figure 1). The project analysis area includes the proposed wind farm location, access road, gen-tie corridor, and substation and consists of approximately 14,318 acres of privately owned lands and 14,787 acres of Arizona State Trust Land within portions of Township 26 North, Ranges 5, 6, 7 and 8 East, and Township 27 North, Range 6 East, Gila and Salt River Meridian (Figure 2).

The objective of this report is to assess the habitat and physical landscape characteristics of the analysis area as they relate to the area's potential use by sensitive species and other wildlife, including any sensitive habitat designations, and to verify habitat types determined from aerial imagery and the U.S. Geological Survey (USGS) Southwest Regional Gap Analysis Project (SWReGAP) land cover database (USGS 2016). This site evaluation and characterization assessment follows the recommendations of the U.S. Fish and Wildlife Service (USFWS) *Land-Based Wind Energy Guidelines* (WEG) (USFWS 2012), *Eagle Conservation Plan Guidance* (ECPG) (USFWS 2013a), and Eagle Rule (USFWS 2016a), combining Tier 1 (Preliminary Site Evaluation) and Tier 2 (Site Characterization) from the WEG with Stage 1 of the ECPG, and provides information needed to address questions posed under Tier 1 and Tier 2 of the WEG. Additionally, site evaluation and characterization screening methods follow the Arizona Game and Fish Department (AGFD) *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona* (AGFD 2012a).

1.1 Applicable Guidelines

1.1.1 U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines

As described in the WEG, Tier 1 questions may be addressed by desktop evaluation alone, or Tiers 1 and 2 questions may be combined to adequately evaluate these questions after one or repeated site visits. In both approaches, the developer evaluates potential risk to species of concern and their habitats related to multiple possible sites or a single site within a landscape context. Combining the two provides a preliminary assessment of site-specific information. In this document, a single site is evaluated using the Tiers 1 and 2 combined approach. ECPG Stage 1 and AGFD's (2012a) preliminary site screening questions have also been incorporated into this evaluation.

1.1.2 Arizona Wind Energy Development Guidelines

AGFD's (2012a) guidelines are meant to assist energy developers in identifying potential impacts to wildlife and wildlife habitats and measures to avoid, minimize, and mitigate for those impacts. Like the WEG and ECPG, adherence to the state guidelines is voluntary and does not absolve individuals and entities from liability for violating state law; however, AGFD will take compliance with these guidelines into consideration when considering law enforcement action. AGFD (2012a) encourages project proponents to coordinate with their Project Evaluation Program staff throughout the tiered process. As part of the early site screening, they encourage a site reconnaissance survey to obtain information on the vegetative communities and significant topographic features to help determine the wildlife community using the site.

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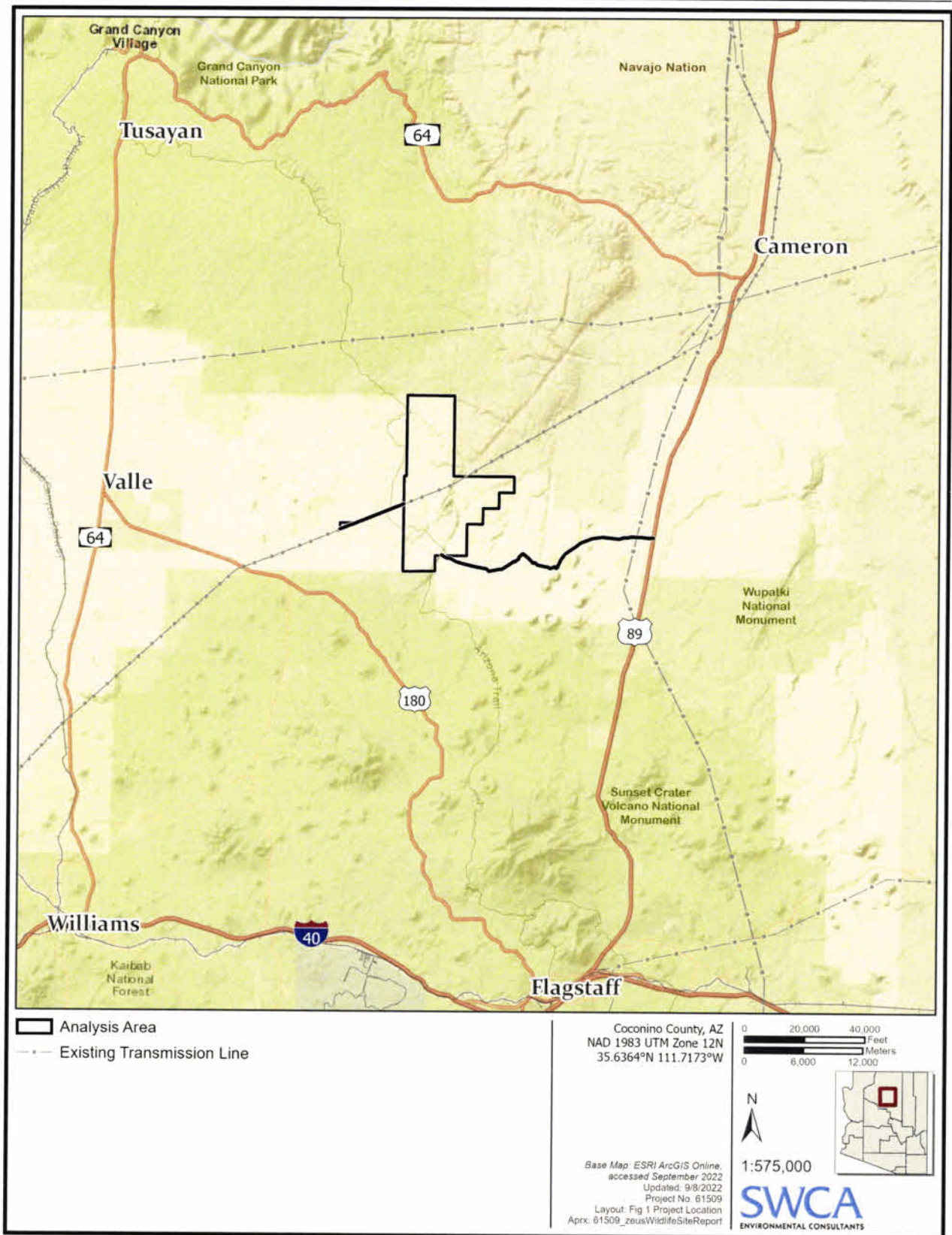


Figure 1. Project analysis area location and existing transmission lines.

Tier 1 Preliminary Site Evaluation and Tier 2 Site Characterization Report, Forged Ethic Wind Energy Project
Coconino County, Arizona

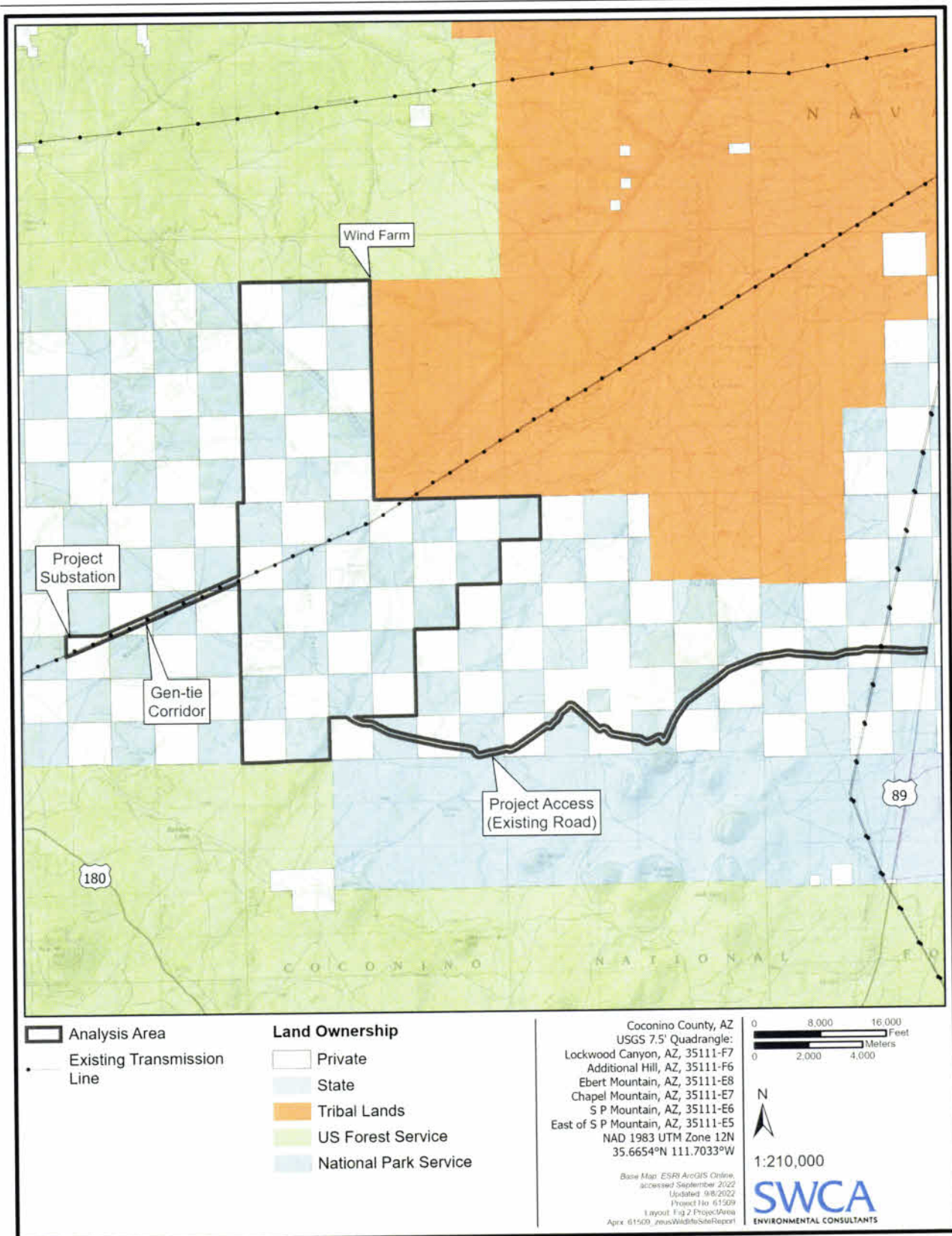


Figure 2. Project analysis area and surrounding land ownership.

1.2 Applicable Statutes, Policies, and Regulations

The results of wildlife and habitat evaluations, aimed at determining which, if any, species may be affected by design, construction, operation, and decommissioning of the project, are meant to inform efforts to achieve compliance with appropriate jurisdictional statutes.

1.2.1 Federal

1.2.1.1 ENDANGERED SPECIES ACT

The Endangered Species Act of 1973, as amended (ESA), protects imperiled (threatened and endangered) species and their habitats, prohibiting anyone without a permit to “take” these species; permits are generally available for conservation and scientific purposes. Section 9 of the ESA makes it unlawful for any person—including private and public entities—to take individuals of an endangered animal species. These prohibitions have been extended, by regulation, to threatened species. *Take* is defined by the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” Harm may include significant habitat modification or degradation that results in killing or injuring listed species by significantly impairing essential behavioral patterns. These actions, referred to as take prohibitions, apply to any person, organization, or entity.

1.2.1.2 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act of 1918, as amended (MBTA), prohibits incidental take of migratory birds—more than 1,000 species (50 Code of Federal Regulations [CFR] 10 and 21)—their parts, eggs, or nests. *Take* is defined by the MBTA as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities.” An MBTA violation can result in fines and/or imprisonment; however, the USFWS focuses its enforcement resources on project proponents that fail to identify and implement appropriate and practicable mitigation measures to avoid bird injury or mortality. In February 2020, the USFWS announced that it intended to codify the U.S. Department of the Interior Office of the Solicitor’s M-Opinion (M-37050; also referred to as the Jorjani Opinion) in December 2017 that the MBTA’s criminal provisions do not apply to incidental take. But in August 2020, the U.S. District Court for the Southern District of New York vacated the opinion; the ruling is being appealed by the current administration.

Relevant to construction and operations activities, Section 1 of the Interim Empty Nest Policy of USFWS Region 2 states that if an MBTA-protected species nest is completely inactive at the time of destruction or movement, a permit is not required for compliance.

1.2.1.3 BALD AND GOLDEN EAGLE PROTECTION ACT

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits anyone without a permit from taking eagles, their parts, eggs, or nests. *Take* is defined by the Eagle Act as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb”; the Eagle Act’s definition of take differs from the definition in the ESA in that it does not include habitat destruction or alteration, unless such damage “disturbs” an eagle. *Disturb* is defined as “to agitate or bother 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.”

In 2009, the USFWS promulgated regulations that established two new permit types authorizing 1) purposeful take (removal, relocation, or destruction) of eagle nests under limited circumstances and

2) incidental take (USFWS 2009). In 2016, the USFWS revised the regulations for eagle incidental take permits, allowing developers to voluntarily obtain a 30-year permit subject to mitigation and monitoring, among other requirements (USFWS 2016a). The 2016 rule also removed the distinction between standard (to address one-time effects from projects) and programmatic (to authorize recurring take from projects) permit types and modified the preservation standard definition; any authorized take must be “consistent with the goals of maintaining stable or increasing breeding populations in all eagle management units and the persistence of local populations throughout the geographic range of each species.”

1.2.1.4 BIRDS OF CONSERVATION CONCERN

USFWS Birds of Conservation Concern (BCC) are migratory and non-migratory bird species, beyond those designated as federally threatened or endangered, that represent the USFWS’s highest conservation priorities. The list does not govern take; rather, it is intended to proactively prevent or remove the need for additional ESA bird listings by promoting greater study and protection of the habitats and ecological communities upon which these species depend.

The USFWS updated its BCC list in 2021 (USFWS 2021a).

1.2.2 State

Pursuant to Arizona Revised Statutes (ARS) 17-102, wildlife is the property of the state and can be taken only as authorized by the Arizona Game and Fish Commission. Violations can result in criminal prosecution and/or civil liability. Other state statutes and commission policies pertinent to wind energy projects are described in AGFD’s *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona* (AGFD 2012a).

1.2.2.1 STATE OF ARIZONA SPECIAL-STATUS SPECIES

Arizona’s State Wildlife Action Plan (AGFD 2012b) identifies Species of Greatest Conservation Need (SGCN): vertebrate, crustacean, and mollusk species that are indicative of the diversity and health of the state’s wildlife, including low and declining populations, warranting heightened attention. AGFD (2012b) prioritized SGCN species into three tiers: 1A, 1B, and 1C. Tier 1A species are those for which AGFD has entered into an agreement or has legal or other contractual obligations or which warrant the protection of a closed season. Tier 1B represents the remainder of the species meeting vulnerability criteria. Tier 1C species are those representing priority research and information needs due to their unknown status. Species identified as vulnerable (1A and 1B species) are evaluated in this report.

AGFD is currently working on a comprehensive revision of the 2012 plan, to be completed in 2022, which will include an updated SGCN list.

1.2.2.2 ARIZONA DEPARTMENT OF AGRICULTURE ARIZONA NATIVE PLANT LAW

The Arizona Native Plant Law (ARS 3-904) (ANPL) states that protected plants shall not be taken, transported, or possessed from any land without permission and a permit from the Arizona Department of Agriculture (ADA); it also requires notification prior to land clearing even if the plants will be destroyed. Highly Safeguarded native plants are those species for which removal is not allowed except with an ADA scientific permit; no collection of these plants is allowed. Salvage Restricted native plants are those plants for which a salvage permit is required; collection is allowed only with a permit. The Salvage Assessed category includes those plants for which a salvage permit is required for removal. Plants in the Harvest

Restricted category are protected because they are subject to excessive harvesting or overcutting as a result of intrinsic value of their by-products, fiber, or woody parts, and a harvest permit is required.

1.2.2.3 ARIZONA DEPARTMENT OF AGRICULTURE NOXIOUS WEED REGULATIONS

The ADA maintains a list of noxious weeds that may be controlled or quarantined to prevent further infestation or contamination as well as those that are prohibited from entering the state.

2 METHODS

The preliminary site assessment and site characterization were completed using a combination of existing information obtained from publicly available sources, including reports, published literature, online agency databases, geographic information system (GIS) data, and field reconnaissance.

2.1 Landscape Scales Considered

This document considers the presence of natural resources (e.g., critical habitats and special designations, eagle breeding areas, wildlife corridors) within broad landscape and project scales defined by the USFWS and AGFD. Generally, the area within 10 miles of the project area and within 3 miles of a gen-tie is evaluated for consistency with AGFD's Environmental Online Review Tool Report (AGFD 2022a) and the USFWS (2013a) definition of eagle nesting population area. Where relevant, we consider specific resources in the context of the larger region. For example, specific to potential species' occurrence determinations, the habitat conditions within the project area are considered; nearest records of these species within the region are presented when known. With regard to eagle nesting pairs, USFWS suggests that based on eagle ranging behavior around nests, eagles nesting within 2 miles of a project may be subject to disturbance or lethal take (USFWS 2020a).

2.2 Potential for Occurrence of Special-Status Species and Their Habitats

This document evaluates potential for occurrence of 1) federally protected (endangered and threatened) species and their critical habitats (USFWS 2021a), 2) Eagle Act-protected species, 3) State SGCN 1A and 1B species¹ (AGFD 2012b, 2022a), and 4) BCCs (USFWS 2021a). The potential for occurrence of each species was based on 1) documented records, 2) existing information on distribution, and 3) qualitative comparisons of the habitat requirements of each species with vegetation communities or landscape features in the project area.

Potential for occurrence categories are as follows:

- *Known to occur*—the species has been documented in the analysis area by a reliable observer.
- *May occur*—the analysis area is within the species' currently known range, and vegetation communities, soils, or other habitat conditions resemble those known to be used by the species.

¹ 1A and 1B species are those defined as "vulnerable" under specific criteria in the *Arizona's State Wildlife Action Plan* (AGFD 2012b).

- *Unlikely to occur*—the analysis area is within the species' currently known range, but vegetation communities, soils, or other habitat conditions do not resemble those known to be used by the species, or the analysis area is clearly outside the species' currently known range.

2.3 Data Sources Reviewed

SWCA reviewed the following environmental and biological data sources to collect existing data for the project area:

- An analysis area-specific species and critical habitats list via the USFWS Information for Planning and Consultation (IPaC) system (USFWS 2022a) (Appendix A)
- The analysis area-specific *Arizona Environmental Online Review Tool Report, Zeus Wind* (AGFD 2022a) (Appendix B)
- Biotic Communities of the Southwest (Brown and Lowe 1982 [digital representation by The Nature Conservancy in 2004])
- National Wetlands Inventory (NWI) (USFWS 2022b)
- SWReGAP data (USGS 2016)
- *Arizona's Wildlife Linkages Assessment* (Arizona Wildlife Linkages Workgroup [AWLW] 2006)
- AGFD's Online Environmental Review Tool map (AGFD 2022b), which provides landscape-level spatial data, such as wildlife corridors, unfragmented areas, wilderness areas, wildlife waters, and special-status species range models, for purposes of land use and conservation planning
- AGFD's (2012b) *Arizona's State Wildlife Action Plan: 2012–2022*
- Audubon's Important Bird Areas (IBAs) (Audubon 2022)
- eBird and Birds of the World's bird species' range maps (Billerman et al. 2020; eBird 2022)
- National Wildlife Refuges (USFWS 2022c)
- Species-specific migration corridors (e.g., sandhill crane flyways) (Pacific Flyway Council 2017; Pacific Flyway Council and Central Flyway Council 2016)
- State parks (Arizona State Parks 2022)
- USFWS critical habitats (USFWS 2022d)
- Western Hemisphere Shorebird Reserve Network (WHSRN) sites (WHSRN 2022)
- Wetlands of International Importance (Ramsar 2022)
- Wild and Scenic Rivers (National Wild and Scenic Rivers System 2022)

2.4 Site Reconnaissance

Tier 3 preconstruction wildlife surveys have also been conducted and are ongoing within the analysis area; these surveys have provided a comprehensive familiarity with the site's wildlife habitat conditions. This includes over a year of avian use surveys conducted monthly at fixed points distributed throughout the wind farm area, which commenced in June 2021 and will continue through June 2023; 2 years of raptor nest surveys within 2 miles of the analysis area (February and March 2021 and 2022); and bat acoustic surveys at fixed stations conducted from February through November 2021. Since these surveys

began, surveyors have been recording incidental data contributing to our overall understanding of wildlife use of the site. Additionally, data acquired during desktop review was field verified during project survey efforts to effectively evaluate species habitat associations and WEG Tiers 1 and 2 questions.²

3 RESULTS

3.1 Potential for Occurrence of Special-Status Species and Their Habitats

3.1.1 Environmental Setting

The analysis area is in north-central Arizona within the San Francisco Plateau, part of the Grand Canyon section of the Colorado Plateau physiographic province. The San Francisco Plateau is characterized by a relatively undissected plateau that contains extensive lava flows and volcanic cones (Fenneman 1931). It is located in the San Francisco Volcanic Field (Duffield 2005) and the northeast boundary is adjacent to the Navajo Nation. Mesa Butte, a large cinder cone, is located in the approximate middle of the analysis area, and its summit, at 7,077 feet above mean sea level (amsl), is the high point. The eastern side of the analysis area contains the low point, at 5,780 feet amsl. The access road from Highway 89 to the east ranges in elevation from 6,170 to 5,500 feet amsl. Lockwood Canyon, in the northern section of the analysis area, is the deepest canyon within the site. Other topography is characterized by small shallow canyons, rounded hills, flat to gently rolling plains, and small volcanic escarpments. There are multiple stock tanks within the analysis area.

3.1.2 Land/Vegetation Cover

The western portion of the project area is within the Plains and Great Basin Grassland biotic community and the eastern portion of the project area is in the Great Basin Conifer Woodland biotic community (Brown 1994). One dominant land/vegetation cover type is mapped by the USGS (2016) within the analysis area: Inter-Mountain Basins Semi-Desert Shrub Steppe (Table 1; Figure 3). Twelve other land/vegetation cover types are also mapped by the USGS (2016) within the analysis area (see Table 1; see Figure 3). Two of the land/vegetation cover types mapped by USGS have not been observed in the analysis area during site-specific surveys: Rocky Mountain Gambel Oak-Mixed Montane Shrubland and Rocky Mountain Ponderosa Pine Woodland.

² The WEG recommends at least one site visit by a knowledgeable biologist to evaluate Tiers 1 and 2 questions.

Tier 1 Preliminary Site Evaluation and Tier 2 Site Characterization Report, Forged Ethic Wind Energy Project
Coconino County, Arizona

Table 1. SWReGAP Land/Vegetation Cover Types within the Analysis Area

Land/Vegetation Cover Type	Description	Acres (%)
Inter-Mountain Basins Semi-Desert Shrub Steppe	This semi-arid shrub-steppe is typically dominated by grasses with an open shrub layer. Characteristic grasses include Indian ricegrass (<i>Achnatherum hymenoides</i>), blue grama (<i>Bouteloua gracilis</i>), saltgrass (<i>Distichlis spicata</i>), needle and thread (<i>Hesperostipa comata</i>), James' galleta (<i>Pleuraphis jamesii</i>), Sandberg bluegrass (<i>Poa secunda</i>), and alkali sacaton (<i>Sporobolus airoides</i>). The woody layer is often a mixture of shrubs and dwarf-shrubs. Characteristic species include fourwing saltbush (<i>Atriplex canescens</i>), big sagebrush (<i>Artemisia tridentata</i>), Greene's rabbitbrush (<i>Chrysothamnus Greenei</i>), yellow rabbitbrush (<i>Chrysothamnus viscidiflorus</i>), jointfir (<i>Ephedra</i> spp.), rubber rabbitbrush (<i>Ericameria nauseosa</i>), broom snakeweed (<i>Gutierrezia sarothrae</i>), and winterfat (<i>Krascheninnikovia lanata</i>).	12,372 (43)
Colorado Plateau Pinyon-Juniper Woodland	Two-needle pinyon (<i>Pinus edulis</i>) and/or oneseed juniper (<i>Juniperus monosperma</i>) and juniper hybrids may dominate or codominate the tree canopy. Understory layers are variable and may be dominated by shrubs, graminoids, or be absent. Associated species include greenleaf manzanita (<i>Arctostaphylos patula</i>), big sagebrush, littleleaf mountain mahogany (<i>Cercocarpus intricatus</i>), alderleaf mountain mahogany (<i>Cercocarpus montanus</i>), blackbrush (<i>Coleogyne ramosissima</i>), Stansbury cliffrose (<i>Purshia stansburiana</i>), antelope bitterbrush (<i>Purshia tridentata</i>), Gambel oak (<i>Quercus gambelii</i>), blue grama, James' galleta, or muttongrass (<i>Poa fendleriana</i>).	8,119 (28)
Inter-Mountain Basins Semi-Desert Grassland	The dominant perennial bunch grasses and shrubs within this system are all very drought-resistant plants. These grasslands are typically dominated or codominated by Indian ricegrass, threeawn (<i>Aristida</i> spp.), blue grama, needle and thread, muhly (<i>Muhlenbergia</i> sp.), or James' galleta and may include scattered shrubs and dwarfshrubs of species of sagebrush, saltbush, <i>Coleogyne</i> , jointfir, snakeweed, or winterfat.	7,309 (25)
Inter-Mountain Basins Big Sagebrush Shrubland	Dominated by basin big sagebrush (<i>Artemisia tridentata</i> ssp. <i>tridentata</i>) and/or Wyoming big sagebrush (<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>). Scattered juniper, greasewood (<i>Sarcobatus vermiculatus</i>), and saltbush may be present in some stands. Rubber rabbitbrush, yellow rabbitbrush, antelope bitterbrush, or mountain snowberry (<i>Symphoricarpos oreophilus</i>) may codominate disturbed stands. Common grass species include Indian ricegrass, blue grama, thickspike wheatgrass (<i>Elymus lanceolatus</i>), Idaho fescue (<i>Festuca idahoensis</i>), needle and thread, basin wildrye (<i>Leymus cinereus</i>), James' galleta, western wheatgrass (<i>Pascopyrum smithii</i>), or Sandberg bluegrass.	682 (2)
Inter-Mountain Basins Mixed Salt Desert Scrub	Characterized by a typically open to moderately dense shrubland composed of one or more saltbush species such as shadscale saltbush (<i>Atriplex confertifolia</i>) or fourwing saltbrush. Other shrubs present to codominate may include Wyoming big sagebrush, yellow rabbitbrush, rubber rabbitbrush, Nevada jointfir (<i>Ephedra nevadensis</i>), winterfat, desert-thorn (<i>Lycium</i> spp.), or horsebrush (<i>Tetradymia</i> spp.). The herbaceous layer varies from sparse to moderately dense and is dominated by perennial grasses such as Indian ricegrass, blue grama, thickspike wheatgrass, western wheatgrass, James' galleta, big galleta (<i>Pleuraphis rigida</i>), Sandberg bluegrass, or alkali sacaton.	422 (1)
Inter-Mountain Basins Juniper Savanna	Typically dominated by oneseed juniper and juniper hybrid trees with a high cover of perennial bunch grasses and forbs, with blue grama, needle and thread, and James' galleta most common.	118 (<1)
Invasive Annual and Biennial and Forbland	Dominated by introduced biennial forb species such as saltlover (<i>Halogeton glomeratus</i>), fireweed (<i>Bassia scoparia</i>), and saltwort (<i>Salsola</i> spp.).	44 (<1)
Inter-Mountain Basins Volcanic Rock and Cinder Land	Barren and sparsely vegetated volcanic substrates with generally <10% plant cover, such as basalt lava (malpais), basalt dikes with associated colluvium, basalt cliff faces and uplifted "backbones," tuff, cinder cones or cinder fields.	13 (<1)

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Land/Vegetation Cover Type	Description	Acres (%)
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	Dominated by Gambel oak alone or codominant with Utah serviceberry (<i>Amelanchier utahensis</i>), big sagebrush, alderleaf mountain mahogany, chokecherry (<i>Prunus virginiana</i>), Stansbury cliffrose, antelope bitterbrush, New Mexico locust (<i>Robinia neomexicana</i>), mountain snowberry (<i>Symphoricarpos oreophilus</i>), or roundleaf snowberry (<i>Symphoricarpos rotundifolius</i>). There may be inclusions of other mesic montane shrublands with Gambel oak absent or as a relatively minor component.	12 (<1)
Rocky Mountain Ponderosa Pine Woodland	Ponderosa pine (<i>Pinus ponderosa</i>) is the predominant conifer; Douglas-fir (<i>Pseudotsuga menziesii</i>), twoneedle pinyon (<i>Pinus edulis</i>), and juniper may be present in the tree canopy. The understory is usually shrubby, with black sagebrush (<i>Artemisia nova</i>), big sagebrush, greenleaf manzanita, alderleaf mountain mahogany, Standbury cliffrose (<i>Purshia stansburiana</i>), antelope bitterbrush, Gambel oak, mountain snowberry, chokecherry, and rose as common species. Bluebunch wheatgrass (<i>Pseudoroegneria spicata</i>) and species of needle and thread, needlegrass (<i>Achnatherum</i>), fescue (<i>Festuca</i>), muhly, and grama are some of the common grasses.	9 (<1)
Colorado Plateau Mixed Bedrock Canyon and Tableland	Barren and sparsely vegetated landscapes of steep cliff faces, narrow canyons, and open tablelands of predominantly sedimentary rocks, such as sandstone, shale, and limestone, with generally <10% plant cover.	2 (<1)
Mogollon Chaparral	Often dominates along mid-elevation transition from the Mojave, Sonoran, and northern Chihuahuan deserts into mountains. Occurs on foothills, mountain slopes and canyons in drier habitats below the encinal and ponderosa woodlands. The moderate to dense shrub canopy includes species such as turbinella oak (<i>Quercus turbinella</i>), Tourney oak (<i>Quercus toumeyii</i>), alderleaf mountain mahogany, canotia (<i>Canotia holacantha</i>), desert ceanothus (<i>Ceanothus greggii</i>), elbow bush (<i>Forestiera pubescens</i>), Wright's silktassel (<i>Garrya wrightii</i>), alligator juniper (<i>Juniperus deppeana</i>), Stansbury's cliffrose, sugarbush (<i>Rhus ovata</i>), three-leaf sumac (<i>Rhus trilobata</i>), and pointleaf manzanita (<i>Arctostaphylos pungens</i>) and pink-bract manzanita (<i>Arctostaphylos pringlei</i>) at higher elevations. Most chaparral species are fire-adapted, resprouting vigorously after burning or producing fire-resistant seeds. Stands occurring within montane woodlands are seral and a result of recent fires.	2 (<1)
Inter-Mountain Basins Greasewood Flat	Usually occurring as a mosaic of multiple communities, with open to moderately dense shrublands dominated or codominated by greasewood. Fourwing saltbush, shadscale saltbush, or winterfat may be present to codominant. The herbaceous layer, if present, is usually dominated by grasses. There may be inclusions of alkali sacaton, saltgrass (where water remains ponded the longest), or common spikerush (<i>Eleocharis palustris</i>).	2 (<1)

Source: USGS (2016)

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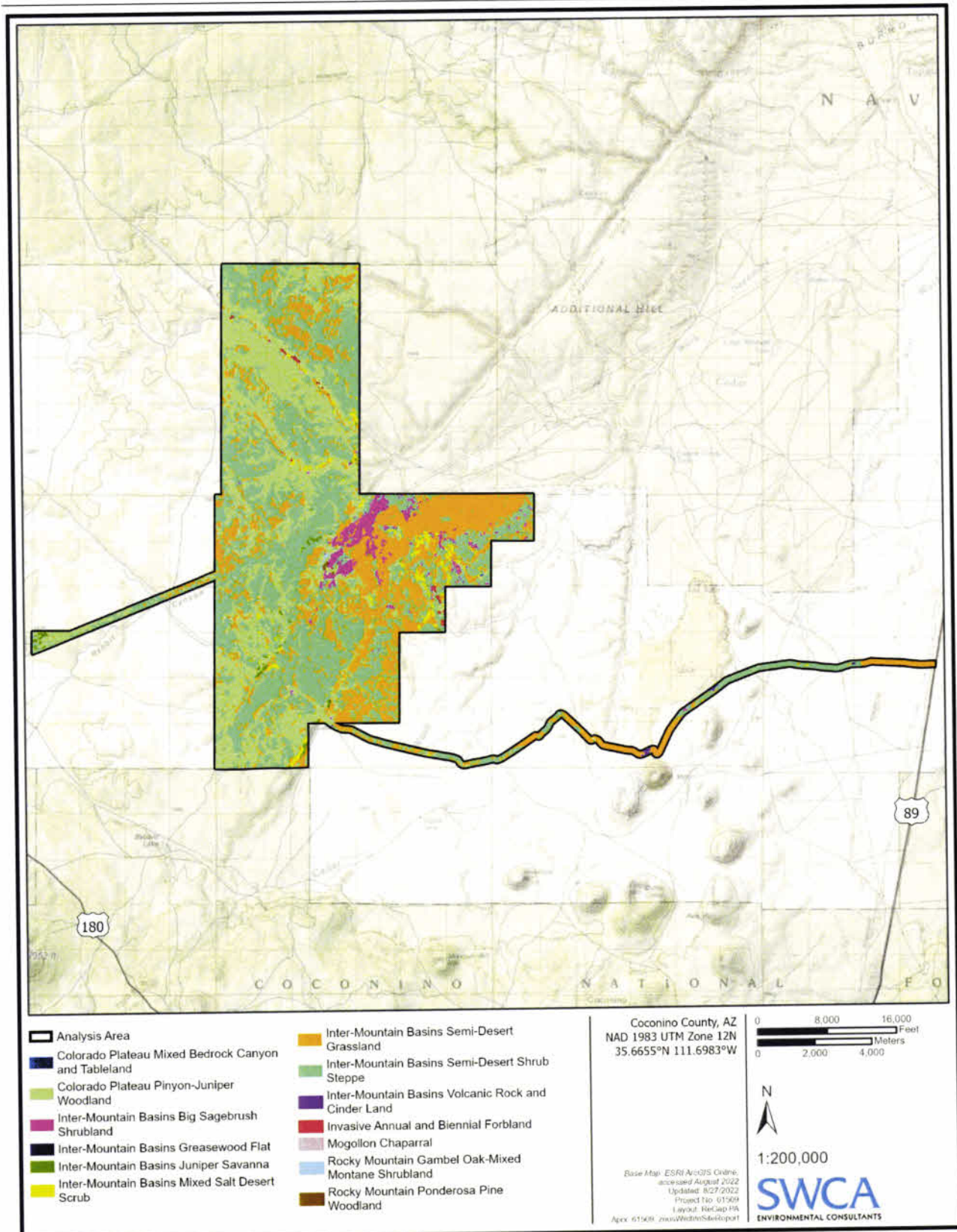


Figure 3. Land/vegetation cover within the analysis area.

3.1.3 Soils

There are 27 soil types mapped within the analysis area (Table 2). Soils in the analysis area contain gravelly loams, gravelly clay loams, silty clay loam, cindery loams, lava flows, and outcrops (Natural Resources Conservation Service [NRCS] 2022) (Figure 4). These soils are primarily classified as well drained with one type being moderately well drained and three being somewhat excessively drained; none of the soils meet hydric criteria (NRCS 2022). A considerable amount of soil disturbance has occurred after decades of agricultural practices (cattle ranching) over the entire analysis area. Existing modifications within the project area include facilities associated with ranching (i.e., access roads, dirt tanks, corrals).

Table 2. Soil Units within the Analysis Area

Soil Unit	Acres in Analysis Area* (%)
Winona stony loam, 0 to 8 percent slopes	5,208 (18)
Ashfork gravelly clay loam, 1 to 15 percent slopes	4,150 (14)
Winona-Boysag gravelly loams, 0 to 8 percent slopes	3,514 (12)
Winona-Rock outcrop complex, 30 to 70 percent slopes	2,632 (9)
Winona-Rock outcrop complex, 15 to 30 percent slopes	2,146 (7)
Ziegler-Cross association, moderately sloping	2,006 (7)
Winona gravelly loam, 0 to 8 percent slopes	1,713 (6)
Ziegler-Wilaha association, strongly sloping	1,174 (4)
Deama-Rock outcrop complex, 8 to 30 percent slopes	1,087 (4)
Deama stony loam, 1 to 15 percent slopes	896 (3)
Poley-Tusayan association, gently sloping	892 (3)
Deama-Toqui complex, 0 to 8 percent slopes	791 (3)
Paymaster-Lynx association, gently sloping	747 (3)
Aut-Cross association, moderately sloping	645 (2)
Lomaki-Nalaki very cindery loams, 0 to 8 percent slopes	361 (1)
Poley gravelly loam, 0 to 8 percent slopes	293 (1)
Rune silty clay loam, 0 to 8 percent slopes	190 (1)
Tusayan-Lynx association, gently sloping	189 (1)
Tuweep very gravelly loam, 0 to 15 percent slopes	186 (1)
Wukoki-Wupatki very cindery loams, 15 to 60 percent slopes	126 (<1)
Quivera very gravelly loam, 0 to 8 percent slopes	66 (<1)
Aut gravelly loam, 0 to 8 percent slopes	29 (<1)
Lava flows	22 (<1)
Wupatki-Wukoki very cindery loams, 0 to 15 percent slopes	18 (<1)
Wukoki-Rock outcrop complex, 5 to 25 percent slopes	6 (<1)
Mellenthin-Rock outcrop complex, 30 to 70 percent slopes	5 (<1)
Meriwhitica-Wayneco-Tassi family, complex, 5 to 30 percent slopes	4 (<1)

*Total acreage may not be exact due to rounding.

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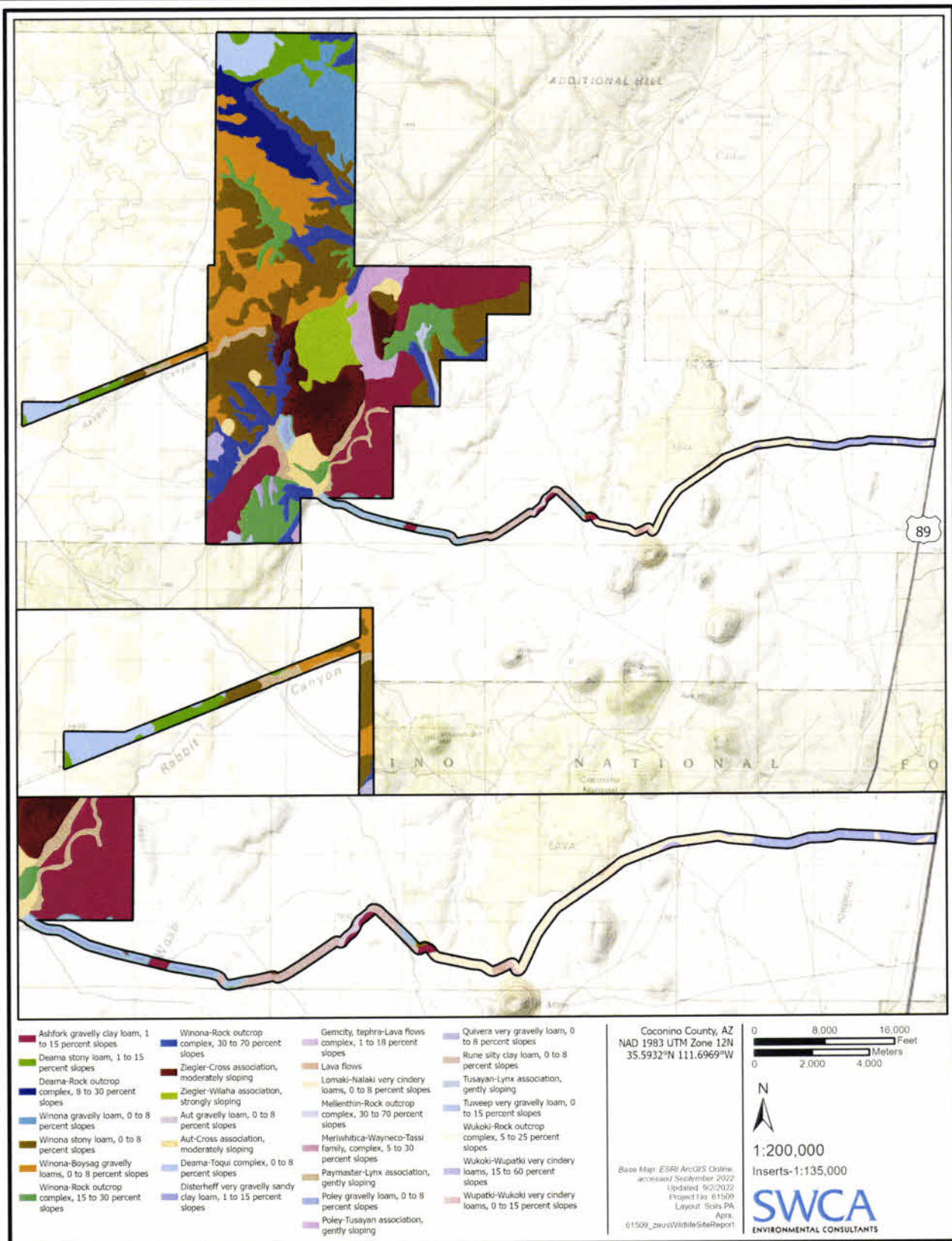


Figure 4. NRCS soil types mapped with the analysis area.

3.1.4 Wetlands/Riparian Areas

Notable water features in the region include the Little Colorado River 12 miles east of the analysis area, flowing northwest to the Grand Canyon (20 miles to the north). Wetlands within the project area (Figure 5, Table 3) include earthen stock tanks, playas/depressions, and ephemeral drainages. The NWI (USFWS 2022b) classifies the stock tanks and playas/depressions as either freshwater ponds “intermittently flooded, diked/impounded” or “temporarily flooded, excavated” (see Figure 5). Most drainages in the project area are classified as “riverine: intermittently or seasonally flooded” (USFWS 2022b). Wetland and water features have been observed to be dry throughout the year except for filling during the monsoon season (approximately June through September) after rain events.

Table 3. NWI-Mapped Wetland and Water Resources in the Analysis Area and 2-Mile Buffer

NWI Code	Description	Acres in Analysis Area (%)
R4SBC	Riverine, intermittent, streambed, seasonally flooded	641.4 (89)
R4SBJ	Riverine, intermittent, streambed, intermittently flooded	41.5 (6)
PUSAh	Palustrine, unconsolidated shore, temporarily flooded, diked/impounded	19.5 (3)
PUSJ	Palustrine, unconsolidated shore, intermittently flooded	7.6 (1)
PUSJh	Palustrine, unconsolidated shore, intermittently flooded, diked/impounded	4.7(1)
R5UBH	Riverine, unknown perennial, unconsolidated bottom, permanently flooded	2.9 (<1)
R5UBFx	Riverine, unknown perennial, unconsolidated bottom, semipermanently flooded, excavated	2.8 (<1)
PUSAx	Palustrine, unconsolidated shore, temporarily flooded, excavated	1.0 (<1)
PUSJx	Palustrine, unconsolidated shore, intermittently flooded, excavated	0.2 (<1)

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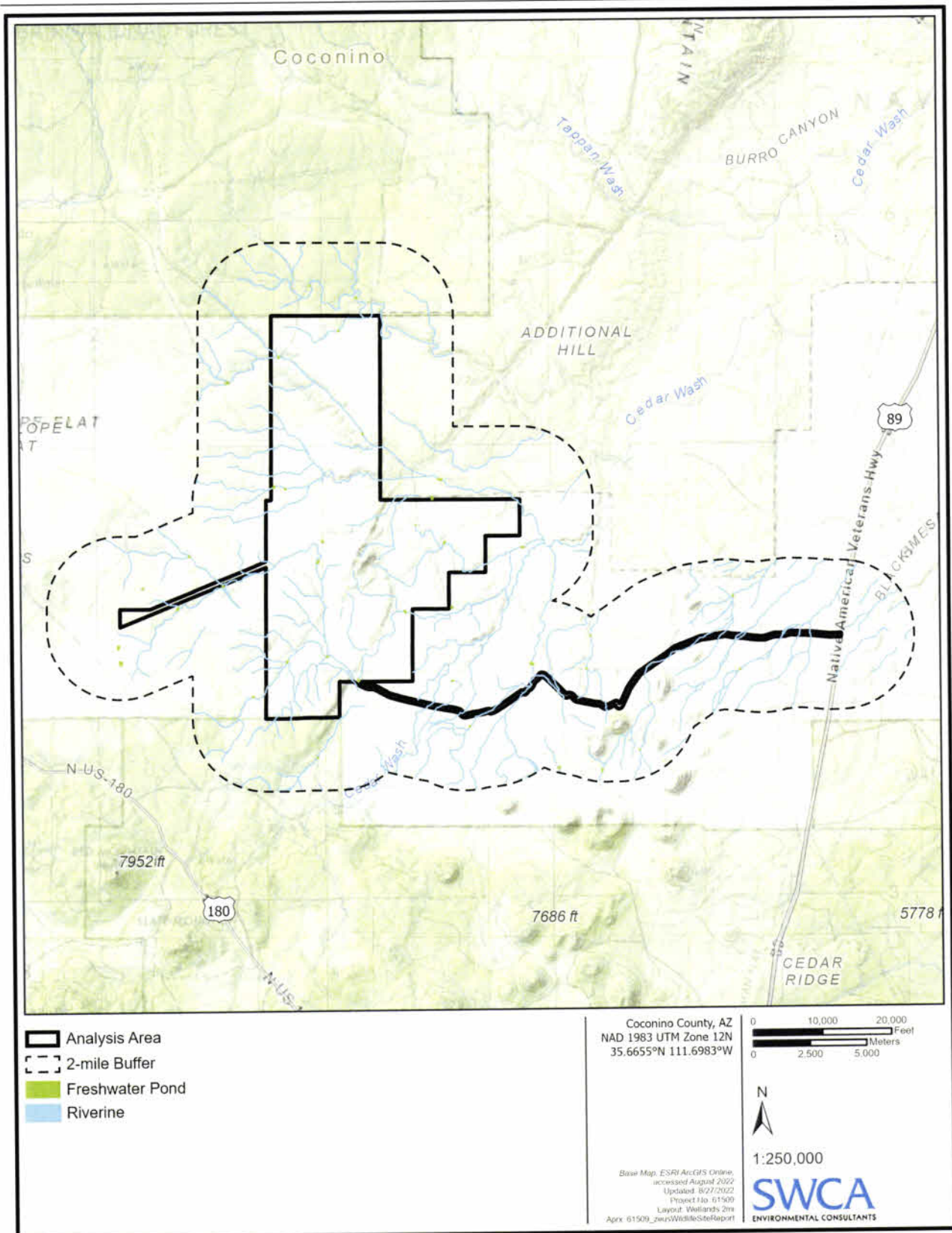


Figure 5. National Wetlands Inventory mapped wetlands within the analysis area and 2-mile buffer.

3.1.5 Special-Status Species Occurrence Determinations

3.1.5.1 FEDERALLY LISTED SPECIES

Three bird species or subspecies (California condor, Mexican spotted owl [*Strix occidentalis lucida*], and yellow-billed cuckoo [*Coccyzus americanus*]), one reptile species (northern Mexican gartersnake [*Thamnophis eques megalops*]), one insect (monarch butterfly) and one plant species (Fickeisen plains cactus) were listed in the official species list for the project (USFWS 2022a; see Appendix A) (Table 4). Their range/habitat requirements and nearest records, if known, are presented in Appendix C, Table C.1. The analysis area is within the geographical/elevational range and contains appropriate habitat conditions to support the California condor, monarch butterfly, and Fickeisen plains cactus; species descriptions are provided below.

Table 4. Occurrence Status of Relevant Federally Listed Species

Common Name	Scientific Name	Status		Occurrence Status
		Federal	State	
Birds				
California condor	<i>Gymnogyps californianus</i>	E, EXPN	SGCN (1A)	May occur; no records within 10 miles of analysis area
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T, CH	SGCN (1A)	Unlikely to occur
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	T, CH	SGCN (1A)	Unlikely to occur
Insects				
Monarch butterfly	<i>Danaus plexippus</i>	C	-	May occur
Mammals				
Mexican gray wolf*	<i>Canis lupus baileyi</i>	E, EXPN	SGCN 1A	Unlikely to occur; documented with 10 miles of the analysis area ³
Reptiles				
Northern Mexican gartersnake	<i>Thamnophis eques megalops</i>	T, CH	SGCN (1A)	Unlikely to occur
Flowering plants				
Fickeisen plains cactus	<i>Pediocactus peeblesianus fickeiseniae</i>	E, CH	ANPL	May occur; documented within 10 miles

Note: Table includes those species listed in USFWS (2022a). Notes regarding documentation within 10 miles of the analysis area are from AGFD (2022a).

*Listed on AGFD (2022a); not listed in USFWS (2022a).

C = Candidate; CH = Designated critical habitat; E = Endangered - species in danger of extinction throughout all or a significant portion of their range; EXPN = Experimental population, non-essential; T = Threatened species likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

ANPL = Protected by the Arizona Native Plant Law; SGCN = Species of Greatest Conservation Need; wildlife species identified by AGFD (2012b) as having conservation priority. Tier 1A species are those categorized by AGFD (2012b) as "highest priority vulnerable" species.

California Condor

The analysis area is within the condor's designated 10(j) non-essential experimental (NEP) area, which is bounded by Interstate 40 approximately 25 miles to the south. While condors comprising the established

³ Any Mexican gray wolves that disperse outside of the 10(j) recovery area are captured and returned. (Personal communication, Corina Anderson, SWCA, and Ryan Gordon, USFWS.)

NEP flock maintain a well-established primary range within the Grand Canyon approximately 19 miles to the northwest, individuals are known to make occasional long-distance forays outside of the area (Finkelstein et al. 2020; Southwest Condor Working Group [SCWG] 2017).

Although condors have not been documented within 10 miles of the analysis area (AGFD 2022a), they have been sighted in the vicinity of Flagstaff (eBird 2022) and may occasionally fly through the area. Potential attractants within the area include mammal carrion (e.g., domestic animals, hunter-shot mule deer [*Odocoileus hemionus*] and elk [*Cervus canadensis*], and coyotes [*Canis latrans*]), for which the species forages in open areas with reliable air movements conducive to soaring flight (Finkelstein et al. 2020). Roosting sites include cliffs, snags, large trees, and rocky outcrops (USFWS 2022e); some rocky outcrops and short cliffs are present along the edge of the San Francisco Plateau, but other roost sites are generally lacking in the project area.

Fickeisen Plains Cactus

The Fickeisen plains cactus is found on specialized and localized soils within the Great Basin Desert and is associated with the Plains and Great Basin grasslands and Great Basin deserts scrub (Benson 1982; NatureServe 2022; USFWS 2016b). Fickeisen plains cactus is a narrow endemic with a wide distribution on the Colorado Plateau in Coconino and Mohave Counties, Arizona, at elevations between 4,200 and 5,950 feet amsl and found exclusively on limestone soils derived predominantly from the Harrisburg Member of the Kaibab Formation (USFWS 2016b).

Populations are found on gravelly limestone or gravelly loam in deserts scrub. Critical habitat for the Fickeisen plains cactus is located in Coconino and Mohave Counties, Arizona, including along the canyon rims of the Colorado River and Little Colorado River to the area of Gray Mountain (USFWS 2016b), approximately 9 miles east of the analysis area.

The lower (eastern) portions of the analysis area are within the species elevational range (USFWS 2022f) and 15,226 acres (20% of the analysis area) of soil classes associated with habitat for this species (each of the Winona series soils) are present along the northern and eastern edges of the analysis area (NRCS 2022; USFWS 2016b). This species is known to occur within 10 miles of the analysis area (AGFD 2022a), and project development may impact the Fickeisen plains cactus, if present.

Monarch Butterfly

The monarch butterfly is a candidate species for listing. There are generally no ESA provisions for candidate species, but USFWS encourages opportunities to conserve the species. Populations in western North America (including Arizona) can migrate either to California or Mexico for the winter (USFWS 2020b) or may overwinter in the low deserts in California or Arizona (Morris et al. 2015). In the middle elevations of Arizona, the species may occur as early as late March and early April, becoming more abundant in late July and August. Peak fall migration is from September through mid-October (Morris et al. 2015). The analysis area is within breeding and migration range for the species (USFWS 2020b) and contains appropriate breeding habitat and blooming nectar resources. Broadleaf milkweed plants were observed during the site visit; therefore, this species may occur spring through fall.

3.1.5.2 OTHER SPECIAL-STATUS SPECIES

Table C.2 (see Appendix C) presents the range/habitat requirements and nearest records, if known, for both Eagle Act–protected species, SGCN 1A and 1B species that are known to occur within 10 miles of the project area or that may occur within the vicinity based on predicted range models (AGFD 2022a), and BCC-listed species for Bird Conservation Regions (BCR) 16 and 34 (USFWS 2021a). Table 5 presents the species, of those evaluated in Table C.2, that may occur within the project area.

Eagles

The analysis area is within the year-round range for golden eagle and the wintering range for bald eagle (see Table 5). Golden eagles and their nests were documented within the analysis area and out to a 2-mile radius during eagle nest inventory and occupancy surveys conducted in 2020 and 2022. The ECPG goal at this stage is to begin to assess the spatiotemporal extent and type of eagle use the site receives or is likely to receive; this assessment is provided in Sections 3.3.4 and 3.4.

State-Listed Species

Twenty-seven species categorized as SGCN 1A or 1B may occur within the analysis area (see Tables 4 and 5), including 11 birds, 14 mammals (including six bats), and two reptiles. Among these species, 13 are known to occur (i.e., they have been observed by SWCA during site visits or detected with monitoring equipment) within the analysis area: bald eagle, golden eagle, common nighthawk (*Chordeiles minor*), pinyon jay (*Gymnorhinus cyanocephalus*), northern goshawk (*Accipiter gentilis*), Scott's oriole (*Icterus parisorum*), Brazilian free-tailed bat (*Tadarida brasiliensis*), greater western bonneted bat (*Eumops perotis californicus*), Gunnison's prairie dog (*Cynomys gunnisoni*), pale townsend's big-eared bat (*Corynorhinus townsendii pallescens*), spotted bat (*Euderma maculatum*), Yuma myotis (*Myotis yumanensis*), and pronghorn (*Antilocapra americana*).

Birds of Conservation Concern

The analysis area is near the boundary of BCR 16, Southern Rockies/Colorado Plateau, and BCR 34, Sierra Madre Occidental (USFWS 2021a). All species from both BCR 16 and BCR 34 were analyzed. Eighteen BCC species may occur within the analysis area (see Table 5). Among these species, five are known to occur: broad-tailed hummingbird (*Selasphorus platycercus*), chestnut-collared longspur (*Calcarius ornatus*), pinyon jay, Scott's oriole, and yellow-headed blackbird (*Xanthocephalus xanthocephalus*).

Table 5. Other Special-Status Species That May Occur or Are Known to Occur within the Project Area

Common Name	Scientific Name	Status*		Occurrence Status
		Federal	State	
Birds				
American peregrine falcon	<i>Falco peregrinus anatum</i>	-	SGCN (1A)	May occur; documented during site-specific surveys
Bald eagle	<i>Haliaeetus leucocephalus</i>	Eagle Act	SGCN (1A)	Known to occur; documented during site-specific surveys
Bendire's thrasher	<i>Toxostoma bendirei</i>	BCC (BCR 16)	SGCN (1C)	May occur
Black-chinned sparrow	<i>Spizella atrogularis</i>	BCC (BCR 16, 34)	SGCN (1C)	May occur
Black-throated gray warbler	<i>Setophaga nigrescens</i>	BCC (BCR 34)	SGCN (1C)	May occur
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>	BCC (BCR 16, 34)	-	Known to occur; documented during site-specific surveys
Cassin's finch	<i>Haemorhous cassinii</i>	BCC (BCR 16)	-	May occur
Chestnut-collared longspur (NB)	<i>Calcarius ornatus</i>	BCC (BCR 34)	SGCN (1C)	Known to occur; documented during site-specific surveys
Common nighthawk	<i>Chordeiles minor</i>	-	SGCN (1B)	Known to occur; documented during site-specific surveys

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Common Name	Scientific Name	Status*		Occurrence Status
		Federal	State	
Evening grosbeak	<i>Coccothraustes vespertinus</i>	BCC (BCR 16, 34)	SGCN (1B)	May occur
Flammulated owl	<i>Otus flammeolus</i>	BCC (BCR 16, 34)	SGCN (1C)	May occur
Ferruginous hawk	<i>Buteo regalis</i>	–	SGCN (1B)	Known to occur; documented during site-specific surveys
Golden eagle	<i>Aquila chrysaetos</i>	Eagle Act	SGCN (1B)	Known to occur; documented during site-specific surveys
Lewis's woodpecker	<i>Melanerpes lewis</i>	BCC (BCR 16, 34)	SGCN (1C)	May occur
Lesser yellowlegs (non-breeding)	<i>Tringa flavipes</i>	BCC (BCR 16)	–	May occur
Lincoln's sparrow	<i>Melospiza lincolni</i>	–	SGCN (1B)	May occur
Long-eared owl	<i>Asio otus</i>	BCC (BCR 16, 34)	SGCN (1C)	May occur
Mountain plover	<i>Charadrius montanus</i>	BCC (BCR 16)	SGCN (1B)	May occur
Northern goshawk	<i>Accipiter gentilis</i>	–	SGCN (1B)	Known to occur; documented during site-specific surveys
Olive-sided flycatcher	<i>Contopus cooperi</i>	BCC (BCR 16, 34)	SGCN (1C)	May occur
Phainopepla	<i>Phainopepla nitens</i>	BCC (BCR 34)	SGCN (1C)	May occur
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	BCC (BCR 16, 34)	SGCN (1B)	Known to occur; documented during site-specific surveys
Scott's oriole	<i>Icterus parisorum</i>	BCC (BCR 34)	SGCN (1C)	Known to occur; documented during site-specific surveys
Virginia's warbler	<i>Leiothlypis virginiae</i>	BCC (BCR 16, 34)	SGCN (1C)	May occur
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	BCC (BCR 16)	–	Known to occur; documented during site-specific surveys
Mammals				
American pronghorn	<i>Antilocapra americana americana</i>	–	SGCN (1B)	Known to occur; documented during site-specific surveys
Arizona myotis	<i>Myotis occultus</i>	–	SGCN (1B)	May occur
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	–	SGCN (1B)	Known to occur; detected during site-specific monitoring
Gray-collared chipmunk	<i>Neotamias cinereicollis</i>	–	SGCN (1B)	May occur
Greater western bonneted bat	<i>Eumops perotis californicus</i>	–	SGCN (1B)	Known to occur; detected during site-specific monitoring
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	–	SGCN (1B)	Known to occur; documented during site-specific surveys
Long-tailed vole	<i>Microtus longicaudus</i>	–	SGCN (1B)	May occur
Mexican vole	<i>Microtus mexicanus</i>	–	SGCN (1B)	May occur
Pale Townsend's big-eared bat	<i>Corynorhinus townsendii pallescens</i>	–	SGCN (1B)	Known to occur; detected during site-specific monitoring
Spotted bat	<i>Euderma maculatum</i>	–	SGCN (1B)	Known to occur; detected during site-specific monitoring
Springerville pocket mouse	<i>Perognathus flavus goodpasteri</i>	–	SGCN (1B)	May occur; documented within 10 miles

Common Name	Scientific Name	Status*		Occurrence Status
		Federal	State	
Stephen's woodrat	<i>Neotoma stephensi</i>	–	SGCN (1B)	May occur
Wupatki Arizona pocket mouse	<i>Perognathus amplus cineris</i>	–	SGCN (1B)	May occur; documented within 10 miles
Yuma myotis	<i>Myotis yumanensis</i>	–	SGCN (1B)	Known to occur; detected during site-specific monitoring
Reptiles				
Arizona black rattlesnake	<i>Crotalus cerberus</i>	–	SGCN (1B)	May occur
Pai striped whiptail	<i>Aspidoscelis pai</i>	–	SGCN (1B)	May occur; documented within 10 miles

Note: Table includes Eagle Act species, Tier 1A and 1B species listed in AGFD (2022a), and Birds of Conservation Concern that may occur within the project area. Notes regarding documentation within 10 miles of the project area are from AGFD (2022a) and eBird (2022).

BCC = Bird of Conservation Concern; BCR = Bird Conservation Region; SGCN = Species of Greatest Conservation Need; species identified by AGFD (2012b) as having conservation priority. Tier 1A species are those categorized by AGFD (2012b) as "highest priority vulnerable" species. Tier 1B species are those categorized as "vulnerable" but not fitting the Tier 1A criteria for highest priority. Tier 1C species are those for which existing data were insufficient to score one or more vulnerability criteria.

3.1.6 Plant Communities of Concern

The Arizona Native Plant Law (Arizona Revised Statutes 3-904) prohibits taking, transporting, or possessing protected plants from any lands without permission and a permit from the ADA; it requires notification prior to land clearing (destruction) or removal. Protected plants are categorized as Highly Safeguarded, Salvage Restricted, Salvage Assessed, and Harvest Restricted.

The analysis area is within the known geographic range of one federally listed plant species (Fickeisen plains cactus) and contains landscape features known to support this species (see Section 3.1.5.1; see Table C.1 in Appendix C). Several protected native plants classified under the ANPL have been observed in the analysis area, including Salvage Restricted prickly pear (*Opuntia chlorotica*), narrowleaf yucca (*Yucca angustissima*), Fendler's hedgehog (*Echinocereus fendleri*), spinystar (*Coryphantha vivipara*), and Whipple cholla (*Opuntia whipplei*), and Harvest Restricted banana yucca (*Yucca baccata*).

For development on Arizona State Land Department (ASLD) land, the ASLD must be informed regarding the occurrence of state-protected plant species. All authorized use of state land resulting in land clearing, shaping, grading, or any surface-disturbing activity prior to construction requires a native plant survey following ASLD standard survey protocol. The required native plant surveys are specific to the number of cacti, succulents, trees, shrubs, and sub-shrubs removed from state lands as part of land-disturbing activities. The ASLD outlines a standard survey protocol to be used in collecting native plant data and establishes a price list for calculating compensation for vegetation removal.

For development on private land, the appropriate permits and tags would need to be obtained prior to salvaging or otherwise transporting these plants. If protected plants are present and not salvaged, a Notice of Intent to Clear Land must be submitted to the ADA 60 days before the beginning of construction (ADA 2022).

Puncturevine (*Tribulus terrestris*), a Class C noxious weed, has also been observed in the analysis area. The ADA categorizes a Class C noxious weed as "a species of plant that is widespread but may be recommended for active control based on risk assessment" (ADA 2022). Two Class B noxious weeds, Dalmatian toadflax (*L. genistifolia* v. *dalmatica*) and diffuse knapweed (*Centaurea diffusa*), have been detected along Highway 89, approximately 3 miles north of the project access road (iMapInvasives 2022).

3.1.7 Critical Habitats

There are no critical habitats within the analysis area or 2-mile buffer (Figure 6). The nearest designated critical habitat has been mapped for Mexican spotted owl approximately 8 miles southwest of the analysis area and for Fickeisen plains cactus approximately 9 miles northeast of the analysis area.

3.2 Other Special Designations

There are no IBAs (Audubon 2022), WHSRN sites (WHSRN 2022), Wetlands of International Importance (Ramsar sites) (Ramsar 2022), National Wildlife Refuges (USFWS 2022c), Wilderness Areas (AGFD 2022b), Wild and Scenic Rivers (National Wild and Scenic Rivers System 2022), or state parks (Arizona State Parks 2022) within 10 miles of the analysis area. Grand Canyon National Park is approximately 19 miles north of the analysis area.

The Western Association of Fish and Wildlife Agencies (WAFWA) Crucial Habitat Assessment Tool (CHAT) is a non-regulatory tool that was developed to bring greater certainty and predictability to planning efforts by establishing a common starting point for discussing the intersection of development and wildlife. It was designed to reduce conflicts and surprises while ensuring wildlife values are better incorporated into land use planning (WAFWA 2020). Crucial habitats are measured using a six-level prioritization scheme (1 = “most crucial,” 6 = “least crucial”) based on an aggregate of data layers of crucial wildlife habitats and important migration/movement areas. The analysis area and the majority of the 2-mile buffer are classified as level 4 (Figure 7). This ranking is influenced by the area’s higher ranking (2) for landscape connectivity. The northernmost portion of the 2-mile buffer and northern edge of the analysis area are ranked as most crucial. This ranking is based on conservation importance for species of concern and species of economic or recreational importance (i.e., game species).

Habitat fragmentation is of particular concern for species that require large habitat blocks for activities such as breeding, foraging, and sheltering. Arizona’s State Wildlife Action Plan (AGFD 2012a) identifies species for which fragmentation has resulted in isolated populations. Among those species evaluated in Section 3.1.5 that may occur or are known to occur within the analysis area or 2-mile buffer, six have been identified by AGFD (2012b) as species of habitat fragmentation concern: American pronghorn (*Antilocapra americana*), bald eagle, ferruginous hawk (*Buteo regalis*), Gunnison’s prairie dog, gray-collared chipmunk (*Neotamias cinereicollis*), and northern goshawk.

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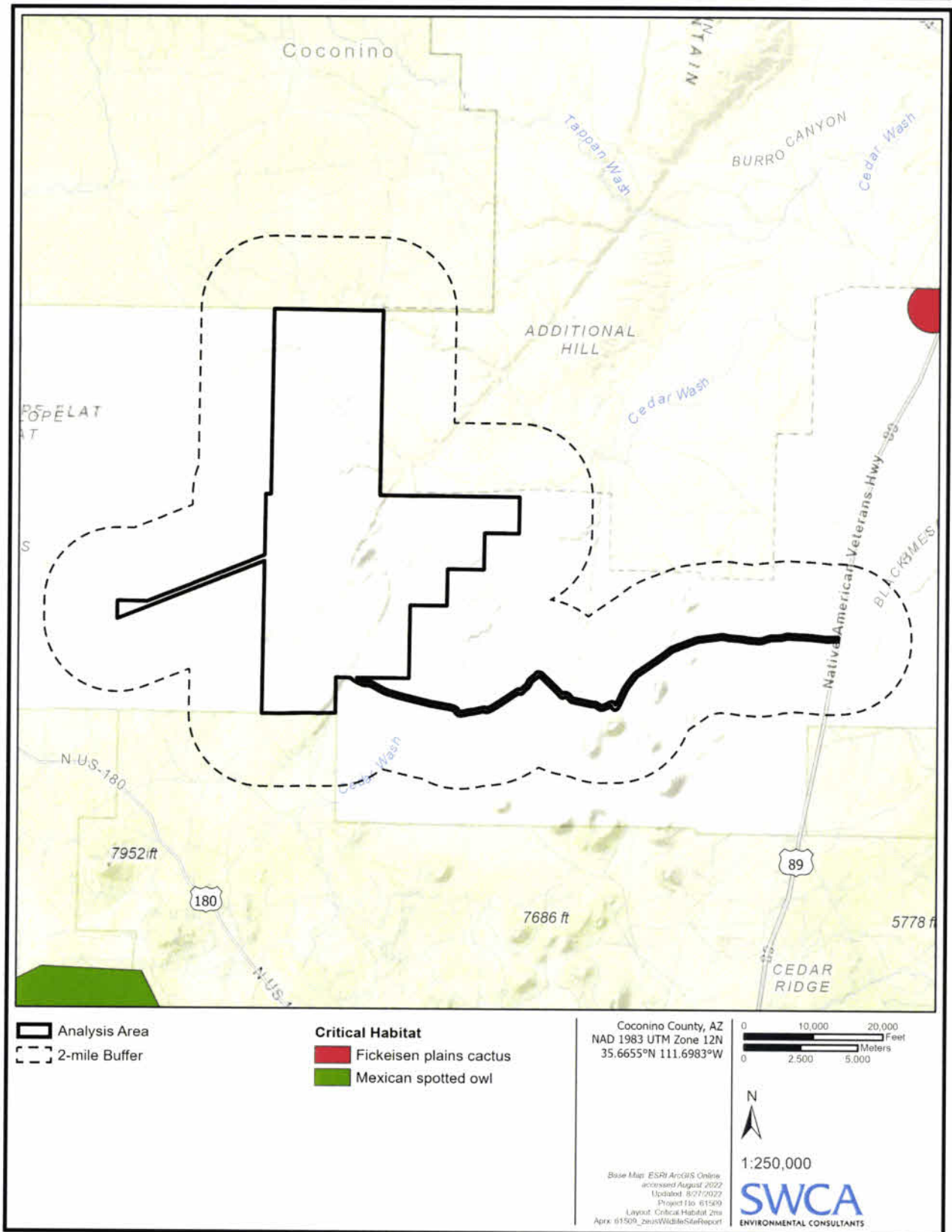


Figure 6. Designated critical habitat mapped in the vicinity of the analysis area.

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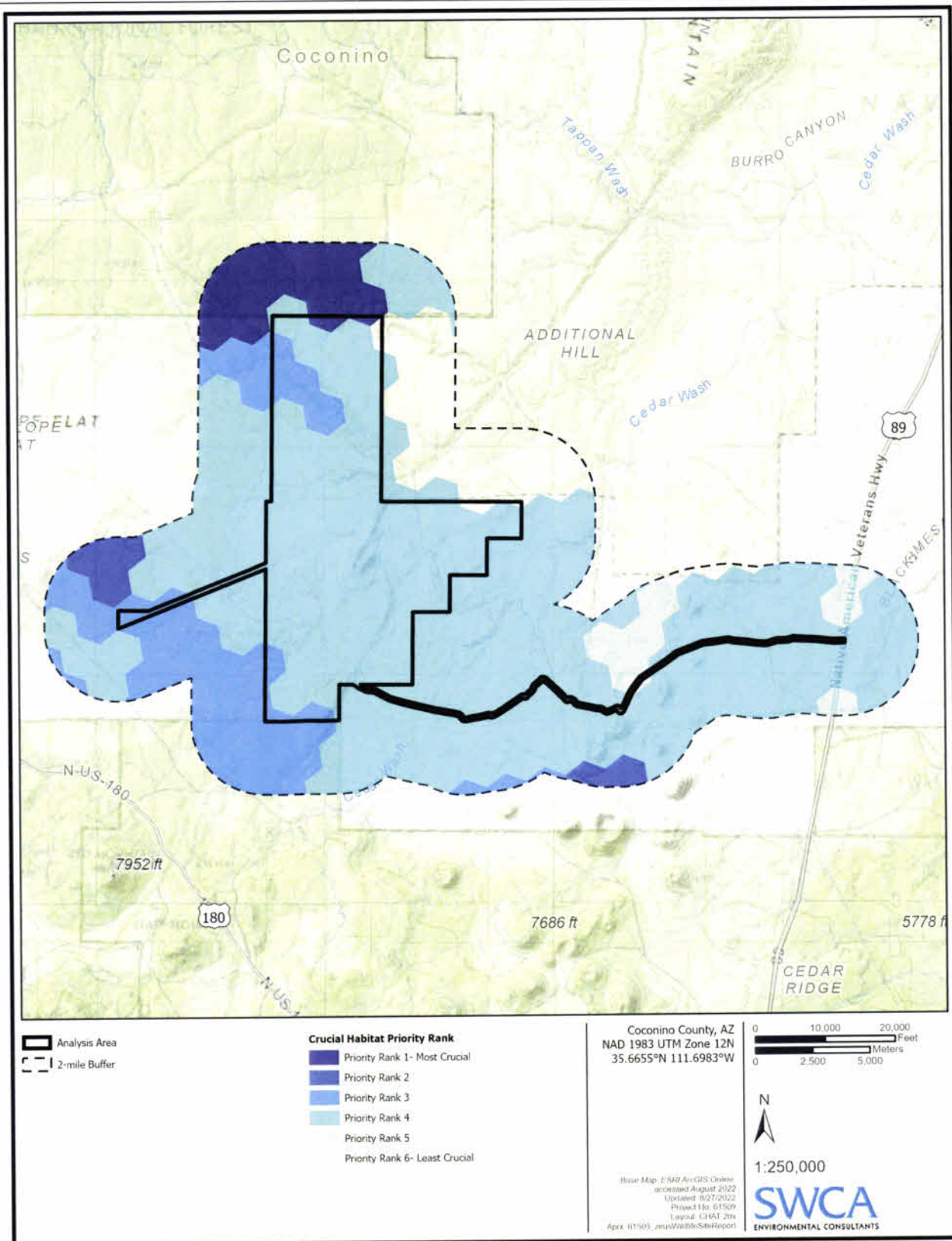


Figure 7. WAFWA CHAT crucial habitats within the analysis area and 2-mile buffer.

3.3 Potential Areas of Wildlife Congregation

Tables C.1 and C.2 in Appendix C provide information regarding potential seasonal use of the analysis area by special-status species.

3.3.1 *Bat Roosts, Hibernacula, and Migration Habitat*

Bat roosting sites may vary by species, season, and time of day (e.g., day—roosts used for rest and raising young; night—roosts used for ingesting food, resting, and avoiding inclement weather or predators). Bats roost singly, in small groups, or in large numbers in naturally occurring and human-made structures, including caves, rock crevices, birds' nests, most parts of trees (e.g., inside cavities or hollow logs, under loose bark, inside furled leaves, on branches), mines, buildings, bridges, and culverts (Ammerman et al. 2012). Many bats raise their young in spring-season nursery or maternity roosts; site fidelity at these sites is highly variable (Ammerman et al. 2012). Hibernacula sites—commonly caves and abandoned mines—are typically restricted to those with relatively stable temperatures and relative humidity (Ammerman et al. 2012).

A bat colony has been documented within 10 miles of the analysis area (AGFD 2022a). During the 2021 Tier 3 bat acoustic monitoring surveys, 20 species representing four species groups were detected. According to their distributional ranges, no federally listed bats would occur within the analysis area, and none were detected during the surveys. Survey results indicate it is likely that up to six Tier 1B SGCN bat species occur within the analysis area.

Bat migratory routes and stopover areas are poorly known (AGFD 2012a; Baerwald and Barclay 2011; Baerwald et al. 2009; Fleming and Eby 2003; Froidevaux et al. 2014). Emerging guidelines for pre-construction surveys have focused on identifying important wildlife habitat for bats such as hibernacula and maternity colonies, and potential movement corridors between these important sites (Arnett and Baerwald 2013; Bennett and Hale 2018; Hein et al. 2013).

The most active species were western small-footed myotis (53.9% of all detections), big brown bat (8.3%), Yuma myotis (7.0%, SGCN 1B), silver-haired bat (5.8%), Brazilian free-tailed bat (5.6%, SGCN 1B), and hoary bat (5.4%).

3.3.2 *Avian Staging Areas, Stopovers, and Migration Corridors*

Staging areas are those with abundant, predictable food resources where, for example, birds prepare for an energetic challenge (typically a long flight over a geographic barrier) requiring substantial food stores (Warnock 2010). Such staging areas are seen for birds such as waterfowl, cranes, shorebirds, and songbirds. Examples of staging sites include large rivers, lakes, and bays. However, smaller sites that provide consistent water availability and quality may also be important to some shorebird species that migrate in small flocks (Robinson and Warnock 1996). The analysis area stock tanks, playas/depressions, and drainages do not provide consistent water availability or predictable food resources (e.g., as seen in coastal mudflats) characteristic of important staging areas. During the first year of Tier 3 avian use surveys, no waterfowl and a single shorebird were observed during formal surveys, and only three species of waterfowl were observed incidentally during the year (SWCA 2022b).

The terms *stopover* and *staging area* are often used interchangeably. Stopover sites may be defined more broadly as sites where birds rest and feed during migration to refuel or avoid adverse conditions (Warnock 2010). Although most species migrate on broad fronts and stopover strategies among and within species are complex, fragments of forested areas and riparian corridors (i.e., oases relative to the surrounding landscape) often provide important stopover habitats. The analysis area does not contain

stopover habitats that would concentrate migrant birds. However, the analysis area lies between the Coconino National Forest to the south and Kaibab National Forest to the north and provides a lower elevation corridor to canyon and desert shrub habitats to the east and west. The Utah – San Francisco Peaks wildlife linkage area (described in Section 3.3.4) is noted as functioning as a migratory flyway for avian species (AGFD 2011).

A raptor migration study was conducted within the analysis area during September and October 2021. Eleven migrant raptor species and one vulture were observed. Overall raptor migration results by number of birds observed per hour was lower than other observations from long-term monitoring locations in northern Arizona (SWCA 2022a). Eagle use of the site is reviewed in Section 3.4.

Negative barriers, such as large bodies of water or mountain ridges that offer energy-efficient flight via updrafts, are not present in the analysis area or vicinity. The analysis area is also outside of any known avian species-specific migration corridors (e.g., sandhill crane [*Antigone canadensis*] flyways) (Pacific Flyway Council 2017; Pacific Flyway Council and Central Flyway Council 2016).

3.3.3 Leks

The analysis area is not within the range of any lekking species (e.g., grouse, sage-grouse, prairie chicken), which are species that form seasonal aggregations characterized by male display.

3.3.4 Wildlife Corridors /Unfragmented Habitat

The eastern end of the proposed access road abuts Highway 89, which is part of the Arizona Department of Transportation’s potential linkage zone 17 (Deadman Mesa – Gray Mountain) (Arizona Wildlife Linkages Workgroup 2006). Linkage Zone 17 runs north-south along the Highway 89 corridor for approximately 45 miles from Flagstaff to Cameron. Potential linkage zones represent areas that are important to Arizona’s wildlife and natural ecosystems and are based on biological importance of threats, existing and anticipated. The highway itself is a threat to connectivity within this zone; however, the analysis area does not cross through the zone.

The analysis area is within several of Coconino County’s diffuse wildlife movement area: the Coconino Plateau (northern portion of analysis area), Grassland north and east of San Francisco Peaks – east of Anderson Mesa (area of access road), Mesa Butte – Kendrick (central to southcentral analysis area), South Rim – San Francisco Peaks – Woody Ridge/Bellemont area (north to south along western portion of analysis area), Utah – San Francisco Peaks (eastern portion of analysis area) (AGFD 2022a). Diffuse movement areas are a type of wildlife linkage in which animals move within a habitat block across a relatively broad area rather than between habitat blocks through a well-defined linkage (Table 6). In addition, important connectivity zones—areas “crucial for maintaining flow throughout the entire landscape” (Perkl 2013)—cross through the analysis area (Figure 8) (AGFD 2022a).

Table 6. Coconino County Diffuse Wildlife Movement Areas within the Analysis Area

Linkage Area	Identified Species	Connecting Habitat Blocks
Coconino Plateau	Elk, mule deer, pronghorn	Grasslands, conifer woodlands, and conifer forest. Multiple pathways for pronghorn and important highway crossing areas.
Grassland north and east of San Francisco Peaks – east of Anderson Mesa	Pronghorn, Gunnison’s prairie dog, jackrabbit, golden eagle, milksnakes (<i>Lampropeltis triangulum</i>), birds, bats	Grasslands. Little to no connectivity for pronghorn across Highway 89.

Linkage Area	Identified Species	Connecting Habitat Blocks
Mesa Butte – Kendrick	Mountain lion (<i>Puma concolor</i>), elk, pronghorn, mule deer	Ponderosa pine forest to grasslands. Wildlife movements across Highway 180.
South Rim – San Francisco Peaks – Woody Ridge/Bellefont area	Sentry milk-vetch (<i>Astragalus cremnophylax</i> var. <i>cremnophylax</i>), mule deer, elk, Gunnison's prairie dog	Canyons and conifer forest to grasslands. Seasonal migration corridor.
Utah – San Francisco Peaks	Raptors, bats	Pinyon-juniper, sagebrush, desert, grassland along valleys, canyons, edges of cliffs/plateaus. Migratory flyway.

Source: AGFD (2011).

3.3.5 Big Game Winter Range

The WEG (USFWS 2012) suggests evaluating the importance of winter ranges with respect to big game species. The analysis area is within the predicted range for elk (*Cervus elaphus*), pronghorn, and mule deer (AGFD 2022a). All three of these species have been observed in the analysis area during site-specific surveys. Breeding and calving in pronghorn occur in August–September and May–June, respectively (AGFD 2022c). Pronghorn primarily use openings in the pinyon-juniper and desert grassland habitats in the region (AGFD 2022c), seeking areas with greater than average shrub cover and height for fawning (Howard 1995).

Mule deer breed in the winter (November–December) and birth young in June–August (AGFD 2022c). Female mule deer prefer mountainous terrain where increased cover and slope reduce the chance of fawn predation by coyotes (Fox and Krausman 1994). Although some populations of mule deer are resident populations, the largest and most productive mule deer herds tend to be migratory and travel anywhere from 10 to 150 miles between seasonal ranges, with strong fidelity to their seasonal ranges and migration routes (Kauffman et al. 2020). Within the analysis area and 2-mile buffer, deer primarily inhabit the pinyon-juniper habitat type over grassland habitat (AGFD 2022c).

Important seasonal periods for elk include breeding (September–October), restoring depleted body fat (November), and calving (late May and June) (AGFD 2022c; New Mexico Department of Game and Fish 2018). Elk calving sites are highly dependent on cover to hide calves, with typical sites in central Arizona characterized as mid-elevational ponderosa pine (*Pinus ponderosa*) summer range habitats (Wallace and Krausman 1992). Elevations and habitats used by calves varies with seasonal snowmelt and green up. Elk calves remain hidden for the first 16 days (Wallace and Krausman 1992). Elk summer range is typically within 0.5 mile of water at higher elevations (7,000–10,000 feet amsl) where they arrive early in the season and stay until forced to move to lower elevations by snow depth. Winter range (5,500–6,500 feet amsl) is often the limiting factor for elk herds as only about 10% of their total habitat is winter range (AGFD 2022c). Elk are known to inhabit the pinyon-juniper and desert grasslands within the analysis area and 2-mile buffer but tend to concentrate at the higher elevations in ponderosa pine forests above pinyon juniper habitat (AGFD 2022c).

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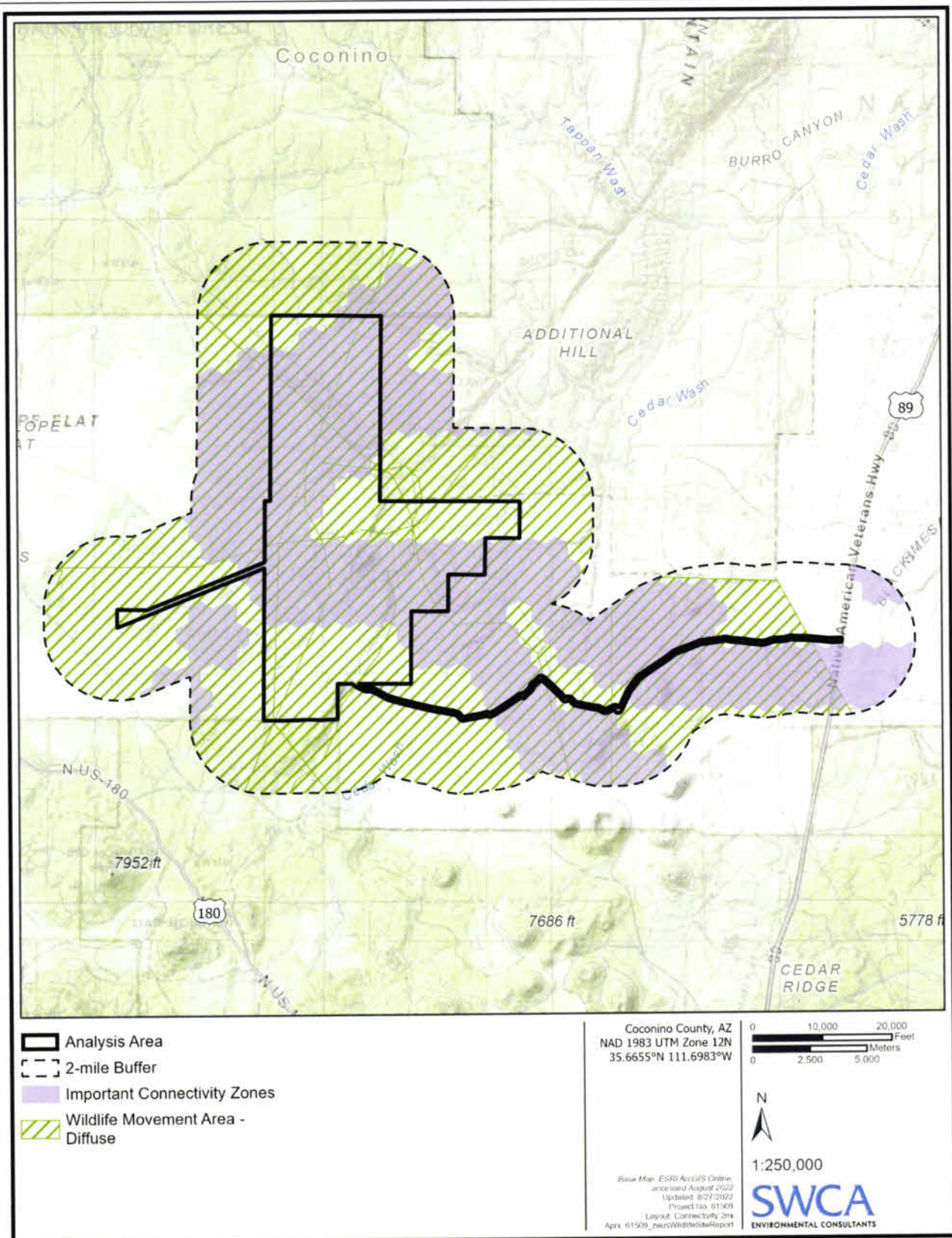


Figure 8. Arizona wildlife linkages within 2 miles of the analysis area.

3.4 Eagle Use

3.4.1 Seasonal Use

The analysis area is within the golden eagle's year-round range and may be broadly categorized as golden eagle foraging habitat (i.e., open grassland and steppe-like vegetation communities) (Katzner et al. 2020). Golden eagles breed throughout the region, including within the analysis area (Figure 9). Nests are placed in rugged terrain (e.g., cliffs), less often in forested areas (e.g., ponderosa pine, Fremont cottonwood [*Populus fremontii*]), and on human-made structures (e.g., transmission towers). One confirmed eagle nesting site is present within the analysis area on a transmission tower (see Figure 9). One potential nesting area has also been documented on the southeast side of Mesa Butte. One confirmed golden eagle nest (ZE014) and one possible golden eagle (ZE013) nest have been documented just outside the 2-mile buffer on Lava Point (see Figure 9).

Nests CO148 (Espee Crater), a known golden eagle nest, and nest CO203, a possible golden eagle nest, have been recorded during surveys conducted by the landowner (Babbitt Ranches) from 2011 to present. These nests were not observed during raptor nest surveys conducted by SWCA in 2021 or 2022 (SWCA 2021 and 2022c) as they are located outside the 2-mile eagle and other raptor nests survey buffer.

Golden eagles exhibit complex migration and nomadic movement patterns dependent on factors such as nesting status, age, and food availability (Katzner et al. 2020). Because individuals from areas north of Arizona winter in the state in October–April (reaching peak numbers in December–February), generally more golden eagles may be expected regionally during the fall through early spring seasons (AGFD 2002; Katzner et al. 2020). Other factors that may influence temporal use of the site by the species include whether breeding areas proximal to the site are used by individuals during the breeding season (winter through early summer) and the extent to which foraging activities increase on-site based on seasonal fluctuations in food availability (e.g., offal piles left by hunters September–November; Gunnison's prairie dogs, a main food item, would be active, if present, on-site from March through October; see Section 3.4.2). During year 1 of the Tier 3 avian use survey, golden eagles were detected in all seasons, and all age classes were observed (juvenile, subadult, and adult), indicating migratory and overwintering golden eagles are present, along with the breeding adults identified in the nest survey (SWCA 2022b). Golden eagle flight paths were widespread, observed in a broad belt curving northwest to west connecting Lockwood Canyon, Mesa Butte, and the lava fields immediately to the west of the analysis area (SWCA 2022b).

The analysis area is within the bald eagle's non-breeding and limited breeding ranges. It does not contain characteristic habitats for nesting (cliffs or trees near appropriate foraging conditions), foraging (aquatic), or roosting (trees 15–60 m in height) (Buehler 2020; Stalmaster 1987). Nests are generally placed in large trees or cliffs less than 2 km from water containing appropriate foraging conditions (e.g., rivers or reservoirs containing fish) (Buehler 2020). Wintering/non-breeding individuals and juveniles are typically associated with breeding habitats; however, they may range widely in search of food (see Section 3.4.2.2). Like golden eagles, bald eagles exhibit complex migration and nomadic movements; generally, more individuals may be expected regionally from late August until February, when wintering northern birds and returning juveniles are present (Corman and Wise-Gervais 2005).

Bald eagles were observed on seven occasions during year 1 of the Tier 3 avian use surveys from September through March and were predominately located along a rough north-south axis from Lockwood Canyon to Rabbit Canyon, in the western half of the analysis area (SWCA 2022b).

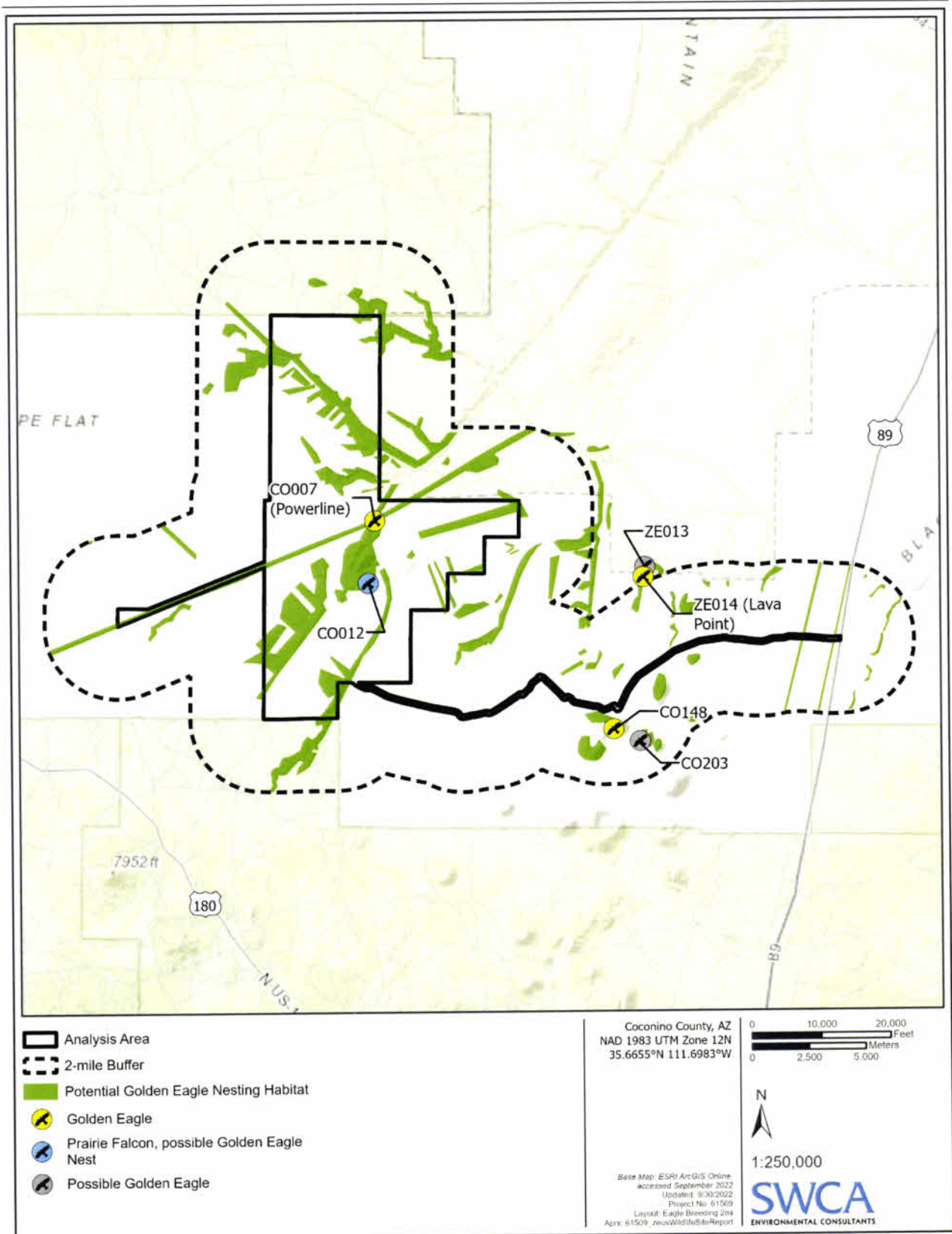


Figure 9. Delineated potential golden eagle habitat and golden eagle nests in the analysis area and within 2 miles recorded during 2022 eagle nest inventory and occupancy surveys and prior surveys.

3.4.2 Eagle Prey Concentrations

3.4.2.1 GOLDEN EAGLE PREY ITEMS

Potential golden eagle main prey items within the analysis area include rabbits (e.g., desert cottontail [*Sylvilagus audubonii*], black-tailed jackrabbit [*Lepus californicus*]), and sciurids (e.g., rock squirrel [*Otospermophilus variegatus*]), and Gunnison's prairie dog. Secondary prey items may include waterfowl, large mammal carrion (e.g., cattle, elk, pronghorn, mule deer), live ungulates (e.g., pronghorn), cattle, mesocarnivores (e.g., coyote, American badger [*Taxidea taxus*], bobcat [*Lynx rufus*]), large birds, and offal piles left by hunters (Katzner et al. 2020). Desert cottontails, black-tailed jackrabbits, Gunnison's prairie dogs, badgers, elk, pronghorn, mule deer, and rock squirrels have all been observed in the analysis area during site-specific surveys, and the analysis area is an active cattle ranch. Additionally, the section of the analysis area north of Mesa Butte is in AGFD Game Management Unit 9 and hunters have been observed in that area during site-specific surveys.

Potential prey concentration areas within the analysis area include relatively small prairie dog colonies and stock tanks potentially containing waterfowl (see Section 3.3.2).

3.4.2.2 BALD EAGLE PREY ITEMS

Potential bald eagle prey items within the analysis area include carrion and waterfowl (Buehler 2020). Preferred bald eagle prey items—fish—are not present within the analysis area. The nearest major bodies of water and their proximity to the site are described above (see Section 3.1.4). Winter use of the stock tanks by bald eagles would likely be infrequent because the species tends to prefer traditional waterfowl concentration areas with heightened hunter-induced mortality (Griffin et al. 1982).

3.4.3 Important Eagle Use Areas or Migration Concentration Sites

An *important eagle use area* is defined by the USFWS (2009) as “an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles.” As described in Section 3.4.1, one confirmed eagle nest and one potential eagle nest have been documented within the analysis area, as well as another confirmed eagle nest and one potential nest just outside the 2-mile buffer of the analysis area. There are no known communal eagle roost sites—generally associated with bald eagles—within or proximal to the analysis area.

Eagle migration concentration sites are associated with negative barriers, such as large bodies of water, or mountain ridges that offer energy-efficient flight via updrafts. Mesa Butte is a solitary feature that does not provide a substantial ridgeline. The nearest known raptor migration sites are the south rim of the Grand Canyon approximately 20 miles north (Hawk Watch International 2022), and along the Aubrey Cliffs, approximately 65 miles southwest of the analysis area (Audubon 2022). The raptor migration survey conducted by SWCA (2022a) found that the analysis area had fewer birds per hour than the Grand Canyon and Aubrey Cliffs migration sites.

3.4.4 USFWS Eagle Use Category Ranking

One golden eagle nest has been documented within the analysis area (see Figure 9), but not within the project footprint where project infrastructure will be constructed. The closest wind turbine generator to the documented eagle nest is approximately 2 miles to south. Additionally, potential eagle food resources are available within the project area (see Section 3.4.2). These findings suggest the eagle use category for

the project per the USFWS (2016a) is Category 2, high or moderate risk to eagles, with the opportunity to mitigate impacts.

4 KEY FINDINGS/SUMMARY

This report evaluates all questions suggested for WEG Tiers 1 and 2, ECPG Stage 1, and AGFD (2012a) preliminary site screening. The following is a summary of findings:

- Two federally listed species, California condor and Fickeisen plains cactus, may occur within the analysis area. Based on habitat associations and range requirements, projected use in the analysis area by the condor is expected to be occasional/rare and projected presence of the cactus is expected to be limited.
- Forty-one species designated as SGCN 1A/1B, BCC, and/or protected under the Eagle Act may occur or are known to occur within the analysis area.
- ANPL native plants have been observed in the analysis area; one ADA noxious weed species has been observed in the analysis area, with the potential for additional species to occur.
- Wetlands within the project area include earthen stock tanks, playas/depressions, and ephemeral drainages. The NWI classifies the stock tanks and playas/depressions as freshwater ponds: “intermittently flooded, diked/impounded” or “temporarily flooded, excavated.” A few short drainage segments adjacent to stock tanks are classified as “permanently flooded.” All wetland features lack emergent wetland and shrub/tree riparian vegetation.
- There are no critical habitats or other special designation areas within the analysis area.
- At this stage, there are no known bat roosts or movement corridors within the project area or vicinity.
- There are no bird staging areas, species-specific flyways, or other negative barriers (e.g., large bodies of water and mountain ridges) that would funnel migrant raptors within the analysis area or vicinity. The project raptor migration survey found a lower number of migrating raptors per hour than other known nearby migration sites.
- Multiple wildlife linkage zones and diffuse movement areas intersect the analysis area (AGFD 2011). Ungulates, birds, and bats are the primary species identified using these areas.
- There are no lekking species in the region.
- During the first year of project avian use surveys, large bird species richness and diversity was found to be moderate, while small bird use and species richness was relatively low.
- Golden eagles are known to occur within the analysis area year-round. Bald eagle use of the analysis area is occasional, particularly from September through March.
- Findings suggest the eagle use category for the project per the USFWS (2016a) is Category 2, high or moderate risk to eagles, with the opportunity to mitigate impacts.

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APPENDIX A
USFWS Site Specific Species Review



United States Department of the Interior

FISH AND WILDLIFE SERVICE
 Arizona Ecological Services Field Office
 9828 North 31st Ave
 #c3
 Phoenix, AZ 85051-2517
 Phone: (602) 242-0210 Fax: (602) 242-2513



In Reply Refer To:
 Project Code: 2022-0079146
 Project Name: Zeus Wind Facility, Phase 1

August 25, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that *may* occur within the One-Range that has been delineated for the species (candidate, proposed, or listed) and its critical habitat (designated or proposed) with which your project polygon intersects. These range delineations are based on biological metrics, and do not necessarily represent exactly where the species is located. Please refer to the species information found on ECOS to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat *may be affected* by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual

or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint." For example, projects that involve streams and river systems should consider downstream effects. If the Federal action agency determines that the action may jeopardize a *proposed* species or may adversely modify *proposed* critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at: <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>.

We also advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668 *et seq.*). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Service. The Eagle Act prohibits anyone, without a permit, from taking (including disturbing) eagles, and their parts, nests, or eggs. Currently 1,026 species of birds are protected by the MBTA, including the western burrowing owl (*Athene cunicularia hypugaea*). Protected western burrowing owls can be found in urban areas and may use their nest/burrows year-round; destruction of the burrow may result in the unpermitted take of the owl or their eggs.

If a bald eagle or golden eagle nest occurs in or near the proposed project area, our office should be contacted for Technical Assistance. An evaluation must be performed to determine whether the project is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see <https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/eagles.php> and <https://www.fws.gov/birds/management/managed-species/eagle-management.php>).

The Division of Migratory Birds (505/248-7882) administers and issues permits under the MBTA and Eagle Act, while our office can provide guidance and Technical Assistance. For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site: <https://www.fws.gov/birds/management.php>. Guidance for minimizing impacts to migratory birds for communication tower projects (e.g. cellular, digital television, radio, and emergency broadcast) can be found at <https://www.fws.gov/migratorybirds/pdf/management/usfwscommtowerguidance2016update.pdf>.

The U.S. Army Corps of Engineers (Corps) may regulate activities that involve streams (including some intermittent streams) and/or wetlands. We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information

about refuge resources, please visit <https://www.fws.gov/southwest/refuges/> to locate the refuge you would be working in or around.

If your action is on tribal land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our Tribal Coordinator, John Nystedt, at 928/556-2160 or John.Nystedt@fws.gov.

We also recommend you seek additional information and coordinate your project with the Arizona Game and Fish Department. Information on known species detections, special status species, and Arizona species of greatest conservation need, such as the western burrowing owl and the Sonoran desert tortoise (*Gopherus morafkai*) can be found by using their Online Environmental Review Tool, administered through the Heritage Data Management System and Project Evaluation Program (<https://www.azgfd.com/wildlife/planning/projevalprogram/>).

We appreciate your concern for threatened and endangered species. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office. If we may be of further assistance, please contact our Flagstaff office at 928/556-2157 for projects in northern Arizona, our general Phoenix number 602/242-0210 for central Arizona, or 520/670-6144 for projects in southern Arizona.

Sincerely,
/s/

Mark A. Lamb
Acting Field Supervisor
Attachment

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arizona Ecological Services Field Office

9828 North 31st Ave

#c3

Phoenix, AZ 85051-2517

(602) 242-0210

Project Summary

Project Code: 2022-0079146
Project Name: Zeus Wind Facility, Phase 1
Project Type: Power Gen - Wind
Project Description: New wind energy generating facility.
Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@35.66499065,-111.74049567089187,14z>



Counties: Coconino County, Arizona

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
California Condor <i>Gymnogyps californianus</i> Population: U.S.A. only, except where listed as an experimental population There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8193	Endangered
California Condor <i>Gymnogyps californianus</i> Population: U.S.A. (specific portions of Arizona, Nevada, and Utah) There is proposed critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8193	Experimental Population, Non-Essential
Mexican Spotted Owl <i>Strix occidentalis lucida</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8196	Threatened
Yellow-billed Cuckoo <i>Coccyzus americanus</i> Population: Western U.S. DPS There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Northern Mexican Gartersnake <i>Thamnophis eques megalops</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7655	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Fickeisen Plains Cactus <i>Pediocactus peeblesianus</i> ssp. <i>fickeiseniae</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5484	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern \(BCC\) list](#) or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Black-throated Gray Warbler <i>Dendroica nigrescens</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jul 20
Cassin's Finch <i>Carpodacus cassinii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Chestnut-collared Longspur <i>Calcarius ornatus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

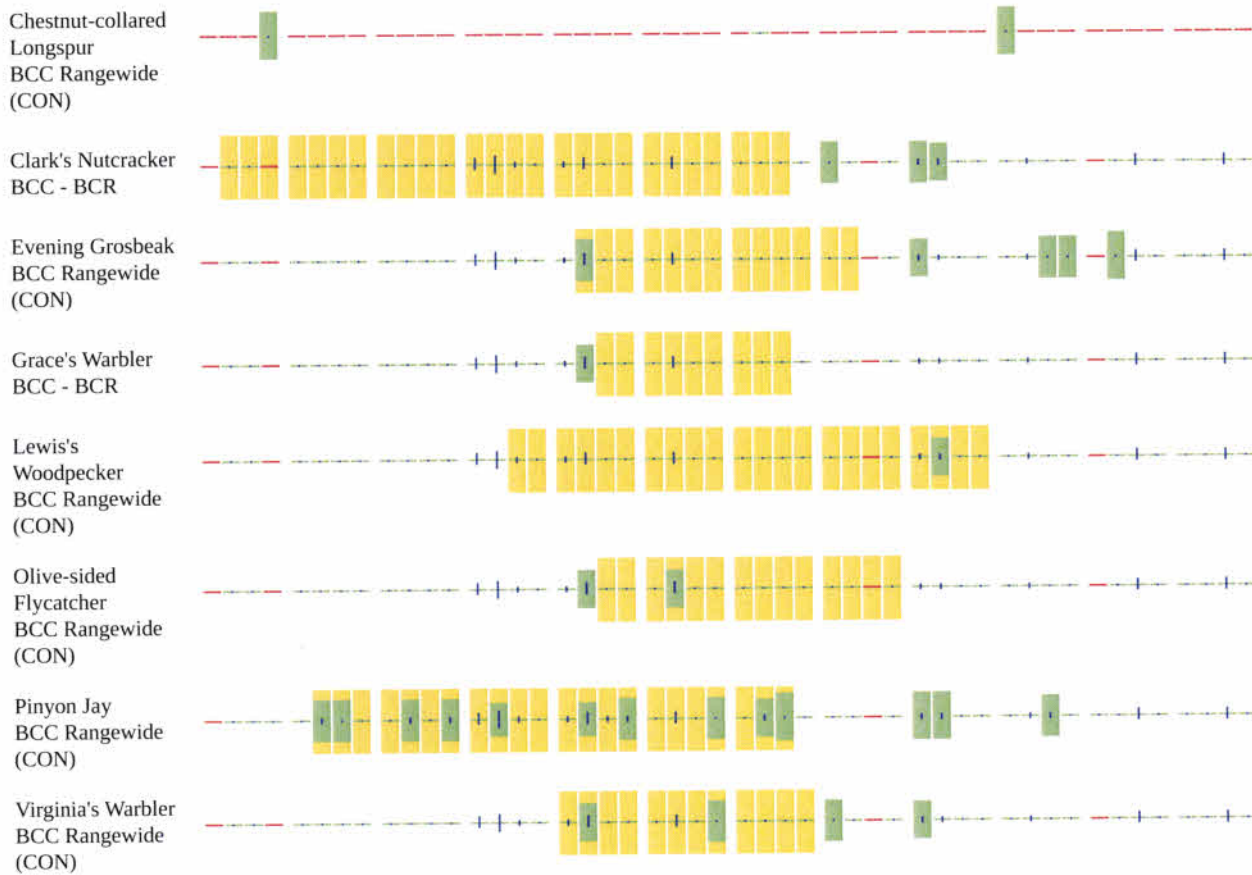
NAME	BREEDING SEASON
<p>Clark's Nutcracker <i>Nucifraga columbiana</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA</p>	Breeds Jan 15 to Jul 15
<p>Evening Grosbeak <i>Coccothraustes vespertinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds May 15 to Aug 10
<p>Grace's Warbler <i>Dendroica graciae</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA</p>	Breeds May 20 to Jul 20
<p>Lewis's Woodpecker <i>Melanerpes lewis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408</p>	Breeds Apr 20 to Sep 30
<p>Olive-sided Flycatcher <i>Contopus cooperi</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914</p>	Breeds May 20 to Aug 31
<p>Pinyon Jay <i>Gymnorhinus cyanocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420</p>	Breeds Feb 15 to Jul 15
<p>Virginia's Warbler <i>Vermivora virginiae</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9441</p>	Breeds May 1 to Jul 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.



Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern \(BCC\)](#) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and

3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell

me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED.
PLEASE VISIT [HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML](https://www.fws.gov/wetlands/data/mapper.html) OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.



IPaC User Contact Information

Agency: SWCA Environmental Consultants

Name: Corina Anderson

Address: 1645 S Plaza Way

City: Flagstaff

State: AZ

Zip: 86001

Email: canderson@swca.com

Phone: 9287745500



APPENDIX B

Arizona Environmental Online Review Tool Report

Arizona Environmental Online Review Tool Report



Arizona Game and Fish Department Mission

To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Project Name:

Zeus Wind Facility, Phase 1

User Project Number:

61509

Project Description:

New wind energy generating facility.

Project Type:

Energy Storage/Production/Transfer, Energy Production (generation), wind power facility (new)

Contact Person:

Corina Anderson

Organization:

SWCA Environmental Consultants

On Behalf Of:

PRIVATE

Project ID:

HGIS-17144

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

Locations Accuracy Disclaimer:

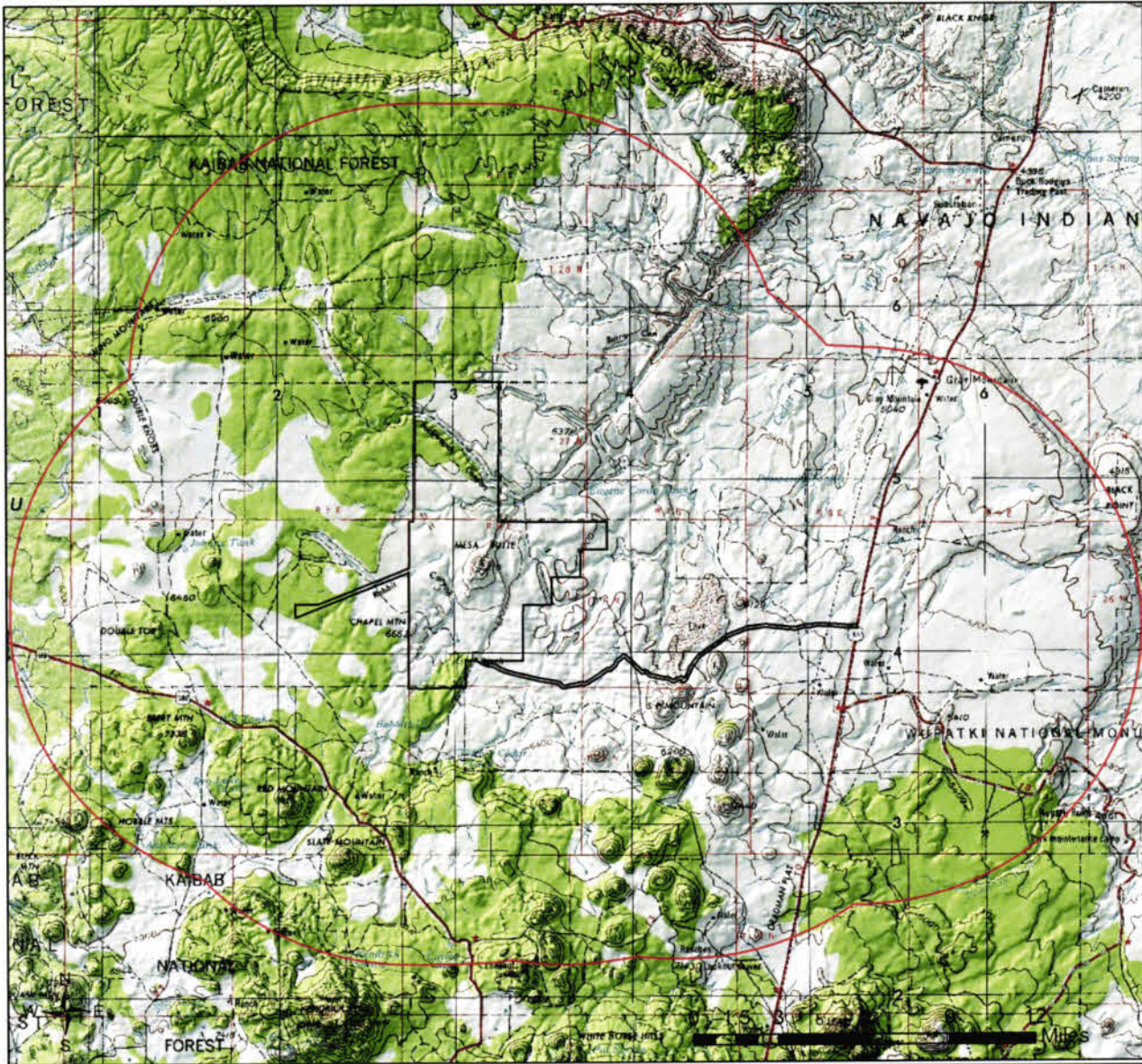
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.



Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:
Project Evaluation Program, Habitat Branch
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086-5000
Phone Number: (623) 236-7600
Fax Number: (623) 236-7366
Or
PEP@azgfd.gov
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

Zeus Wind Facility, Phase 1

USA Topo Basemap With Locator Map



-  Buffered Project Boundary
-  Project Boundary

Project Size (acres): 29,106.22

Lat/Long (DD): 35.6592 / -111.7588

County(s): Coconino

AGFD Region(s): Flagstaff; Pinetop

Township/Range(s): T25N, R6E; T26N, R5E; T26N, R6E +

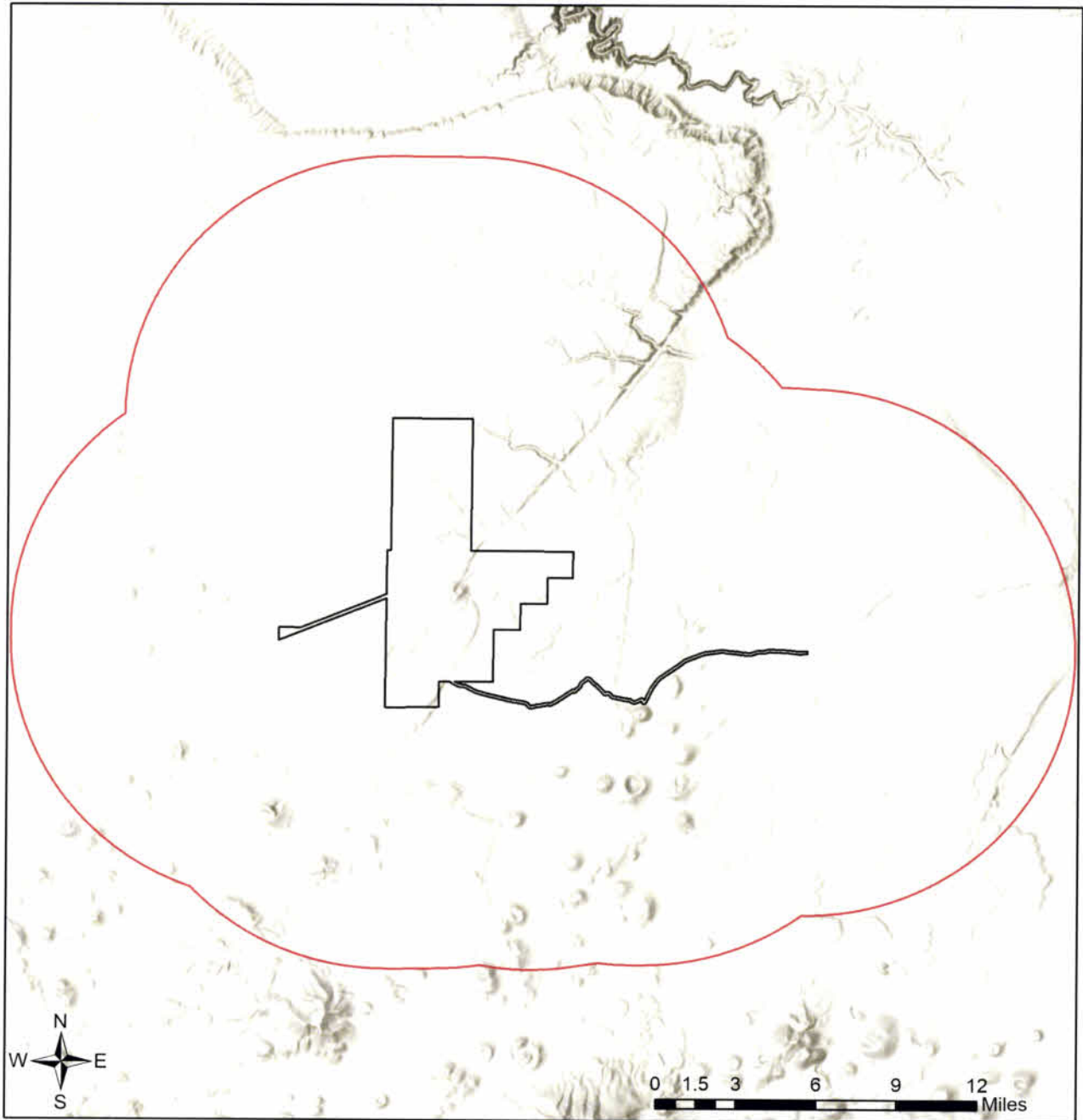
USGS Quad(s): ADDITIONAL HILL; CHAPEL MOUNTAIN +

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community



Zeus Wind Facility, Phase 1

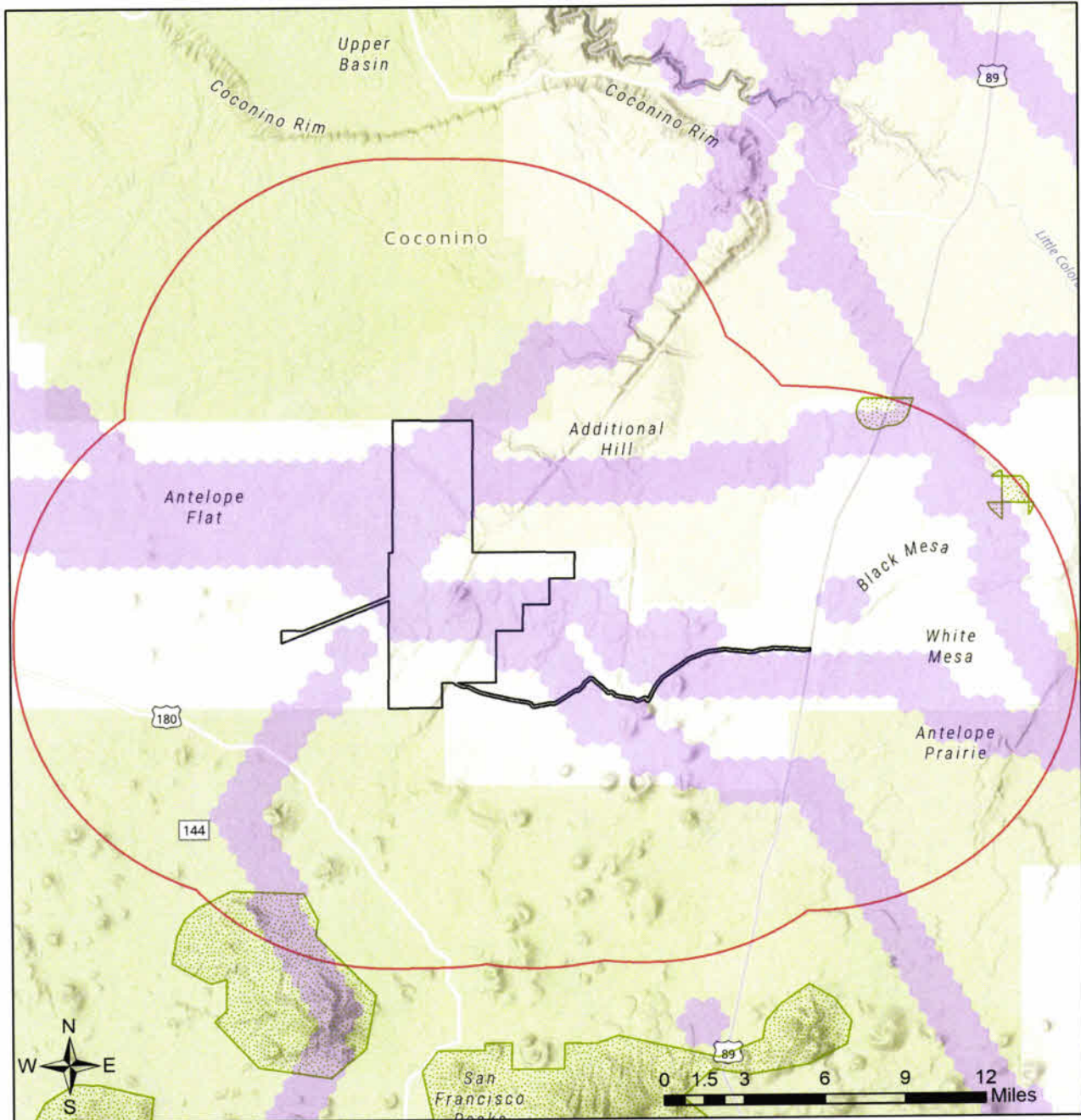
Web Map As Submitted By User



Project Size (acres): 29,106.22
Lat/Long (DD): 35.6592 / -111.7588
County(s): Coconino
AGFD Region(s): Flagstaff; Pinetop
Township/Range(s): T25N, R6E; T26N, R5E; T26N, R6E +
USGS Quad(s): ADDITIONAL HILL; CHAPEL MOUNTAIN +

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Zeus Wind Facility, Phase 1 Important Areas



Project Size (acres): 29,106.22

Lat/Long (DD): 35.6592 / -111.7588

County(s): Coconino

AGFD Region(s): Flagstaff; Pinetop

Township/Range(s): T25N, R6E; T26N, R5E; T26N, R6E +

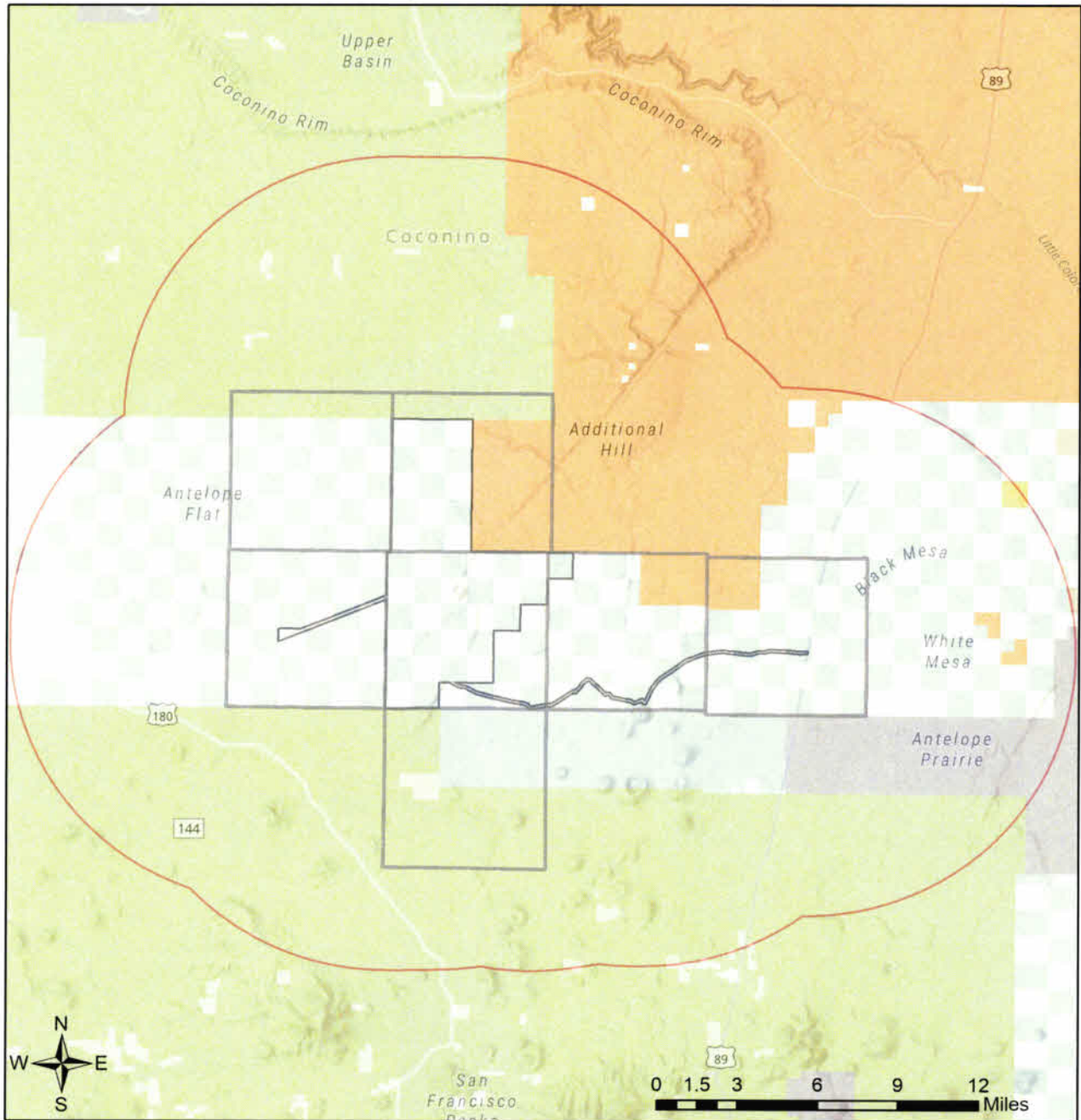
USGS Quad(s): ADDITIONAL HILL; CHAPEL MOUNTAIN +

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Zeus Wind Facility, Phase 1

Township/Ranges and Land Ownership



Project Size (acres): 29,106.22
Lat/Long (DD): 35.6592 / -111.7588
County(s): Coconino
AGFD Region(s): Flagstaff; Pinetop
Township/Range(s): T25N, R6E; T26N, R5E; T26N, R6E +
USGS Quad(s): ADDITIONAL HILL; CHAPEL MOUNTAIN +

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodastystyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Special Status Species Documented within 10 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Accipiter gentilis	Northern Goshawk	SC	S	S		1B
Aquila chrysaetos	Golden Eagle	BGA		S		1B
Aspidoscelis pai	Pai Striped Whiptail					1B
Bat Colony						
Canis lupus baileyi	Mexican Wolf	LE,XN				1A
Chrysothamnus molestus	Tusayan Rabbitbrush	SC	S			
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B
Cynomys gunnisoni	Gunnison's Prairie Dog	SC		S		1B
Eremogone aberrans	Mt. Dellenbaugh Sandwort		S			
Eremothera gouldii	Diamond Valley Suncup	SC				
Errazurizia rotundata	Roundleaf Errazurizia			S	SR	
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S		1A
Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC, BGA	S	S		1A
Myotis ciliolabrum	Western Small-footed Myotis	SC				
Pediocactus peeblesianus ssp. fickeiseniae	Fickeisen Plains Cactus	LE	S		HS	
Pediocactus simpsonii	Simpson Plains Cactus					SR
Penstemon clutei	Sunset Crater Beardtongue	SC	S			SR
Perognathus amplus cineris	Wupatki Arizona Pocket Mouse	SC				1B
Perognathus flavus goodpasteri	Springerville Pocket Mouse	SC	S			1B
Phacelia serrata	Cinder Phacelia	SC				
Phacelia welshii	Welsh's Phacelia	SC				
Phemeranthus validulus	Tusayan Flameflower	SC			SR	
Phlox amabilis	Arizona Phlox		S			

Note: Status code definitions can be found at <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/>

Special Areas Documented that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Coconino Plateau	Coconino County Wildlife Movement Area - Diffuse					
Grassland north and east of San Francisco Peaks - east of Anderson Mesa	Coconino County Wildlife Movement Area - Diffuse					
Important Connectivity Zone	Wildlife Connectivity					
Mesa Butte - Kendrick	Coconino County Wildlife Movement Area - Diffuse					
Navajo Nation	Navajo Nation					
South Rim - San Francisco Peaks - Woody Ridge/Bellemont area	Coconino County Wildlife Movement Area - Diffuse					

Special Areas Documented that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Utah - San Francisco Peaks	Coconino County Wildlife Movement Area - Diffuse					

Note: Status code definitions can be found at <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/>

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Accipiter gentilis	Northern Goshawk	SC	S	S		1B
Ambystoma mavortium nebulosum	Arizona Tiger Salamander					1B
Antilocapra americana americana	American Pronghorn					1B
Aquila chrysaetos	Golden Eagle	BGA		S		1B
Aspidoscelis pai	Pai Striped Whiptail					1B
Baeolophus ridgwayi	Juniper Titmouse					1C
Buteo regalis	Ferruginous Hawk	SC		S		1B
Buteo swainsoni	Swainson's Hawk					1C
Cardellina rubrifrons	Red-faced Warbler					1C
Castor canadensis	American Beaver					1B
Chordeiles minor	Common Nighthawk					1B
Contopus cooperi	Olive-sided Flycatcher	SC				1C
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B
Crotalus cerberus	Arizona Black Rattlesnake					1B
Cynomys gunnisoni	Gunnison's Prairie Dog	SC		S		1B
Empidonax wrightii	Gray Flycatcher					1C
Euderma maculatum	Spotted Bat	SC	S	S		1B
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S		1A
Gymnorhinus cyanocephalus	Pinyon Jay			S		1B
Haliaeetus leucocephalus	Bald Eagle	SC, BGA	S	S		1A
Lithobates pipiens	Northern Leopard Frog		S	S		1A
Melospiza lincolnii	Lincoln's Sparrow					1B
Microtus longicaudus	Long-tailed Vole					1B
Microtus mexicanus	Mexican Vole					1B
Mustela nigripes	Black-footed Ferret	LE,XN				1A
Myotis occultus	Arizona Myotis	SC		S		1B
Myotis yumanensis	Yuma Myotis	SC				1B
Neotamias cinereicollis	Gray-collared Chipmunk					1B
Neotoma stephensi	Stephen's Woodrat					1B
Oreoscoptes montanus	Sage Thrasher					1C

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Panthera onca</i>	Jaguar	LE				1A
<i>Patagioenas fasciata</i>	Band-tailed Pigeon					1C
<i>Perognathus amplus cineris</i>	Wupatki Arizona Pocket Mouse	SC				1B
<i>Perognathus amplus</i>	Arizona Pocket Mouse					1B
<i>Peucedramus taeniatus</i>	Olive Warbler					1C
<i>Psiloscoops flammeolus</i>	Flammulated Owl					1C
<i>Rallus limicola</i>	Virginia Rail					1C
<i>Sphyrapicus thyroideus</i>	Williamson's Sapsucker					1C
<i>Spizella atrogularis</i>	Black-chinned Sparrow					1C
<i>Spizella breweri</i>	Brewer's Sparrow					1C
<i>Sturnella magna</i>	Eastern Meadowlark					1C
<i>Tadarida brasiliensis</i>	Brazilian Free-tailed Bat					1B
<i>Vireo vicinior</i>	Gray Vireo		S			1C

Species of Economic and Recreation Importance Predicted that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Antilocapra americana americana</i>	America Pronghorn					1B
<i>Cervus elaphus</i>	Elk					
<i>Odocoileus hemionus</i>	Mule Deer					
<i>Patagioenas fasciata</i>	Band-tailed Pigeon					1C
<i>Puma concolor</i>	Mountain Lion					
<i>Zenaida macroura</i>	Mourning Dove					

Project Type: Energy Storage/Production/Transfer, Energy Production (generation), wind power facility (new)

Project Type Recommendations:

Fence recommendations will be dependent upon the goals of the fence project and the wildlife species expected to be impacted by the project. General guidelines for ensuring wildlife-friendly fences include: barbless wire on the top and bottom with the maximum fence height 42", minimum height for bottom 16". Modifications to this design may be considered for fencing anticipated to be routinely encountered by elk, bighorn sheep or pronghorn (e.g., Pronghorn fencing would require 18" minimum height on the bottom). Please refer to the Department's Fencing Guidelines located on Wildlife Friendly Guidelines page, which is part of the Wildlife Planning button at <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/>.

During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife. Guidelines for many of these can be found at: <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/>.

Consider impacts of outdoor lighting on wildlife and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use. Use only the minimum amount of light needed for safety. Narrow spectrum bulbs should be used as often as possible to lower the range of species affected by lighting. All lighting should be shielded, canted, or cut to ensure that light reaches only areas needing illumination.

Minimize the potential introduction or spread of exotic invasive species, including aquatic and terrestrial plants, animals, insects and pathogens. Precautions should be taken to wash and/or decontaminate all equipment utilized in the project activities before entering and leaving the site. See the Arizona Department of Agriculture website for a list of prohibited and restricted noxious weeds at <https://www.invasivespeciesinfo.gov/unitedstates/az.shtml> and the Arizona Native Plant Society <https://aznps.com/invas> for recommendations on how to control. To view a list of documented invasive species or to report invasive species in or near your project area visit iMapInvasives - a national cloud-based application for tracking and managing invasive species at <https://imap.natureserve.org/imap/services/page/map.html>.

- To build a list: zoom to your area of interest, use the identify/measure tool to draw a polygon around your area of interest, and select "See What's Here" for a list of reported species. To export the list, you must have an account and be logged in. You can then use the export tool to draw a boundary and export the records in a csv file.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

For any powerlines built, proper design and construction of the transmission line is necessary to prevent or minimize risk of electrocution of raptors, owls, vultures, and golden or bald eagles, which are protected under state and federal laws. Limit project activities during the breeding season for birds, generally March through late August, depending on species in the local area (raptors breed in early February through May). Conduct avian surveys to determine bird species that may be utilizing the area and develop a plan to avoid disturbance during the nesting season. For underground powerlines, trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herpetofauna (snakes, lizards, tortoise) from entering ditches. In addition, indirect affects to wildlife due to construction (timing of activity, clearing of rights-of-way, associated bridges and culverts, affects to wetlands, fences) should also be considered and mitigated.

Based on the project type entered, coordination with State Historic Preservation Office may be required (<https://azstateparks.com/>).

The effects of wind development projects on wildlife, in particular birds and bats, are well documented. The Department recommends conducting raptor nest, general avian, and threatened and endangered species surveys during the appropriate breeding/migration seasons within 10 miles of the project site to determine the location of active nests, migratory pathways, and associated species potentially disturbed by project activities. Effects that should be minimized or mitigated may include direct habitat loss from the wind plant footprint, including turbine base, access road, and substation construction; indirect habitat loss from increased human presence and/or turbine operation noise; habitat alteration, such as soil erosion and construction of migration-hindering obstacles; mortality by powerline electrocution; and mortality by collision with structures, turbine blades or guy wires. The Department has developed guidelines for wind energy development which can be found on the Wildlife Friendly Guideline on our Wildlife Planning page at <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/>. We also recommend referring to the USFWS Land-based Wind Energy Guidelines, <https://www.fws.gov/node/266177>. We encourage the project proponent to coordinate directly with the Project Evaluation Program to identify and develop mitigation measures for these projects.

Based on the project type entered, coordination with U.S. Fish and Wildlife Service (Migratory Bird Treaty Act) may be required (<https://www.fws.gov/office/arizona-ecological-services>).

Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

The Department requests further coordination to provide project/species specific recommendations, please contact Project Evaluation Program directly at PEP@azgfd.gov.

Project Location and/or Species Recommendations:

HDMS records indicate that one or more native plants listed on the **Arizona Native Plant Law and Antiquities Act** have been documented within the vicinity of your project area. Please contact:

Arizona Department of Agriculture
1688 W Adams St.
Phoenix, AZ 85007
Phone: 602.542.4373

<https://agriculture.az.gov/sites/default/files/Native%20Plant%20Rules%20-%20AZ%20Dept%20of%20Ag.pdf> starts on page 44

Analysis indicates that your project is located in the vicinity of an identified **wildlife habitat connectivity feature**. The **County-level Stakeholder Assessments** contain five categories of data (Barrier/Development, Wildlife Crossing Area, Wildlife Movement Area- Diffuse, Wildlife movement Area- Landscape, Wildlife Movement Area- Riparian/Washes) that provide a context of select anthropogenic barriers, and potential connectivity. The reports provide recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to: <https://www.azgfd.com/wildlife/planning/habitatconnectivity/identifying-corridors/>. Please contact the Project Evaluation Program (pep@azgfd.gov) for specific project recommendations.

HDMS records indicate that one or more **Listed, Proposed, or Candidate** species or **Critical Habitat** (Designated or Proposed) have been documented in the vicinity of your project. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at <https://www.fws.gov/office/arizona-ecological-services> or:

Phoenix Main Office

9828 North 31st Avenue #C3
Phoenix, AZ 85051-2517
Phone: 602-242-0210
Fax: 602-242-2513

Tucson Sub-Office

201 N. Bonita Suite 141
Tucson, AZ 85745
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Flagstaff Sub-Office

SW Forest Science Complex
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001
Phone: 928-556-2157
Fax: 928-556-2121

HDMS records indicate that **Peregrine Falcons** have been documented within the vicinity of your project area. Please review the Peregrine Falcon Management Guidelines at: <https://s3.amazonaws.com/azgfd-portal-wordpress/PortallImages/files/wildlife/planningFor/wildlifeFriendlyGuidelines/peregrineFalconConservGuidelines.pdf>.

Analysis indicates that your project is located in the vicinity of an identified **wildlife habitat connectivity feature**. The **Statewide Wildlife Connectivity Assessment's Important Connectivity Zones** (ICZs) represent general areas throughout the landscape which contribute the most to permeability of the whole landscape. ICZs may be used to help identify, in part, areas where more discrete corridor modeling ought to occur. The reports provide recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to: https://s3.amazonaws.com/azgfd-portal-wordpress/azgfd.wp/wp-content/uploads/0001/01/23120719/ALIWCA_Final_Report_Perkl_2013_lowres.pdf. Please contact the Project Evaluation Program (pep@azgfd.gov) for specific project recommendations.

Tribal Lands are within the vicinity of your project area and may require further coordination. Please contact:

Navajo Nation
PO Box 1480
Window Rock, AZ 86515
(928) 871-6352
(928) 871-4025 (fax)



APPENDIX C

Special-Status Species Reviewed for Their Potential to Occur in the Analysis Area

Table C.1. Federally Listed Species Reviewed for Their Potential to Occur in the Analysis Area

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Birds					
California condor [†] (<i>Gymnogyps californianus</i>)	E, EXPN	SGCN (1A)	Nests in variety of rock formations, including caves crevices, and potholes in isolated scrubby chaparral and forested montane regions. Presence of adequate food supplies in open, accessible areas, with reliable air movements is an important habitat attribute; foraging occurs over long distances in these open habitats. Roosts on cliffs, rocky outcrops, or snags, or in large trees. The USFWS began reintroducing a non- essential experimental (NEP) population into northern Arizona and southern Utah in 1996. These condors are generally found in southern Utah (Zion National Park Kolob Plateau) and northern Arizona (Kaibab and Paria plateaus and the Colorado River corridor west of Marble Canyon). The NEP area is defined by Interstate 40 on the south, U.S. Highway 91 on the east, Interstate 70 on the north, and Interstate 15 to U.S. Highway 93 on the west. Known or believed to occur in five Arizona counties, including Coconino County. The NEP area in Arizona includes portions of Apache, Coconino, Mohave, and Yavapai Counties.	May occur. The analysis area is within the NEP area, and potential roosting sites of short cliffs and rocky outcrops are present. The analysis area is south of the species' primary range; however, individuals are known to make occasional forays outside of this range. The species has not been documented within 10 miles of the analysis area, although condors have been recorded approximately 17 miles east near Wupatki National Monument. They have also been recorded in the Flagstaff area approximately 28 miles south of the analysis area.	Year-round, occasional foray
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T, CH	SGCN (1A)	Nests and roosts primarily in high-elevation (4,000– 10,000 feet) old growth forests: mixed conifer dominated by Douglas-fir, pine, or true fir and pine-oak forests dominated by ponderosa pine and Gambel oak. Secondarily, in steep, narrow canyons with cliffs and perennial water. Breeding and roosting habitats typically include steep slopes with high canopy closure, high basal area, many snags, and many downed logs. Foraging, juvenile dispersal, and wintering habitats are more diverse and include a wide variety of forest conditions (including pinyon-juniper), canyon bottoms, cliff faces, tops of canyon rims, and riparian areas. Wintering owls will also use mountain-shrub habitat. Known or believed to occur in 13 Arizona counties, including Navajo County.	Unlikely to occur. The analysis area does not contain suitable nesting and roosting habitat for this species. There are no old-growth pine-oak forests present within the analysis area, nor are there any steep, narrow canyons with perennial water. This species has not been documented within 10 miles of the analysis area. Nearest records are north of Flagstaff in Kaibab National Forest and near Grand Canyon National Park approximately 28 miles north of the analysis area. Critical habitat for this species is located approximately 8 miles southwest in Kaibab National Forest.	Year-round

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	T, CH	SGCN (1A)	Nests in low- to moderate-elevation (usually below 6,600 feet) riparian woodlands with native broadleaf trees and shrubs that are 50 acres or more in extent. Most commonly associated with cottonwood/willow-dominated vegetation cover, but composition of dominant riparian vegetation can vary across range. Has not been found nesting in isolated patches (1-2 acres) or narrow, linear riparian habitats less than 10 to 20 m wide; migrant cuckoos have been detected in these habitats. During migration uses a wider array of forest and shrub habitats but is rarely observed away from riparian habitats. Known or believed to occur in 15 Arizona counties, including Coconino County.	Unlikely to occur. AGFD predicted range models do not include the analysis area; however, it is within the general range of the species. The analysis area does not contain riparian habitats, and the species has not been documented within 10 miles. Cuckoos have been recorded along the Little Colorado River north of Cameron, Arizona, approximately 20 miles northeast of the analysis area. There is designated critical habitat for this species approximately 50 miles south of the analysis area along the Verde River and Oak Creek.	Breeding, migration
Insects					
Monarch butterfly (<i>Danaus plexippus</i>)	C	-	A migratory species found in a variety of habitats. Monarchs require milkweed for breeding. Populations in Arizona can migrate either to California or Mexico for winter or may overwinter in the low deserts in California or Arizona. In the southwestern United States, migrating monarchs often occur near water sources such as rivers, creeks, riparian corridors, roadside ditches, and irrigated gardens.	May occur. Monarchs may be present as transients during migration or as occasional individuals passing through the analysis area in route to nectar sources or larval food plants. Nectar sources are available in the analysis area for foraging and milkweed species for reproduction use were observed during site-specific surveys.	Breeding, migration

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Flowering Plants					
Fickeisen plains cactus (<i>Pediocactus peeblesianus fickeniseianae</i>)	E, CH	ANPL	Mesas, plateaus, terraces, gently sloping hills, and near canyon rims at elevations between 4,200 and 5,950 feet. Associated with well-drained, shallow, gravelly soils derived from exposed layers of Kaibab limestone. Vegetation community associations include desertscrub and desert grasslands. Occurs in widely scattered, small populations on the Colorado Plateau. The species' range includes northwestern and north-central portions of the state. Known or believed to occur in two Arizona counties, including Coconino County.	May occur. Although almost all of the analysis area is above the species' elevational range with the exception of a small portion of the very eastern section, the species has been documented within 10 miles of the analysis area. Soil classes associated with the species (Winona stony loam, 0 to 8 percent slopes; Winona gravelly loam, 0 to 8 percent slopes; and Winona-Boysag gravelly loams, 0 to 8 percent slopes) occur within the analysis area, occupying 9,552 acres. One soil class—Winona stony loam, 0 to 8 percent slopes—is found within the small section of the analysis area within the species' elevational range. Critical habitat for the species is located approximately 9 miles northeast of the analysis area near Gray Mountain.	Flowers in mid-April to mid-May
Mammals					
Black-footed ferret† (<i>Mustela nigripes</i>)	E, XN	SGCN (1A)	Grassland plains and prairies in association with prairie dogs below 10,500 feet.	Unlikely to occur. There are no populations of reintroduced ferrets within the analysis area. The nearest known reintroduced population of ferrets is on Espee Ranch, approximately 37 miles to the northwest. It is suspected that this population has been extirpated due to plague.	Year-round, nocturnal, crepuscular
Jaguar† (<i>Panthera onca</i>)	E	SGCN (1A)	Known from a variety of habitats, preferring lowland wet habitats. In Arizona, found only in the southeastern portion of the state in dry forests, desertscrub, and mountains.	Unlikely to occur. The analysis area is outside the known current range. Nearest record is approximately 250 miles south of the analysis area.	Year-round

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Mexican gray wolf (<i>Canis lupus baileyi</i>)	E, EXPN	SGCN (1A)	Areas with sufficient prey populations, such as deer and elk, and where human-induced mortality is controlled. Current populations typically associated with evergreen pine-oak woodlands, pinyon juniper woodlands, and mixed-conifer montane forests above 4,000 feet. The Mexican Wolf Experimental Population Area (MWEPA) encompasses Arizona and New Mexico from Interstate 40 south to Mexico.	Unlikely to occur. The analysis area is located north of the MWEPA and contains only marginal habitat parameters. The dominant vegetation type in the project area is grassland. There are patches of pinyon-juniper woodland on the west side and near the center of the analysis area but they are fragmented. Cattle and elk may be present, but only intermittently. The species has been documented within 10 miles of the analysis area but this was likely a young, lone wolf that had dispersed from the MWEPA, which is uncommon. Wolves that stray beyond the MWEPA are captured and returned (personal communication, Corina Anderson, SWCA, and Ryan Gordon, USFWS). The next nearest recent recorded sighting of a Mexican wolf was a member of the Saffel pack on August 23, 2022, west of Greer, Arizona, approximately 170 miles to the southeast.	Juvenile dispersal

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Reptiles					
Northern Mexican gartersnake (<i>Thamnophis</i> <i>eques megalops</i>)	T, CH	SGCN (1A)	Riparian obligate. Lotic and lentic habitats that include cienegas and stock tanks (earthen impoundments), and rivers containing pools and backwaters. Most frequently found between 3,000 and 5,000 feet but may occur up to approximately 8,500 feet. Uses adjacent terrestrial habitats for foraging, thermoregulation, gestation, shelter, immigration, emigration, and brumation. Found in areas of high native prey (fish and leopard frogs) concentration. Prey include leopard frogs and native fish, and, secondarily, non-native larval and juvenile bullfrogs and soft-rayed fish. Core population areas in Arizona include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley. Known or believed to occur in 11 Arizona counties, including Coconino County.	Unlikely to occur. Earthen impoundment stock tanks within the project area contain water seasonally but are far from riparian habitats; thus, movements associated with foraging, thermoregulation, gestation, shelter, immigration, emigration, and brumation would be unlikely. The nearest record is approximately 48 miles south of the analysis area, and the nearest designated critical habitat is approximately 53 miles south southwest of the analysis area along the Verde River and Oak Creek.	Year-round; generally surface active between March and November

Notes: Species provided in this table include those listed in the project-specific list of threatened and endangered species that may occur (USFWS 2022a) and federally listed species listed in the project-specific AGFD (2022a) environmental online review tool report. Range or habitat requirement information and potential occurrence justification are from AGFD (2022d), Billerman et al. (2020), Brennan (2012), eBird (2022), Finkelstein et al. (2020), Natural Resources Conservation Service (2022), SCWG (2017), USFWS (2013b, 2014, 2016b, 2021b, 2022d, 2022e, 2022f).

* Federal Status Definitions

- BCC = Bird of Conservation Concern
- BCR = Bird Conservation Region
- CH = Designated critical habitat
- E = Endangered. Endangered species are those in danger of extinction throughout all or a significant portion of their range.
- EXP = Experimental population, non-essential
- T = Threatened. Threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

State Status Definitions

- ANPL = Protected by the Arizona Native Plant Law, Highly Safeguarded
- SGCN = Species of Greatest Conservation Need; species identified by AGFD (2012b) as having conservation priority. Tier 1A species are those categorized by AGFD (2012b) as "highest priority vulnerable" species.

† Species not included in USFWS (2022a) but are included here because it is listed in AGFD (2022a).

Table C.2. Other Special-Status Species Reviewed for Their Potential to Occur in the Analysis Area

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Amphibians					
Arizona tiger salamander (<i>Ambystoma mavortium nebulosum</i>)	-	SGCN (1B)	Permanent or ephemeral wetlands: ponds, stock tanks, backwaters, and lakes. Limited by non-native fishes. May be found in uplands 2-3 miles from breeding locations (ponds). Associated with coniferous forests, chaparral, and high grasslands. Range throughout the state except for the western and southwestern deserts.	May occur; sections of the analysis area are within the predicted range and contain ephemeral stock tanks/playas. Nearest record is approximately 25 miles south southwest.	Year-round
Northern leopard frog (<i>Lithobates pipiens</i>)	-	SGCN (1A)	Variety of habitats usually in permanent waters with rooted aquatic vegetation from sea level to 11,000 feet. In Arizona, limited to stock tanks, wildlife waters, and a lake. Range includes northern and central portions of the state.	May occur; sections of the analysis area are within the predicted range and contain limited habitat associations (ephemeral stock tanks/playas). Nearest record is approximately 20 miles south.	Year-round
Birds					
American peregrine falcon (<i>Falco peregrinus anatum</i>)	-	SGCN (1A)	Variety of biomes; generally associated with cliffs and open landscapes. Year-round range includes almost all of Arizona.	May occur; the analysis area is within the year-round range and contains appropriate habitat associations. This species has been documented within 10 miles.	Year-round
Arizona woodpecker (<i>Dryobates arizonae</i>)	BCC (BCR 34)	SGCN (1B)	Oak or pine-oak woodland and associated sycamore-walnut riparian woodland. Year-round range includes southeastern corner of Arizona.	Unlikely to occur; the analysis area is well north of the year-round range. Nearest record is approximately 194 miles southeast of the analysis area.	Year-round
Baird's sparrow (<i>Ammodramus bairdii</i>)	BCC (BCR 34)	SGCN (1C)	Dense, expansive grasslands with minor shrub component. Non-breeding range includes southeastern extreme of Arizona.	Unlikely to occur; the analysis area is well north of the non-breeding range. Nearest record is approximately 164 miles southeast of the analysis area.	Non-breeding
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Eagle Act	SGCN (1A)	Aquatic habitats with open water or Southwest arid regions with available food and roost sites. Non-breeding eagles range throughout Arizona except for the south-central portion of the state; breeding eagles occur in limited, fragmented locations of central, east-central, and west-central portions of the state.	Known to occur; documented during site-specific surveys.	Non-breeding
Bendire's thrasher (<i>Toxostoma bendirei</i>)	BCC (BCR 16, 34)	SGCN (1C)	Desert habitats: grassland, shrubland, or woodland from sea level to approximately 6,000 feet. Breeding range includes northern two-thirds of Arizona; year-round range includes southern third of the state.	May occur; the analysis area is within the breeding range and contains appropriate habitat associations as there are grasslands present. Nearest record is approximately 11 miles northeast of the analysis area.	Breeding

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Black-chinned sparrow (<i>Spizella atrogularis</i>)	BCC (BCR 16, 34)	SGCN (1C)	Arid brushlands of chapparal, sagebrush, and pinyon-juniper on slopes from sea level to 9,000 feet. Breeding range includes northwestern, central, and east-central portions of Arizona. Non-breeding range includes southeastern portions of the state.	May occur; the analysis area is on the eastern edge of the breeding range within northern Arizona and contains sloped pinyon-juniper and shrub habitats. Nearest record is approximately 12 miles north of the analysis area.	Breeding
Black rosy-finch (<i>Leucosticte atrata</i>)	BCC (BCR 16)	-	Mountainous areas (alpine tundra and high open parks and valleys), thinly vegetated lowlands, and high deserts of shadscale, greasewood, sagebrush, rabbitbrush, and open pinyon-juniper. Winter movements dependent on snow depth and weather conditions. May winter in north-central extreme of Arizona (one or twice per decade, including as far south as Flagstaff).	Unlikely to occur; the analysis area is outside of the species' wintering range. Nearest record is approximately 20 miles southeast of the analysis area.	Non-breeding, transient
Black-throated gray warbler (<i>Setophaga nigrescens</i>)	BCC (BCR 34)	SGCN (1C)	Open coniferous or mixed coniferous-deciduous woodland with brushy undergrowth, pinyon-juniper and pine-oak associations, and oak scrub. Breeding range includes northern and eastern Arizona; migration range includes central and southwestern portions of the state.	May occur; the analysis area is within the breeding range and contains pinyon-juniper woodlands. Nearest record is approximately 5 miles southwest of the analysis area.	Breeding
Black swift (<i>Cypseloides niger</i>)	BCC (BCR 16)	-	Prefers montane forested highlands. Nests on ledges or shallow niches on steep rock faces and canyons, usually near or behind waterfalls, winters in South America. Migration range includes all of Arizona.	Unlikely to occur; the analysis area does not contain suitable habitat associations. Nearest record is approximately 143 miles south of the analysis area.	Migration
Broad-tailed hummingbird (<i>Selasphorus platycercus</i>)	BCC (BCR 16, 34)	-	Breeds in open woodland, especially pine, pine-oak, pinyon-juniper, and conifer-aspen associations, brushy hillsides, montane scrub, and thickets. Breeding range fragmented throughout Arizona except for southwestern extreme of the state. Migrants may occur throughout Arizona.	Known to occur; documented during site-specific surveys.	Breeding
Brown-capped rosy-finch	BCC (BCR 16)	-	Open areas including alpine tundra, high parks, meadows, and open grasslands/shrublands. Non-breeding range outside of Arizona: includes southern Wyoming through Colorado and north-central New Mexico.	Unlikely to occur; the analysis area is well outside (southwest) of the species' non-breeding range. Nearest record is approximately 217 miles northeast of the analysis area.	Non-breeding
California gull (<i>Larus californicus</i>)	BCC (BCR 16)	-	Breeding colonies are nearly always found on islands on natural lakes, rivers, or reservoirs. Foraging occurs at alpine lakes and meadows, irrigated farm fields, wet school yards, pastures, sagebrush and other high-desert scrublands, rivers, lakes, weirs, irrigation canals, sloughs, garbage dumps, and treatment ponds. Migrates across Arizona.	Unlikely to occur; the analysis area does not contain suitable habitat associations. Nearest record is approximately 8 miles east of the analysis area.	Migration

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Cassin's finch (<i>Haemorhous cassinii</i>)	BCC (BCR 16)	-	Open coniferous forest over broad elevational range, including ponderosa pine and pinyon pine associations. Non-breeding range includes central, east-central, and southeastern portions of Arizona; year-round range includes north-central and northeastern portions of the state.	May occur; the analysis area is within the species' non-breeding range and contains open pinyon-juniper woodlands. Nearest record is approximately 1 mile south of the analysis area.	Non-breeding
Chestnut-collared longspur (<i>Calcarius ornatus</i>)	BCC (BCR 34)	SGCN (1C)	Desert grasslands dominated by low grasses and forbs; flocks to isolated water sources. Tend to be more abundant in habitat where prairie dog colonies are present. Non-breeding range includes east half of Arizona.	Known to occur; documented during site-specific surveys.	Non-breeding
Clark's grebe (<i>Aechmophorus clarkia</i>)	BCC (BCR 16)	SGCN (1C)	Nests on large freshwater lakes and marshes with edges having emergent vegetation such as reeds (<i>Phragmites</i> spp.). Winters in saltwater or brackish habitats primarily along the West Coast, with a few numbers wintering inland on lakes and rivers. In Arizona breeding range includes all but the southernmost portion of the state. Migrants may occur throughout Arizona.	Unlikely to occur; although the analysis area is within the known breeding range for this species, it does not contain appropriate habitat associations. Nearest record is approximately 33 miles south of the analysis area.	Breeding, migration
Clark's nutcracker (<i>Nucifraga columbiana</i>)	BCC (BCR 16)	-	Breeding habitat includes coniferous forest from montane to subalpine zones, including pinyon-juniper woodland, pinyon pine, ponderosa pine, and Douglas fir (<i>Pseudotsuga menziesii</i>), and mixed coniferous subalpine communities. The species' year-round range includes the northeastern portion of Arizona.	May occur; the analysis area is within the species' year-round range and contains patches of appropriate habitat associations. Nearest record is approximately 8 miles west of the analysis area.	Year-round
Common nighthawk (<i>Chordeiles minor</i>)	-	SGCN (1B)	Variety of open habitats, including sagebrush and desert grassland, prairies and plains, open forests, croplands, rock outcrops, and gravel rooftops. Breeding range includes northern, central, and eastern Arizona.	Known to occur; documented during site-specific surveys.	Breeding
Cordilleran flycatcher	BCC (BCR 34)	SGCN (1C)	In Arizona, nests in snowmelt drainages at about 8,500 feet elevation with a canopy of quaking aspen (<i>Populus tremuloides</i>), Douglas fir, white fir (<i>Abies concolor</i>), ponderosa pine (<i>Pinus ponderosa</i>), and western white pine (<i>Pinus monticola</i>).	Unlikely to occur; the analysis area is within the breeding range but does not contain appropriate habitat associations. Nearest record is approximately 5 miles southwest of the analysis area.	Breeding
Elegant trogon (<i>Trogon elegans</i>)	BCC (BCR 34)	SGCN (1B)	Sycamore (<i>Platanus</i> spp.), pinyon pine, pine, oak, and juniper riparian habitats and riparian edge vegetation. Breeding range includes southeastern corner of Arizona.	Unlikely to occur; the analysis area is well north of the breeding range of this species. Nearest record is approximately 66 miles south of the analysis area.	Breeding, transient

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Evening grosbeak (<i>Coccothraustes vespertinus</i>)	BCC (BCR 16, 34)	SGCN (1B)	Mixed-conifer and spruce-fir forests; less common in pine-oak, pinyon-juniper, ponderosa pine, and aspen forests. In winter, flocks typically observed in pinyon-juniper and ponderosa pine ecotone. Year-round breeding (scarce) range includes northeastern Arizona; non-northwestern, and southeastern portions of the state.	May occur; the analysis area is within the year-round (scarce) range and contains appropriate habitat associations. Nearest record is approximately 5 miles southwest of the analysis area.	Year-round
Ferruginous hawk (<i>Buteo regalis</i>)	-	SGCN (1B)	Grasslands, shrub-steppe, pinyon-juniper, sparse riparian forests, and canyon areas with cliffs and rock outcrops. Year-round range includes roughly north half of Arizona; wintering range includes roughly south half of the state.	Known to occur; documented during site-specific surveys.	Year-round
Flammulated owl (<i>Ptiloscopus flammeolus</i>)	BCC (BCR 16, 34)	SGCN (1C)	Open, mature ponderosa pine or other forest (e.g., dry montane conifer, aspen) with similar features often with oak, dense saplings, or other brushy understory. Breeding range includes central to east-central Arizona and fragmented locations of southeastern and northwestern portions of the state.	Unlikely to occur; the analysis area is within the breeding range but does not contain appropriate habitat associations. Nearest record is approximately 3 miles south of the analysis area.	Breeding
Gilded flicker	BCC (BCR 34)	SGCN (1B)	Associated with dense stands of giant cactus in the Sonoran Desert. Sometimes nests in riparian woodland and wooded dry washes where it may build nests in cottonwood (<i>Populus</i> spp.) and willow (<i>Salix</i> spp.) trees. Found year-round in the southern half of Arizona.	Unlikely to occur; the analysis area is north of the breeding range and does not contain appropriate habitat associations. Nearest record is approximately 52 miles south of the analysis area.	Year-round
Golden eagle (<i>Aquila chrysaetos</i>)	Eagle Act	SGCN (1B)	Mountainous canyon land, rimrock terrain of open desert, grassland, and forested areas. Year-round range includes all of Arizona.	Known to occur; one nesting area is within the analysis area.	Year-round
Grace's warbler (<i>Setophaga graciae</i>)	BCC (BCR 16, 34)	SGCN (1C)	Pine, pine-oak, and spruce-fir forest. Breeds throughout Arizona except for southwestern portion of the state.	Unlikely to occur; the analysis area is within the breeding range; however, appropriate habitat associations are not present. Nearest record is approximately 5 miles southwest of the analysis area.	Breeding
Lesser yellowlegs (<i>Tringa flavipes</i>)	BCC (BCR 16)	-	Migrates through Arizona. Breeds in open boreal forest with scattered shallow wetlands. Winters in wide variety of shallow, fresh, and saltwater habitats.	Unlikely to occur; the analysis area is within the migration range, but it does not contain appropriate habitat associations. Nearest record is approximately 12 miles east of the analysis area.	Migration

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Lewis's woodpecker (<i>Melanerpes lewis</i>)	BCC (BCR 16, 34)	SGCN (1C)	Ponderosa pine and open riparian forests with brushy understorey and dead or downed woody material; may also use oak, pinyon-juniper, and pine-fir woodlands, and nut and fruit orchards. Year-round range includes northern portion of Arizona. Non-breeding range includes northwestern, central, and southeastern portions of the state.	May occur; the analysis area is within the year-round range and contains pinyon-juniper habitats. Nearest record is approximately 5 miles southwest of the analysis area.	Year-round, non-breeding
Lincoln's sparrow (<i>Melospiza lincolni</i>)	-	SGCN (1B)	Breeds in willow-, sedge-, and moss-dominated habitats, mixed-deciduous wood groves, and black spruce-tamarisk bogs. Uses shrub-dominated habitats, particularly riparian sites, but also brushy forest edges and weedy fields during migration. Uses pine-oak forests, freshwater habitats, coniferous forests, and brushy fields in winter. Non-breeding range includes southwest half and east-central portion of Arizona. Migration range includes northeastern Arizona. Isolated breeding locations are known in north-central and east-central portions of the state.	May occur; the analysis area is along the boundary of the migration range and an isolated portion of its fragmented breeding range and contains shrubby/brushy habitats. Nearest record is approximately 12 miles east of the analysis area.	Breeding, migration
Long-eared owl (<i>Asio otus</i>)	BCC (BCR 16, 34)	SGCN (1C)	Found year-round throughout most of Arizona. Roosts in dense vegetation, forages in open grasslands or shrublands. Known to nest in willows, cottonwoods, and junipers adjacent to shrub steppe.	May occur; the analysis area is within the year-round range and contains open grasslands, shrub steppe, and junipers. Nearest record is approximately 20 miles northeast of the analysis area.	Year-round
Mexican chickadee (<i>Poecile sclateri</i>)	BCC (BCR 34)	SGCN (1B)	Ponderosa pine and spruce-Douglas fir forests. Known in Arizona only in the very southeastern portion of the state.	Unlikely to occur; the analysis area is well north of the year-round range. Nearest record is approximately 283 miles southeast of the analysis area.	Year-round
Mexican whip-poor-will (<i>Antrostomus arizonae</i>)	BCC (BCR 34)	SGCN (1C)	Densely forested mountain canyons with ponderosa pine or pine-oak woodlands. Found across central and southeastern Arizona.	Unlikely to occur; the analysis area is outside the breeding range and lacks appropriate habitat associations. Nearest record is approximately 35 miles southwest of the analysis area.	Breeding
Mountain plover (<i>Charadrius montanus</i>)	BCC (BCR 16)	SGCN (1B)	Shortgrass prairie dominated by blue grama; also, fallow or recently tilled agricultural fields. Often associated with prairie dog colonies. In migration, can use alkaline or mud soils. Wintering range includes central and southern portions of Arizona.	Unlikely to occur; the analysis area is outside the breeding and wintering ranges. Nearest record is approximately 1 mile south of the analysis area access road.	Migration
Northern goshawk (<i>Accipiter gentilis</i>)	-	SGCN (1B)	Ponderosa pine forests; may also use Douglas-fir, various pine, and aspen forests. May hunt in habitats ranging from open sage steppes to dense forests. Year-round range includes higher elevations in roughly the east half of Arizona.	Known to occur; documented during site-specific surveys.	Year-round

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Olive-sided flycatcher (<i>Contopus cooperi</i>)	BCC (BCR 16, 34)	SGCN (1C)	Found in openings or edges of coniferous forests, particularly burned ponderosa forests in Arizona; also, coniferous-deciduous forests and forested edges of wetlands. In migration use greater diversity of habitats, including substantially more riparian and non-coniferous forests. Breeding range includes northeastern half of Arizona; migration range includes southwestern half of the state.	Unlikely to occur; although the analysis area is within the known breeding range for this species, it does not contain appropriate habitat associations. Nearest record is approximately 5 miles southwest of the analysis area.	Breeding
Pectoral sandpiper (<i>Calidris melanotos</i>)	BCC (BCR 16)	-	Found in grasslands, agricultural area, pastures, and wetlands. Breeds in the Arctic and winters in South America. Migrates through Arizona	Unlikely to occur; the analysis area is outside of the species' breeding and non-breeding ranges. Nearest record is approximately 12 miles northeast of the analysis area.	Migration
Phainopepla (<i>Phainopepla nitens</i>)	BCC (BCR 34)	SGCN (1C)	Early nesting habitat includes desert riparian, desert washes, and adjacent mesquite belts; closely associated with desert mistletoe. Later nesting habitat includes higher elevation riparian woodland, pinyon-juniper woodland, and Madrean evergreen oak woodlands. Breeding range includes central, western, and southern portions of Arizona.	May occur; the analysis area is within the breeding range and contains pinyon-juniper woodlands. Nearest record is approximately 5 miles southwest of the analysis area.	Breeding
Pinyon jay (<i>Gymnorhinus cyanocephalus</i>)	BCC (BCR 16, 34)	SGCN (1B)	Pinyon-juniper woodland; also found in sagebrush, scrub oak, and chaparral. Year-round range includes northern half of Arizona.	Known to occur; documented during site-specific surveys.	Year-round
Plumbeous vireo (<i>Vireo plumbeus</i>)	BCC (BCR 34)	-	Montane coniferous and mixed forests including ponderosa pine, pinyon-juniper, Douglas fir, and mixed conifer-aspens woodlands. Breeding range includes northern and eastern Arizona, wintering range includes south-central Arizona.	May occur; the analysis area is within the breeding range and contains pinyon-juniper woodlands. Nearest record is approximately 5 miles southwest of the analysis area.	Breeding
Pyrrhuloxia (<i>Cardinalis sinuatus</i>)	BCC (BCR 34)	-	Arizona upland subdivision of Sonoran Desert, mesquite savanna at 3,300–4,900 feet in elevation, and Sonoran riparian woodland. Also found in agricultural and residential area. Found year-round in central and southeastern Arizona.	Unlikely to occur; the analysis area is outside the year-round range and lacks appropriate habitat associations. Nearest record is approximately 50 miles south of the analysis area.	Year-round
Red-faced warbler (<i>Cardellina rubrifrons</i>)	BCC (BCR 34)	SGCN (1C)	Montane fir, pine, and open pine-oak forests between 6,500 and 9,100 feet; may contain other deciduous trees (e.g., maple, aspen) in stream and snowmelt drainages. Breeding range includes central and southeastern Arizona.	Unlikely to occur; the analysis area is adjacent to the breeding range; however, appropriate habitat associations are not present. Nearest record is approximately 13 miles southwest of the analysis area.	Breeding

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Rufous-winged sparrow (<i>Peucaea carpalis</i>)	BCC (BCR 34)	SGCN (1B)	Nests in thornscrub grasslands characterized by scattered thorny trees and shrubs and grassy swales. Habitat is characteristic of the transitional zone between semiarid grassland and Sonoran desertscrub. Year-round range includes southeastern Arizona.	Unlikely to occur; the analysis area is well north of the year-round range. Nearest record is approximately 119 miles south southwest of the analysis area.	Year-round
Scott's oriole (<i>Icterus parisorum</i>)	BCC (BCR 34)	SGCN (1C)	Pinyon-juniper and live oak belts in foothills and semiarid plains between mountain ranges, where yucca and beargrass (<i>Nolina</i> spp.) are common. Breeding range includes all of Arizona except portions of the east-central part of the state.	Known to occur; documented during site-specific surveys.	Breeding
Short-eared owl (<i>Asio flammeus</i>)	BCC (BCR 16)	-	This species winters throughout Arizona. It prefers dense grassy areas and large open areas within woodlots, stubble fields, fresh and saltwater marshes, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets.	Unlikely to occur; although the analysis area is within the species' wintering range, it does not contain appropriate roosting habitat. Nearest record is approximately 40 miles west of the analysis area.	Non-breeding
Sprague's pipit (<i>Anthus spragueii</i>)	BCC (BCR 34)	SGCN (1A)	Grasslands with low shrub cover and cultivated lands. Non-breeding range includes central and southeastern Arizona.	Unlikely to occur; the analysis area is north of the non-breeding range. Nearest record is approximately 40 miles west of the analysis area.	Non-breeding
Snowy plover (<i>Charadrius nivosus</i>)	BCC (BCR 16)	SGCN (1B)	Inland habitats include wastewater and salt- evaporation ponds, alkaline and saline lakes, reservoirs, and riverine sand bars. Migrates throughout Arizona except eastern edge of the state. Isolated breeding locations in southern portion of the state.	Unlikely to occur; the analysis area is within the species' migration range; however, appropriate habitat associations are not present. Nearest record is approximately 44 miles south southeast of the analysis area.	Migration
Varied bunting (<i>Passerina versicolor</i>)	BCC (BCR 34)	SGCN (1C)	Desert thorn brush in canyons, desert washes, and riparian edges. Breeding range includes extreme southeastern Arizona.	Unlikely to occur; the analysis area is well north of the breeding range. Nearest record is approximately 104 miles southwest of the analysis area.	Breeding
Virginia's warbler (<i>Vermivora virginiae</i>)	BCC (BCR 16, 34)	SGCN (1C)	Breeds in a variety of scrub-woodlands with dense understorey vegetation, including oak, pinyon-juniper, and mixed conifer forests. Commonly seen in pine habitats and riparian corridors during spring and fall migration. Migration range includes southeastern and central portions of the state; breeding range includes fragmented locations throughout the state except for southwestern Arizona.	May occur; the analysis area is adjacent to the fragmented breeding range and contains pinyon-juniper stands. Nearest record is approximately 5 miles southwest of the analysis area.	Breeding, migration
Western grebe (<i>Aechmophorus occidentalis</i>)	BCC (BCR 16, 34)	SGCN (1C)	Fresh water lakes and marshes with extensive areas of open water bordered by emergent vegetation. Breeding range includes the far western edge of Arizona along the Lower Colorado River. Winters along the coast of the Pacific Ocean.	Unlikely to occur; the analysis area is outside the breeding range and does not contain appropriate habitat associations. Nearest record is approximately 12 miles east of the analysis area.	Migration

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Whiskered screech-owl (<i>Megascops trichopsis</i>)	BCC (BCR 34)	SGCN (1B)	Canyon riparian forests, evergreen woodland, and lower coniferous forests of pine or mixed conifer at 3,900–8,200 feet in elevation.	Unlikely to occur; the analysis area is north of the year-round range and does not contain appropriate habitat associations. Nearest record is approximately 213 miles south southeast of the analysis area.	Year-round
Yellow-headed blackbird (<i>Xanthocephalus xanthocephalus</i>)	BCC (BCR 16)	-	Open agricultural areas: harvested grain fields, plowed fields, meadows, and pastures. Forages within wetlands and surrounding grasslands, croplands, or savanna. Breeding range includes east-central Arizona, non-breeding range includes southeastern Arizona. Migrates throughout the rest of the state.	Known to occur; documented during site-specific surveys.	Non-breeding
Flowering Plants					
Roundleaf errazurizia (<i>Errazurizia rotundata</i>)	-	ANPL	Red or white sandstone pavement and ledges, in sandy crevices among rocks, or in loose, drifted sand. Found in desertscrub from 4,800 to 5,200 feet in elevation. Known in Coconino and Navajo Counties in Arizona.	Unlikely to occur; although this species has been documented within 10 miles, the analysis area contains only marginal habitat associations and is above the elevational range.	Perennial; flowers late April to early May
Simpson plains cactus (<i>Pediocactus simpsonii</i>)	-	ANPL	Pinyon-juniper woodlands, sagebrush communities, and Rocky Mountain forests from 6,700 to 10,000 feet in elevation. In Arizona, occurs in the northwest corner of the state.	Unlikely to occur; although this species has been documented within 10 miles, the analysis area is below the elevational range.	Perennial; flowers April to May
Sunset Crater beardtongue (<i>Penstemon clutei</i>)	-	ANPL	Volcanic cinder fields and pine forests near Indian Flat and Sunset Crater in south-central Coconino County, Arizona.	Unlikely to occur; although this species has been documented within 10 miles, the analysis area is outside the known geographic range.	Perennial; flowers April to August
Tusayan flameflower (<i>PheMERanthus validulus</i>)	-	ANPL	Woodland openings in rocky soil in Coconino, Mohave, and Yavapai Counties, Arizona, at elevations ranging from 5,600 to 7,500 feet.	May occur; the analysis area contains suitable habitat associations and this species has been documented within 10 miles.	Perennial; flowers May to September

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Mammals					
American beaver (<i>Castor canadensis</i>)	-	SGCN (1B)	Permanent water sources. Prefer low gradient streams, ponds, and small-bottomed lakes with dammable outlets. Found throughout Arizona except south-central portion of the state.	Unlikely to occur; the analysis area does not contain permanent waters. Nearest record is approximately 48 miles south of the analysis area.	Year-round
Arizona myotis (<i>Myotis occultus</i>)	-	SGCN (1B)	Day roosts and maternity colonies in tree cavities and crevices; maternity colonies also in buildings and bridges; winter roost records from mines. Riparian areas and in ponderosa pine and oak-pine woodland near water below 8,600 feet. Also found along permanent water. In Arizona, range includes central band from east to west and north-central portions of the state.	Unlikely to occur; the analysis area is within the geographic range, but appropriate habitat associations are lacking. Nearest record is approximately 13 miles north of the analysis area.	Year-round; may migrate locally
Arizona pocket mouse; Wupatki Arizona pocket mouse (<i>Perognathus amplus cineris</i>)	-	SGCN (1B)	Various types of desert scrub habitats, including greasewood, rabbitbrush, creosote bush, cactus, mesquite, and palo verde. Also found in scattered scrub oak and juniper.	May occur; documented within 10 miles.	Year-round
Brazilian free-tailed bat (<i>Tadarida brasiliensis</i>)	-	SGCN (1B)	Wide variety of habitats from desert communities through pinyon-juniper woodlands and pine-oak forests at elevations up to approximately 9,000 feet. Maternity colonies and roosts found in limestone caves, abandoned mines, bridges, buildings, and hollow trees. Range is throughout Arizona.	Known to occur; detected during site-specific monitoring.	Spring, summer, fall
Gray-collared chipmunk (<i>Neotamias cinereicollis</i>)	-	SGCN (1B)	Ponderosa pine and spruce-fir forests at elevations of 6,400-11,150 feet.	Unlikely to occur, the analysis area is outside the year-round range and lacks appropriate habitat associations. Nearest record is approximately 20 miles south of the analysis area.	Spring, summer, fall; hibernates November-March
Greater western bonneted bat (<i>Eumops perotis californicus</i>)	-	SGCN (1B)	Roosts in vertical cliffs and buildings. Associated with variety of habitats, including chaparral, oak woodlands, mixed xeric shrubland and riparian woodlands, ponderosa pine woodlands, floodplains, desert washes, grasslands, agricultural areas, and water bodies below 8,500 feet. Limited by available drinking water, use water features > 100 feet long. In Arizona, range includes central, northwestern, western, and southern portions of the state.	Known to occur; detected during site-specific monitoring.	Year-round; may vacate high-elevation areas in winter

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Gunnison's prairie dog (<i>Cynomys gunnisoni</i>)	-	SGCN (1B)	Gently sloping grasslands and semidesert and montane shrublands between 4,600 and 12,000 feet. In Arizona, range includes central and northeastern portions of the state.	Known to occur; documented during site-specific surveys.	Year-round; hibernates from October to mid- February/late April
Long-tailed vole (<i>Microtus longicaudus</i>)	-	SGCN (1B)	Forests, brushy areas, clear cuts and sagebrush stands. Often found along rivers and streams. In Arizona, predicted range consists of a few isolated regions in the northern and eastern parts of the state.	Unlikely to occur; the analysis area is outside the predicted range. Nearest record is 40 miles north northwest of the analysis area.	Year-round
Mexican vole (<i>Microtus mexicanus</i>)	-	SGCN (1B)	Meadows of grasses, sedges, and forbs within ponderosa forests on steep mountain slopes from 3,100 to 8,400 feet. May also be associated with drier sites where groundcover is suitable and in pinyon- juniper and pine-oak associations. In Arizona, fragmented range from east-central, central, northwestern, and northeastern portions of the state.	May occur; the analysis area is within the year- round range and contains pinyon-juniper woodland. Nearest record is approximately 7 miles south of the analysis area.	Year-round
Pale Townsend's big-eared bat; <i>Corynorhinus townsendii pallefcens</i>)	-	SGCN (1B)	Day roosts and maternity and hibernation colonies in caves, mines, or buildings. Night roosts may include caves, buildings, and tree cavities. Associated with mesic forested habitats but occupies a broad range of habitats, including arid scrub, pine forest, pinyon- juniper, and wooded canyons between 500 and 8,400 feet. Range is throughout Arizona.	Known to occur; detected during site-specific monitoring.	Year-round; may migrate locally
American pronghorn (<i>Antilocapra americana americana</i>)	-	SGCN (1B)	Grasslands, sagebrush plains, deserts, and foothills. In Arizona, scattered populations throughout the state. <i>A. americana</i> range includes narrow band from east-central through north-central and northwestern portions of the state. Small fragmented range in southeastern portion of the state.	Known to occur; recorded during site-specific surveys.	Year-round; may move seasonally
Spotted bat (<i>Euderma maculatum</i>)	-	SGCN (1B)	Roosts in crevices and cracks of cliff faces; sometimes roosts in caves or in buildings near cliffs. Variety of habitats, including low to high deserts, riparian areas, ponderosa, and spruce-fir forests below 10,600 feet. Range is throughout Arizona.	Known to occur; detected during site-specific monitoring.	Year-round; may migrate locally by elevation
Springerville pocket mouse (<i>Perognathus flavus goodpasteri</i>)	-	SGCN (1B)	Found year-round in plains-like short grasslands interspersed with volcanic rock or other sparsely vegetated grasslands at elevations from 5,200 to 7,000 feet. In Arizona, found in grasslands of eastern end of Mogollon Plateau near Springerville, Snowflake, south of Holbrook, and on the south side of plateau along Nash Creek.	May occur; documented within 10 miles.	Year-round

Common Name (Scientific Name)	Status*		Range/Habitat Requirements	Potential for Occurrence in Analysis Area	Season/Life History Information Relevant to Analysis Area
	Federal	State			
Stephen's woodrat (<i>Neotoma stephensi</i>)	-	SGCN (1B)	Rocky areas in pinyon-juniper woodlands. In Arizona, found roughly in north half of the state.	May occur; the project area is within the geographic range and contains appropriate habitat associations. Nearest record is approximately 3 miles east of the analysis area.	Year-round; nocturnal
Yuma myotis (<i>Myotis yumanensis</i>)	-	SGCN (1B)	Roosts in caves, mines, cliff crevices, buildings, bridges, and similar structures. Nursery colonies in buildings, caves, mines, and bridges. Associated with wide variety of upland and lowland habitats (within wide range of elevations: sea level to 11,000 feet), including riparian, desertscrub, moist woodlands, and forests, where they prefer cliffs and rocky walls near water. In Arizona, ranges throughout except for the south-central portion of the state.	Known to occur; detected during site-specific monitoring.	Year-round; may migrate to warmer regions in winter
Reptiles					
Arizona black rattlesnake (<i>Crotalus cerberus</i>)	-	SGCN (1B)	Variety of biotic communities from approximately 4,000 to 9,000 feet. Often associated with rocky drainages with permanent or semipermanent water and open, rocky slopes. Range in Arizona extends northwest to southeast through central portions of the state, including along and below the Mogollon Rim.	Unlikely to occur; the analysis area is just north of the geographic range. Nearest record is approximately 22 miles southwest of the analysis area.	Year-round; dens in winter and late fall
Pai striped whiptail (<i>Aspidoscelis pai</i>)	-	SGCN (1B)	Inhabits grasslands, chaparral, conifer woodlands, and ponderosa pine parklands at elevations from approximately 4,500 to 7,600 feet. Populations scattered across the Colorado Plateau of northern Arizona and in the Mazatzal Mountains of central Arizona.	May occur; the analysis area is within the year-round range and appropriate habitat associations are present. Nearest record is approximately 48 miles southeast of the analysis area.	Year-round; hibernates in winter and late fall

Notes: Species include Eagle Act species, Tier 1A and 1B species listed in the project area-specific AGFD (2022a) environmental online review tool report, and Birds of Conservation Concern for Bird Conservation Regions 16 and 34 (USFWS 2021a). Range or habitat requirement information and potential occurrence justification from Ammerman et al. (2012), AGFD (2021c), Bat Conservation International (2022), Billerman et al. (2020), Brennan (2012), Corman and Wise-Gervais (2005), eBird (2022), Flora of North America (2022), Reid (2006), SEINet (2022), and Sonoran Joint Venture (2022).

* Federal Status Definitions

BCC = Bird of Conservation Concern, BCR = Bird Conservation Region

State Status Definitions

SGCN = Species of Greatest Conservation Need; species identified in AGFD (2012b) as having conservation priority. Tier 1A, 1B, and 1C species are those categorized by AGFD (2012b) as "highest priority vulnerable" species, "vulnerable" but not fitting the Tier 1A criteria for highest priority, and species for which existing data were insufficient to score one or more vulnerability criteria, respectively.

ANPL = Protected by the Arizona Native Plant Law, Salvage Restricted

Exhibit B – Attachment B-7

Aquatic Resources Assessment Report,
Forged Ethic Wind Energy Project; December 2022

Aquatic Resources Assessment Report, Forged Ethic Wind Energy Project

DECEMBER 2022

SWCA

PREPARED FOR

RWE Renewables Development, LLC

PREPARED BY

SWCA Environmental Consultants

AQUATIC RESOURCES ASSESSMENT REPORT, FORGED ETHIC WIND ENERGY PROJECT

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1 INTRODUCTION

RWE Renewables Development, LLC (RWE), is proposing to develop the Forged Ethic Wind Energy Project (the Project), in Coconino County, Arizona (Figure 1). The Project is located on approximately 29,106 acres of private land and Arizona State Trust Land, approximately 25 miles north of Flagstaff, Arizona. The area assessed for the potential presence of surface water features considered to be waters of the U.S. (WOTUS) included an approximately 5,314-acre analysis area encompassing the estimated potential area of ground disturbance that would be associated with the Project's construction. The approximate center point of the analysis area is 35.648530° N, 111.738504° W.

The proposed Project includes the construction of a 323-megawatt (MW) wind energy facility consisting of approximately 102 turbines, an approximately 4.5-mile generation-tie (gen-tie) electrical transmission line and interconnection to the Moenkopi to Cedar Mountain 500-kilovolt (kV) transmission line, 34.5-kV underground electrical collection lines, and access roads.

The Project will be accessed during construction and operations from U.S. Highway 89 (U.S. 89) via both existing and proposed new access roads. The primary access road will originate from U.S. 89 via Tub Ranch Road at approximately milepost 447.8. A Project substation, operations and maintenance (O&M) building, and temporary laydown area will be established during construction.

The objectives of this assessment are to document natural and/or constructed surface water features including agency-mapped features within the analysis area for their potential as WOTUS (as defined under 33 Code of Federal Regulations [CFR] 328.3) and thus subject to federal regulation under Section 404 of the Clean Water Act (CWA) (33 United States Code [USC] 1344), and determine the geographic limits of the potential extent of the U.S. Army Corps of Engineers' (USACE's) jurisdiction under Section 404 of the CWA (as outlined in 33 CFR 328.4–5) within the analysis area. Results of this assessment can be used to inform the Project design to minimize and avoid impacts to potential WOTUS. The report is also intended to support a request to the USACE for a written determination of WOTUS in the Project area, if desired.

2 METHODS

SWCA personnel completed a desktop review to identify potential WOTUS, including wetlands and other special aquatic sites, as defined under the CWA (USC Title 33 Part 328.3 (a)), that intersected the analysis area and required field verification at selected data points. SWCA accessed several public databases to characterize surface water features and provide additional data relating to their function. The following data sources were accessed:

- Aerial photographs (Google Earth 2022)
- U.S. Environmental Protection Agency (EPA) Watershed Assessment, Tracking & Environmental Results System (WATERS) Surface Water Information System, which includes modeled National Hydrography Dataset (NHD) streams, U.S. Geological Survey (USGS) watersheds, and other surface water feature data (EPA 2022; USGS 2022a, b)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI)–modeled wetland feature dataset (USFWS 2022)
- Arizona Department of Environmental Quality (ADEQ) eMaps (ADEQ 2022)
- USGS 1:24K quadrangle maps : Lockwood Canyon, Chapel Mountain, Additional Hill, SP Mountain, and East of SP Mountain (USGS 2022c)
- Natural Resources Conservation Service (NRCS) Soil Survey data (NRCS 2022)

- Federal Emergency Management Agency (FEMA) flood insurance rate map (FIRM) panels (FEMA 2022)
- USACE Antecedent Precipitation Tool (USACE 2022)
- Arizona Department of Water Resources (ADWR) Registry of Wells in Arizona (Wells 55) (ADWR 2022)
- National Oceanic and Atmospheric Administration (NOAA) Regional Climate Centers Applied Climate Information System (NOAA 2022)

This report and associated field reconnaissance were completed in accordance with the USACE's *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008), *Minimum Standards for Acceptance of Aquatic Resources Delineation Reports* (USACE 2017), *Corps of Engineers Wetland Delineation Manual* (USACE 1987), and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2)* (USACE 2008).

In addition, the *User Manual for a Beta Streamflow Duration Assessment Method for the Arid West of the United States (Version 1.0)* (SDAM) (Mazor et al. 2021) was used to characterize the flow regimes. Flow regime for each surface water feature was established based on information gathered during the desktop review and field reconnaissance. The wetland indicator status (USACE 2018) of vegetation observed along surface water features during field reconnaissance was used to assist in flow regime characterizations.

Field investigations were performed on November 1–4 and 11, 2022. SWCA water resources specialists surveyed the analysis area on foot, investigating drainage features identified during desktop review for the presence of OHWM and flow regime indicators, and documenting associated plant assemblages to determine the presence and potential limits of WOTUS (Figure 2). Physical characteristics that may be considered indicators of an OHWM are listed in guidance developed by the USACE; they include typical bed and banks with discrete breaks in slope, distinct changes in surrounding substrates, presence of shelving, and bands of vegetation along channel banks (USACE 2005).

Ground-level photographs and notes regarding feature width and depth, flow regime observations, and presence or absence of OHWM indicators were recorded at representative data points (Appendix A). Data point locations were recorded using global positioning system (GPS) technology. Field GPS data were then transferred to geographic information system (GIS) platforms and mapped on aerial imagery using AutoCAD/GIS software to create figures that depict data points and any observed drainage features within the Project area (Appendix B).

Identified surface water features were characterized by flow persistence as perennial, intermittent, or ephemeral based on available desktop data and field observations, including application of the SDAM. Perennial streams typically flow year-round because the water table is located above the streambed; groundwater is therefore the primary source of surface water in the stream, but flows are also supplemented by upstream rainfall and snowmelt runoff. By contrast, intermittent streams only flow seasonally as the result of rainfall, snowmelt runoff, and/or rising groundwater that discharges into the stream channel. The groundwater rises in response to seasonal increases in upstream precipitation. Finally, ephemeral streambeds are above the water table throughout the year and only flow during and shortly after precipitation events. Rainfall runoff is the primary source of water for stream flow in ephemeral streams.

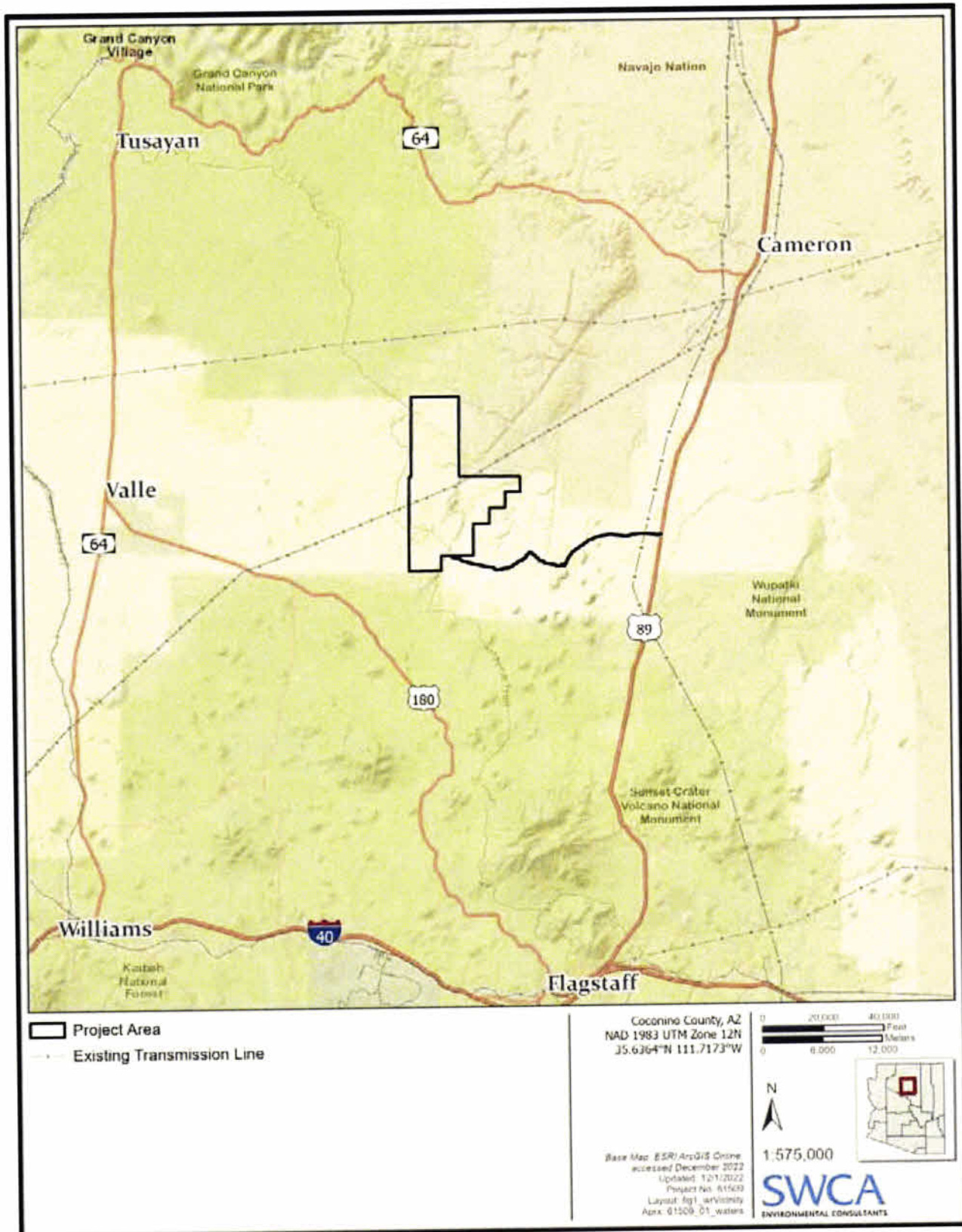


Figure 1. Project location.

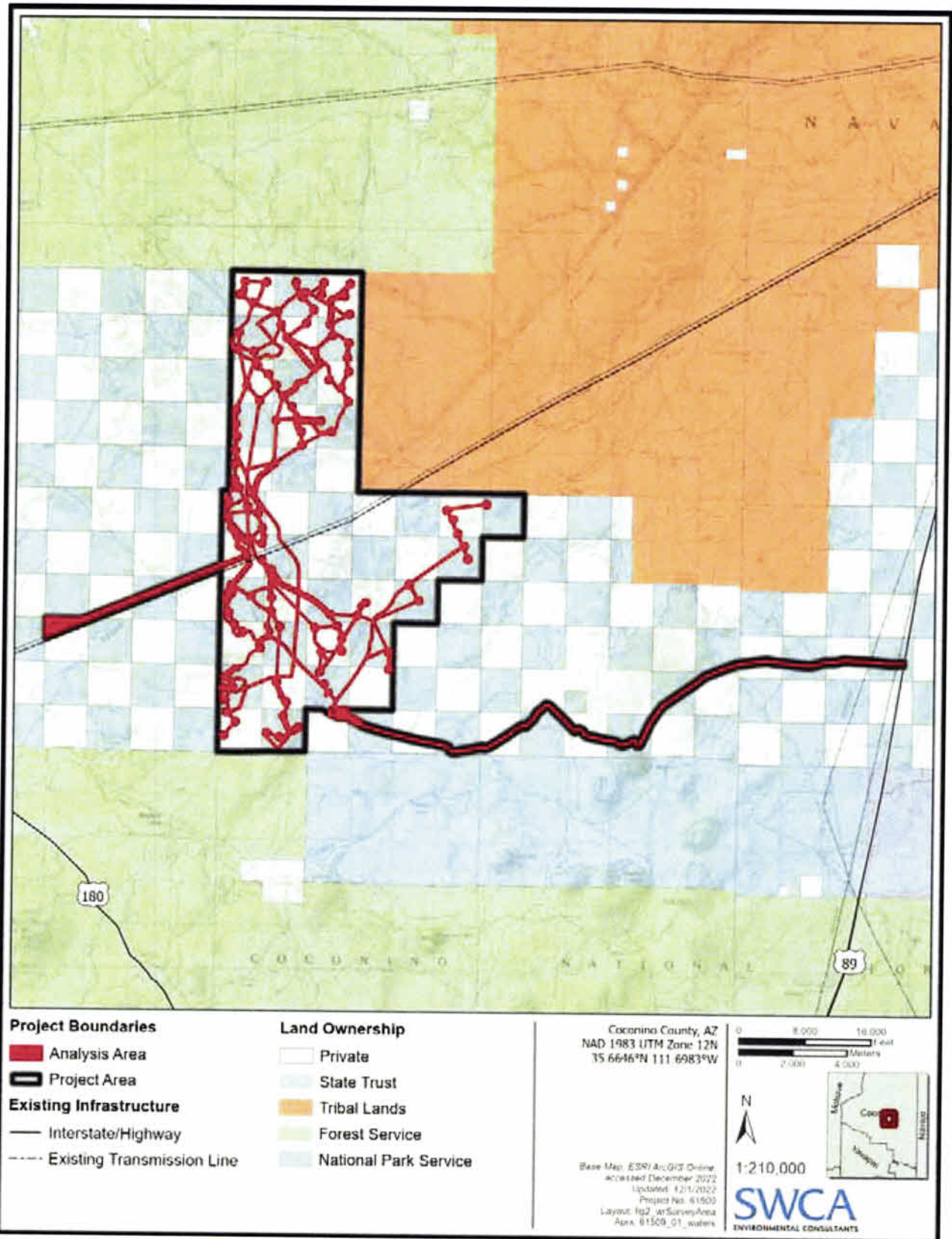


Figure 2. Aquatic resource survey area.

3 RESULTS

3.1 Topography

The topography of the Project area is characterized by small shallow canyons, rounded hills, flat to gently rolling plains, and small volcanic escarpments. Mesa Butte, a large cinder cone, is located in the approximate middle of the Project area, and its summit (7,077 feet above mean sea level [amsl]) is the high point. The eastern side of the Project area contains the low point, at 5,780 feet amsl. The access road ranges in elevation from approximately 5,500 feet amsl at U.S. 89, to 6,170 feet amsl at its western end. Lockwood Canyon, in the northern section of the Project area, is the deepest canyon within the site (see Figure 2).

3.2 Soils

There are 28 soil map units identified in the Project area, 13 of which individually make up 2.6% or more of the area (Table 1; Appendix C). These 13 soil map units make up more than 93% of the Project area. All 28 soil map units have a “well-drained” or “somewhat excessively drained” drainage class and none are classified as hydric (NRCS 2022).

Table 1. Soils in the Analysis Area

Map Unit Name	Percent of Analysis Area
Winona stony loam, 0-8% slopes	17.9
Ashfork gravelly clay loam, 1-15% slopes	14.2
Winona-Boydag gravelly loams, 0-8% slopes	12.0
Winona-Rock outcrop complex, 30-70% slopes	9.0
Winona-Rock outcrop complex, 15-30% slopes	7.4
Ziegler-Cross association, moderately sloping	6.9
Winona gravelly loam, 0-8% slopes	5.9
Ziegler-Wilaha association, strongly sloping	4.0
Deama-Rock outcrop complex, 8-30% slopes	3.7
Deama-Toqui complex, 0-8% slopes	3.7
Deama stony loam, 1-15% slopes	3.2
Poley-Tusayan association, gently sloping	3.1
Paymaster-Lynx association, gently sloping	2.6

3.3 Vegetation

The northern and western portions of the Project area are within the Great Basin Conifer Woodland biotic community and the remaining portions to the east are in the Plains and Great Basin Grassland biotic community, as described and mapped by Brown (1994). Vegetation within the Project area largely consists of Intermountain Basins Semi-Desert Shrub-Steppe, Colorado Plateau Pinyon-Juniper Woodland, and Intermountain Basins Semi-Desert Grassland cover types (USGS 2016). Dominant native plant species present in the Project area include Greene's rabbitbrush (*Chrysothamnus greenei*), broom snakeweed (*Gutierrezia sarothrae*), oneseed juniper (*Juniperus monosperma*), twoneedle pinyon (*Pinus edulis*), and blue grama (*Bouteloua gracilis*). Other species present include rubber rabbitbrush (*Ericameria nauseosa*), Fremont's mahonia (*Mahonia fremontii*), squirreltail (*Elymus elymoides*), sand dropseed (*Sporobolus cryptandrus*), spinystar (*Escobaria vivipara*), Whipple cholla (*Cylindropuntia whipplei*), tulip pricklypear (*Opuntia phaeacantha*), Fendler's globemallow (*Sphaeralcea fendleri*), and winterfat (*Krascheninnikovia lanata*).

3.4 Hydrology

As indicated by the USGS Watershed Boundary Dataset (2022b), the Project area is within portions of the 11 Hydrologic Unit Code (HUC-12) watersheds indicated in Table 2.

Table 2. Project Area Watersheds

Watershed Name	Hydrologic Unit Code (HUC 12)	Watershed Area (acres)	Watershed Area Within Project Area (acres)
Old Dent and Sayer Tank	150200160701	36,605	1,764
Dent and Sayer Tank	150200160601	37,240	72
Babbitt Lake	150200160602	28,432	149
Lava Wash	150200160705	11,148	1,018
Lockwood Canyon	150200160604	32,183	10,608
Rabbit Canyon	150200160603	41,367	14,087
Upper Cedar Wash	150200160606	23,492	563
Lower Cedar Wash	150200160707	26,078	146
Klostermeyer Lake	150200160605	28,129	169
Campbell Francis Wash	150200160704	28,025	302
Rimmy Jim Tank	150200160804	42,340	228
	Total	335,039	29,106

Source: USGS 2022b

The mean annual precipitation recorded at the Grand Canyon National Park Airport weather station, located approximately 20 miles west of the Project area, for the previous 30 years (since 1991) is 12.8 inches (NOAA 2022). Results from the USACE Antecedent Precipitation Tool (USACE 2022) indicate that the field investigations were conducted during the wet season, the drought index was "moderate drought", and the vicinity of the analysis area had been experiencing "wetter than normal to normal" antecedent precipitation conditions in the 90 days prior to the field visits.

A review of FEMA FIRM panels (see Appendix C) indicates that there are no designated 100-year floodplains mapped in the Project area and that the area is classified as Zone X, an area with minimal risk of flood hazard (FEMA 2022).

There are two wells registered with the ADWR within the Project area—one for mineral exploration and the other for piezometer monitoring—and neither have water level data. The nearest three registered wells with water level data, located about 20 miles west of the Project area in Valle, Arizona, indicate that depth to groundwater in the region ranges from 1,380 feet below the surface (registered well 55-555659) to 2,506 feet below the surface (registered wells 55-545165 and 55-914939) (ADWR 2022).

3.5 Surface Water Features

In total, 47 surface water features were identified in the analysis area, consisting of 17 on private land, 23 on Arizona State Land Department (ASLD) land, and seven on both private and ASLD land. The USFWS NWI dataset (USFWS 2022) identified 43 modeled surface water features within the analysis area, consisting of two freshwater ponds and 41 riverine features (Table 3; see Appendix C). The NHD review (USGS 2022a) indicated 39 modeled linear flowlines and two waterbodies within or crossing the analysis area (see Table 3 and Appendix C). All the NHD flowlines within the analysis area are associated with the NWI riverine features. Four additional linear surface water features not modeled by NWI or NHD were identified in the analysis area through a review of aerial imagery and two additional features were identified during the field investigations.

Table 3. NWI and NHD Features within the Analysis Area

NWI or NHD Feature Code	Code Translation	Quantity within Analysis Area	Associated Feature(s)
R4SBC	Riverine, intermittent, streambed, seasonally flooded	39	Unnamed natural ephemeral drainages including Cedar Wash
R5UBFx	Riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded, excavated	1	Beasley Ditch
R5UBH / PUSAh	Riverine, unknown perennial, unconsolidated bottom, permanently flooded / Palustrine, unconsolidated shore, temporarily flooded, diked/impounded	1	Chapel Tank
PUSAh	Palustrine, unconsolidated shore, temporarily flooded, diked/impounded	1	Livestock tank along natural ephemeral drainage
R4SBC / R5UBH	Riverine, intermittent, streambed, seasonally flooded / Riverine, unknown perennial, unconsolidated bottom, permanently flooded	1	Unnamed natural ephemeral drainage
Flowline	Ephemeral stream/river	39	Unnamed natural ephemeral drainages
Waterbody	Intermittent lake/pond	2	Chapel Tank and livestock tank along natural ephemeral drainage

Sources: Cowardin et al. (1979); USFWS (2022)

3.6 Potentially Jurisdictional Waters Summary

Tables 4 and 5 summarize surface water features that were identified during the desktop review and assessed during the field investigations on private and ASLD land, respectively. Ground-level photographs

were taken at 69 representative data points (see Appendix A). Aerial photograph figures showing all numbered features and data point locations are in Appendix B (Figures B.1–B.17).

The surface water features in the analysis area, some of which were influenced by livestock activity, show poor development of bed and banks, have discontinuous OHWMs, and in most cases can be described as small erosional features or swales.

Table 4. Summary of Surface Water Features on Private Land

Feature No.	Data Point No.	Photos (Appx. A) / Map (Appx. B)	Latitude	Longitude	Notes	Associated NWI Code	OHWM Indicators Observed	Potential WOTUS
1	1	1,2/17	35.618281°	-111.537718°	Human-made road water bar identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
2	2	3,4/17	35.618415°	-111.542847°	Upland identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
3	3	5,6/17	35.617884°	-111.551012°	Human-made road water bar identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
4*	52	9,10/17	35.617234°	-111.570762°	Human-made road water bar identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
5	5	11,12/17	35.617708°	-111.581314°	Broad swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
10	12	25,26/16	35.600174°	-111.664780°	Human-made road water bar identified from aerial imagery as a linear drainage feature.	None	None	No
11	13	27,28/16	35.601665°	-111.668945°	Human-channelized swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
13	15	31,32/16	35.589866°	-111.687443°	Human-made road water bar identified from aerial imagery as a linear drainage feature.	None	None	No
14	16	33,34/16	35.587640°	-111.693671°	Erosional feature/ditch identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
17, Cedar Wash	19	39,40/16	35.590022°	-111.722758°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
18, Beasley Ditch	20	41,42/16	35.589313°	-111.718380°	Broad swale identified by NHD and NWI as a linear drainage feature.	R5UBFx	None	No

Feature No.	Data Point No.	Photos (Appx. A) / Map (Appx. B)	Latitude	Longitude	Notes	Associated NWI Code	OHWM Indicators Observed	Potential WOTUS
20	25	49,50/12	35.629935°	-111.738915°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	30	51,52/12	35.633986°	-111.745382°				
22*	29	57,58/14	35.620756°	-111.762075°	Swale identified by NHD and NWI as a linear drainage feature.		None	No
23*	31	59,60/13	35.610583°	-111.772538°	Swale/sheet flow identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	46	63,64/11	35.639922°	-111.775202°				
	49	65,66/10	35.649114°	-111.793778°				
24	33	67,68/13	35.604321°	-111.777364°	Swale/erosional feature identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
25*	34	69,70/13	35.606181°	-111.778332°	Sheet flow/erosional feature identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
31	43	87,88/13	35.623001°	-111.787999°	Swale/erosional feature with discontinuous OHWMs identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	44	89,90/10	35.626174°	-111.796112°				
33	50	95,96/10	35.647283°	-111.800295°	Broad swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
36	53	99,100/9	35.630548°	-111.849689°	Sheet flow/two-track road identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
38	55	103,104/5	35.676542°	-111.792517°	Human-made livestock tank/swale identified by NHD and NWI as freshwater pond.	PUSAh	None	No
39	56	105,106/13	35.682470°	-111.796226°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
42*	59	111,112/3	35.703522°	-111.794850°	Swale/erosional feature influenced by livestock activity identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	69	115,116/5	35.688899°	-111.780965°				

Feature No.	Data Point No.	Photos (Appx. A) / Map (Appx. B)	Latitude	Longitude	Notes	Associated NWI Code	OHWM Indicators Observed	Potential WOTUS
43*	70	119,120/1	35.740421°	-111.787181°	Broad swale influenced by livestock activity identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
44*, Lockwood Canyon	64	127,128/3	35.718856°	-111.778721°	Swale/erosional feature influenced by livestock activity identified by NHD and NWI as a linear drainage feature.	R/4SBC	None	No

* Feature occurs on both private and ASLD land.

Table 5. Summary of Surface Water Features on ASLD Land

Feature No.*	Data Point No.*	Photos (Appx. A) / Map (Appx. B)	Latitude	Longitude	Notes	Associated NWI Code	OHWM Indicators Observed	Potential WOTUS
4*	4	8,9/17	35.617234°	-111.570762°	Human-made road water bar identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
6	6	13,14/17	35.616293°	-111.591955°	Human-made road water bar/swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	7	15,16/17	35.606885°	-111.612890°				
	8	17,18/17	35.604431°	-111.617222°				
7	9	19,20/17	35.603188°	-111.619374°	Erosional feature/gully identified from aerial imagery as a linear drainage feature.	None	None	No
8	10	21,22/16	35.589064°	-111.637049°	Sheet flow concentrating into a human-made road water bar identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
9	11	23,24/16	35.597402°	-111.661011°	Human-made road water bar identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No

Feature No.*	Data Point No.*	Photos (Appx. A) / Map (Appx. B)	Latitude	Longitude	Notes	Associated NWI Code	OHWM Indicators Observed	Potential WOTUS
12	14	29,30/16	35.594981°	-111.677027°	Sheet flow concentrating into a rocky swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
15	17	35,36/16	35.586661°	-111.700455°	Swale identified from aerial imagery as a linear drainage feature.	None	None	No
16	18	37,38/16	35.587049°	-111.707569°	Partially excavated swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
19	22	43,44/14	35.603693°	-111.755543°	Broad swale/sheet flow identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	23	45,46/14	35.618058°	-111.741591°				
	24	47,48/12	35.626957°	-111.740098°				
21	27	53,54/8	35.650949°	-111.709632°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
22*	28	55,56/14	35.613643°	-111.759516°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
23*	41	61,62/13	35.618981°	-111.773900°	Swale/sheet flow identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
25*	40	71,72/15	35.592055°	-111.781420°	Sheet flow/erosional feature identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
26	35	73,74/13	35.606434°	-111.790655°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
27	36	75,76/13	35.607464°	-111.791791°	Human-made livestock tank identified by NHD and NWI as a linear drainage feature associated with a freshwater pond (Chapel Tank).	R5UBH / PUSAH	None	No
	38	77,78/13	35.607835°	-111.797505°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No

Feature No.*	Data Point No.*	Photos (Appx. A) / Map (Appx. B)	Latitude	Longitude	Notes	Associated NWI Code	OHWM Indicators Observed	Potential WOTUS
28	37	79,80/13	35.605038°	-111.797761°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
29	39	81,82/13	35.599830°	-111.798200°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
30	42	83,84/13	35.621758°	-111.778532°	Roadside ditch/water bar / swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	45	85,86/11	35.626571°	-111.782345°				
32	47	91,92/11	35.638553°	-111.787909°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
34	51	95,96/10	35.643052°	-111.812346°	Erosional feature/sheet flow identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
					Erosional feature/sheet flow identified by NHD and NWI as a linear drainage feature.			
35	68	97,98/10	35.639053°	-111.824531°	Erosional feature/sheet flow identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
37	54	101,102/7	35.669061°	-111.793776°	Swale/two-track road identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
40	57	107,108/5	35.692603°	-111.797629°	Swale identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
41	58	109,110/13	35.700563°	-111.796589°	Erosional feature/swale identified by NWI as a linear drainage feature.	R4SBC	None	No
42*	60	113,114/5	35.684354°	-111.775427°	Swale/erosional feature influenced by livestock activity identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
43*	61	117,118/6	35.693760°	-111.764796°	Broad swale influenced by livestock activity identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	71	121,122/2	35.738985°	-111.770652°				

Feature No.*	Data Point No.*	Photos (Appx. A) / Map (Appx. B)	Latitude	Longitude	Notes	Associated NWI Code	OHWM Indicators Observed	Potential WOTUS
44*, Lockwood Canyon	62	123,124/6	35.697260°	-111.754473°	Swale/erosional feature influenced by livestock activity identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
	63	125,126/4	35.710635°	-111.767107°				
	66	129,130/1	35.726978°	-111.789039°				
	67	131,132/1	35.728107°	-111.793251°				
45		133,134/3	35.716768°	-111.795638°	Swale/erosional feature with headcutting identified by NHD and NWI as a linear drainage feature.	R4SBC	None	No
46	A	135,136/11	35.626389°	-111.782778°	Rocky swale/sheet flow feature identified in the field.	None	None	No
47	B	137,138/13	35.606667°	-111.789444°	Broad swale identified in the field.	None	None	No

* Feature occurs on both private and ASLD land.

3.6.1 Regulatory Background

SWCA reviewed the analysis area for all surface water features, including ephemeral streams and other water features, and evaluated potential jurisdiction under the *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States and Carabell v. United States* regulatory guidance memorandum (EPA and USACE 2008) (2008 post-Rapanos guidance, which is the active guidance at the time of this report).

The USACE has a preliminary jurisdictional determination (PJD) process that assumes jurisdiction over surface water features that exhibit OHWMs as defined by USACE methodology, regardless of downstream connectivity or nexus to a traditional navigable water (TNW). In accordance with USACE Regulatory Guidance Letter 16-01 (USACE 2016), a USACE-verified PJD is not an official determination of jurisdictional WOTUS; rather, it is a nonbinding written indication that there may be WOTUS in the review area that would be used to calculate impacts to determine the appropriate CWA Section 404 permit. Under current rules, a PJD allows an expedited USACE review of a property, compared with an official determination provided under an approved jurisdictional determination (AJD) with a significant nexus evaluation (i.e., following 2008 post-Rapanos guidance), and can be used to support the USACE's processing of a Section 404 permit.

Alternatively, an AJD process is based on fact-specific analysis to determine whether each surface water feature in the review area that exhibits an OHWM has a significant nexus with a TNW. Hydrologic information (e.g., historical records of water flow, personal observations), physical characteristics of the feature (i.e., reliable OHWM and bed and banks), and contextual factors (e.g., size of the watershed, average annual rainfall, channel dimensions) are considered when determining whether a significant nexus is present between a tributary and its downstream TNW.

3.6.2 Conclusions

Agency-modeled and other features identified during the desktop review (e.g., from NHD, NWI, and aerial imagery) were given a feature number and investigated during the field reconnaissance. Based on observations from the field reconnaissance, the desktop review of available information, and the current definition of WOTUS under the 2008 post-Rapanos guidance (EPA and USACE 2008), there are no potential WOTUS located within the analysis area. The surface water features identified in the analysis area were determined to be upland areas, ephemeral swales, small erosional features, or livestock tanks that did not exhibit consistent OHWM indicators as described by Lichvar and McColley (2008). These drainage features showed either no OHWM indicators or weak, discontinuous OHWM indicators and no clear bed and banks. The modeled linear riverine features identified by NHD and NWI are either upland areas or ephemeral swale features; the ponds identified by NWI, as well as other ponded areas observed during the site investigation, are human-developed impoundments constructed in uplands heavily influenced by livestock activity and were not identified as potential WOTUS. There are no special aquatic sites (including wetlands), relatively permanent waters, intermittent or perennial waters, or TNWs in the analysis area.

As currently designed, the Project's turbines are sited on ridges away from surface water features and the construction of linear Project components, such as access roads and buried electric lines, would not require a Section 404 permit because no dredge or fill activities within WOTUS would occur during construction. Even if potential WOTUS were identified in the analysis area, USACE involvement may not be required for the installation of the linear Project components because the installations at each potential WOTUS crossing would be considered a single and complete project, and each would have negligible disturbance on potential WOTUS that would be below the 0.10-acre threshold requiring pre-construction notification (PCN) submittal to USACE. Under this non-notifying scenario, the applicable

Nationwide Permits (NWP) would be NWP #14 for Linear Transportation Projects and NWP #57 for Electric Utility Line and Telecommunications Activities, and all the terms and conditions of the Section 404 program in Arizona would need to be met to avoid PCN submittal including, but not limited to, the following:

- The project would not affect threatened and endangered species listed under the Endangered Species Act (USACE General Condition #18).
- The project would have no adverse effect on historic properties (USACE General Condition #20).

If the above two conditions cannot be met, or the disturbance threshold is exceeded but still under the 0.5 acre allowable under NWP #14 and #57, PCN would need to be submitted to USACE for NWP authorization.

If any Project design changes are required, SWCA recommends that the wind turbines and other facilities associated with the Project are placed outside of surface water features.

4 LIMITATIONS AND WARRANTY

The results and conclusions of this report represent the best professional judgment of SWCA scientists and are based on information provided by the project proponent and obtained from agencies and other sources during the course of the study. The USACE and the EPA have the ultimate authority to determine which surface water features, including wetlands, are jurisdictional and considered a WOTUS for CWA Section 404 permitting purposes. No other warranty, expressed or implied, is made.

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APPENDIX A

Representative Data Point Photographs
(Data points keyed to Figures B.1 through B.17 in Appendix B)



Photograph A.1. Feature 1, Data Point (DP)-1; human-made road water bar, view upstream.



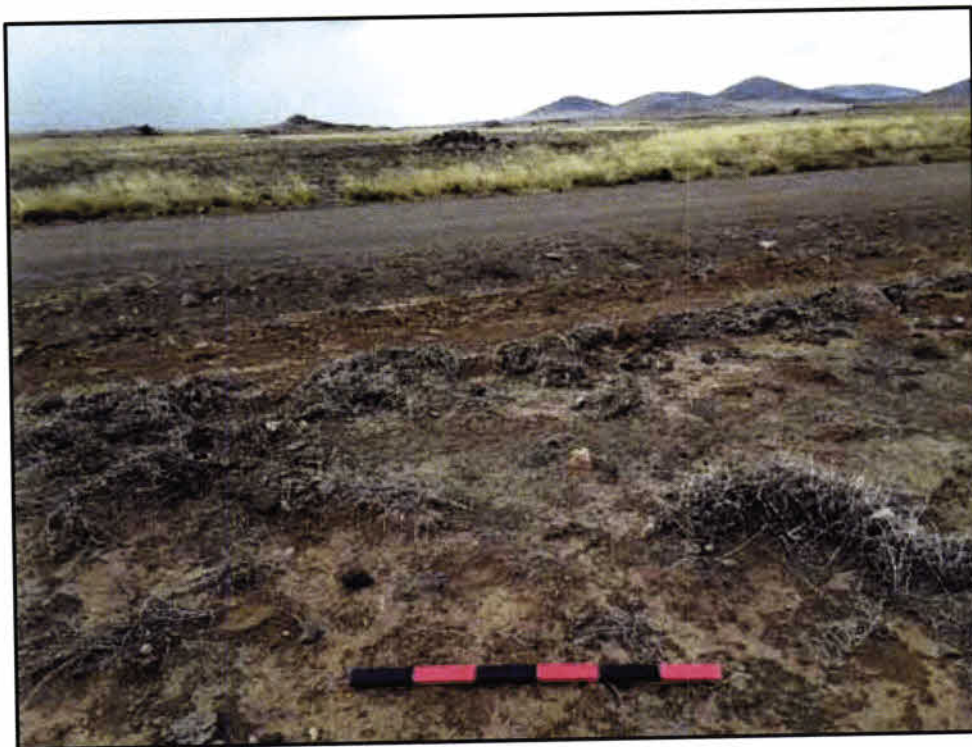
Photograph A.2. Feature 1, DP-1; human-made road water bar, view downstream.



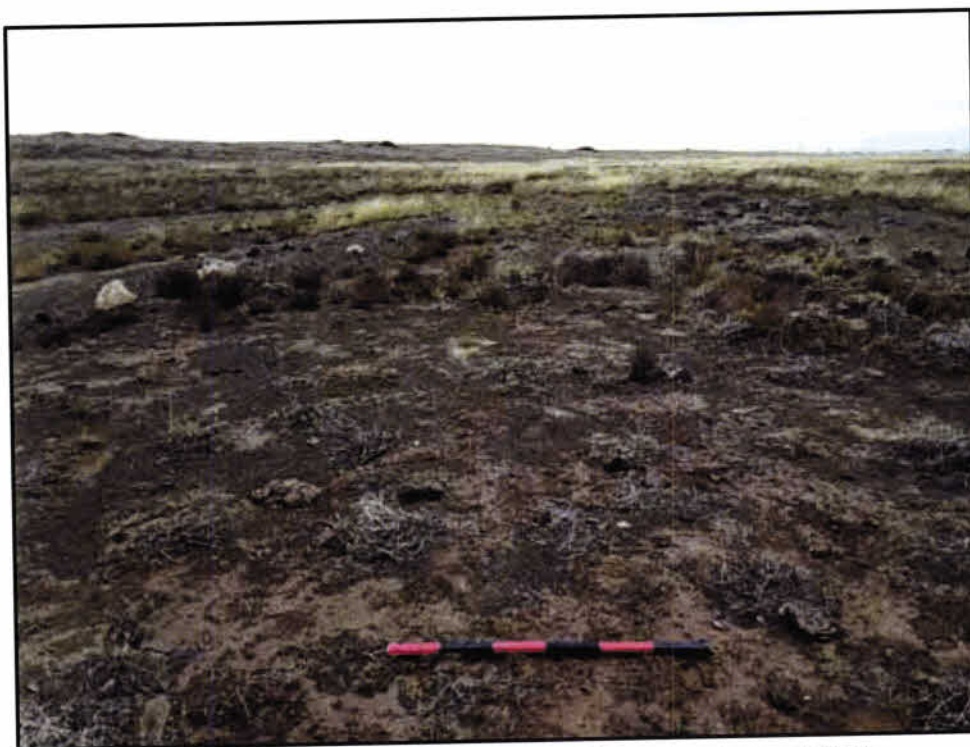
Photograph A.3. Feature 2, DP-2; upland area, view upgradient.



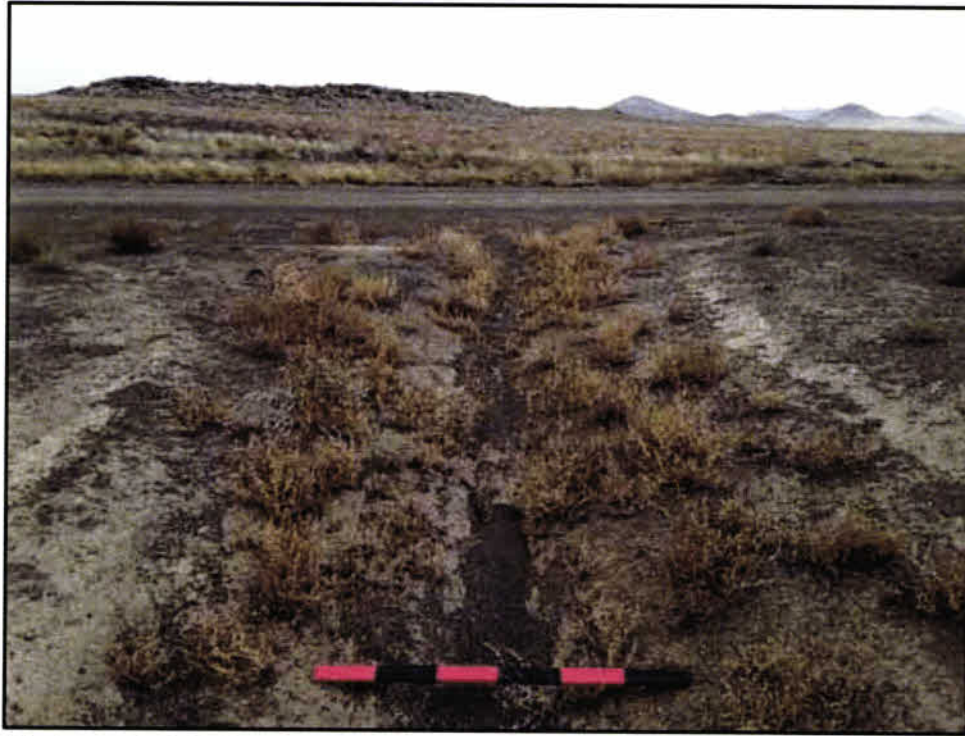
Photograph A.4. Feature 2, DP-2; upland area, view downgradient.



Photograph A.5. Feature 3, DP-3; human-made road water bar, view upstream.



Photograph A.6. Feature 3, DP-3; human-made road water bar, view downstream.



Photograph A.7. Feature 4, DP-4; human-made road water bar, view upstream.



Photograph A.8. Feature 4, DP-4; human-made road water bar, view downstream.



Photograph A.9. Feature 4, DP-52; human-made road water bar, view upstream.



Photograph A.10. Feature 4, DP-52; human-made road water bar, view downstream.



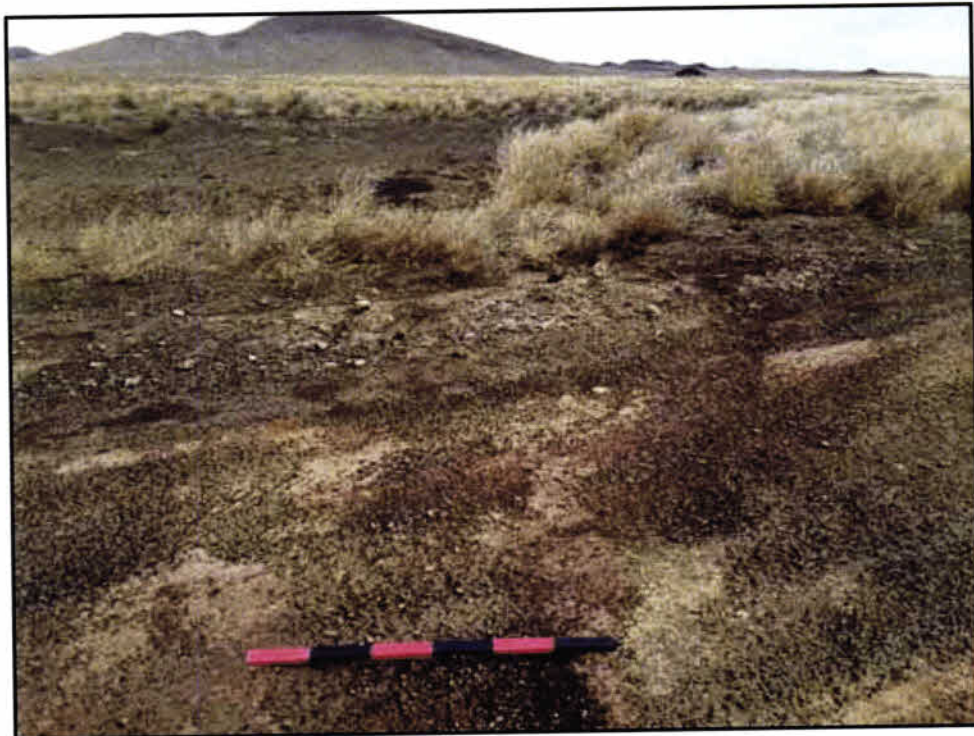
Photograph A.11. Feature 5, DP-5; broad swale, view upgradient.



Photograph A.12. Feature 5, DP-5; broad swale, view downgradient.



Photograph A.13. Feature 6, DP-6; human-made road water bar/swale, view upstream.



Photograph A.14. Feature 6, DP-6; human-made road water bar/swale, view downstream.



Photograph A.15. Feature 6, DP-7; human-made road water bar/swale, view upstream.



Photograph A.16. Feature 6, DP-7; human-made road water bar/swale, view downstream.



Photograph A.17. Feature 6, DP-8; human-made road water bar/swale, view upstream.



Photograph A.18. Feature 6, DP-8; human-made road water bar/swale, view downstream.



Photograph A.19. Feature 7, DP-9; erosional feature/gully, view upstream.



Photograph A.20. Feature 7, DP-9; erosional feature/gully, view downstream.



Photograph A.21. Feature 8, DP-10; sheet flow concentrating into a human-made water bar, view upstream.



Photograph A.22. Feature 8, DP-10; sheet flow concentrating into a human-made water bar, view downstream.



Photograph A.23. Feature 9, DP-11; human-made road water bar, view upstream.



Photograph A.24. Feature 9, DP-11; human-made road water bar, view downstream.



Photograph A.25. Feature 10, DP-12; human-made road water bar, view upstream.



Photograph A.26. Feature 10, DP-12; human-made road water bar, view downstream.



Photograph A.27. Feature 11, DP-13; human-channelized swale, view upgradient.



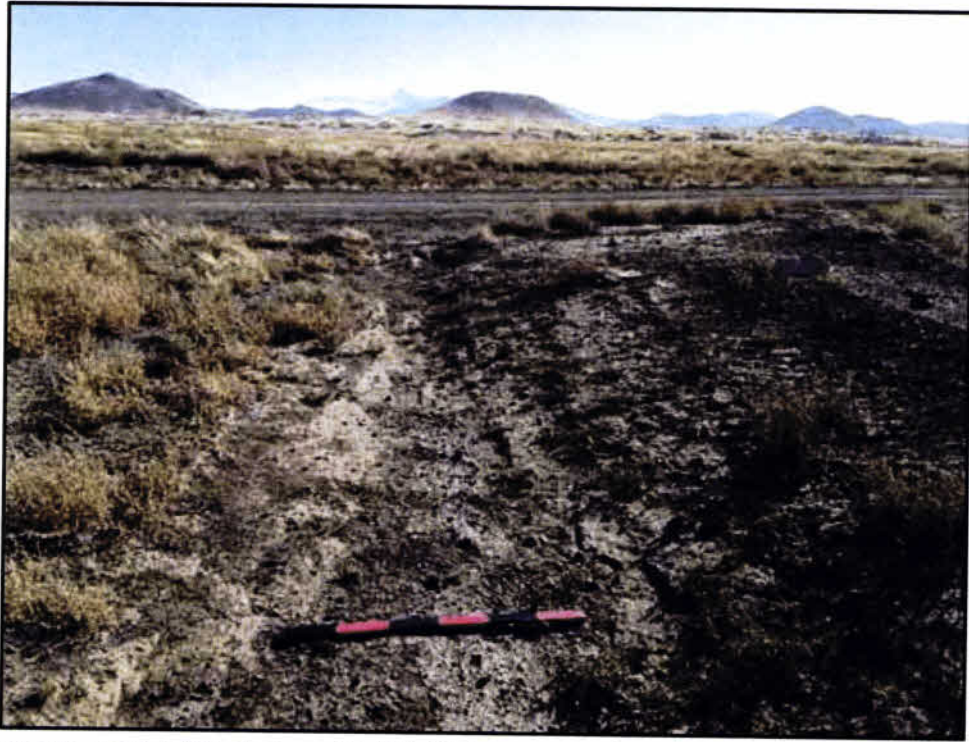
Photograph A.28. Feature 11, DP-13; human-channelized swale, view downgradient.



Photograph A.29. Feature 12, DP-14; sheet flow concentrating into a rocky swale, view upgradient.



Photograph A.30. Feature 12, DP-14; sheet flow concentrating into a rocky swale, view downgradient.



Photograph A.31. Feature 13, DP-15; human-made road water bar, view upstream.



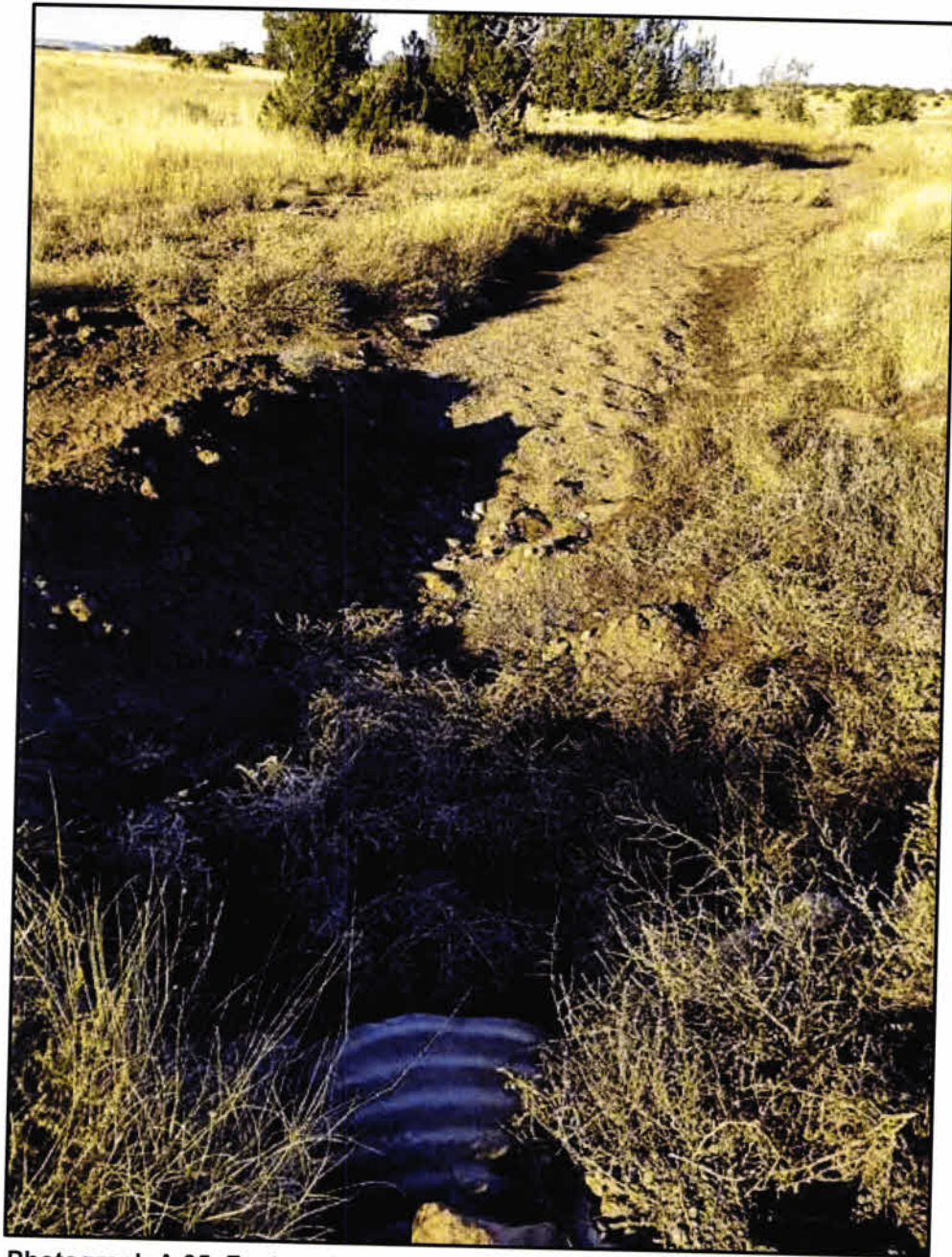
Photograph A.32. Feature 13, DP-15; human-made road water bar, view downstream.



Photograph A.33. Feature 14, DP-16; erosional feature/ditch, view upstream.



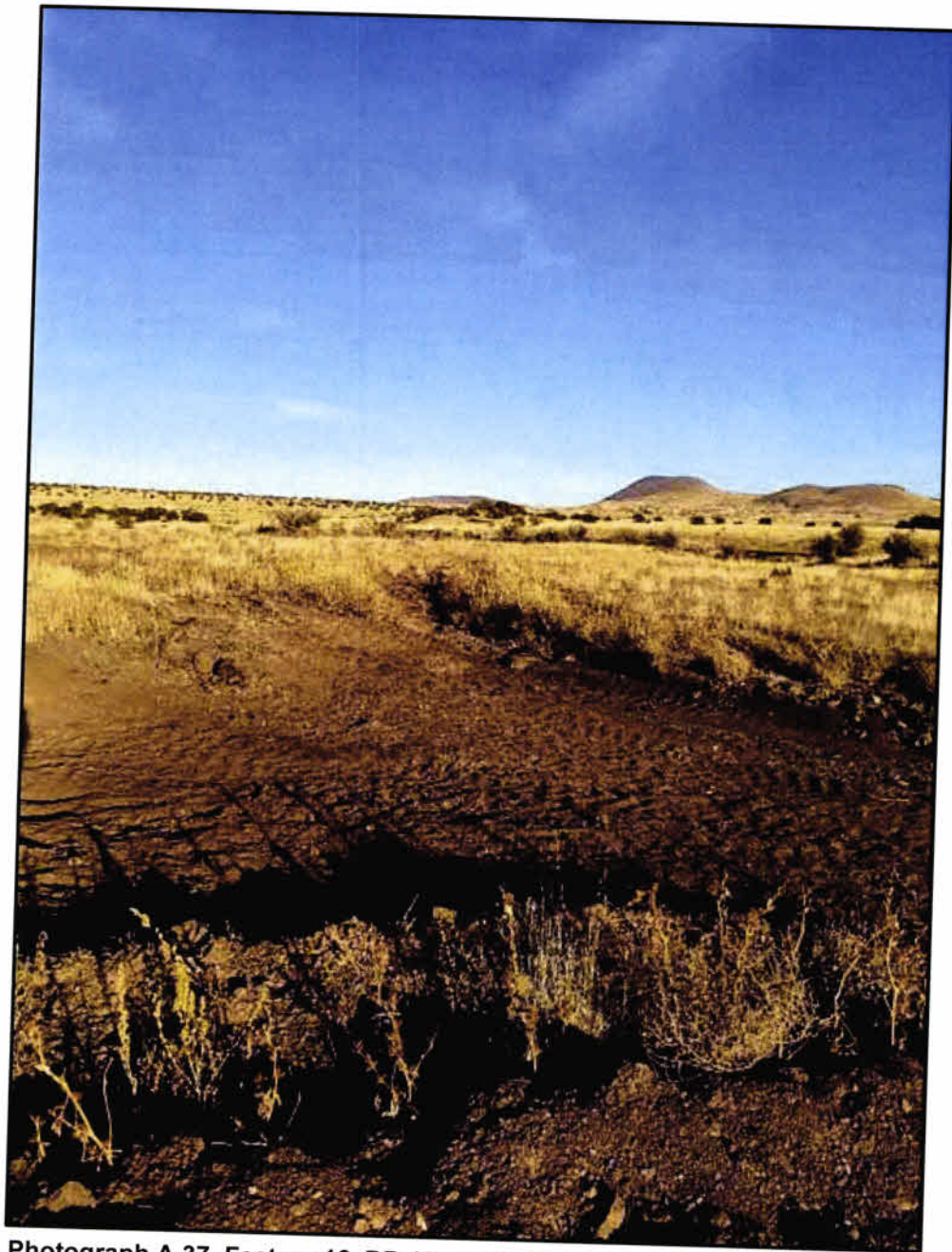
Photograph A.34. Feature 14, DP-16; erosional feature/ditch, view downstream.



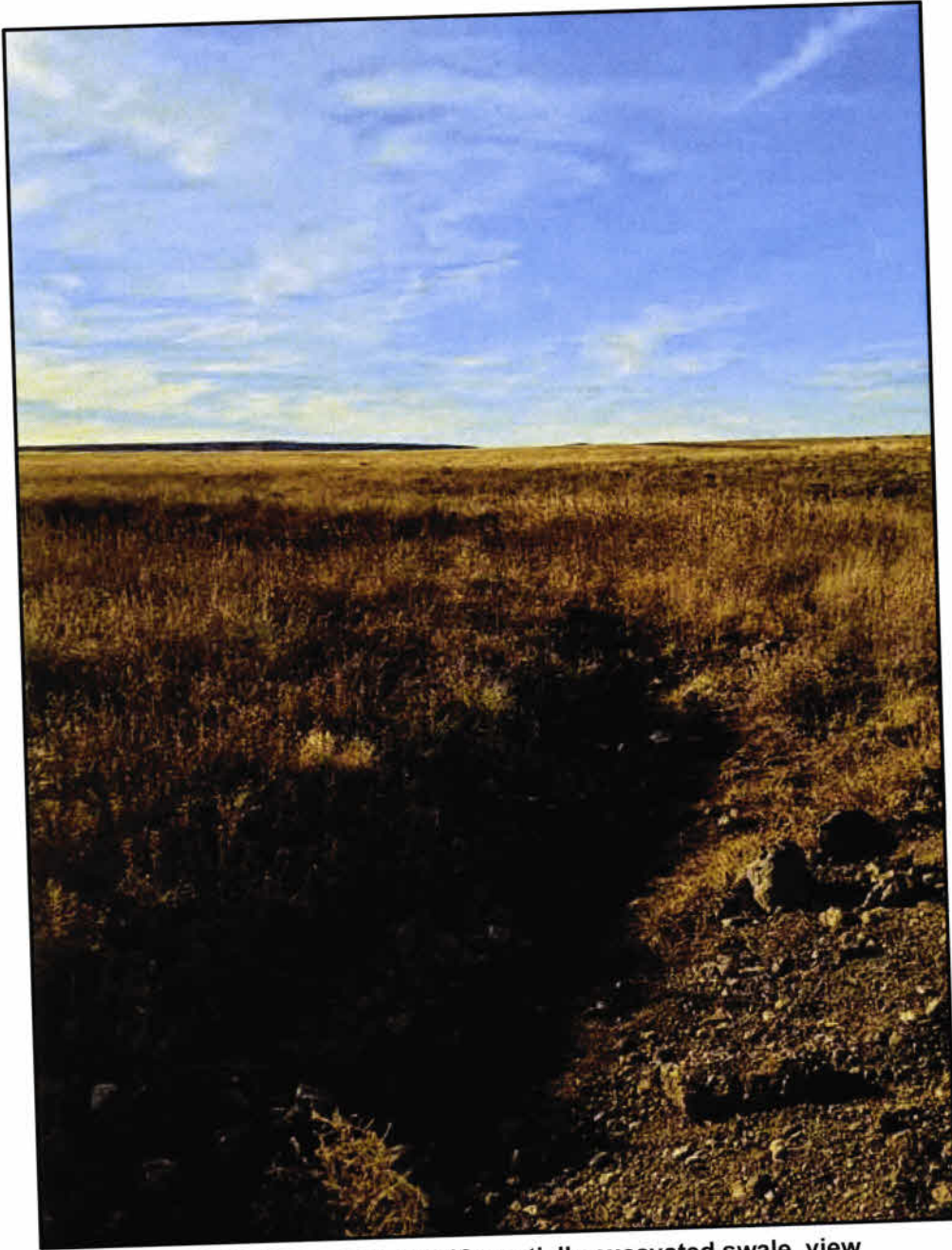
Photograph A.35. Feature 15, DP-17; swale, view upgradient.



Photograph A.36. Feature 15, DP-17; swale, view downgradient.



Photograph A.37. Feature 16, DP-18; partially excavated swale, view upgradient.



Photograph A.38. Feature 16, DP-18; partially excavated swale, view downgradient.



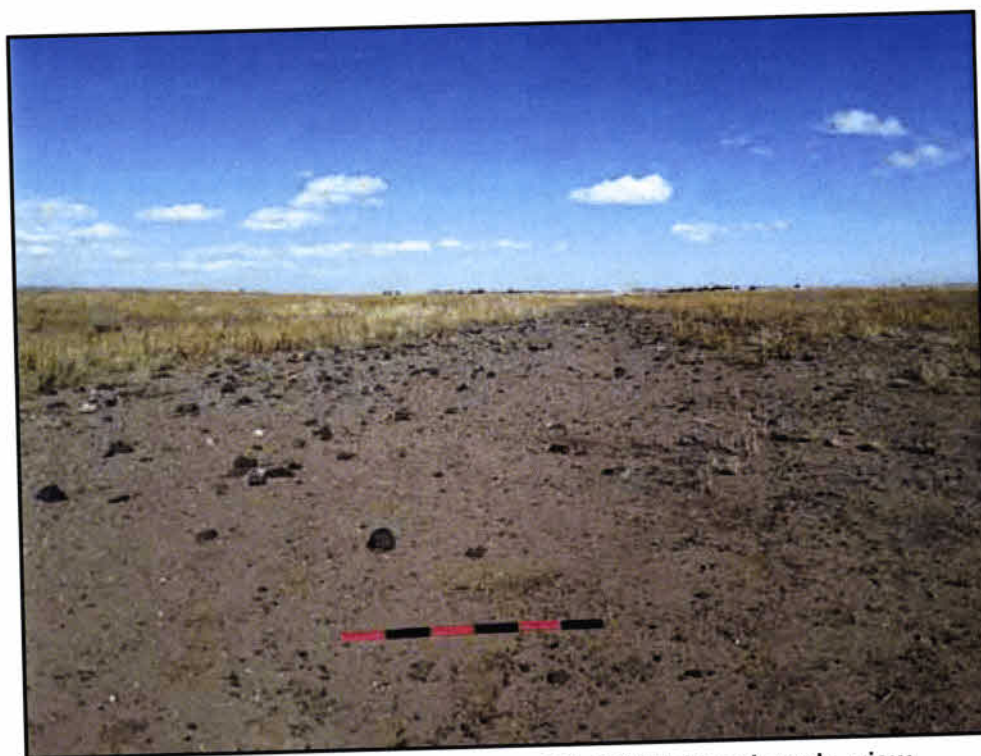
Photograph A.39. Cedar Wash (Feature 17), DP-19; swale, view upgradient.



Photograph A.40. Cedar Wash (Feature 17), DP-19; swale, view downgradient.



Photograph A.41. Beasley Ditch (Feature 18), DP-20; broad swale, view upgradient.



Photograph A.42. Beasley Ditch (Feature 18), DP-20; broad swale, view downgradient.



Photograph A.43. Feature 19, DP-22; broad swale, view upgradient.



Photograph A.44. Feature 19, DP-22; broad swale, view downgradient.



Photograph A.45. Feature 19, DP-23; sheet flow, view upgradient.



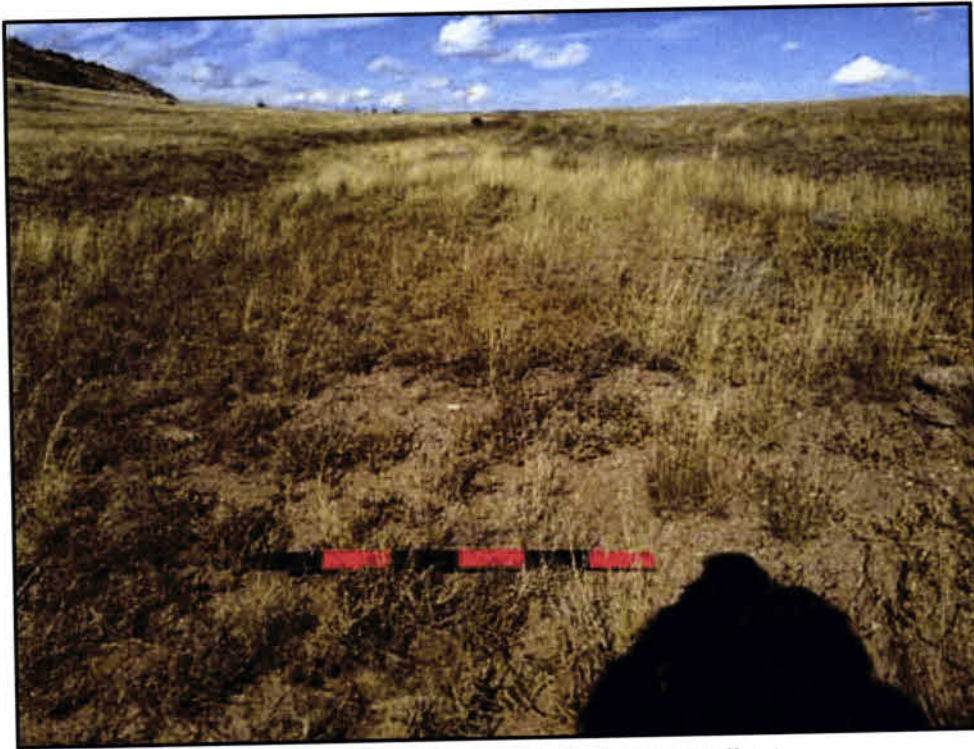
Photograph A.46. Feature 19, DP-23; sheet flow, view downgradient.



Photograph A.47. Feature 19, DP-24; sheet flow, view upgradient.



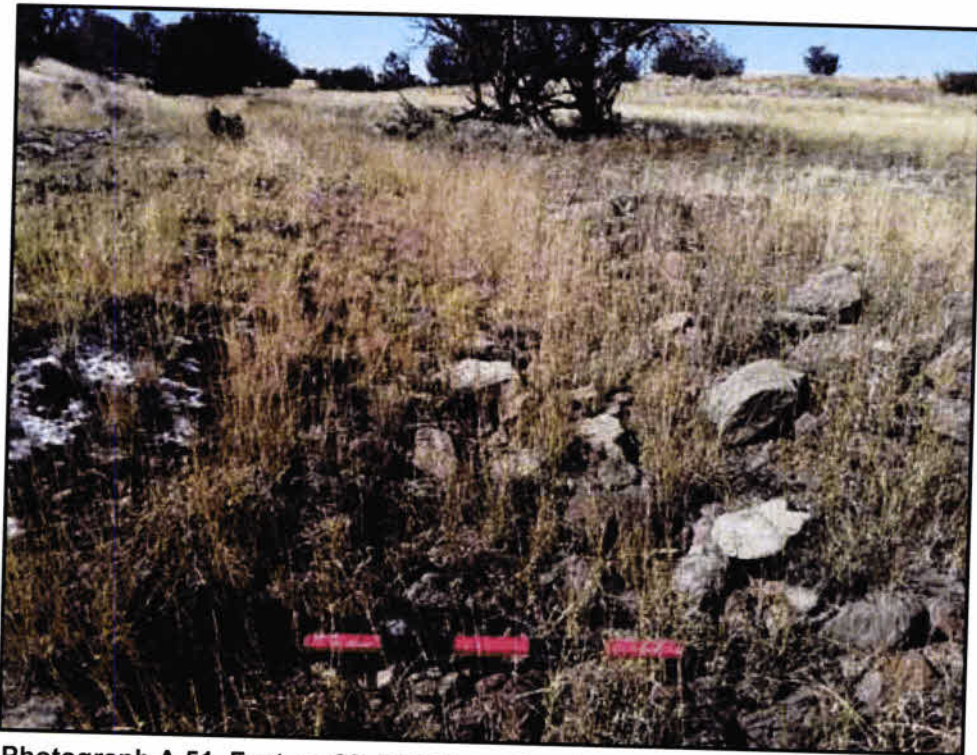
Photograph A.48. Feature 19, DP-24; sheet flow, view downgradient.



Photograph A.49. Feature 20, DP-25; swale, view upgradient.



Photograph A.50. Feature 20, DP-25; swale, view downgradient.



Photograph A.51. Feature 20, DP-30; swale, view upgradient.



Photograph A.52. Feature 20, DP-30; swale, view downgradient.



Photograph A.53. Feature 21, DP-27; swale, view upgradient.



Photograph A.54. Feature 21, DP-27; swale, view downgradient.



Photograph A.55. Feature 22, DP-28; swale, view upgradient.



Photograph A.56. Feature 22, DP-28; swale, view downgradient.



Photograph A.57. Feature 22, DP-29; swale, view upgradient.



Photograph A.58. Feature 22, DP-29; swale, view downgradient.



Photograph A.59. Feature 23, DP-31; sheet flow, view upgradient.



Photograph A.60. Feature 23, DP-31; sheet flow, view downgradient.



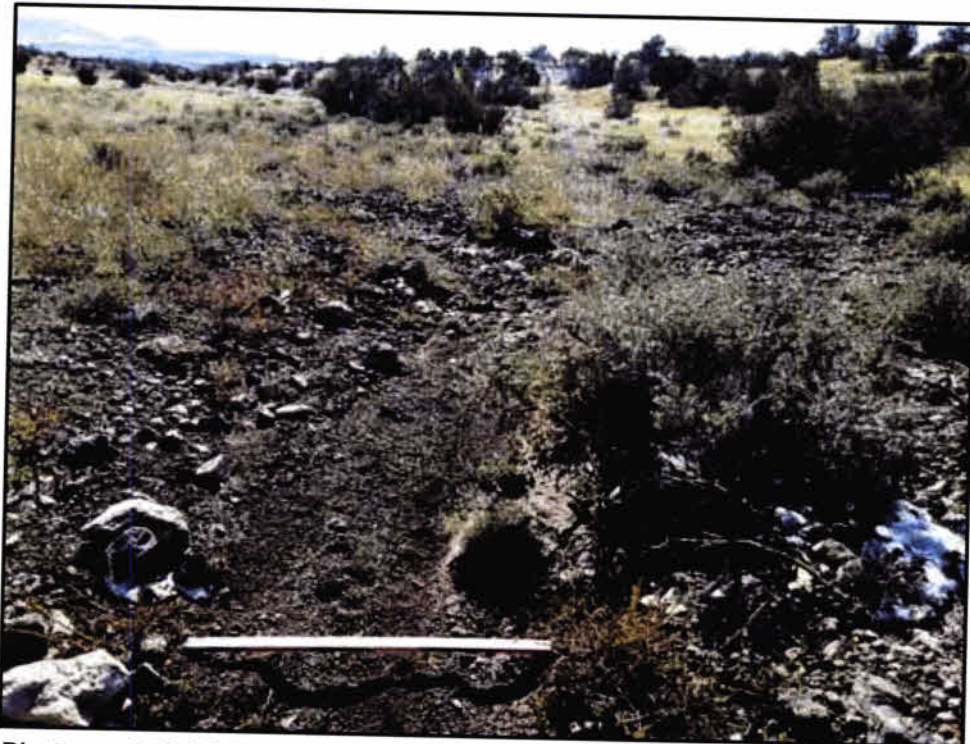
Photograph A.61. Feature 23, DP-41; sheet flow, view upgradient.



Photograph A.62. Feature 23, DP-41; sheet flow, view downgradient.



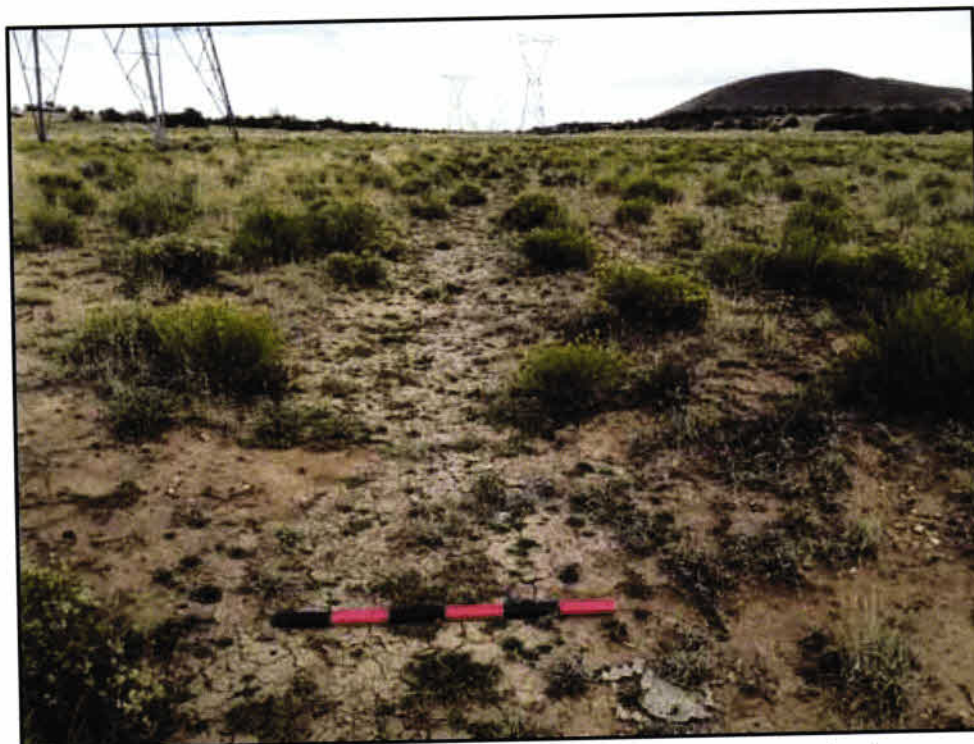
Photograph A.63. Feature 23, DP-46; swale, view upgradient.



Photograph A.64. Feature 23, DP-46; swale, view downgradient.



Photograph A.65. Feature 23, DP-49; sheet flow, view upgradient.



Photograph A.66. Feature 23, DP-49; sheet flow, view downgradient.



Photograph A.67. Feature 24, DP-33; swale/erosional feature, view upgradient.



Photograph A.68. Feature 24, DP-33; swale/erosional feature, view downgradient.



Photograph A.69. Feature 25, DP-34; sheet flow, view upgradient.



Photograph A.70. Feature 25, DP-34; sheet flow, view downgradient.



Photograph A.71. Feature 25, DP-40; erosional feature, view upgradient.



Photograph A.72. Feature 25, DP-40; erosional feature, view downgradient.



Photograph A.73. Feature 26, DP-35; swale, view upgradient.



Photograph A.74. Feature 26, DP-35; swale, view downgradient.



Photograph A.75. Chapel Tank (Feature 27), DP-36; human-made livestock tank, view upgradient.



Photograph A.76. Chapel Tank (Feature 27), DP-36; human-made livestock tank, view downgradient.



Photograph A.77. Feature 27, DP-38; swale, view upgradient.



Photograph A.78. Feature 27, DP-38; swale, view downgradient.



Photograph A.79. Feature 28, DP-37; swale, view upgradient.



Photograph A.80. Feature 28, DP-37; swale, view downgradient.



Photograph A.81. Feature 29, DP-39; swale, view upgradient.



Photograph A.82. Feature 29, DP-39; swale, view downgradient.



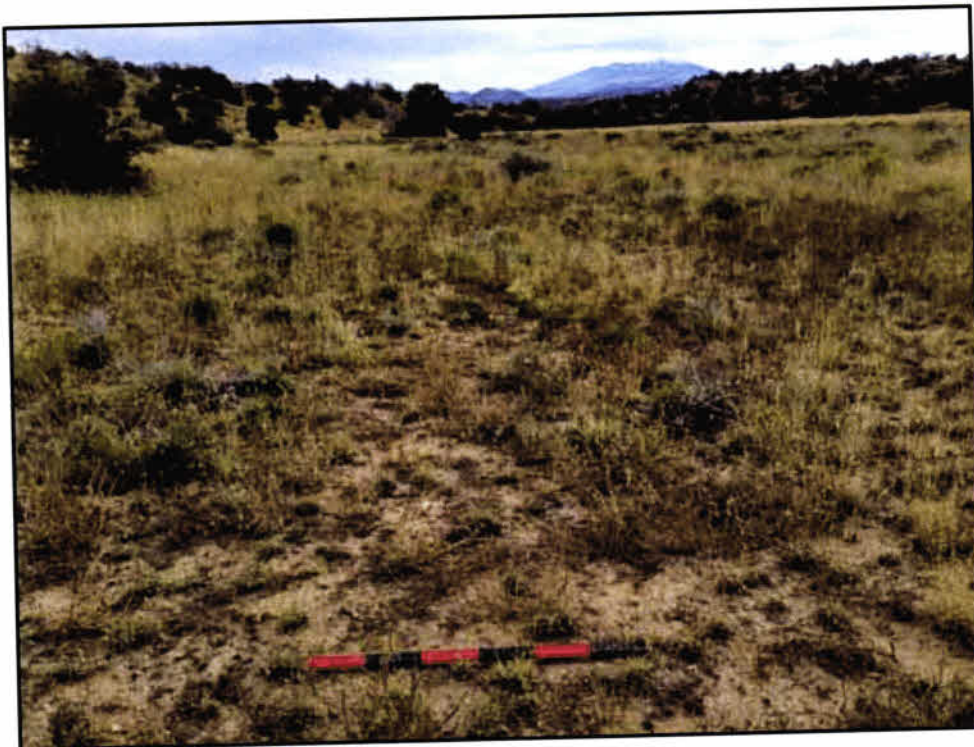
Photograph A.83. Feature 30, DP-42; roadside ditch/water bar, view upgradient.



Photograph A.84. Feature 30, DP-42; roadside ditch/water bar, view downgradient.



Photograph A.85. Feature 30, DP-45; swale, view upgradient.



Photograph A.86. Feature 30, DP-45; swale, view downgradient.



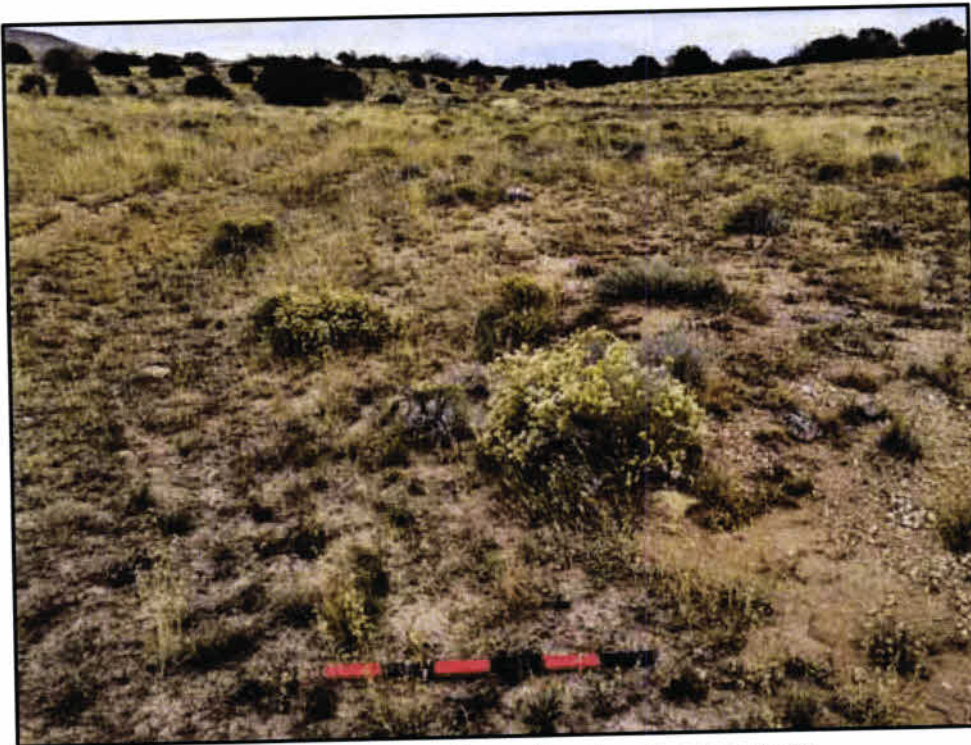
Photograph A.87. Feature 31, DP-43; erosional feature, view upgradient.



Photograph A.88. Feature 31, DP-43; erosional feature, view downgradient.



Photograph A.89. Feature 31, DP-44; swale, view upgradient.



Photograph A.90. Feature 31, DP-44; swale, view downgradient.



Photograph A.91. Feature 32, DP-47; swale, view upgradient.



Photograph A.92. Feature 32, DP-47; swale, view downgradient.



Photograph A.93. Feature 33, DP-50; broad swale, view upgradient.



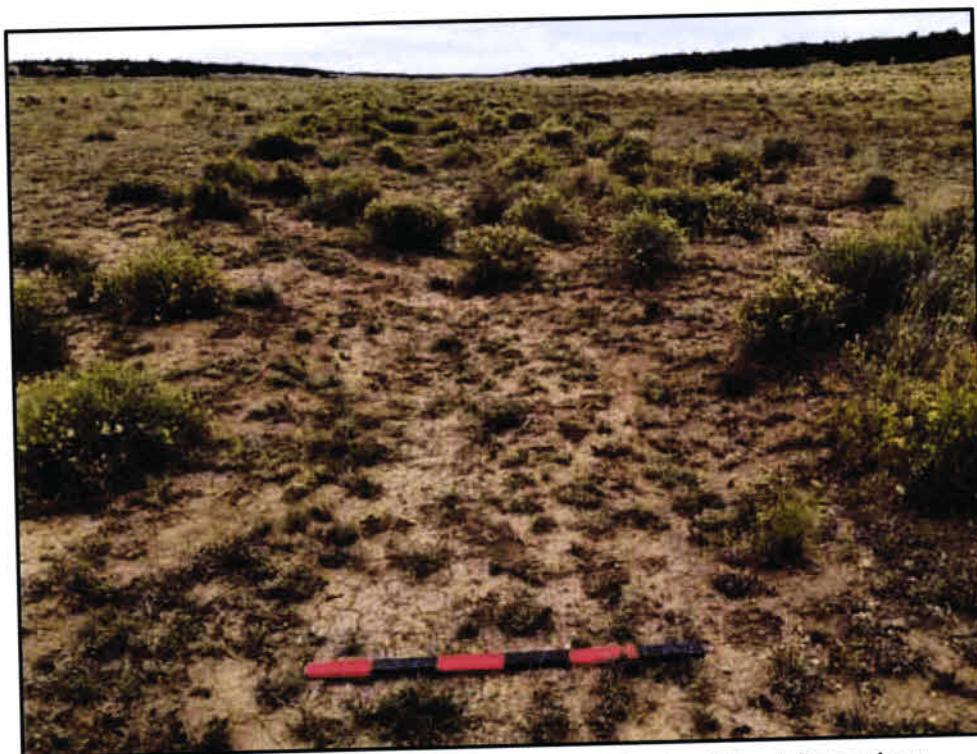
Photograph A.94. Feature 33, DP-50; broad swale, view downgradient.



Photograph A.95. Feature 34, DP-51; erosional feature/sheet flow, view upgradient.



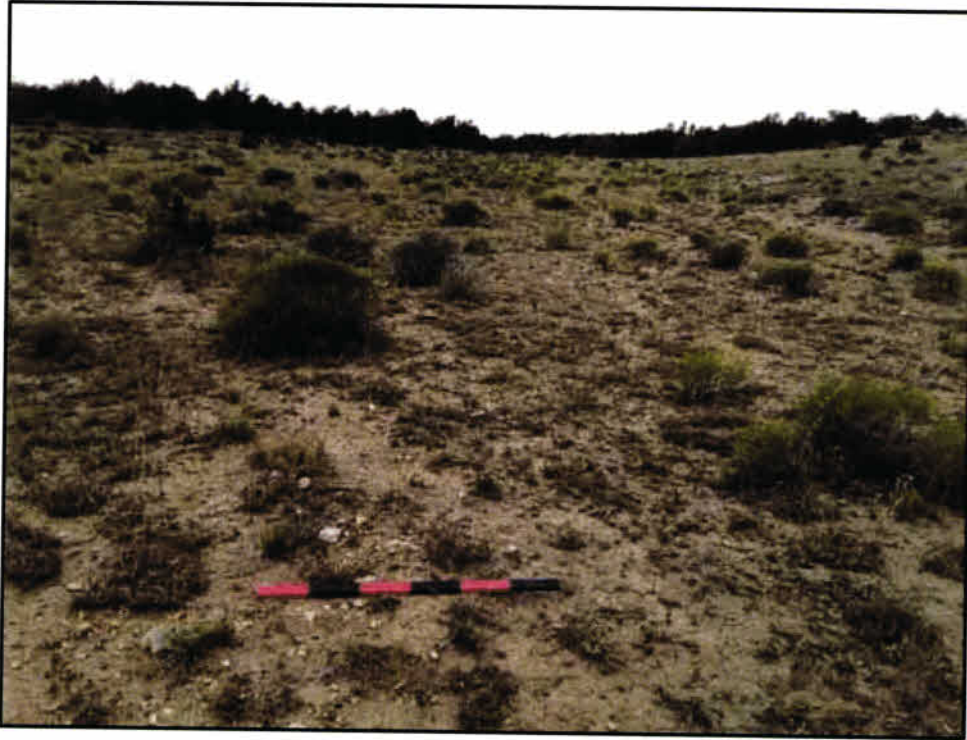
Photograph A.96. Feature 34, DP-51; erosional feature/sheet flow, view downgradient.



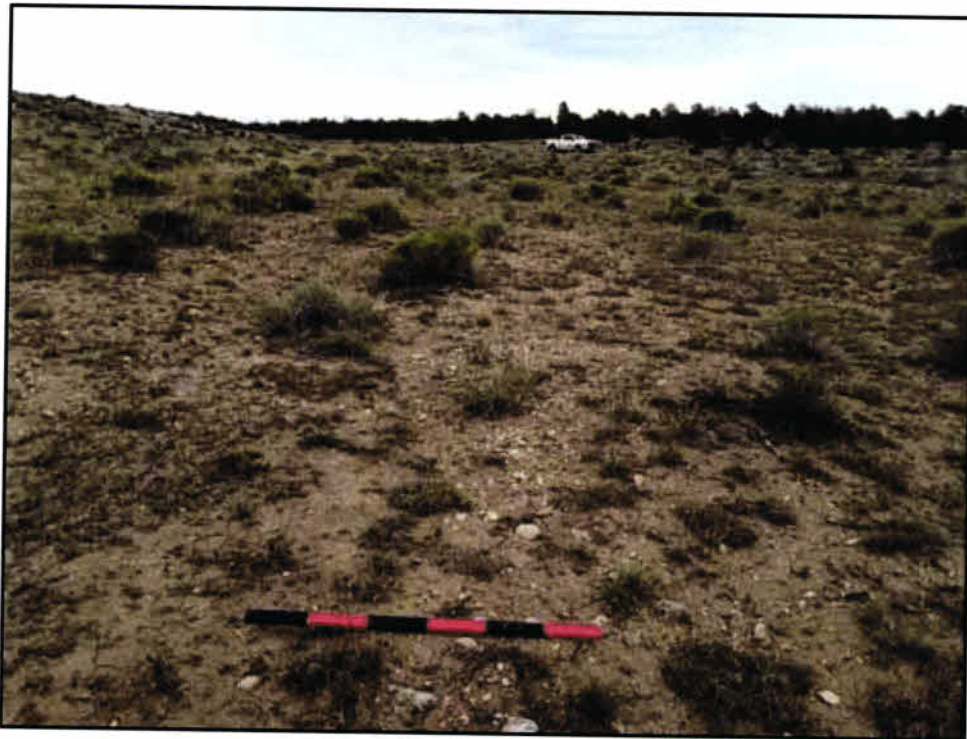
Photograph A.97. Feature 35, DP-68; erosional feature/sheet flow, view upgradient.



Photograph A.98. Feature 35, DP-68; erosional feature/sheet flow, view downgradient.



Photograph A.99. Feature 36, DP-53; sheet flow/two-track road, view upgradient.



Photograph A.100. Feature 36, DP-53; sheet flow/two-track road, view downgradient.



Photograph A.101. Feature 37, DP-54; swale/two-track road, view upgradient.



Photograph A.102. Feature 37, DP-54; swale/two-track road, view downgradient.



Photograph A.103. Feature 38, DP-55; human-made livestock tank, view upgradient.



Photograph A.104. Feature 38, DP-55; human-made livestock tank, view downgradient.



Photograph A.105. Feature 39, DP-56; swale, view upgradient.



Photograph A.106. Feature 39, DP-56; swale, view downgradient.



Photograph A.107. Feature 40, DP-57; swale, view upgradient.



Photograph A.108. Feature 40, DP-57; swale, view downgradient.



Photograph A.109. Feature 41, DP-58; erosional feature/swale, view upgradient.



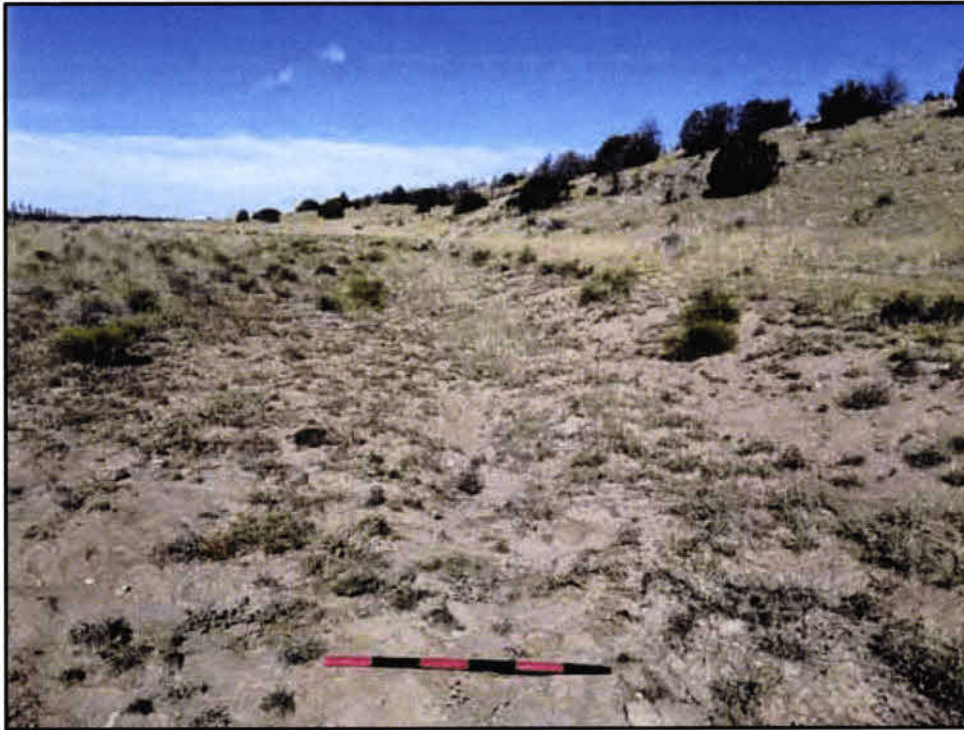
Photograph A.110. Feature 41, DP-58; erosional feature/swale, view downgradient.



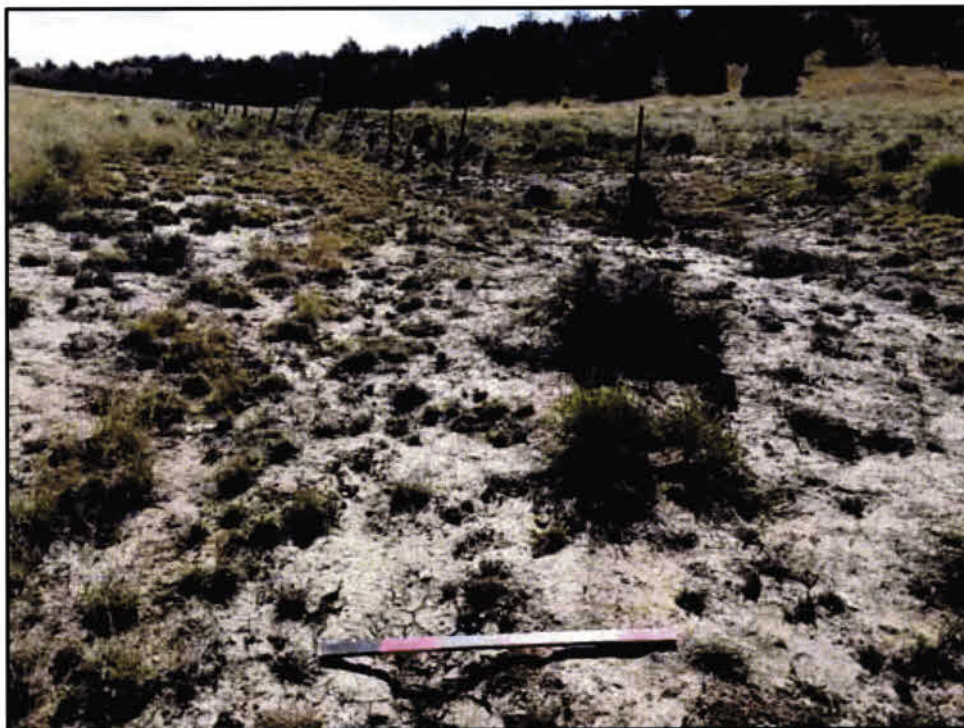
Photograph A.111. Feature 42, DP-59; erosional feature/swale influenced by livestock activity, view upgradient.



Photograph A.112. Feature 42, DP-59; erosional feature/swale influenced by livestock activity, view downgradient.



Photograph A.113. Feature 42, DP-60; erosional feature/swale influenced by livestock activity, view upgradient.



Photograph A.114. Feature 42, DP-60; erosional feature/swale influenced by livestock activity, view downgradient.



Photograph A.115. Feature 42, DP-69; erosional feature/swale, view upgradient.



Photograph A.116. Feature 42, DP-69; erosional feature/swale, view downgradient.



Photograph A.117. Feature 43, DP-61; broad swale, view upgradient.



Photograph A.118. Feature 43, DP-61; broad swale, view downgradient.



Photograph A.119. Feature 43, DP-70; broad swale, view upgradient.



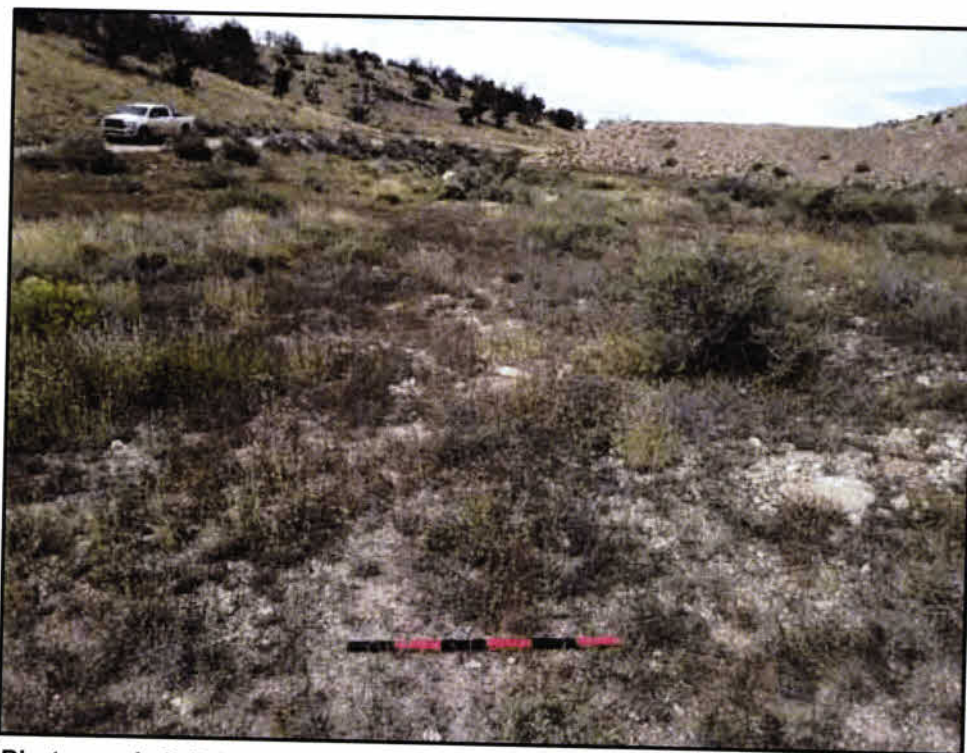
Photograph A.120. Feature 43, DP-70; broad swale, view downgradient.



Photograph A.121. Feature 43, DP-71; broad swale influenced by livestock activity, view upgradient.



Photograph A.122. Feature 43, DP-71; broad swale influenced by livestock activity, view downgradient.



Photograph A.123. Lockwood Canyon (Feature 44), DP-62; erosional feature/swale, view upgradient.



Photograph A.124. Lockwood Canyon (Feature 44), DP-62; erosional feature/swale, view downgradient.



Photograph A.125. Lockwood Canyon (Feature 44), DP-63; swale/erosional feature influenced by livestock activity, view upgradient.



Photograph A.126. Lockwood Canyon (Feature 44), DP-63; swale/erosional feature influenced by livestock activity, view downgradient.



Photograph A.127. Lockwood Canyon (Feature 44), DP-64; swale/erosional feature influenced by livestock activity, view upgradient.



Photograph A.128. Lockwood Canyon (Feature 44), DP-64; swale/erosional feature influenced by livestock activity, view downgradient.



Photograph A.129. Lockwood Canyon (Feature 44), DP-66; erosional feature/swale, view upgradient.



Photograph A.130. Lockwood Canyon (Feature 44), DP-66; erosional feature/swale, view downgradient.



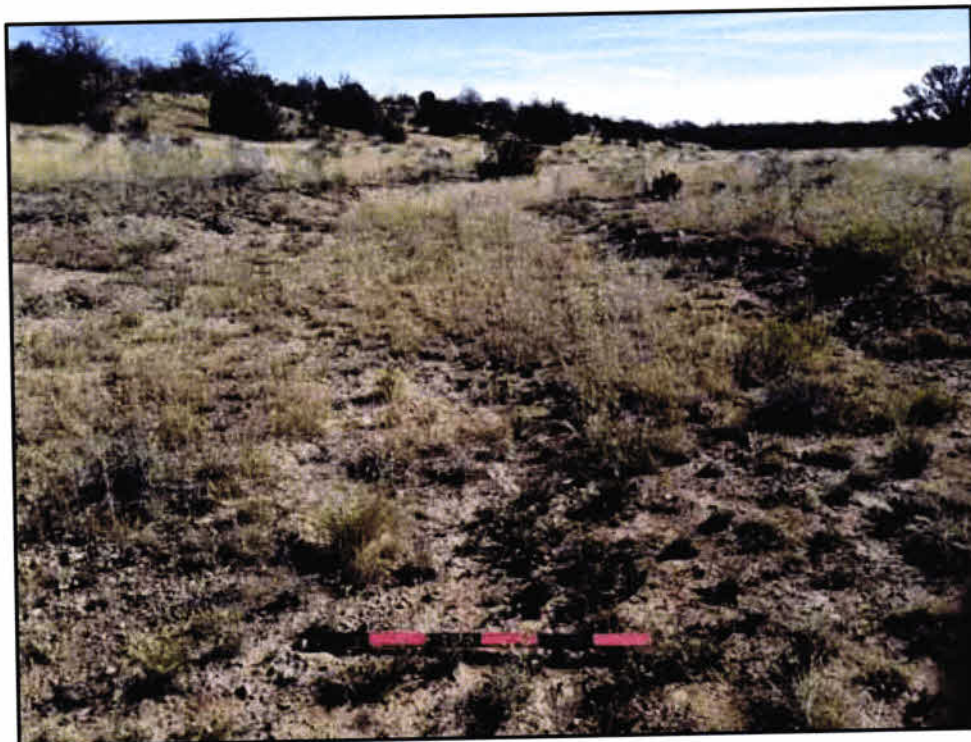
Photograph A.131. Lockwood Canyon (Feature 44), DP-67; swale/erosional feature influenced by livestock activity, view upgradient.



Photograph A.132. Lockwood Canyon (Feature 44), DP-67; swale/erosional feature influenced by livestock activity, view downgradient.



Photograph A.133. Feature 45, DP-65; erosional feature/swale with headcutting, view upgradient.



Photograph A.134. Feature 45, DP-65; erosional feature/swale, view downgradient.



Photograph A.135. Feature 46, DP A; rocky swale, view upgradient.



Photograph A.136. Feature 46, DP A; swale/sheet flow, view downgradient.



Photograph A.137. Feature 47, DP B; broad swale, view upgradient.



Photograph A.138. Feature 47, DP B; broad swale, view downgradient.

APPENDIX B

**Aerial Photographs
Figure Sheets B.1 through B.17**

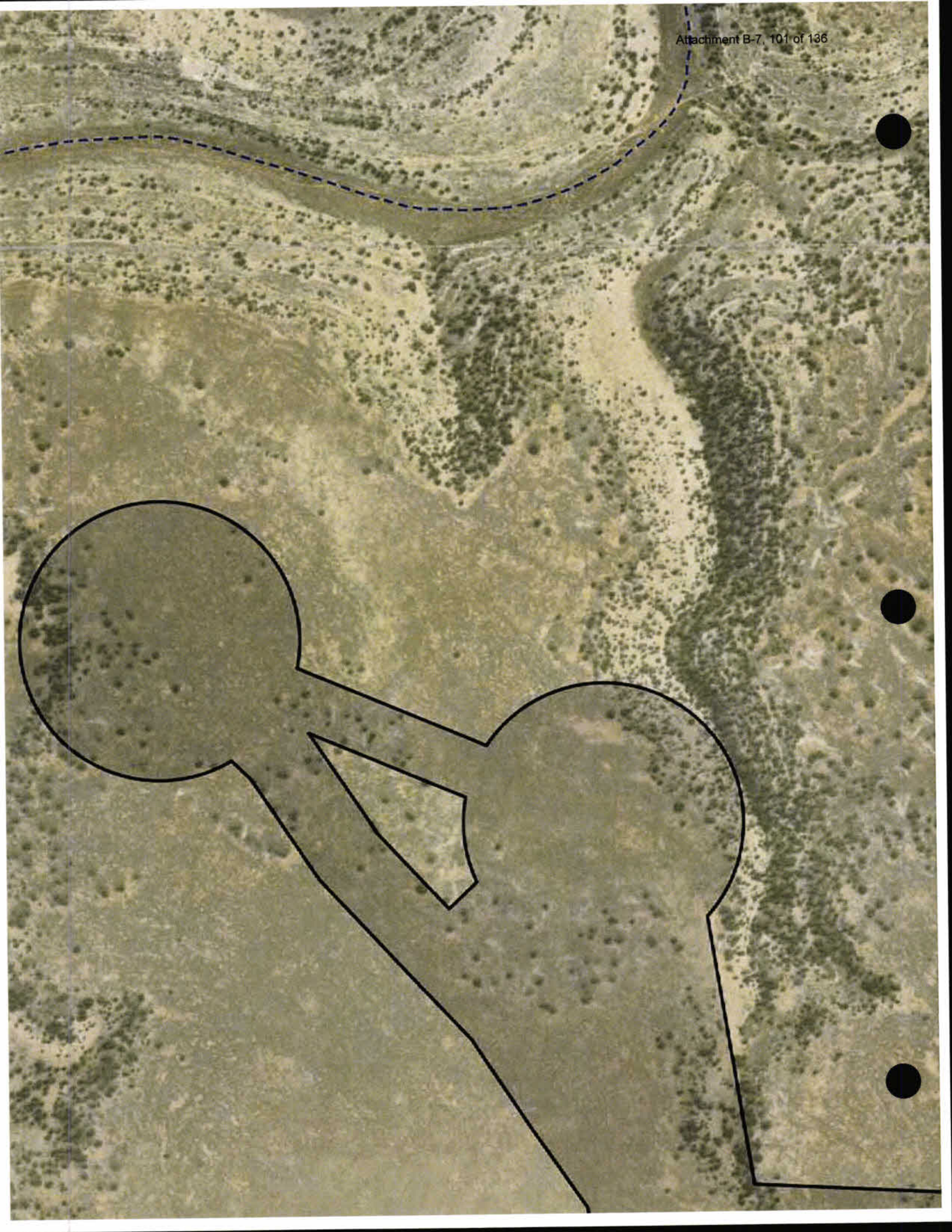
1512-11

DP 70

1512-11

1512-11



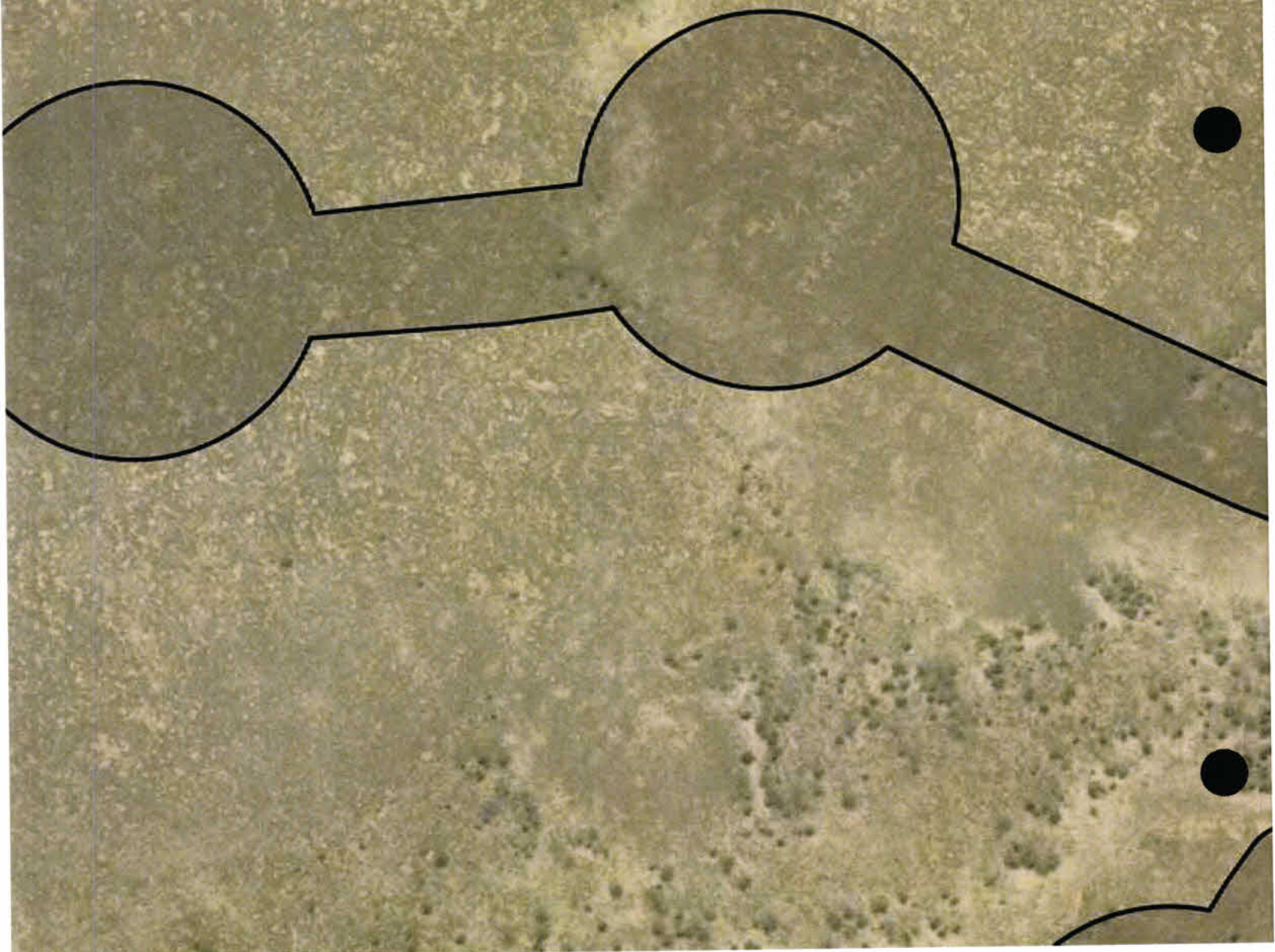


Feature 45

Feature 44

DP 65









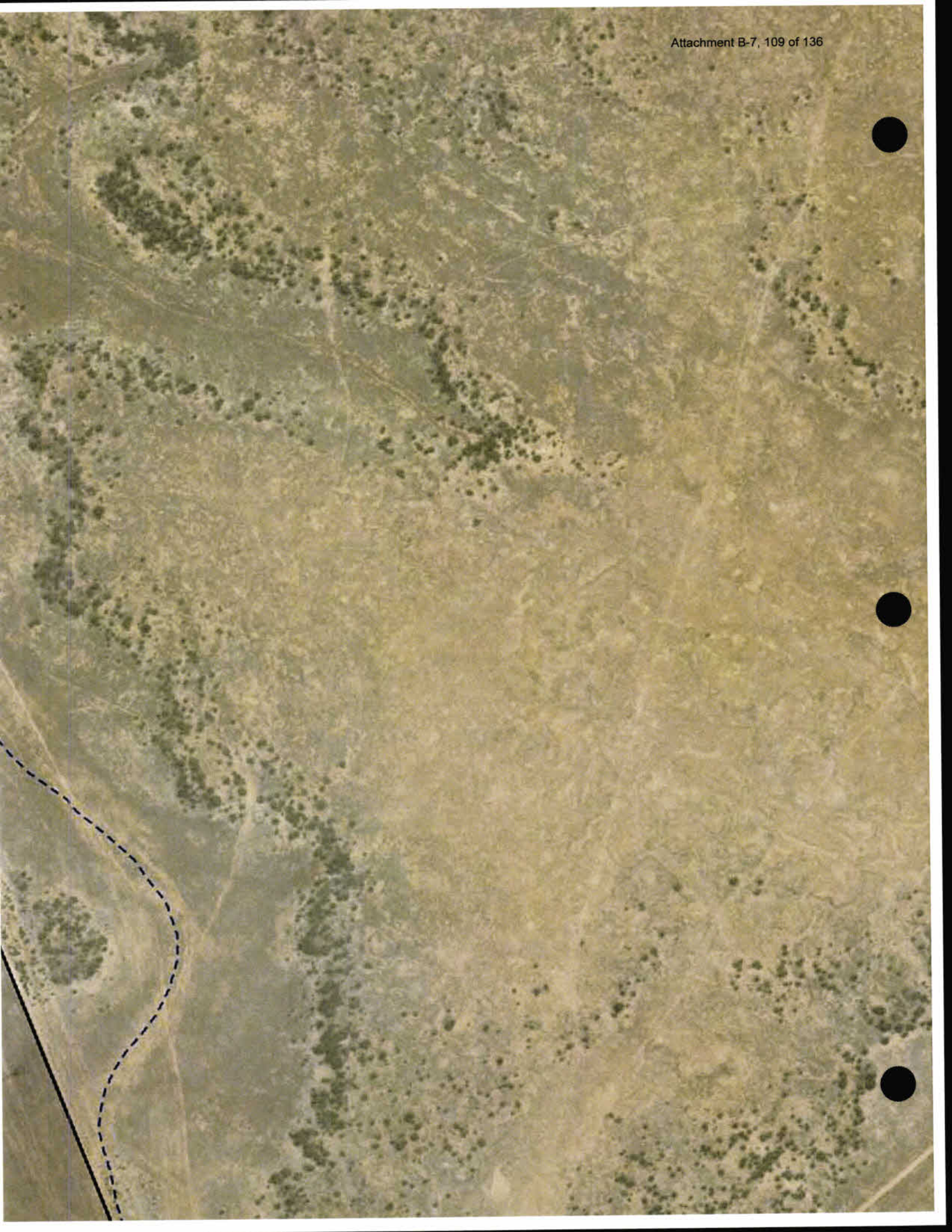




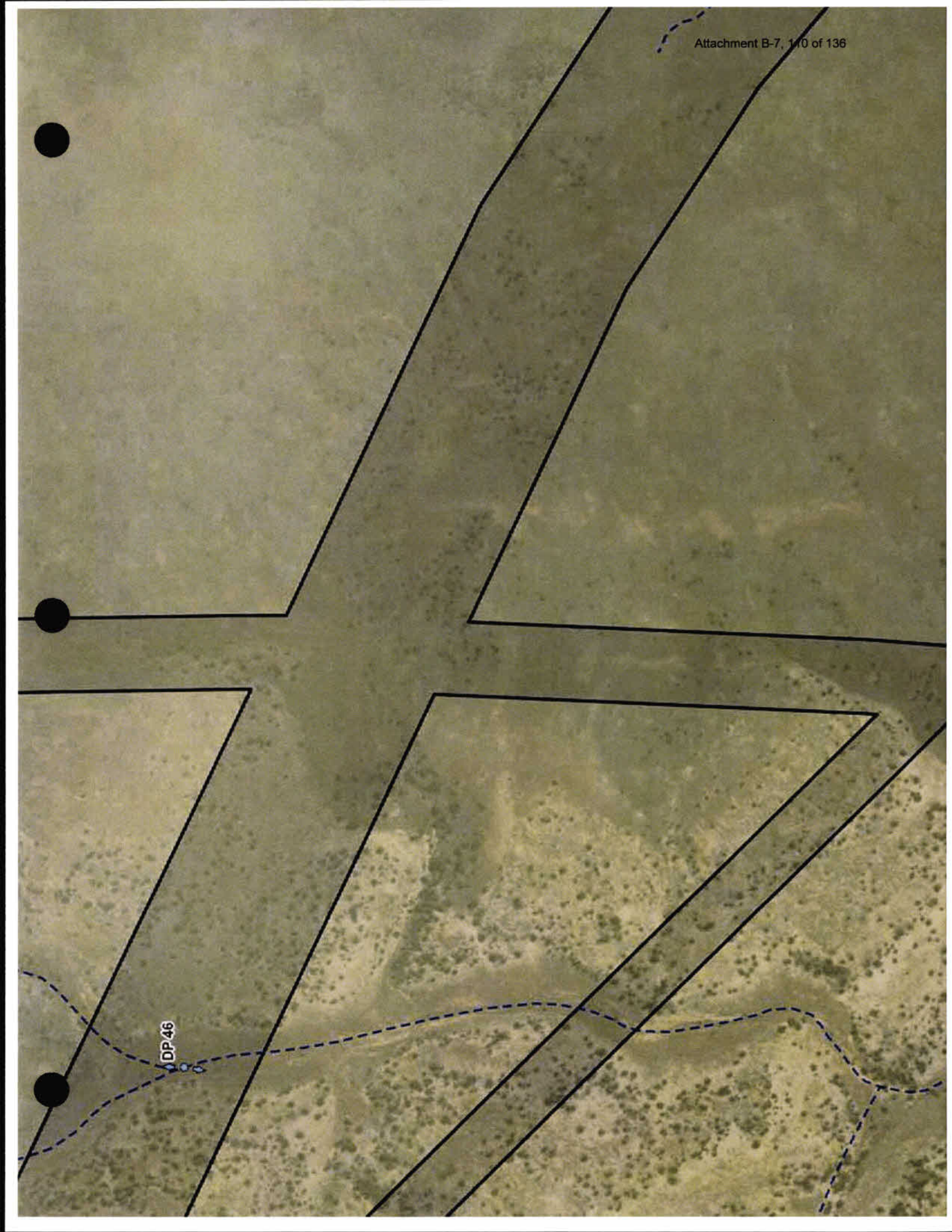


Feature 36

DP 53

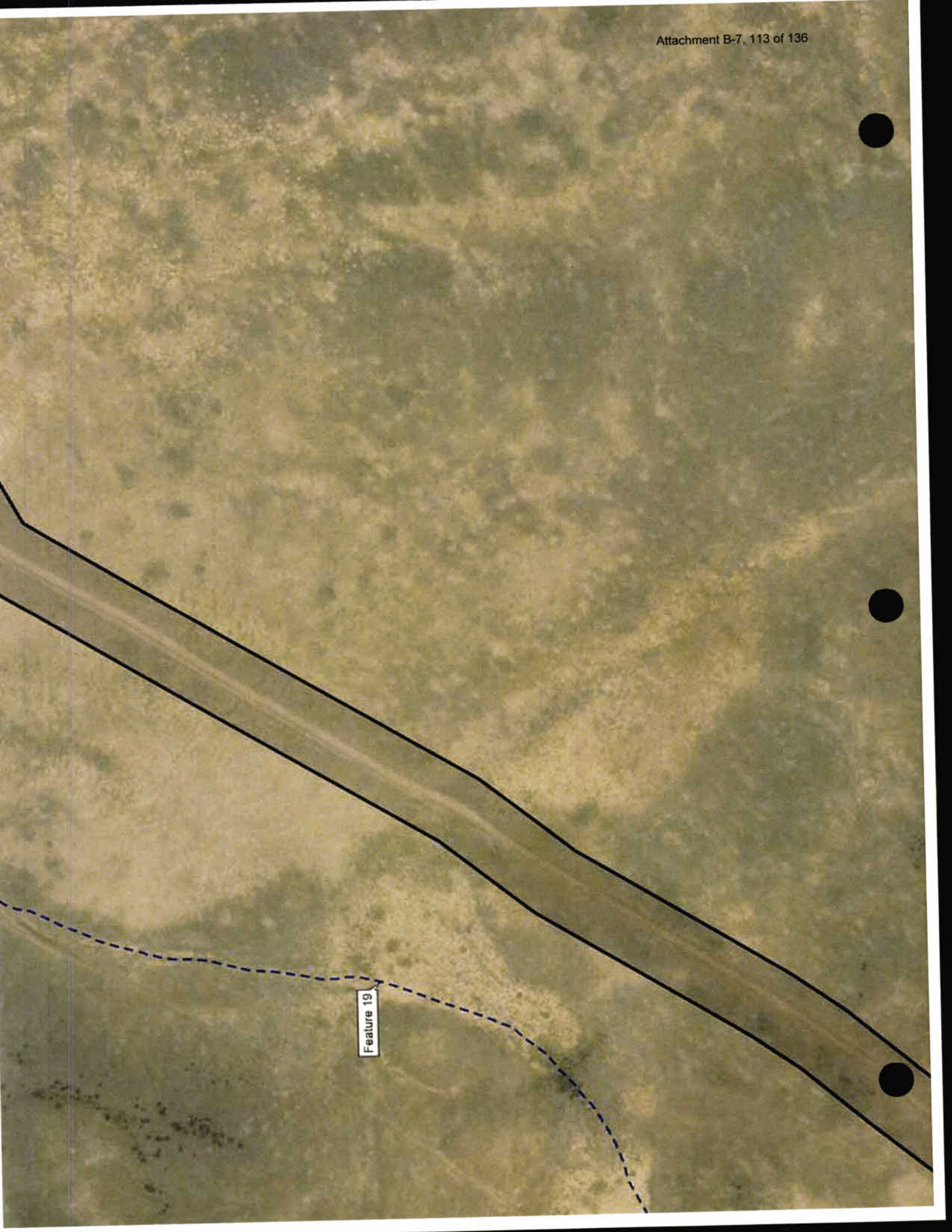


DP 46



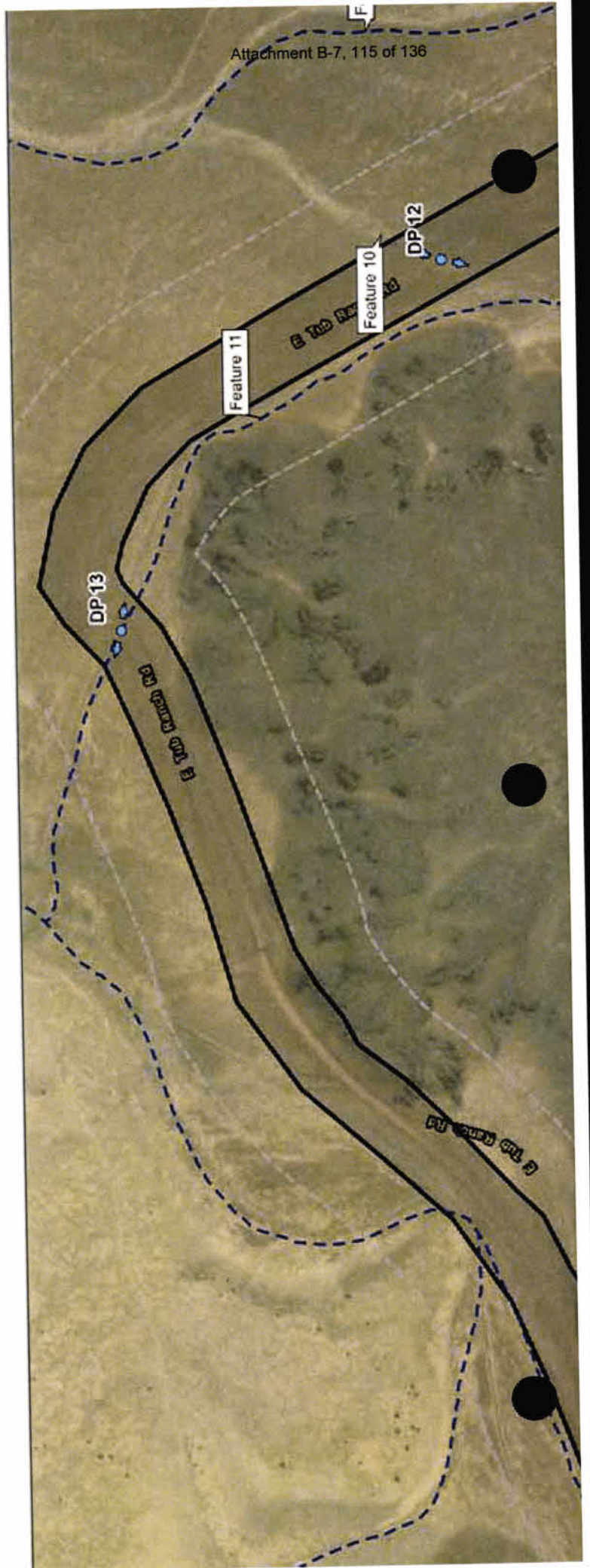
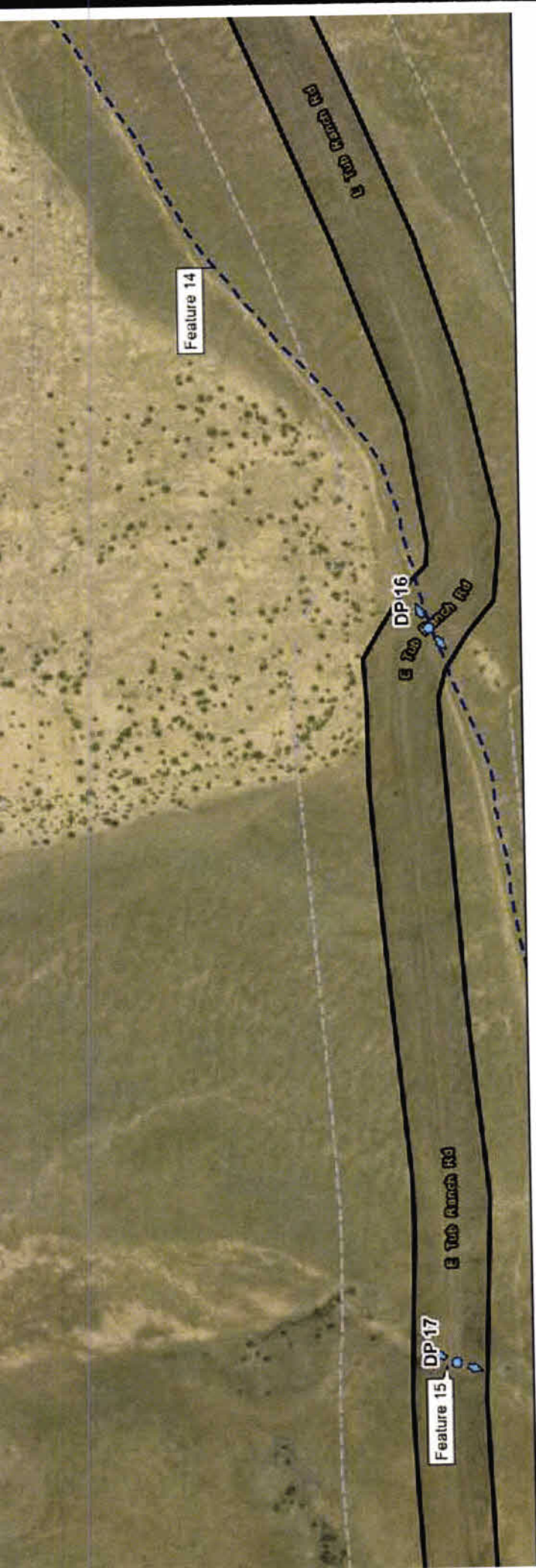


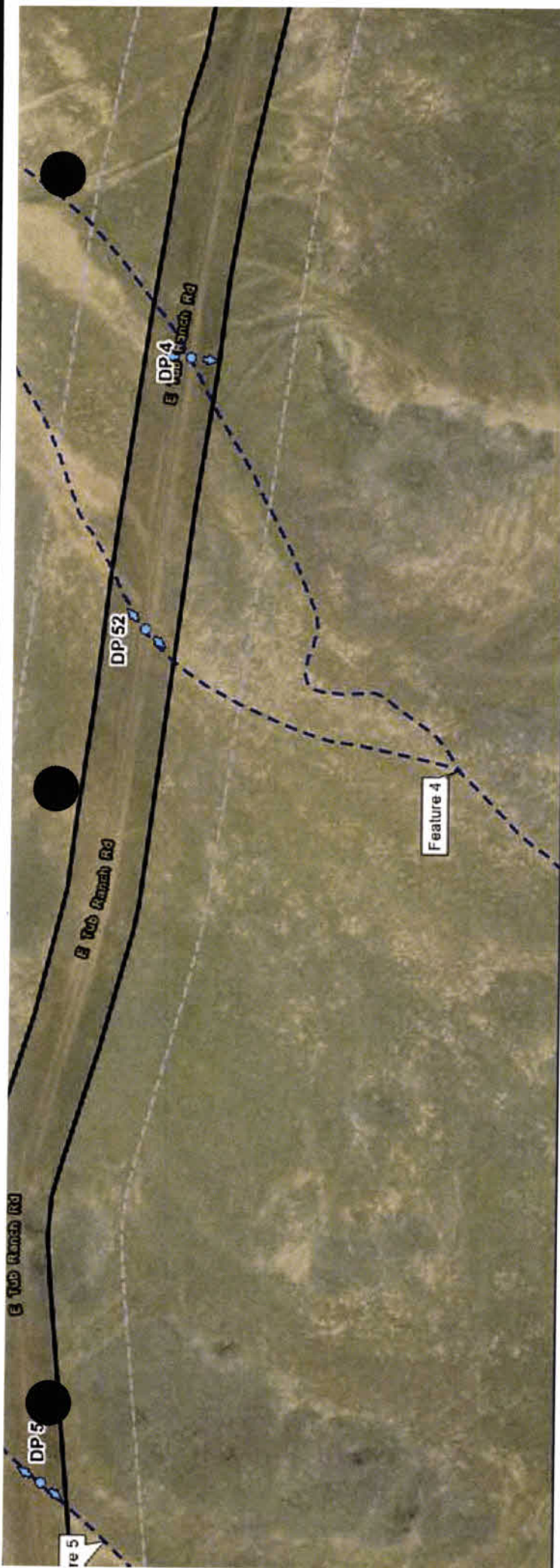




Feature 19



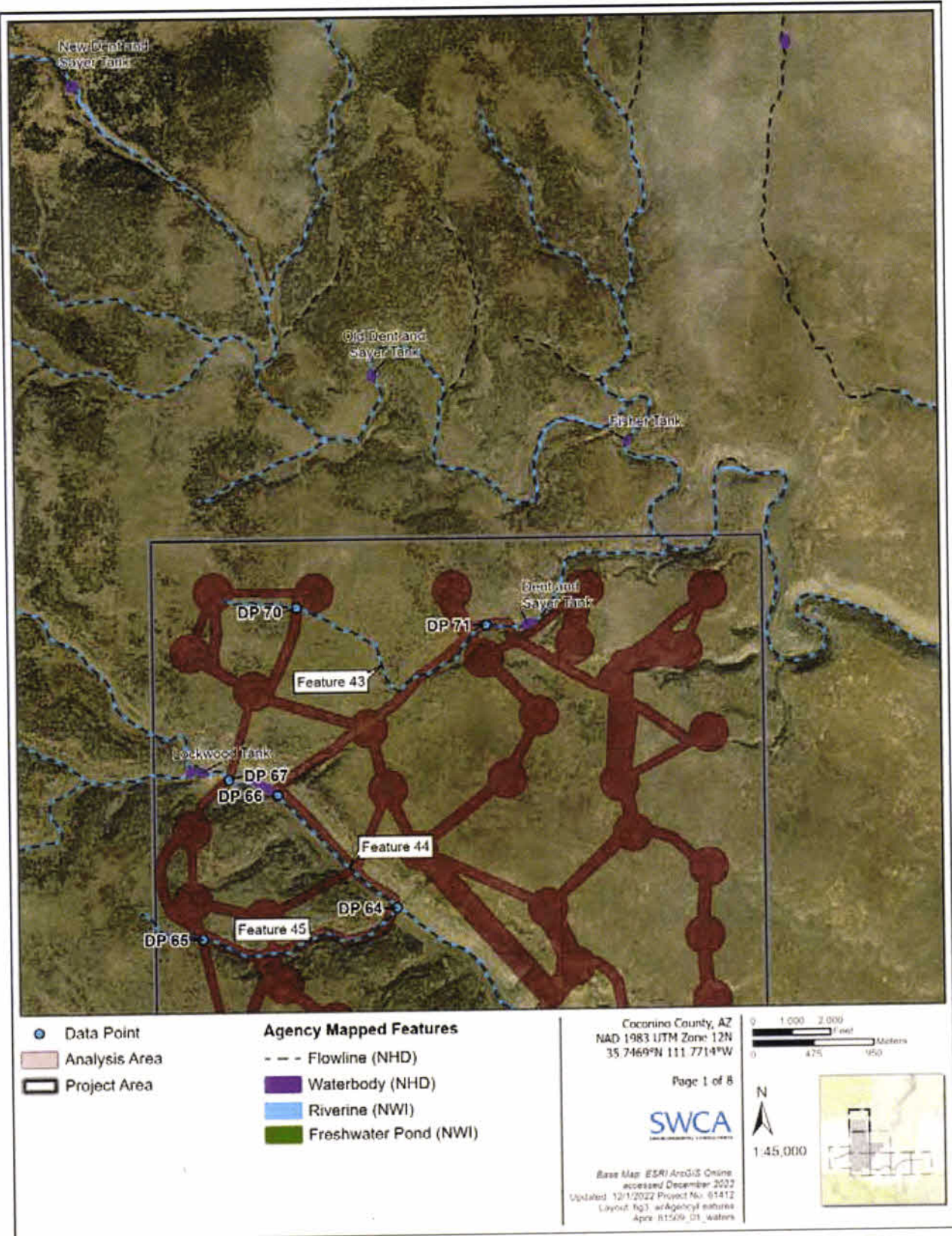


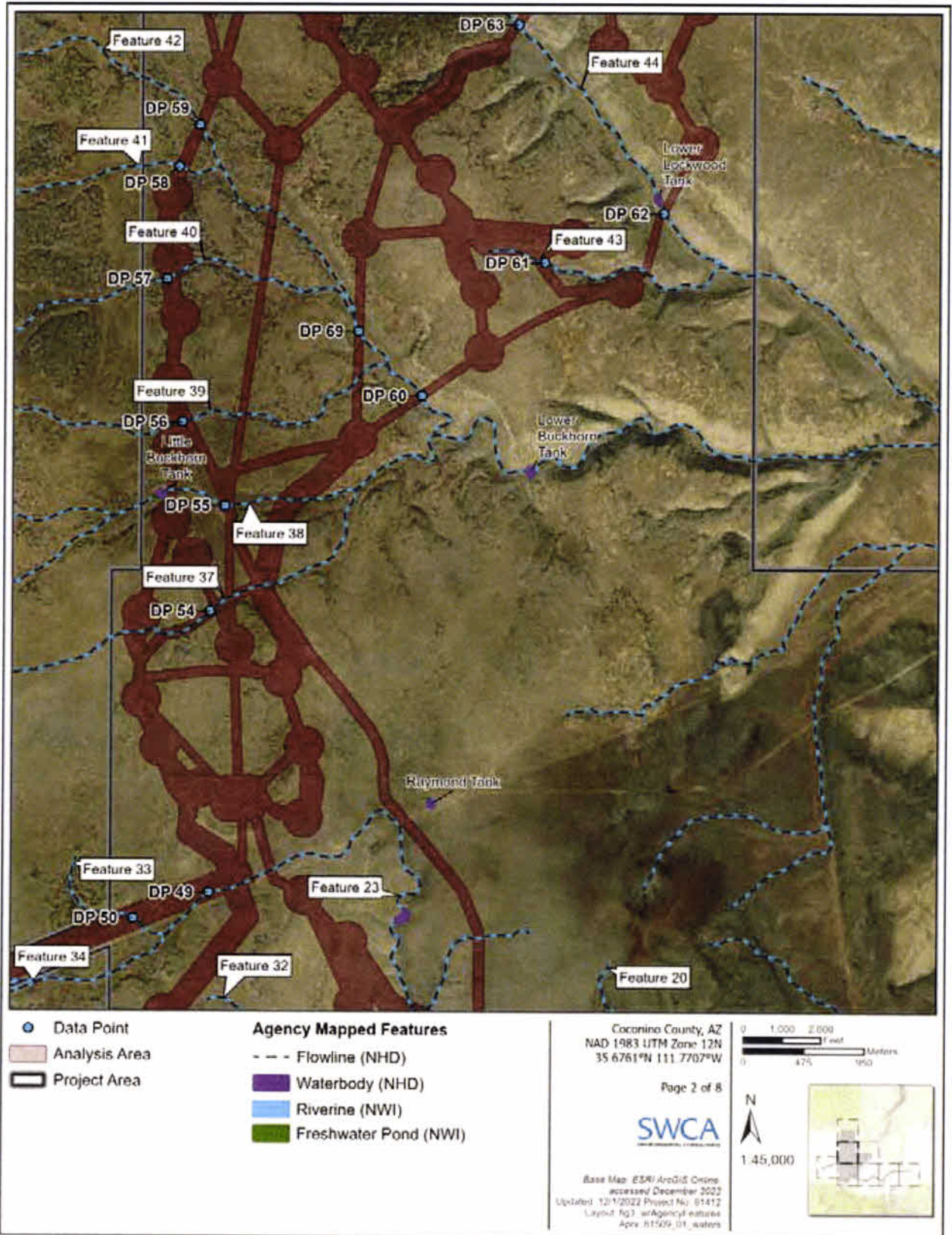


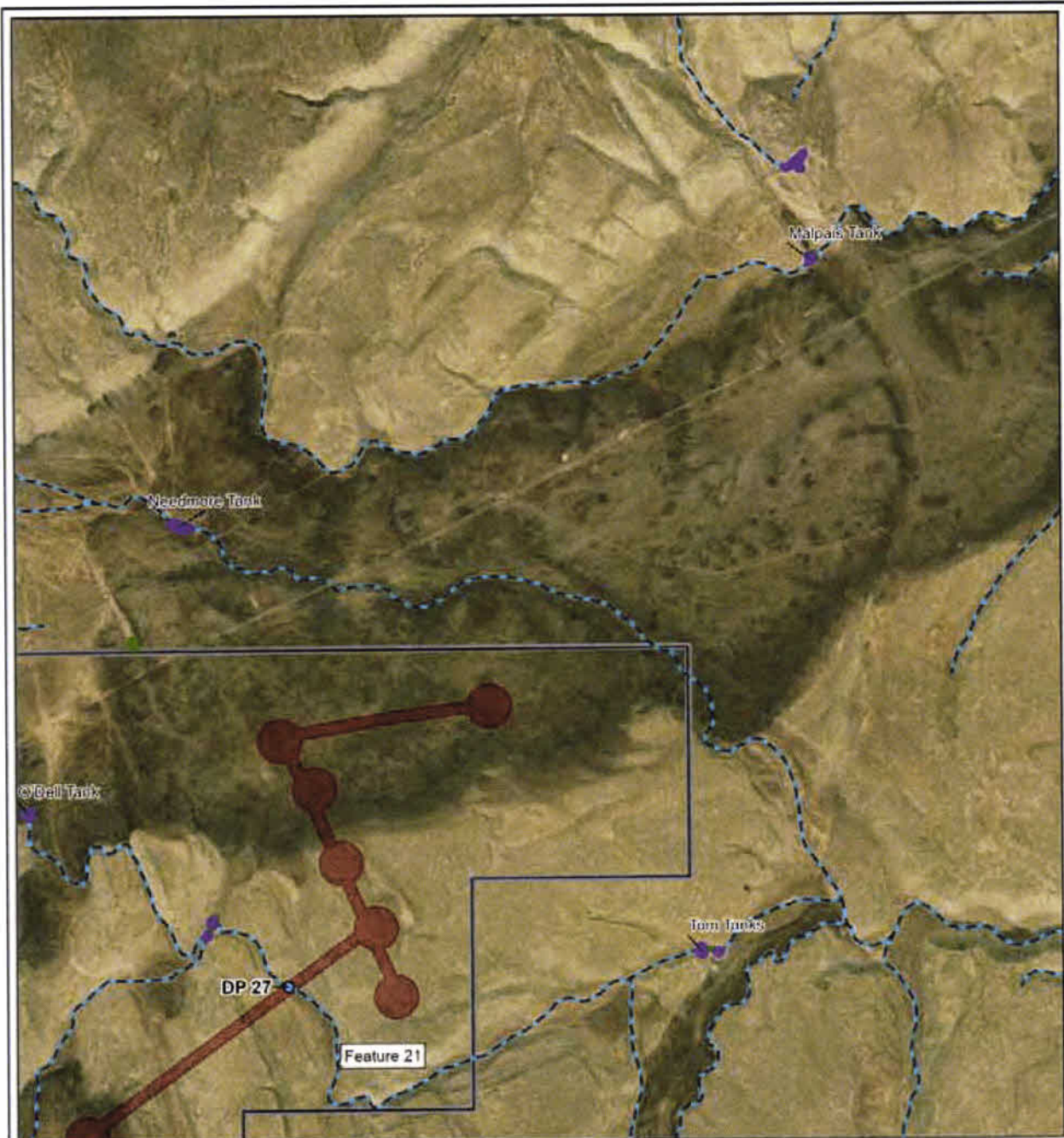
APPENDIX C

Supporting Agency Data

U.S. Environmental Protection Agency National Hydrology Dataset / U.S.
Fish and Wildlife Service National Wetlands Inventory Maps
Federal Emergency Management Agency Floodplain Map
Natural Resources Conservation Service Soils Map
U.S. Army Corps of Engineers Antecedent Precipitation Tool Results







- Data Point
- Analysis Area
- Project Area

- Agency Mapped Features**
- Flowline (NHD)
 - Waterbody (NHD)
 - Riverine (NWI)
 - Freshwater Pond (NWI)

Cocorino County, AZ
NAD 1983 UTM Zone 12N
35 6766°N 111 6902°W

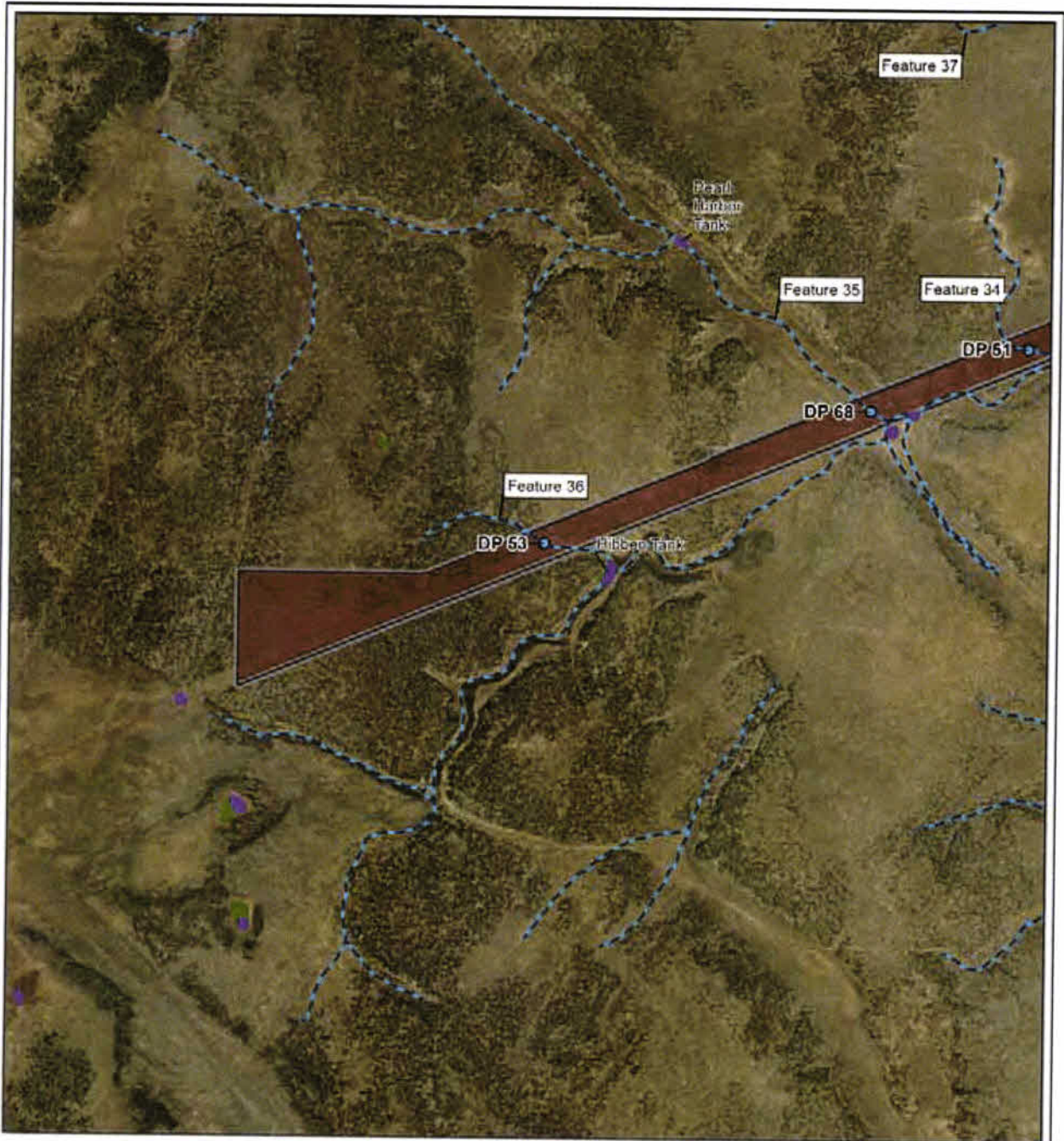


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Base Map: ESRI ArcGIS Online, accessed December 2022
Updated: 12/1/2022 Project No: 01412
Layout: fg3_wAgencyFeatures
Apr 01/2023 01_waters





- Data Point
- Analysis Area
- Project Area

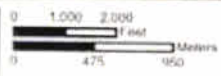
- Agency Mapped Features**
- Flowline (NHD)
 - Waterbody (NHD)
 - Riverine (NWI)
 - Freshwater Pond (NWI)

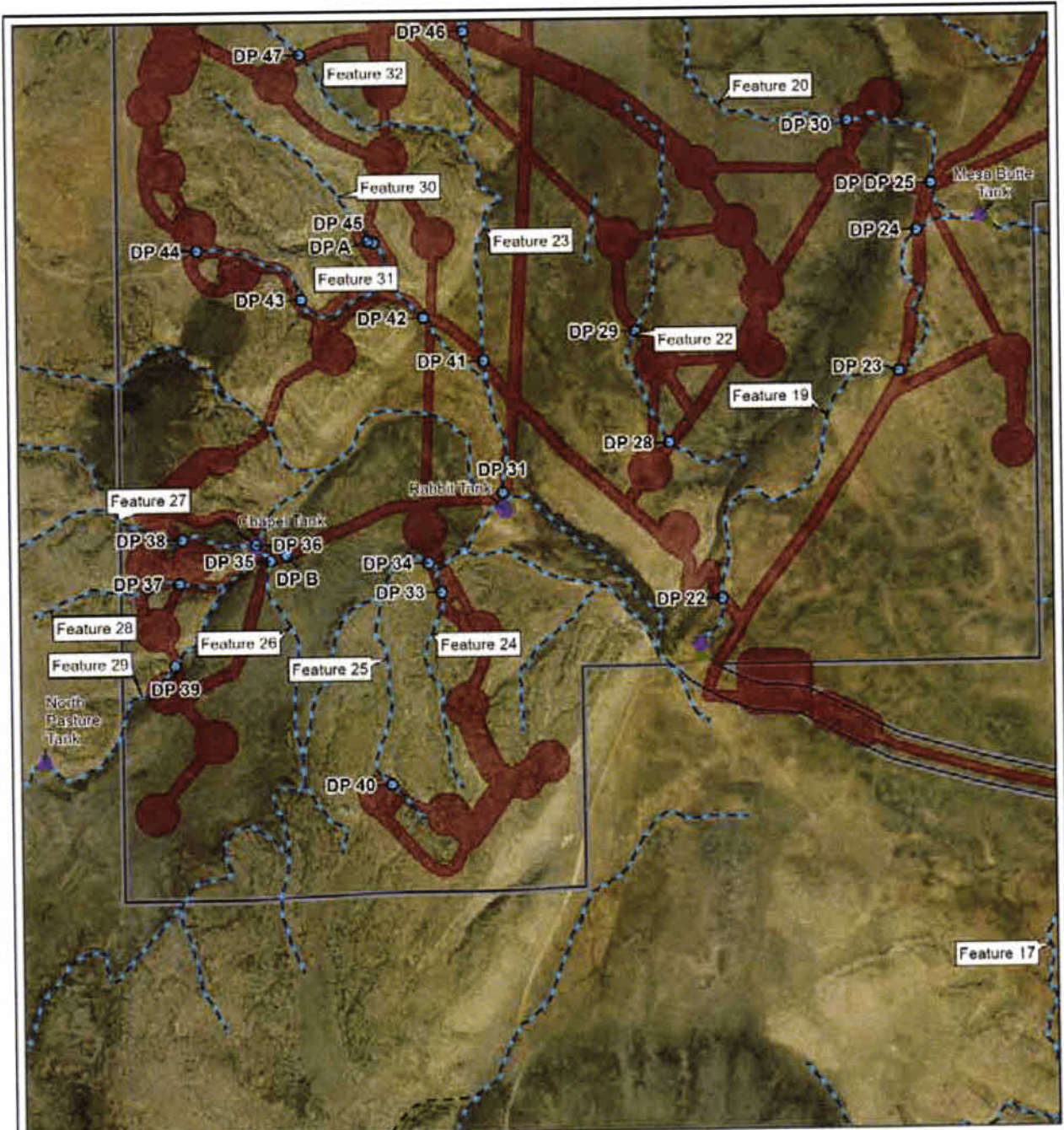
Cocconino County, AZ
 NAD 1983 UTM Zone 12N
 35.6283°N 111.8508°W

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Base Map: ESRI ArcGIS Online
 accessed December 2022
 Updated: 12/1/2022 Project No: 01412
 Layout: fg1_wAgencyFeatures
 App: 01509_01_waters





- Data Point
 - Analysis Area
 - ▭ Project Area
- Agency Mapped Features**
- - - Flowline (NHD)
 - Waterbody (NHD)
 - Riverine (NWI)
 - Freshwater Pond (NWI)

Coconino County, AZ
NAD 1983 UTM Zone 12N
35.6052°N 111.77°W

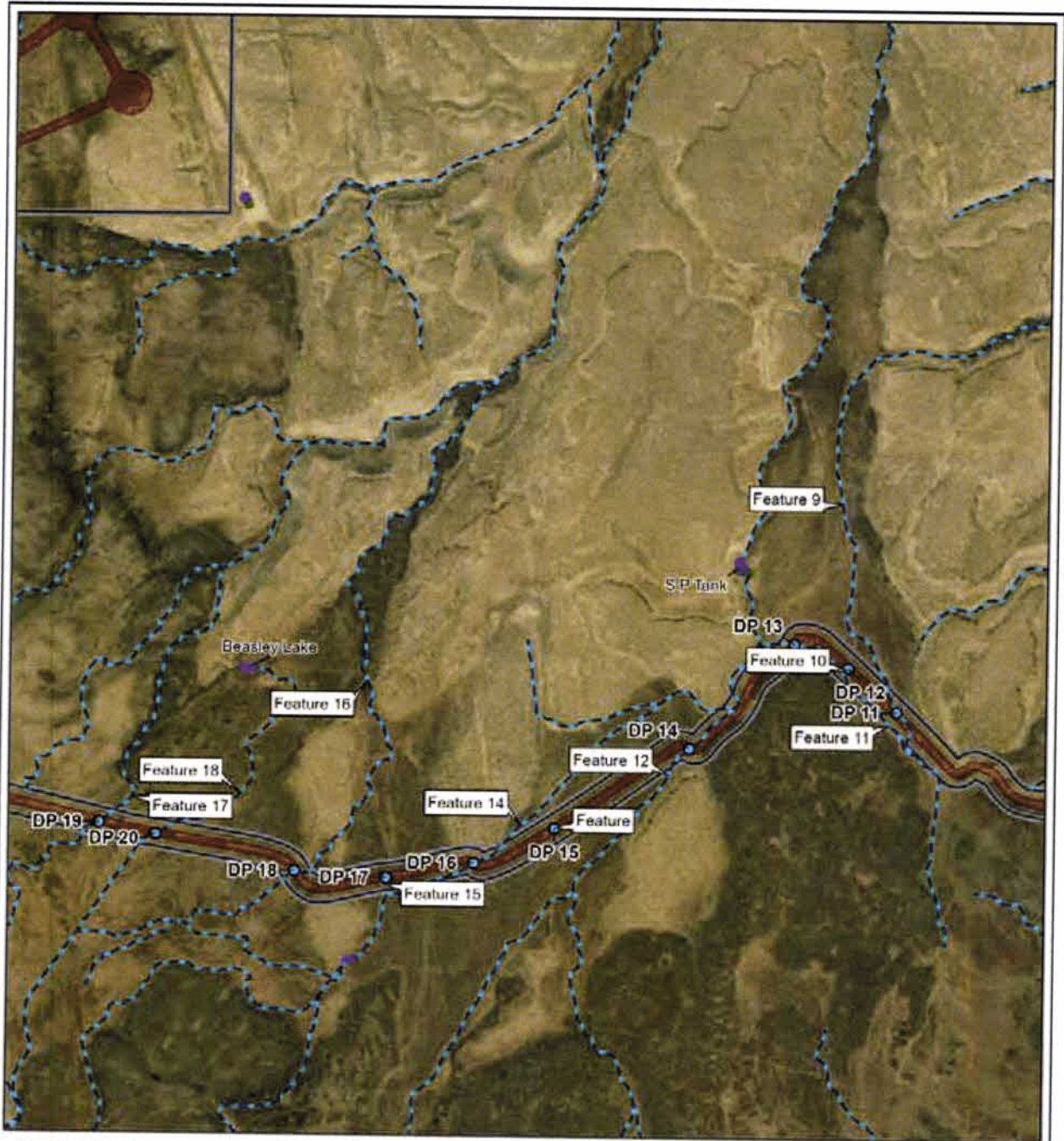
Page 5 of 8



Base Map: ESRI ArcGIS Online, accessed December 2022
Updated: 12/1/2022 Project No: 51412
Layout: 1q3_1wAgencyFeatures_April_15/2019_01_waters

0 1,000 2,000 Feet
0 475 950 Meters

1:45,000



- Data Point
- Analysis Area
- Project Area

Agency Mapped Features

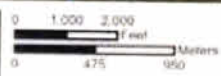
- Flowline (NHD)
- Waterbody (NHD)
- Riverine (NWI)
- Freshwater Pond (NWI)

Cocconino County, AZ
 NAD 1983 UTM Zone 12N
 35 6057°N 111 6895°W

Page 6 of 8

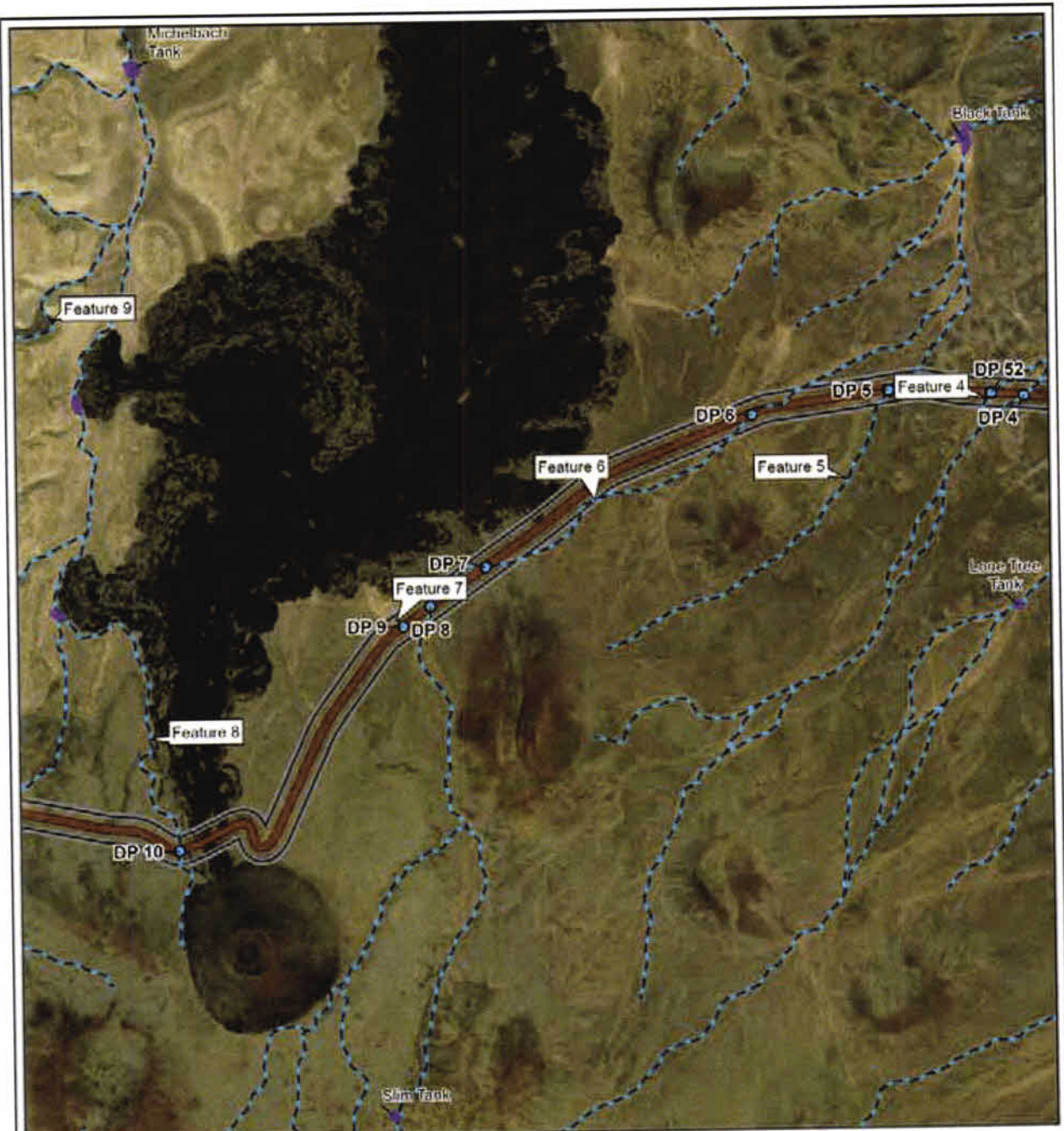


Base Map: ESRI ArcGIS Online
 accessed December 2022
 Updated: 12/1/2022 Project No. 61412
 Layout: f03 - wAgency features
 Apr 01:50N 01_waters



1:45,000





- Data Point
- Analysis Area
- ▭ Project Area

- Agency Mapped Features**
- - - Flowline (NHD)
 - Waterbody (NHD)
 - Riverine (NWI)
 - Freshwater Pond (NWI)

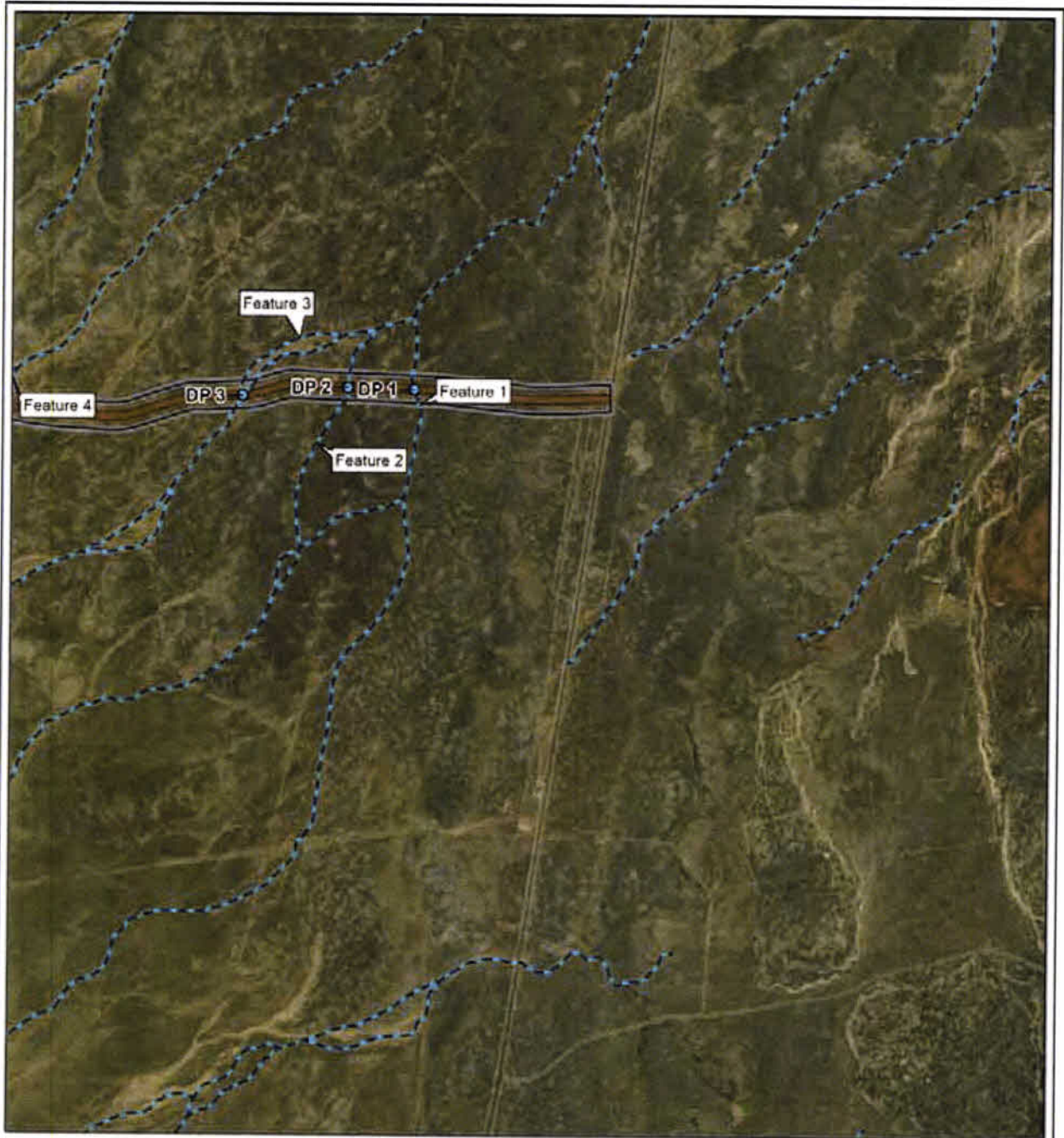
Coconino County, AZ
NAD 1983 UTM Zone 12N
35 6061°N 111.6091°W

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Base Map: ESRI/ArcGIS Online, accessed December 2022
Updated: 12/1/2022 Project No. 81412
Layout: 1q3_wAgency-features
Apr 11/2019_01_waters





- Data Point
- Analysis Area
- ▭ Project Area

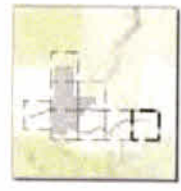
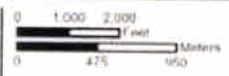
- Agency Mapped Features**
- - - Flowline (NHD)
 - Riverine (NWI)
 - Freshwater Pond (NWI)

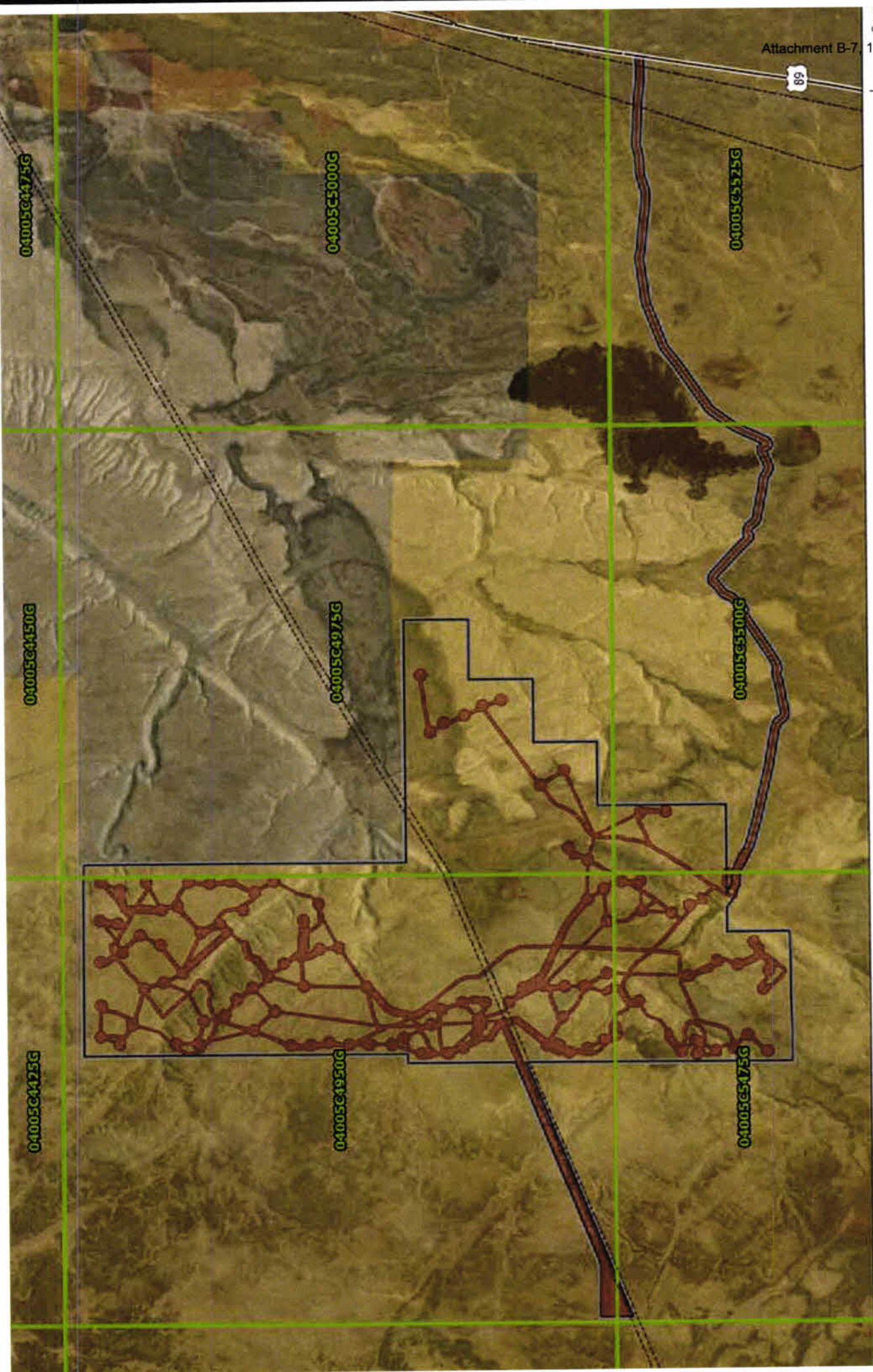
Coconino County, AZ
NAD 1983 UTM Zone 12N
35.6065°N 111.5287°W

Page 8 of 8



Base Map: ESRI ArcGIS Online
accessed December 2022
Updated: 12/1/2022 Project No: 01412
Layout: hg3_wAgencyFeatures
Apr 01:00 01_waters



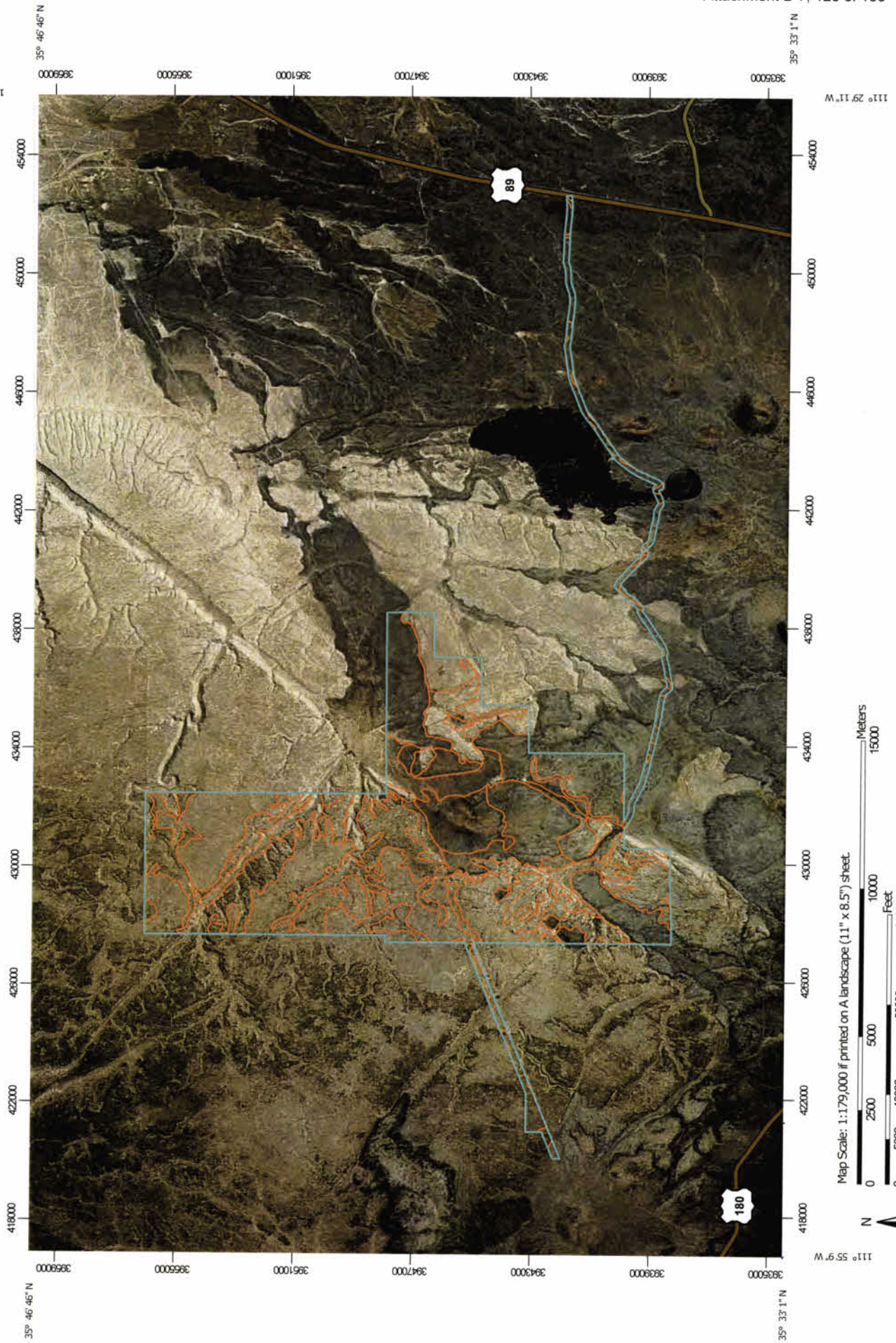


Project Boundaries
 Analysis Area
 Project Area

Existing Infrastructure
 Existing Transmission Line
 Interstate/Highway

azard)
 -d)
 l)





































Soil Map—Coconino County Area, Arizona, Central Part; Kaibab National Forests, Arizona, Parts of Coconino, Mohave and Yavapai Counties; Little Colorado ...
 (project_shapefile_zeus_wind_phase_i_52582_54250)



Map Scale: 1:179,000 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Soil Map Unit Polygons	 Very Stony Spot
 Soil Map Unit Lines	 Wet Spot
 Soil Map Unit Points	 Other
 Special Point Features	 Special Line Features
 Blowout	 Water Features
 Borrow Pit	 Streams and Canals
 Clay Spot	 Transportation
 Closed Depression	 RAILS
 Gravel Pit	 Interstate Highways
 Gravelly Spot	 US Routes
 Landfill	 Major Roads
 Lava Flow	 Local Roads
 Marsh or swamp	 Background
 Mine or Quarry	 Aerial Photography
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Coconino County Area, Arizona, Central Part
 Survey Area Data: Version 16, Sep 15, 2021

Soil Survey Area: Kaibab National Forests, Arizona, Parts of Coconino, Mohave and Yavapai Counties
 Survey Area Data: Version 10, Sep 16, 2021

Soil Survey Area: Little Colorado River Area, Arizona, Parts of Coconino and Navajo Counties
 Survey Area Data: Version 15, Sep 16, 2021

Soil Survey Area: Oak Creek-San Francisco Peaks Area, Arizona, Part of Coconino County
 Survey Area Data: Version 11, Sep 16, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

Soil Map—Coconino County Area, Arizona, Central Part; Kaibab National Forests, Arizona, Parts of Coconino, Mohave and Yavapai Counties; Little Colorado River Area, Arizona, Parts of Coconino and Navajo Counties; and Oak Creek-San Francisco Peaks Area, Arizona, Part of Coconino County
(project_shapefile_zeus_wind_phase_i_52582_54250)

MAP LEGEND

MAP INFORMATION

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Ashfork gravelly clay loam, 1 to 15 percent slopes	4,153.6	14.2%
2	Aut gravelly loam, 0 to 8 percent slopes	28.5	0.1%
3	Aut-Cross association, moderately sloping	645.9	2.2%
11	Deama stony loam, 1 to 15 percent slopes	921.8	3.2%
12	Deama-Rock outcrop complex, 8 to 30 percent slopes	1,087.1	3.7%
13	Deama-Toqui complex, 0 to 8 percent slopes	790.9	2.7%
15	Disterheff very gravelly sandy clay loam, 1 to 15 percent slopes	30.3	0.1%
23	Lava flows	21.6	0.1%
24	Lomaki-Nalaki very cindery loams, 0 to 8 percent slopes	360.6	1.2%
29	Paymaster-Lynx association, gently sloping	747.6	2.6%
31	Poley gravelly loam, 0 to 8 percent slopes	293.5	1.0%
33	Poley-Tusayan association, gently sloping	893.1	3.1%
35	Quivera very gravelly loam, 0 to 8 percent slopes	66.3	0.2%
37	Rune silty clay loam, 0 to 8 percent slopes	190.1	0.7%
55	Tusayan-Lynx association, gently sloping	188.8	0.6%
56	Tuweep very gravelly loam, 0 to 15 percent slopes	185.8	0.6%
60	Winona gravelly loam, 0 to 8 percent slopes	1,713.8	5.9%
61	Winona stony loam, 0 to 8 percent slopes	5,211.4	17.9%
62	Winona-Boysag gravelly loams, 0 to 8 percent slopes	3,513.9	12.0%
64	Winona-Rock outcrop complex, 15 to 30 percent slopes	2,147.9	7.4%
65	Winona-Rock outcrop complex, 30 to 70 percent slopes	2,633.5	9.0%

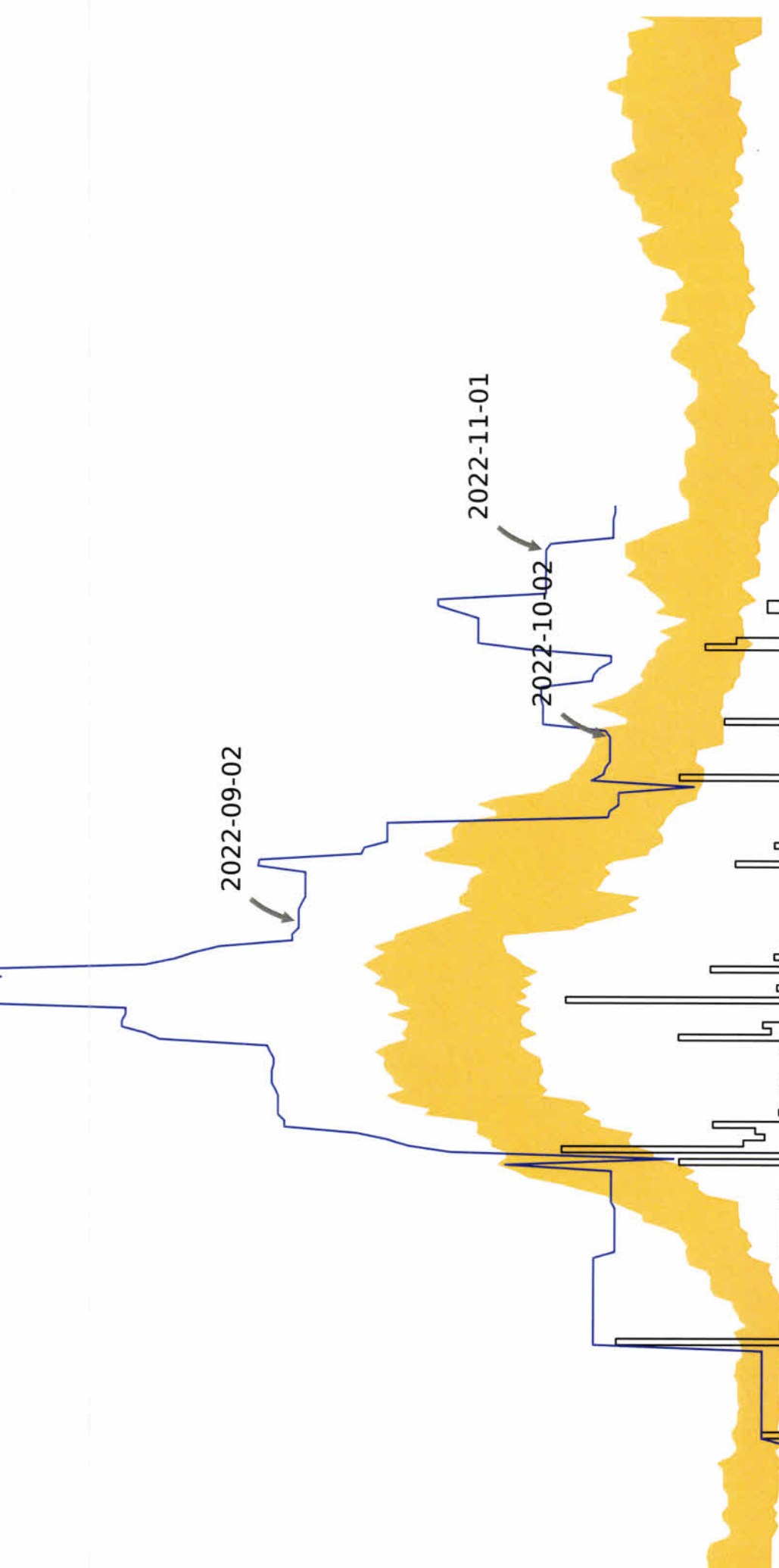
Soil Map—Coconino County Area, Arizona, Central Part; Kaibab National Forests, Arizona, Parts of Coconino, Mohave and Yavapai Counties; Little Colorado River Area, Arizona, Parts of Coconino and Navajo Counties; and Oak Creek-San Francisco Peaks ...

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
67	Wukoki-Rock outcrop complex, 5 to 25 percent slopes	6.2	0.0%
68	Wukoki-Wupatki very cindery loams, 15 to 60 percent slopes	126.5	0.4%
69	Wupatki-Wukoki very cindery loams, 0 to 15 percent slopes	18.4	0.1%
71	Ziegler-Cross association, moderately sloping	2,007.7	6.9%
72	Ziegler-Wilaha association, strongly sloping	1,174.9	4.0%
Subtotals for Soil Survey Area		29,160.0	99.9%
Totals for Area of Interest		29,181.5	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	6.6	0.0%
Subtotals for Soil Survey Area		6.6	0.0%
Totals for Area of Interest		29,181.5	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
28	Mellenthin-Rock outcrop complex, 30 to 70 percent slopes	5.6	0.0%
29	Meriwhitica-Wayneco-Tassi family, complex, 5 to 30 percent slopes	5.9	0.0%
104	Gemcity, tephra-Lava flows complex, 1 to 18 percent slopes	0.0	0.0%
Subtotals for Soil Survey Area		11.5	0.0%
Totals for Area of Interest		29,181.5	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	3.3	0.0%
Subtotals for Soil Survey Area		3.3	0.0%
Totals for Area of Interest		29,181.5	100.0%

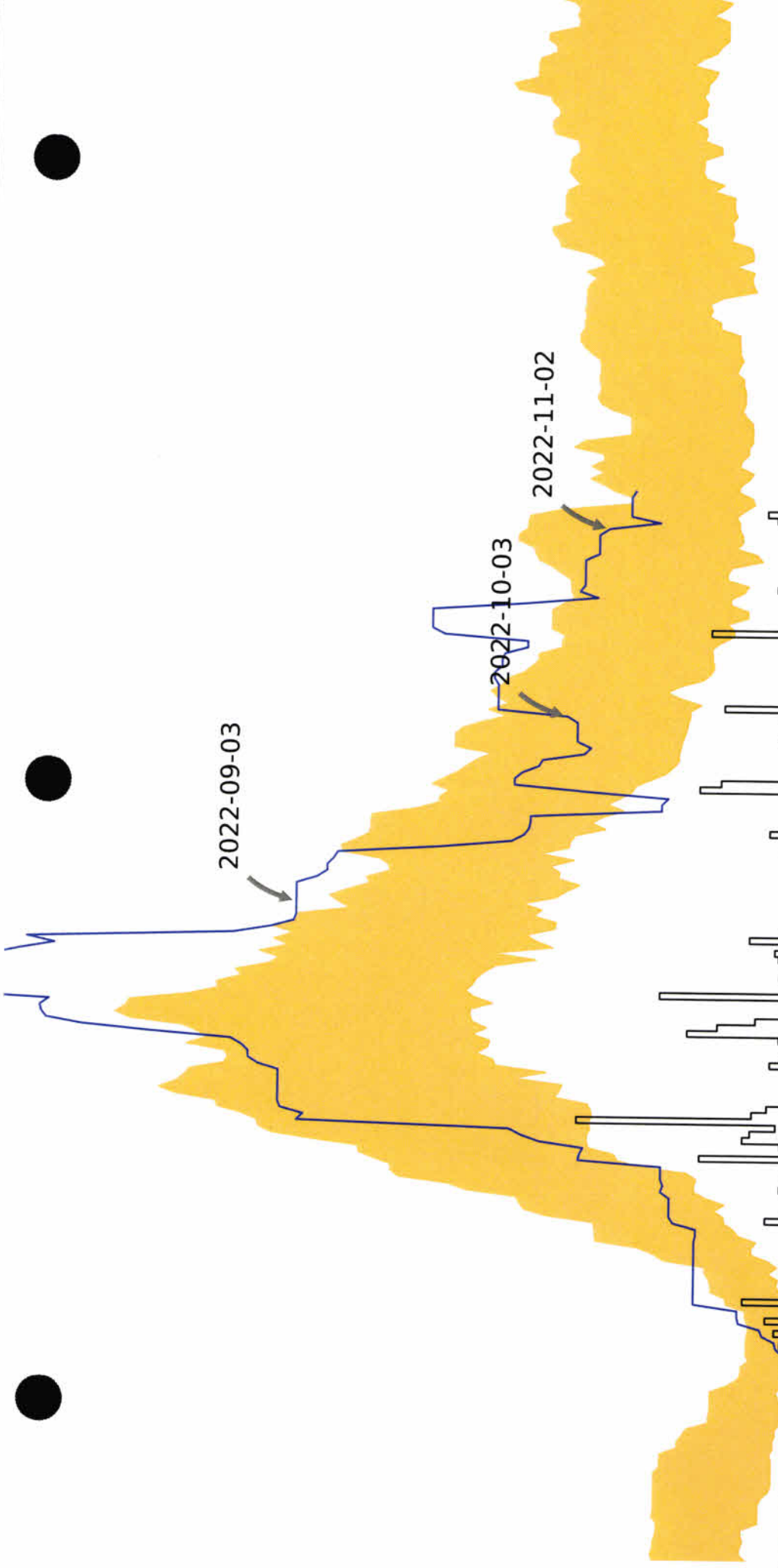


35.648530, -111.738504
 2022-11-01
 6172.58
Moderate drought (2022-10)
 Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month
2022-11-01	0.31063	1.779921	2.661417	Wet	3	Nov 2022
2022-10-02	0.709843	2.109449	1.948819	Normal	2	Oct 2022
2022-09-02	2.189764	3.854331	5.358268	Wet	3	Sep 2022
Result						

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted
SUNSET CRATER NM	35.3694, -111.5436	6979.987	22.184	807.407	27.89
FLAGSTAFF 9.8 NNE	35.3091, -111.5541	6852.034	4.208	127.953	2.43
FLAGSTAFF 10.0 NNE	35.3113, -111.5524	6804.134	4.045	171.73	2.53
FLAGSTAFF 8.2 NE	35.2268, -111.5414	6699.147	7.007	286.84	5.12
ELACSTAFF 0.3 NE	35.2617, -111.5343	6622.033	7.16	362.06	6.7

Figure and tables made by the
Antecedent Precipitation Tool
 Version 1.0

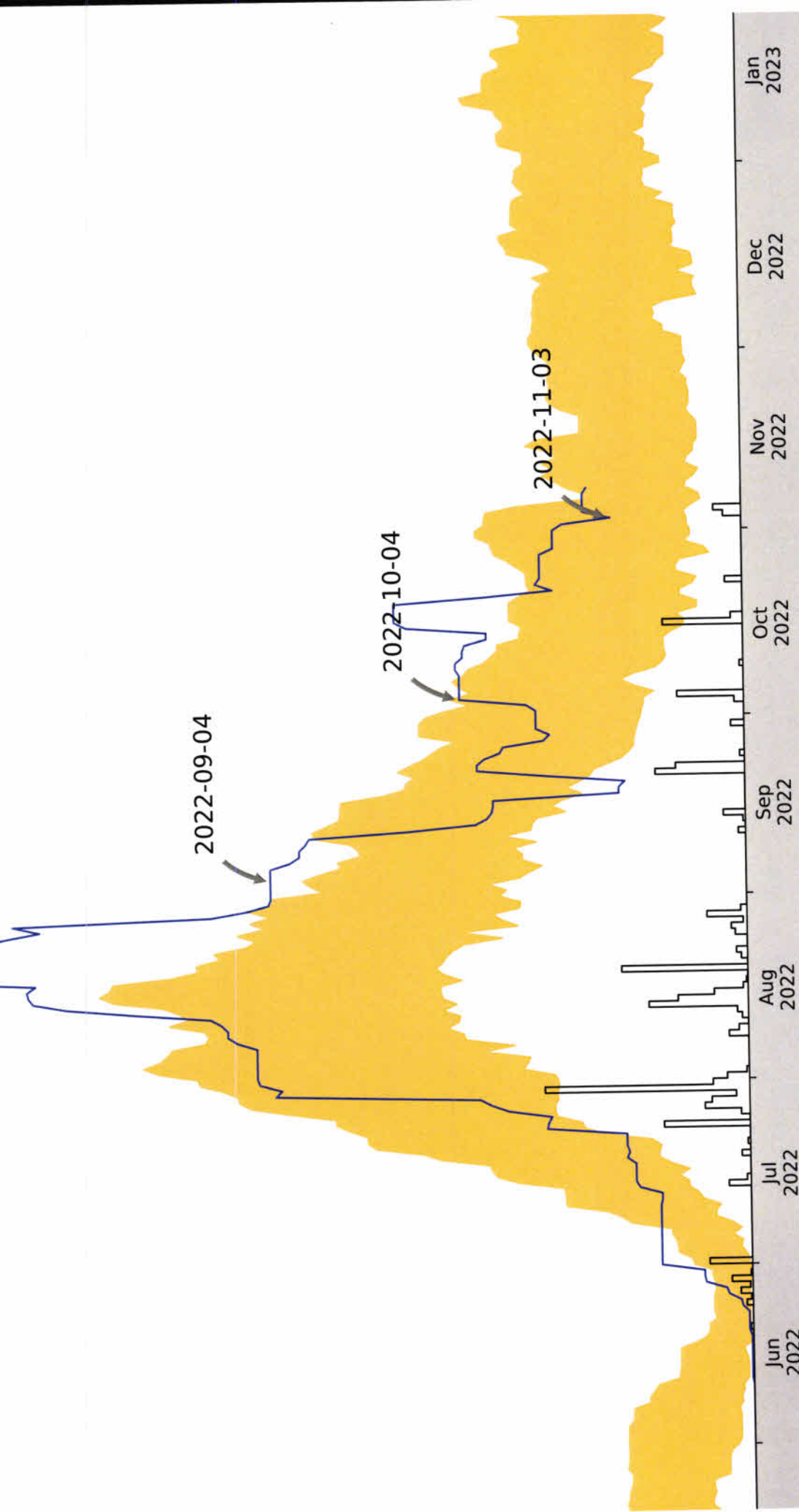


30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month
2022-11-02	0.453543	2.129134	1.484252	Normal	2	Nov 2022
2022-10-03	0.829528	2.273228	1.799213	Normal	2	Oct 2022
2022-09-03	2.142913	3.6	3.933071	Wet	3	Sep 2022

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted
FLAGSTAFF 10.4 NE	35.277, -111.499	6551.837	28.994	379.257	24.04
FLAGSTAFF 3.1 NNW	35.2306, -111.6731	7136.155	29.11	963.575	41.14
FLAGSTAFF 3.2 NNW	35.233, -111.6687	7087.927	28.978	915.347	39.56
FLAGSTAFF 6.8 NW	35.256, -111.7404	7319.882	27.121	1147.302	43.3
FLAGSTAFF 8.2 NE	35.2617, -111.5343	6623.032	29.094	450.452	26.19
FLAGSTAFF 7.9 NE	35.265, -111.5436	6695.866	28.68	523.286	27.91

35.648530, -111.738504
 2022-11-02
 6172.58
Moderate drought (2022-10)
 Wet Season

Figure and tables made by the
Antecedent Precipitation Tool
 Version 1.0



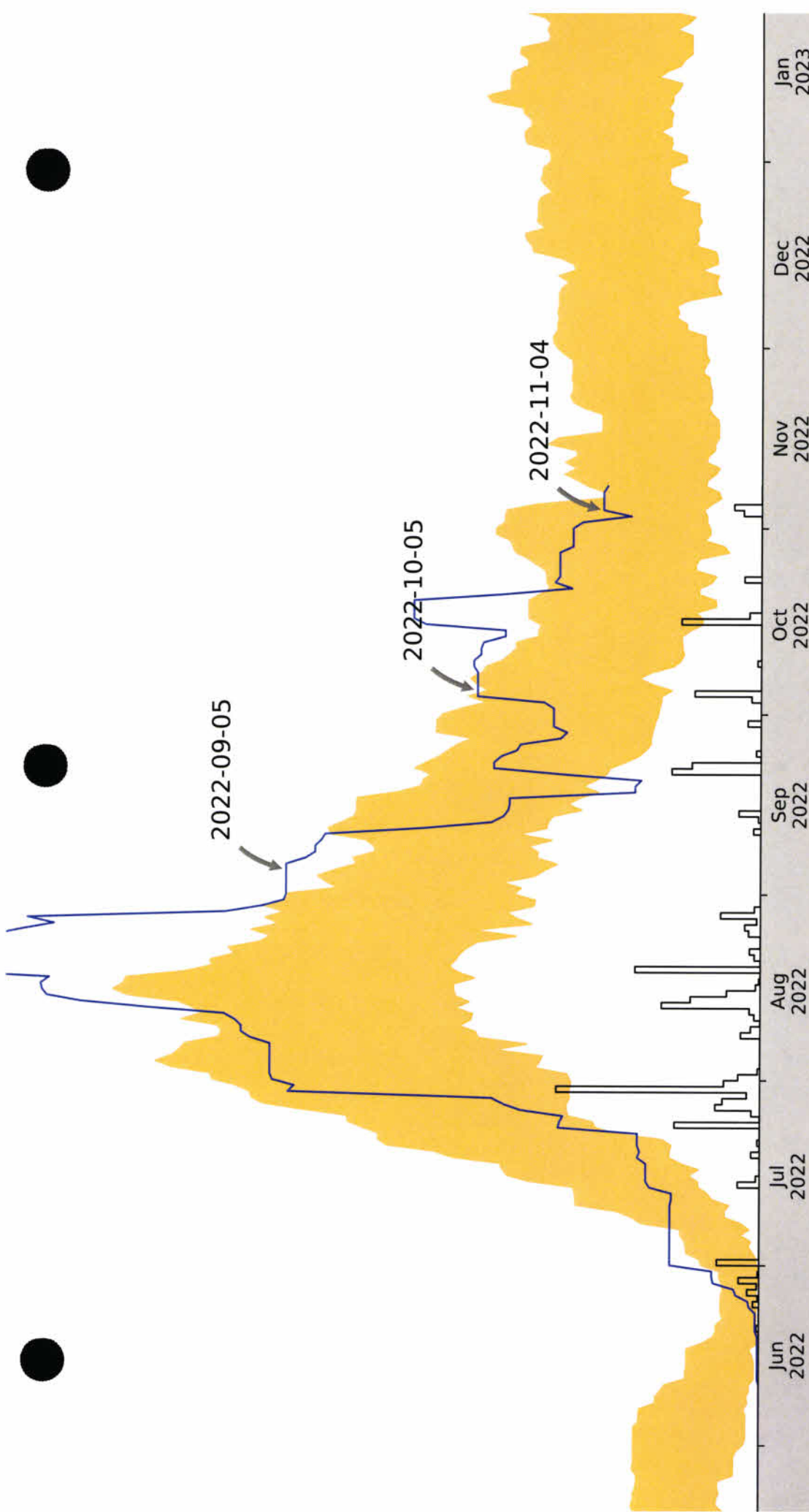
30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month
2022-11-03	0.453543	2.129134	1.082677	Normal		2
2022-10-04	0.826772	2.427165	2.350394	Normal		2
2022-09-04	1.875591	3.670866	3.933071	Wet		3

Weather Station Name	Coordinates		Elevation (ft)	Distance (mi)	Elevation Δ	Weighted
	Latitude	Longitude				
FLAGSTAFF 10.4 NE	35.277	-111.499	6551.837	28.994	379.257	24.04
FLAGSTAFF 3.1 NNW	35.2306	-111.6731	7136.155	29.11	963.575	41.14
FLAGSTAFF 3.2 NNW	35.233	-111.6687	7087.927	28.978	915.347	39.56
FLAGSTAFF 6.8 NW	35.256	-111.7404	7319.882	27.121	1147.302	43.3
FLAGSTAFF 8.2 NE	35.2617	-111.5343	6623.032	29.094	455.52	26.19
FLAGSTAFF 7.9 NE	35.265	-111.5436	6695.866	28.68	522.86	27.91
FLAGSTAFF 10.0 NNE	35.3113	-111.5524	6804.134	25.545	631.554	27.62

35.648530, -111.738504
 2022-11-03
 6172.58
Moderate drought (2022-10)
 Wet Season

Figure and tables made by the
Antecedent Precipitation Tool
 Version 1.0

Attachment B-7-135



Attachment B-7 135

35.648530, -111.738504
2022-11-04
6172.58
Moderate drought (2022-10)
Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month
2022-11-04	0.481102	2.11378	1.311024	Normal	2	Nov 2022
2022-10-05	0.743307	2.261024	2.350394	Wet	3	Oct 2022
2022-09-05	1.792913	3.525984	3.933071	Wet	3	Sep 2022

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted
FLAGSTAFF 10.4 NE	35.277, -111.499	6551.837	28.994	379.257	324.04
FLAGSTAFF 3.1 NNW	35.2306, -111.6731	7136.155	29.11	963.575	41.14
FLAGSTAFF 3.2 NNW	35.233, -111.6687	7087.927	28.978	915.347	39.56
FLAGSTAFF 6.8 NW	35.256, -111.7404	7319.882	27.121	1147.302	43.3
FLAGSTAFF 8.2 NE	35.2617, -111.5343	6623.032	29.094	450.452	26.19
FLAGSTAFF 7.9 NE	35.265, -111.5436	6695.866	28.68	523.286	27.91
FLAGSTAFF 10.0 NNE	35.3113, -111.5524	6804.134	25.545	631.554	27.62

Figure and tables made by the
Antecedent Precipitation Tool
 Version 1.0

EXHIBIT C. AREAS OF BIOLOGICAL WEALTH

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

Describe any areas in the vicinity of the proposed site or route which are unique because of biological wealth or because they are habitats for rare and endangered species. Describe the biological wealth or species involved and state effects, if any, the proposed facilities will have thereon.

Introduction

The proposed Forged Ethic Wind Energy Interconnection Project (Interconnection Project) would be built on open rangeland just north of and parallel to two existing 500-kV transmission lines. Unpaved ranch roads cross under and run along the length of the existing transmission lines. The Study Area for biological wealth is a 0.5 mile buffer around the project because the farthest-reaching effects associated with the Interconnection Project would most likely be noise from construction equipment and vehicle traffic, which typically extends up to 0.5 mile from the noise source (Wrigley 2018).

Methods

Areas of biological wealth and the rare and endangered species that may occur at or in the vicinity of the proposed Interconnection Project were identified through a biotic resource review using the following resources:

- The U.S. Fish and Wildlife Service (USFWS) official species list for the proposed Interconnection Project obtained from the USFWS online Information for Planning and Consultation (IPaC) system (USFWS 2023a; Attachment C-1).
- Species information obtained from the Arizona Game and Fish Department (AGFD) online Environmental Online Review Tool (AGFD 2023a; Attachment C-2).
- Land cover, elevation data, and species descriptions from a variety of sources.

In addition, biologists with SWCA Environmental Consultants (SWCA) have conducted field reconnaissance and wildlife surveys adjacent to the Study Area, beginning in February 2021. For more information about the surveys, see Exhibits B and D.

Results

The AGFD (2023a) identified an Important Connectivity Zone and three named wildlife linkages that intersect with the Study Area. Each wildlife linkage is an area, or corridor, used by wildlife to move between or within habitat blocks in order to complete activities necessary for survival and reproduction (AGFD 2011a).

- The Utah–San Francisco Peaks wildlife linkage connects pinyon-juniper, sagebrush, desert, grassland along valleys, canyons, and edges of cliffs/plateaus and is important for the movement of raptors and bats.

- The South Rim–San Francisco Peaks–Woody Ridge/Bellefont Area wildlife linkage connects canyons and conifer forest to grasslands and is important for sentry milkvetch (*Astragalus cremnophylax* var. *cremnophylax*), mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), and Gunnison’s prairie dog (*Cynomys gunnisoni*).
- The Coconino Plateau wildlife linkage connects grasslands, conifer woodlands, and conifer forest and is important for American pronghorn (*Antilocapra americana americana*), mule deer, and elk (AGFD 2011a).

No other areas of biological importance were identified by either the USFWS (2023a) or the AGFD (2023a) in the vicinity of the Interconnection Project.

The USFWS (2023a) and AGFD (2023a) provided lists of special-status species that should be considered in an effects analysis for the Interconnection Project. These species and the likelihood of their being present in the vicinity of the Interconnection Project are addressed below in three sections: Federally Listed and Candidate Species, Other Special-Status Species, and State-Protected Native Plant Species.

Special-status species observed during SWCA’s site visits and wildlife surveys are also addressed in this exhibit.

Federally Listed and Candidate Species

Five federally listed or candidate species were identified by the USFWS (2023a) in its official species list for the Interconnection Project. These species include one mammal (Mexican wolf [*Canis lupus baileyi*]), two birds (Mexican spotted owl [*Strix occidentalis lucida*] and yellow-billed cuckoo [*Coccyzus americanus*]), one insect (monarch butterfly [*Danaus plexippus*]), and one plant (Fickeisen plains cactus [*Pediocactus peeblesianus* ssp. *fickeiseniae*]). The Study Area is within the geographical/elevational range and contains appropriate habitat conditions for only one of the five species: the monarch butterfly (Table C-1). The other four species are unlikely to occur in the Study Area (see Table C-1).

Table C-1. Federally Listed and Candidate Species Reviewed for Their Potential to Occur in the Study Area

Common Name (Scientific Name)	Status*		Range or Habitat Requirements	Potential for Occurrence in Study Area
	Federal	State		
Mexican wolf (<i>Canis lupus baileyi</i>)	E, EXPN	SGCN Tier 1	Inhabits oak and pinyon/juniper savannas in foothills and mixed-conifer woodlands above 4,000 feet above mean sea level (amsl).	Unlikely to occur. The Study Area is approximately 25 miles north of the Mexican Wolf Experimental Population Area (MWEPA), the northern border of which runs along Interstate 40. Wolves that stray outside the MWEPA are captured and returned (personal communication, Corina Anderson, SWCA, and Ryan Gordon, USFWS). According to USFWS radio-collar tracking data, the nearest recent record of a Mexican wolf is approximately 90 miles southeast of the Study Area in the Apache-Sitgreaves National Forests.
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T	SGCN Tier 1	Found in mature montane forests and woodlands and steep, shady, wooded canyons. Generally, nests in older forests of mixed conifers or ponderosa pine–Gambel oak in live trees, snags, and canyon walls at	Unlikely to occur. The Study Area does not contain suitable nesting and roosting habitat for this species. Critical habitat for this species is located approximately 9 miles south in the Kaibab National Forest.

Common Name (Scientific Name)	Status*		Range or Habitat Requirements	Potential for Occurrence in Study Area
	Federal	State		
			elevations between 4,100 and 9,000 feet amsl.	
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	T	SGCN Tier 1	Typically found in riparian woodland vegetation (cottonwood, willow, or saltcedar) at elevations below 6,600 feet amsl. Dense understory foliage appears to be an important factor in nest site selection.	Unlikely to occur. The Study Area does not contain suitable habitat parameters: there is no riparian woodland vegetation or dense understory foliage in or near the Study Area. Critical habitat for this species is located approximately 53 miles south of the Study Area along the Verde River.
Monarch butterfly (<i>Danaus plexippus</i>)	C	–	Monarch butterflies are a migratory species found in a variety of habitats, often near water sources. They require milkweed (<i>Asclepias</i> spp.) for breeding. Populations in Arizona overwinter in Mexico and California, more rarely in the low deserts of Arizona.	May occur. See below for details.
Fickeisen plains cactus (<i>Pediocactus peeblesianus</i> ssp. <i>fickeiseniae</i>)	E, EXPN	ANPL	Populations are found on gravelly limestone or gravelly loam in desertscrub at elevations between 4,200 and 5,950 feet amsl. Known to occur in the vicinity of Cataract Canyon, Mays Canyon, and the community of Gray Mountain in Coconino County and the Arizona Strip in Coconino and Mohave Counties.	Unlikely to occur. The Study Area is above the species' elevational range of 4,200 to 5,950 feet amsl, although soil types associated with the species (Winona stony loam, 0 to 8 percent slopes, and Winona-Boysag gravelly loam, 0 to 8 percent slopes) are present within the Study Area. The nearest critical habitat is approximately 17 miles to the northeast in the vicinity of Gray Mountain, Arizona, and the nearest species record is within that critical habitat unit.

Note: All species were listed in USFWS (2023a). Potential occurrence determination based on information from AGFD (2023b, 2023c), ArcGIS (2023), Arizona Rare Plant Committee (2023), Corman and Wise-Gervais (2005), Morris et al. (2015), USFWS (2016, 2020, 2023b).

* Federal status definitions

C = Candidate for listing; E = Endangered - species in danger of extinction throughout all or a significant portion of their range; EXPN = Experimental population, non-essential; T = Threatened species likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

* State status definitions

ANPL = Protected by the Arizona Native Plant Law; SGCN = Species of Greatest Conservation Need; wildlife species identified by AGFD (2022a) as having conservation priority. SGCN Tier 1 species are those categorized by AGFD (2022a) as "highest priority vulnerable" species.

MONARCH BUTTERFLY

The monarch butterfly is a candidate species for listing. There are generally no provisions in the Endangered Species Act, as amended (16 United States Code 1531 et seq.) for candidate species, but the USFWS encourages opportunities to conserve the species. Adult monarchs feed on the nectar of many flowers during breeding and migration, but they lay eggs only on milkweed (*Asclepias* spp.) plants. The species occurs throughout Arizona during the summer and migrates to winter in Mexico and California, though small numbers do overwinter in the low deserts of southwestern Arizona (Morris et al. 2015; USFWS 2020, 2023b). In the southwestern United States, migrating monarchs often occur near water sources such as rivers, creeks, riparian corridors, roadside ditches, and irrigated gardens.

The Study Area is within the summer range for the species and contains suitable nectar-producing species for monarch foraging, such as rabbitbrush (*Chrysothamnus* spp.) and thistles (*Cirsium* spp.). Broadleaf (*Asclepias latifolia*) and horsetail (*A. subverticillata*) milkweed species have been observed in the vicinity; therefore, this species may occur in spring through fall.

Other Special-Status Species

Other special-status species considered for this project fall into the following conservation categories:

1. Eagle species—bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*)—protected by the Bald and Golden Eagle Protection Act (BGEPA).
2. Birds of Conservation Concern (BCC), which are bird species beyond those designated as federally threatened or endangered that represent the USFWS’s highest conservation priorities (USFWS 2021). The BCC for this project are those that occur in Bird Conservation Region 34.
3. Species of Greatest Conservation Need (SGCN) in Arizona, which are species identified by the AGFD (2022a) as warranting heightened attention because of low and declining populations. SGCN are prioritized into three tiers. Tier 1 species include federally listed taxa (or those requiring post-delisting monitoring); species protected under the BGEPA; closed-season species; and species covered by AGFD-signed conservation agreements, a conservation strategy and assessment, or a strategic conservation plan. Tier 2 represents the remainder of the species meeting the vulnerability criteria. Tier 3 species are those for which the AGFD was unable to assess status and thus represent priority research and information needs. Only Tier 1 and 2 species are addressed in this document.

Table C-2 lists special-status species identified by the AGFD (2023a) that may occur in the Study Area because the area falls within the species’ predicted range and contains suitable habitat. Also included in Table C-2 are species not identified by the AGFD (2023a) but which may occur in the Study Area because they were observed in the vicinity during SWCA’s wildlife studies, and suitable habitat is present. Table C-3 lists species that were identified by the AGFD (2023a) but are unlikely to occur in the Study Area because it is outside their geographic range, or lacks suitable habitat, or both.

Table C-2. Other Special-Status Species that May Occur in the Study Area

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Birds				
American kestrel (<i>Falco sparverius</i>)	-	SGCN Tier 2	Favors open settings including deserts and grasslands with scattered trees or other structures for perching and nesting; also reported in open pinyon-juniper woodlands. Found year-round in most of Arizona at elevations ranging from approximately 100 to 9,500 feet above mean sea level (amsl).	May occur. The Study Area is within the year-round range, contains appropriate habitat associations, and the species was observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
American peregrine falcon (<i>Falco peregrinus anatum</i>)	-	SGCN Tier 1	Found in a variety of biomes; generally associated with cliffs and open landscapes. Year-round range includes almost all of Arizona.	May occur. The Study Area is within the year-round range, contains appropriate habitat associations, and the species was observed in 2022 during avian surveys within 8 miles of the Study Area.
American pipit (<i>Anthus rubescens</i>)	-	SGCN Tier 2	In winter and on migration, reported on coastal beaches and marshes, mud flats and river courses, stubble fields and recently plowed fields, and prairie dog colonies. Common migrant throughout Arizona; winter range includes the entire state; known to breed above timberline in the San Francisco Peaks.	May occur. The Study Area is within the non-breeding range, and the species was observed in 2021 during avian surveys within 8 miles of the Study Area.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	BGEPA	SGCN Tier 1	Aquatic habitats with open water or Southwest arid regions with available food (small birds, rodents, and carrion) and roost sites. Non-breeding eagles range throughout Arizona except for the south-central portion of the state; breeding eagles occur in limited, fragmented locations of central, east-central, and west-central portions of the state.	May occur. The Study Area is within the non-breeding range; food resources are available. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Black-throated gray warbler (<i>Setophaga nigrescens</i>)	-	SGCN Tier 2	Habitat includes open coniferous or mixed coniferous-deciduous woodland with brushy undergrowth, pinyon-juniper and pine-oak associations, and oak scrub. Breeding range includes northern and eastern Arizona; migration range includes central and southwestern portions of the state.	May occur. The Study Area is within the breeding range and contains pinyon-juniper woodlands.
Brewer's blackbird (<i>Euphagus cyanocephalus</i>)	-	SGCN Tier 2	Prefers cooler, higher elevation areas near irrigated lands or other permanent water sources (e.g., marshy meadows, springs, ponds, and lake edges) for nesting with guard perches and shortgrass foraging areas. Year-round resident north of the Mogollon Rim; non-breeding south and west of the Mogollon Rim.	May occur as a migrant or forager. The Study Area is within the year-round range but lacks breeding habitat. Observed in 2021 during avian surveys within 8 miles of the Study Area.
Brewer's sparrow (<i>Spizella breweri</i>)	-	SGCN Tier 2	Occupies desertscrub-dominated landscapes; most occupied locations are characterized by big sagebrush and saltbush but may also contain other sagebrush and low woody species with a mixture of native and nonnative grasses. Also reported in adjacent grasslands composed of scattered junipers and low woody shrubs. Breeding range includes the Coconino Plateau south of the Grand Canyon, at elevations from approximately 4,300 to 7,400 feet amsl.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Broad-tailed hummingbird (<i>Selasphorus platycercus</i>)	BCC	SGCN Tier 2	Breeds in open woodland, especially pine, pine-oak, pinyon-juniper, and conifer-aspen associations, brushy hillsides, montane scrub, and thickets. Breeding range fragmented throughout Arizona except for southwestern extreme of the state. Migrants may occur throughout Arizona.	May occur. The Study Area is within the non-breeding range and possibly breeding range contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Bullock's oriole (<i>Icterus bullockii</i>)	-	SGCN Tier 2	Closely associated with a variety of riparian communities but also breeds in drier habitats such as pinyon-juniper or evergreen oak woodlands and occasionally at higher elevations in montane riparian areas. Nesting from approximately 150 to 7,700 feet amsl in northern Arizona and the eastern half of the state.	May occur. The Study Area is within the breeding range, and pinyon-juniper habitat is present. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Cassin's finch (<i>Haemorhous cassinii</i>)	-	SGCN Tier 2	Occupies open coniferous forest over a broad elevational range, including ponderosa pine and pinyon pine associations. Non-breeding range includes central, east-central, and southeastern portions of Arizona; year-round range includes north-central and northeastern portions of the state.	May occur. The Study Area is within the non-breeding range and contains open pinyon-juniper woodlands.
Chestnut-collared longspur (<i>Calcarius ornatus</i>)	BCC	SGCN Tier 2	Occupies desert grasslands dominated by low grasses and forbs; flocks to isolated water sources. Tends to be more abundant in habitat where prairie dog colonies are present. Non-breeding range includes east half of Arizona.	May occur. The Study Area is within the non-breeding range and contains grassland habitat. Observed in 2021 during avian surveys within 8 miles of the Study Area.
Common nighthawk (<i>Chordeiles minor</i>)	-	SGCN Tier 2	Found in a variety of open habitats, including sagebrush and desert grassland, prairies and plains, open forests, croplands, rock outcrops, and gravel rooftops. Breeding range includes northern, central, and eastern Arizona.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Ferruginous hawk (<i>Buteo regalis</i>)	-	SGCN Tier 2	Inhabits grasslands, shrub-steppe, pinyon-juniper, sparse riparian forests, and canyon areas with cliffs and rock outcrops. Year-round range includes roughly the northern half of Arizona; wintering range includes roughly the southern half of the state.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Golden eagle (<i>Aquila chrysaetos</i>)	BGEPA	SGCN Tier 2	Mountainous canyon land, rimrock terrain of open desert, grassland, and forested areas. Year-round range includes all of Arizona.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Gray flycatcher (<i>Empidonax wrightii</i>)	-	SGCN Tier 2	Prefers arid pinyon-juniper woodlands; infrequently in grasslands and desert scrub where these trees are few and scattered. Common breeder and summer resident from the Mogollon Rim north at elevations from approximately 4,300 to 7,600 feet amsl.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Gray vireo (<i>Vireo vicinior</i>)	-	SGCN Tier 2	Forages and nests on dry, mid-elevation slopes dominated by open stands of junipers and the adjacent cold-temperate grasslands with small, scattered juniper stands. Widely distributed across northern Arizona, east to the Carrizo and Chuska ranges in northern Apache County and as far west as the Hualapai and McCracken ranges in Mohave County. Breeds across the northeastern half of the state.	May occur. The Study Area is within the breeding range and contains pinyon-juniper woodlands.

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Horned lark (<i>Eremophila alpestris</i>)	-	SGCN Tier 2	Favors bare, dry ground and areas of short, sparse vegetation in prairies, deserts, tundra, beaches, dunes, and heavily grazed pastures. Year-round resident throughout Arizona.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Lewis's woodpecker (<i>Melanerpes lewis</i>)	BCC	SGCN Tier 2	Found in ponderosa pine and open riparian forests with brushy understory and dead or downed woody material; may also use oak, pinyon-juniper, and pine-fir woodlands, and nut and fruit orchards. Year-round range includes northern Arizona. Non-breeding range includes northwestern, central, and southeastern portions of the state.	May occur. The Study Area is within the year-round range and contains pinyon-juniper habitats.
Lincoln's sparrow (<i>Melospiza lincolni</i>)	-	SGCN Tier 2	Breeds in willow-, sedge-, and moss-dominated habitats, mixed-deciduous wood groves, and black spruce-tamarisk bogs. Uses shrub-dominated habitats, particularly riparian sites, but also brushy forest edges and weedy fields during migration. Uses pine-oak forests, freshwater habitats, coniferous forests, and brushy fields in winter. Non-breeding range includes southwestern and east-central Arizona. Migration range includes northeastern Arizona. Isolated breeding locations are known in north-central and east-central portions of the state.	May occur. The Study Area is along the boundary of the migration range and an isolated portion of its fragmented breeding range and contains shrubby/brushy habitats.
Long-eared owl (<i>Asio otus</i>)	-	SGCN Tier 2	Roosts in dense vegetation, forages in open grasslands or shrublands. Known to nest in willows, cottonwoods, and junipers adjacent to shrub steppe. Found year-round throughout most of Arizona.	May occur. The Study Area is within the year-round range and contains open grasslands, shrub steppe, and junipers.
Mountain chickadee (<i>Poecile gambeli</i>)	-	SGCN Tier 2	Found in evergreen forests, particularly pine, mixed conifer, and spruce-fir forests, and pinyon-juniper woodlands. A year-round resident in roughly the northeastern half of Arizona.	May occur. The Study Area is within the year-round range and contains pinyon-juniper woodlands. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Northern goshawk (<i>Accipiter gentilis</i>)	-	SGCN Tier 2	Occupies ponderosa pine forests; may also use Douglas-fir, various pine, and aspen forests. May hunt in habitats ranging from open steppes to dense forests. Year-round range includes higher elevations in roughly the eastern half of Arizona.	May occur. The Study Area is within the year-round range and contains open foraging habitat. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Northern harrier (<i>Circus hudsonius</i>)	-	SGCN Tier 2	Inhabits plains grasslands, semiarid grasslands, cold-temperate desertscrub, and active farm fields. Found year-round throughout most of Arizona. Nests in marshes or cienegas containing bulrush, cattails, sedge, and grasses at elevations from 3,200 to 6,000 feet amsl.	May occur. The Study Area is within the year-round range and contains appropriate habitat. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Pinyon jay (<i>Gymnorhinus cyanocephalus</i>)	BCC	SGCN Tier 2	Associated with pinyon-juniper woodland; also found in sagebrush, scrub oak, and chaparral. Year-round range includes northern half of Arizona.	May occur. The Study Area is within the year-round range and contains appropriate habitat. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.

Table C-2. Other Special-Status Species that May Occur in the Study Area

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Birds				
American kestrel (<i>Falco sparverius</i>)	-	SGCN Tier 2	Favors open settings including deserts and grasslands with scattered trees or other structures for perching and nesting; also reported in open pinyon-juniper woodlands. Found year-round in most of Arizona at elevations ranging from approximately 100 to 9,500 feet above mean sea level (amsl).	May occur. The Study Area is within the year-round range, contains appropriate habitat associations, and the species was observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
American peregrine falcon (<i>Falco peregrinus anatum</i>)	-	SGCN Tier 1	Found in a variety of biomes; generally associated with cliffs and open landscapes. Year-round range includes almost all of Arizona.	May occur. The Study Area is within the year-round range, contains appropriate habitat associations, and the species was observed in 2022 during avian surveys within 8 miles of the Study Area.
American pipit (<i>Arithus rubescens</i>)	-	SGCN Tier 2	In winter and on migration, reported on coastal beaches and marshes, mud flats and river courses, stubble fields and recently plowed fields, and prairie dog colonies. Common migrant throughout Arizona; winter range includes the entire state; known to breed above timberline in the San Francisco Peaks.	May occur. The Study Area is within the non-breeding range, and the species was observed in 2021 during avian surveys within 8 miles of the Study Area.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	BGEPA	SGCN Tier 1	Aquatic habitats with open water or Southwest arid regions with available food (small birds, rodents, and carrion) and roost sites. Non-breeding eagles range throughout Arizona except for the south-central portion of the state; breeding eagles occur in limited, fragmented locations of central, east-central, and west-central portions of the state.	May occur. The Study Area is within the non-breeding range; food resources are available. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Black-throated gray warbler (<i>Setophaga nigrescens</i>)	-	SGCN Tier 2	Habitat includes open coniferous or mixed coniferous-deciduous woodland with brushy undergrowth, pinyon-juniper and pine-oak associations, and oak scrub. Breeding range includes northern and eastern Arizona; migration range includes central and southwestern portions of the state.	May occur. The Study Area is within the breeding range and contains pinyon-juniper woodlands.
Brewer's blackbird (<i>Euphagus cyanocephalus</i>)	-	SGCN Tier 2	Prefers cooler, higher elevation areas near irrigated lands or other permanent water sources (e.g., marshy meadows, springs, ponds, and lake edges) for nesting with guard perches and shortgrass foraging areas. Year-round resident north of the Mogollon Rim; non-breeding south and west of the Mogollon Rim.	May occur as a migrant or forager. The Study Area is within the year-round range but lacks breeding habitat. Observed in 2021 during avian surveys within 8 miles of the Study Area.
Brewer's sparrow (<i>Spizella breweri</i>)	-	SGCN Tier 2	Occupies desertscrub-dominated landscapes; most occupied locations are characterized by big sagebrush and saltbush but may also contain other sagebrush and low woody species with a mixture of native and nonnative grasses. Also reported in adjacent grasslands composed of scattered junipers and low woody shrubs. Breeding range includes the Coconino Plateau south of the Grand Canyon, at elevations from approximately 4,300 to 7,400 feet amsl.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Broad-tailed hummingbird (<i>Selasphorus platycercus</i>)	BCC	SGCN Tier 2	Breeds in open woodland, especially pine, pine-oak, pinyon-juniper, and conifer-aspen associations, brushy hillsides, montane scrub, and thickets. Breeding range fragmented throughout Arizona except for southwestern extreme of the state. Migrants may occur throughout Arizona.	May occur. The Study Area is within the non-breeding range and possibly breeding range contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Bullock's oriole (<i>Icterus bullockii</i>)	-	SGCN Tier 2	Closely associated with a variety of riparian communities but also breeds in drier habitats such as pinyon-juniper or evergreen oak woodlands and occasionally at higher elevations in montane riparian areas. Nesting from approximately 150 to 7,700 feet amsl in northern Arizona and the eastern half of the state.	May occur. The Study Area is within the breeding range, and pinyon-juniper habitat is present. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Cassin's finch (<i>Haemorhous cassinii</i>)	-	SGCN Tier 2	Occupies open coniferous forest over a broad elevational range, including ponderosa pine and pinyon pine associations. Non-breeding range includes central, east-central, and southeastern portions of Arizona; year-round range includes north-central and northeastern portions of the state.	May occur. The Study Area is within the non-breeding range and contains open pinyon-juniper woodlands.
Chestnut-collared longspur (<i>Calcarius ornatus</i>)	BCC	SGCN Tier 2	Occupies desert grasslands dominated by low grasses and forbs; flocks to isolated water sources. Tends to be more abundant in habitat where prairie dog colonies are present. Non-breeding range includes east half of Arizona.	May occur. The Study Area is within the non-breeding range and contains grassland habitat. Observed in 2021 during avian surveys within 8 miles of the Study Area.
Common nighthawk (<i>Chordeiles minor</i>)	-	SGCN Tier 2	Found in a variety of open habitats, including sagebrush and desert grassland, prairies and plains, open forests, croplands, rock outcrops, and gravel rooftops. Breeding range includes northern, central, and eastern Arizona.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Ferruginous hawk (<i>Buteo regalis</i>)	-	SGCN Tier 2	Inhabits grasslands, shrub-steppe, pinyon-juniper, sparse riparian forests, and canyon areas with cliffs and rock outcrops. Year-round range includes roughly the northern half of Arizona; wintering range includes roughly the southern half of the state.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Golden eagle (<i>Aquila chrysaetos</i>)	BGEPA	SGCN Tier 2	Mountainous canyon land, rimrock terrain of open desert, grassland, and forested areas. Year-round range includes all of Arizona.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Gray flycatcher (<i>Empidonax wrightii</i>)	-	SGCN Tier 2	Prefers arid pinyon-juniper woodlands; infrequently in grasslands and desertscrub where these trees are few and scattered. Common breeder and summer resident from the Mogollon Rim north at elevations from approximately 4,300 to 7,600 feet amsl.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Gray vireo (<i>Vireo vicinior</i>)	-	SGCN Tier 2	Forages and nests on dry, mid-elevation slopes dominated by open stands of junipers and the adjacent cold-temperate grasslands with small, scattered juniper stands. Widely distributed across northern Arizona, east to the Carrizo and Chuska ranges in northern Apache County and as far west as the Hualapai and McCracken ranges in Mohave County. Breeds across the northeastern half of the state.	May occur. The Study Area is within the breeding range and contains pinyon-juniper woodlands.

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Horned lark (<i>Eremophila alpestris</i>)	-	SGCN Tier 2	Favors bare, dry ground and areas of short, sparse vegetation in prairies, deserts, tundra, beaches, dunes, and heavily grazed pastures. Year-round resident throughout Arizona.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Lewis's woodpecker (<i>Melanerpes lewis</i>)	BCC	SGCN Tier 2	Found in ponderosa pine and open riparian forests with brushy understory and dead or downed woody material; may also use oak, pinyon-juniper, and pine-fir woodlands, and nut and fruit orchards. Year-round range includes northern Arizona. Non-breeding range includes northwestern, central, and southeastern portions of the state.	May occur. The Study Area is within the year-round range and contains pinyon-juniper habitats.
Lincoln's sparrow (<i>Melospiza lincolni</i>)	-	SGCN Tier 2	Breeds in willow-, sedge-, and moss-dominated habitats, mixed-deciduous wood groves, and black spruce-tamarisk bogs. Uses shrub-dominated habitats, particularly riparian sites, but also brushy forest edges and weedy fields during migration. Uses pine-oak forests, freshwater habitats, coniferous forests, and brushy fields in winter. Non-breeding range includes southwestern and east-central Arizona. Migration range includes northeastern Arizona. Isolated breeding locations are known in north-central and east-central portions of the state.	May occur. The Study Area is along the boundary of the migration range and an isolated portion of its fragmented breeding range and contains shrubby/brushy habitats.
Long-eared owl (<i>Asio otus</i>)	-	SGCN Tier 2	Roosts in dense vegetation, forages in open grasslands or shrublands. Known to nest in willows, cottonwoods, and junipers adjacent to shrub steppe. Found year-round throughout most of Arizona.	May occur. The Study Area is within the year-round range and contains open grasslands, shrub steppe, and junipers.
Mountain chickadee (<i>Poecile gambeli</i>)	-	SGCN Tier 2	Found in evergreen forests, particularly pine, mixed conifer, and spruce-fir forests, and pinyon-juniper woodlands. A year-round resident in roughly the northeastern half of Arizona.	May occur. The Study Area is within the year-round range and contains pinyon-juniper woodlands. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Northern goshawk (<i>Accipiter gentilis</i>)	-	SGCN Tier 2	Occupies ponderosa pine forests; may also use Douglas-fir, various pine, and aspen forests. May hunt in habitats ranging from open steppes to dense forests. Year-round range includes higher elevations in roughly the eastern half of Arizona.	May occur. The Study Area is within the year-round range and contains open foraging habitat. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Northern harrier (<i>Circus hudsonius</i>)	-	SGCN Tier 2	Inhabits plains grasslands, semiarid grasslands, cold-temperate deserts scrub, and active farm fields. Found year-round throughout most of Arizona. Nests in marshes or cienegas containing bulrush, cattails, sedge, and grasses at elevations from 3,200 to 6,000 feet amsl.	May occur. The Study Area is within the year-round range and contains appropriate habitat. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Pinyon jay (<i>Gymnorhinus cyanocephalus</i>)	BCC	SGCN Tier 2	Associated with pinyon-juniper woodland; also found in sagebrush, scrub oak, and chaparral. Year-round range includes northern half of Arizona.	May occur. The Study Area is within the year-round range and contains appropriate habitat. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Prairie falcon (<i>Falco mexicanus</i>)	-	SGCN Tier 2	Inhabits desertscrub and grasslands, often dominated by a mixture of grasses, sagebrush, and other low-growing shrubs. Found year-round throughout most of Arizona. Nests statewide on ledges and within crevices and potholes of cliffs, canyon walls, and rocky ridges at elevations ranging from approximately 500 to 9,000 feet amsl.	May occur. The Study Area is within the year-round range and contains appropriate habitat. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Red-winged blackbird (<i>Agelaius phoeniceus</i>)	-	SGCN Tier 2	In fall and winter, congregates in agricultural fields, pastures, and grassland. During the breeding season, strongly associated with emergent vegetation, riparian groves, and irrigated agricultural lands where they select dense cover for both nesting and roosting. In Arizona, nests at elevations from approximately 80 to 9,200 feet amsl. Found year-round throughout most of the state.	May occur. The Study Area does not contain the wet habitat conditions normally associated with this species; grasslands do occur, however, and the species was observed in 2021 during avian surveys within 8 miles of the Study Area.
Savannah sparrow (<i>Passerculus sandwichensis</i>)	-	SGCN Tier 2	Occupies grasslands with few trees, including meadows, pastures, grassy roadsides, sedge wetlands, and cultivated fields. Breeding range includes most of Arizona north of the Mogollon Rim; non-breeding range includes the rest of the state. In Arizona nests only in high-elevation grasslands and larger mountain meadows, typically where the soil is damp at elevations primarily between 8,700 and 9,300 feet amsl.	May occur as a migrant or forager; the Study Area is within the year-round range but lacks breeding habitat.
Scott's oriole (<i>Icterus parisorum</i>)	BCC	SGCN Tier 2	Found in pinyon-juniper and live oak belts in foothills and semiarid plains. Breeding range includes all of Arizona except portions of the east-central part of the state.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Swainson's hawk (<i>Buteo swainsoni</i>)	-	SGCN Tier 2	Closely associated with open grasslands and similar structured grain croplands. Breeding range includes all of Arizona. Typically nest in solitary, conspicuous tree or tall shrub at elevations from approximately 1,900 to 9,200 feet amsl. Known to nest on the Coconino Plateau.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021, 2022, and 2023 during avian surveys within 8 miles of the Study Area.
Townsend's solitaire (<i>Myadestes townsendi</i>)	-	SGCN Tier 2	In Arizona, associated with high-elevation forests and mountain slopes; wintering habitat includes juniper trees with a few scattered tall pines for perching. Range includes all of Arizona except the southwestern deserts; breeding range north of the Mogollon Rim; non-breeding range south of the Mogollon Rim. Breeds at elevations ranging from approximately 6,500 to 11,000 feet amsl.	May occur. The Study Area is within the breeding range but does not contain typical high-elevation nesting habitat. Species would most likely occur as a wintering bird. Observed in 2021 during avian surveys within 8 miles of the Study Area.
Vesper sparrow (<i>Pooecetes gramineus</i>)	-	SGCN Tier 2	Commonly associated with dry grassland often containing widely scattered junipers, low woody shrubs, various forbs, and mixed native and nonnative grasses. Winters south of the Mogollon Rim and moves into northern Arizona in early March to breed. Nests on the ground, under grass clumps or near the base of shrubs at elevations ranging from approximately 5,600 to 9,500 feet amsl.	May occur. The Study Area is within the breeding range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Western screech-owl (<i>Megascops kennicottii</i>)	-	SGCN Tier 2	Found year-round throughout much of the state in a variety of woodland habitats, including Sonoran Desert uplands, pinyon-juniper woodlands, and lowland wooded drainages. Nests primarily at elevations from 180 to 6,500 feet amsl but has been detected at elevations to just above 7,500 feet amsl on dry mountain slopes with pinyon-juniper woodlands.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations.
Woodhouse's scrub-jay (<i>Aphelocoma woodhouseii</i>)	-	SGCN Tier 2	Occurs in woodland, especially pinyon, juniper, and oak associations, and scrub habitats. Year-round range includes roughly the northeastern two-thirds of Arizona.	May occur. The Study Area is within the year-round range and contains appropriate habitat associations. Observed in 2021 and 2022 during avian surveys within 8 miles of the Study Area.
Flowering Plants				
Tusayan flameflower (<i>Phemeranthus validulus</i>)	-	ANPL	Woodland openings in rocky soil in Coconino, Mohave, and Yavapai Counties, at elevations ranging from 5,600 to 7,500 feet amsl.	May occur: the Study Area contains suitable habitat associations, and this species has been documented within 3 miles of the Study Area.
Mammals				
Allen's lappet-browed bat (<i>Idionycteris phyllotis</i>)	-	SGCN Tier 2	Typically found in ponderosa pine, pinyon-juniper, and Madrean pine-oak woodlands, as well as riparian woodlands at elevations from approximately 1,300 to 9,800 feet amsl. Commonly associated with boulder piles, cliffs, rocky outcrops, and lava flows. Roosts in caves, abandoned mines, and large trees or cliffs. Ranges from the northwest corner to the southeast corner of the state.	May occur. The Study Area is within the known range for the species, and pinyon-juniper woodlands are present. The species was detected in 2021 during bat acoustic monitoring as close as 0.5 mile from the Study Area.
American pronghorn (<i>Antilocapra americana americana</i>)	-	SGCN Tier 2	Inhabits grasslands, sagebrush plains, deserts, and foothills. In Arizona, range includes a narrow band of scattered populations from east-central through north-central and northwestern portions of the state, as well as a small, fragmented range in southeastern portion of the state.	May occur. The Study Area is within the known range for the species and contains grasslands. Recorded in the vicinity of the Study Area during site-specific surveys.
Big free-tailed bat (<i>Nyctinomops macrotis</i>)	-	SGCN Tier 2	Primarily inhabits rugged, rocky country, roosting in rock crevices in cliffs, caves, buildings, and tree holes. Plant associations include subalpine meadow; sage grassland; ponderosa pine; pinyon-juniper woodland; lowland deserts scrub; earthen stock tanks in deserts scrub; and Sonoran Desert riparian areas at elevations ranging from approximately 1,800 to 8,500 feet amsl. Found throughout most of the state, but most records are from northern Arizona.	May occur. The Study Area is within the known range for the species and contains appropriate habitat associations. Detected during bat acoustic monitoring in the vicinity of the Study Area.
Brazilian free-tailed bat (<i>Tadarida brasiliensis</i>)	-	SGCN Tier 2	Occupies a wide variety of habitats from desert communities through pinyon-juniper woodlands and pine-oak forests at elevations up to approximately 9,000 feet amsl. Maternity colonies and roosts found in limestone caves, abandoned mines, bridges, buildings, and hollow trees. Range is throughout Arizona.	May occur. The Study Area is within the known range for the species, and pinyon-juniper woodlands are present. Detected in 2021 during bat acoustic monitoring as close as 0.5 mile from the Study Area.

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Fringed myotis (<i>Myotis thysanodes</i>)	-	SGCN Tier 2	Occurs primarily in middle-elevation habitats in deserts, grasslands, and, most commonly, oak and pinyon-juniper woodlands at elevations from approximately 4,000 to 8,500 feet amsl. Roosts in caves, mine tunnels, in large snags, under exfoliating bark, and in buildings. Ranges throughout much of Arizona except the northeastern and southwestern corners.	May occur. The Study Area is within the known range for the species, and grasslands and pinyon-juniper woodlands are present. Detected in 2021 during bat acoustic monitoring as close as 0.5 mile from the Study Area.
Greater western bonneted bat (<i>Eumops perotis californicus</i>)	-	SGCN Tier 2	Associated with variety of habitats, including chaparral, oak woodlands, mixed xeric shrubland and riparian woodlands, ponderosa pine woodlands, floodplains, desert washes, grasslands, agricultural areas, and water bodies below 8,500 feet amsl. Roosts in vertical cliffs and buildings. In Arizona, range includes central, northwestern, western, and southern portions of the state.	May occur. The Study Area is within the known range for the species contains appropriate habitat associations. Detected in 2021 during bat acoustic monitoring as close as 0.5 mile from the Study Area.
Gunnison's prairie dog (<i>Cynomys gunnisoni</i>)	-	SGCN Tier 1	Gently sloping grasslands and semidesert and montane shrublands between 4,600 and 12,000 feet amsl. In Arizona, range includes central and northeastern portions of the state.	May occur. The Study Area is within the known range for the species and contains appropriate habitat associations. Documented during project-related surveys in the vicinity of the Study Area.
Hoary bat (<i>Lasiurus cinereus</i>)	-	SGCN Tier 2	Prefers deciduous and coniferous forests and woodlands, juniper scrub, riparian forest, and desert habitats at elevations from 485 to 9,900 feet amsl. Roosts primarily among foliage in trees. Ranges statewide.	May occur. The Study Area is within the known range for the species and contains appropriate habitat associations. Detected in 2021 during bat acoustic monitoring as close as 0.5 mile from the Study Area.
Pale Townsend's big-eared bat <i>Corynorhinus townsendii pallescens</i>)	-	SGCN Tier 1	Associated with mesic forested habitats but occupies a broad range of habitats, including arid scrub, pine forest, pinyon-juniper, and wooded canyons between 500 and 8,400 feet amsl. Day roosts and maternity and hibernation colonies in caves, mines, or buildings. Night roosts may include caves, buildings, and tree cavities. Range is throughout Arizona.	May occur. The Study Area is within the known range for the species and contains appropriate habitat associations. Detected in 2021 at a bat acoustic monitoring station 5.8 miles from the Study Area.
Southwestern myotis (<i>Myotis aunculius</i>)	-	SGCN Tier 2	Known from desertscrub, desert grasslands, mesquite, and chaparral to pinyon-juniper woodland and pine-fir forest at elevations from approximately 1,200 to 7,300 feet amsl. Night roosts include caves, mines, and buildings.	May occur. The Study Area contains appropriate habitat associations. Detected at seven monitoring stations between 0.75 and 6.1 miles from the Study Area.
Spotted bat (<i>Euderma maculatum</i>)	-	SGCN Tier 2	Occupies a variety of habitats, including low to high deserts, riparian areas, pinyon-juniper woodland, and ponderosa and spruce-fir forests below 10,600 feet amsl. Roosts in crevices and cracks of cliff faces; sometimes roosts in caves or in buildings near cliffs. Range is throughout Arizona.	May occur. The Study Area is within the known range for the species and contains appropriate habitat associations. Detected in 2021 during bat acoustic monitoring as close as 0.5 mile from the Study Area.
Stephen's woodrat (<i>Neotoma stephensi</i>)	-	SGCN Tier 2	Rocky areas in pinyon-juniper woodlands. In Arizona, found roughly in north half of the state.	May occur. The Study Area is within the geographic range for the species and contains appropriate habitat associations.
Western red bat (<i>Lasiurus blossevillii</i>)	-	SGCN Tier 2	Uses broadleaf deciduous riparian forests and wooded areas, and preferentially roosts in cottonwood trees and dense foliage. Generally distributed in south-central to southern and southeastern Arizona at elevations between 1,900 and 7,200 feet amsl.	May occur. While broadleaf deciduous woodlands are not present, the Study Area is within the species' range, and the species was detected during bat acoustic monitoring 2.6 miles from the Study Area.

Table C-3. Other Special-Status Species Unlikely to Occur in the Study Area

Common Name (Scientific Name)	Status*		Habitat/Range Requirements	Potential for Occurrence in Study Area
	Federal	State		
Amphibians				
Arizona toad (<i>Anaxyrus microscaphus</i>)	-	SGCN Tier 2	Associated with riparian habitats at elevations from 480 to 8,400 feet amsl. Range includes central Arizona, canyons and floodplains south of the Mogollon Rim, East Clear Creek, and the Virgin River basin.	Unlikely to occur. The Study Area is outside the predicted range, and no riparian habitat is present in or near the Study Area. The AGFD has not reported the species within 3 miles of the Study Area.
Northern leopard frog (<i>Lithobates pipiens</i>)	-	SGCN Tier 1	Occupies aquatic systems in a variety of habitats, including grassland, brushland, woodland, and forest ranging into high mountains. Usually found in permanent water with rooted aquatic vegetation; also frequents ponds, canals, marshes, springs, and streams. May be found in upland areas when dispersing to new breeding areas. Found up to 11,000 feet amsl.	Unlikely to occur. The project area is within the known geographic range for the species; however, there is no perennial aquatic habitat present, and the AGFD has not reported the species within 3 miles of the Study Area.
Birds				
Gila woodpecker (<i>Melanerpes uropygialis</i>)	-	SGCN Tier 2	Known from the Sonoran Desert in southern Arizona containing saguaros and adjacent timbered drainages and residential shade at elevations from approximately 150 to 4,800 feet amsl.	Unlikely to occur. The Study Area is outside the species' range, and no Sonoran Desert habitat is present in or near the Study Area.
Northern pygmy-owl (<i>Glaucidium gnomia californicum</i>)	-	SGCN Tier 2	In northern Arizona, reported in ponderosa pine forests and less frequently in denser woodlands of pine-juniper. Found year-round throughout most of Arizona. Nests at elevations from approximately 3,600 to 10,500 feet amsl.	Unlikely to occur, while the Study Area is within the year-round range and contains pine-juniper woodlands, the woodlands are not dense.
Flowering Plants				
Roundleaf errazurizia (<i>Errazurizia rotundata</i>)	-	ANPL	Red or white sandstone pavement and ledges, in sandy crevices among rocks, or in loose, drifted sand. Found in desertscrub from 4,800 to 5,200 feet amsl. Known in Coconino and Navajo Counties in Arizona.	Unlikely to occur. The Study Area contains only marginal habitat associations and is above the elevational range of this species.
Simpson plains cactus (<i>Pediocactus simpsonii</i>)	-	ANPL	Pinyon-juniper woodlands, sagebrush communities, and Rocky Mountain forests from 6,700 to 10,000 feet amsl in elevation. In Arizona, occurs in the northwest corner of the state.	Unlikely to occur. The Study Area is outside the known geographic range and below the elevational range of this species.
Sunset Crater beardtongue (<i>Penstemon clutei</i>)	-	ANPL	Volcanic cinder fields and pine forests near Indian Flat and Sunset Crater in south-central Coconino County, Arizona.	Unlikely to occur. The Study Area is outside the known geographic range of this species.

Notes: Includes Arizona SGCN Tier 1 and 2 species listed in the AGFD (2023a) environmental online review tool report. Range or habitat requirement information and potential occurrence justification from AGFD (2003c, 2003d, 2005, 2011d, 2021, 2022f), Brennan (2012), Corman and Wise-Gervais (2005), SEINet (2023), SWCA (2021).

* State Status Definitions

ANPL = Protected by the Arizona Native Plant Law, Salvage Restricted; SGCN = Species of Greatest Conservation Need; wildlife species identified by AGFD (2022a) as having conservation priority. SGCN Tier 1 species are those categorized by AGFD (2022a) as "highest priority vulnerable" species. Tier 2 represent the remainder of the species meeting the vulnerability criteria.

BALD AND GOLDEN EAGLE PROTECTION ACT SPECIES

Both bald eagles and golden eagles may occur in the Study Area (see Table C-2).

BIRDS OF CONSERVATION CONCERN AND STATE SPECIES

In total, 48 BCC and SGCN (excluding the two eagle species) may occur in the Study Area because the area falls within the species' predicted range and contains suitable habitat (see Table C-2).

State-Protected Native Plant Species

The Arizona Native Plant Law (ANPL; Arizona Revised Statutes 3-904) identifies a lengthy list of plant species—largely cacti, agaves, yuccas, and desert trees—that are susceptible to removal for collection, landscaping, sale, or other commercial uses. The ANPL states that these plants shall not be taken, transported, or possessed from any land without permission and a permit from the Arizona Department of Agriculture; it also requires notification prior to land clearing even if the plants will be destroyed. Protected native plants classified under the ANPL are present in areas potentially disturbed by Interconnection Project development.

Assessment of Potential Effects

Facilities for the Interconnection Project would permanently remove habitat potentially used by special-status species on an estimated 18.18 acres. An additional 13.44 acres of habitat would temporarily be lost, primarily at laydown and pulling and tensioning sites. Additional construction impacts such as noise and human activity would be temporary and of short duration.

Areas of Biological Wealth

No areas of biological wealth were identified within the Study Area, so none would be affected by the Interconnection Project.

Federally Listed and Candidate Species

MONARCH BUTTERFLY

A relatively small amount of suitable habitat for the monarch butterfly would be permanently lost because of the Interconnection Project. If individuals of the species are present during construction and are disturbed, they will simply move away.

Mitigation: None needed.

Other Special-Status Species

Burrow-dwelling Species. In addition to permanently losing a relatively small amount of habitat, kit foxes (*Vulpes macrotis*), small mammals, and reptiles could potentially be impacted by construction activities. Such impacts may include temporary loss of habitat and displacement of individuals, possible injury or death during ground-disturbing activities, temporary impacts on foraging behaviors, and noise-related disturbance.

Mitigation: Burrow surveys will be conducted prior to construction to identify potential burrows for these species. Burrows will be avoided or excavated per species-specific requirements if they cannot be avoided.

Birds. Potential threats to birds include damage to active nests, eggs, and nestlings during construction.

Mitigation: If construction occurs during nesting season, before the start of construction activities, qualified biologists will survey potentially disturbed areas to locate nests for species protected under the Migratory Bird Treaty Act. All active nests and those of undetermined status will be flagged in the field and will be buffered from ground-clearing activities until the nest is known to be inactive. Nests that can be determined to be inactive will be removed.

Transmission lines pose a risk of collisions and electrocution for birds, particularly eagles and other raptors.

Mitigation: To minimize that risk, RWE Clean Energy (Applicant) will construct the proposed transmission line following the guidelines outlined in *Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006) and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012).

Bats. No roosting or maternal roost habitat for bats exists in the vicinity, so roosting behavior would not be affected by the Interconnection Project. Construction would not take place at night, so construction-related noise and activity would not affect bat foraging, commuting, or migrating behavior. Lighting at the Project Substation may result in minor alterations in bat foraging, commuting, and migrating behavior. Some bat species appear to be attracted to light, and others avoid it (Stone et al. 2015).

Mitigation: None needed.

State-Protected Native Plant Species

Potential effects of the proposed Interconnection Project on state-protected plant species include direct removal during vegetation clearing activities or crushing by heavy equipment and vehicles.

Mitigation: Because clearing of private and ASLD lands is subject to the ANPL's Notice of Intent (NOI) requirements, a general survey will be conducted identifying species protected by the ANPL that occur in potentially disturbed areas. The Applicant will submit the NOI form to the Arizona Department of Agriculture using the plant list generated from the survey.

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Exhibit C – Attachment C-1

U.S. Fish and Wildlife Service
Information for Planning and Consultation (IPaC) System Official Species
List for the Forged Ethic
Interconnection Project



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
9828 North 31st Ave
Phoenix, AZ 85051-2517
Phone: (602) 742-4010 Fax: (602) 742-2513



May 13, 2023

In Reply Refer To:

Project Code: 2023-0081746

Project Name: Forged Ethic Interconnection Project - 0.5 mi buffer

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that may occur within the One-Range that has been delineated for the species (candidate, proposed, or listed) and its critical habitat (designated or proposed) within which your project polygon intersects. These range delineations are based on biological metrics, and do not necessarily represent exactly where the species is located. Please refer to the species information found on ECOS to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(C)(i)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12. If the Federal action agency determines that listed species or critical habitat may be affected by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual

05/13/2023

or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint." For example, projects that involve streams and river systems should consider downstream affects. If the Federal action agency determines that the action may jeopardize a proposed species or may adversely modify proposed critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at: <https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>.

We also advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668 et seq.). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Service. The Eagle Act prohibits anyone, without a permit, from taking (including disturbing) eagles, and their parts, nests, or eggs. Currently 1,026 species of birds are protected by the MBTA, including the western burrowing owl (*Athene cunicularia hypugae*). Protected western burrowing owls can be found in urban areas and may use their nest burrows year-round; destruction of the burrow may result in the unpermitted take of the owl or their eggs.

If a bald eagle or golden eagle nest occurs in or near the proposed project area, our office should be contacted for Technical Assistance. An evaluation must be performed to determine whether the project is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see <https://www.fws.gov/law/bald-and-golden-eagle-protection-act> and <https://www.fws.gov/program/eagle-management>).

The Division of Migratory Birds (505-248-7882) administers and issues permits under the MBTA and Eagle Act, while our office can provide guidance and Technical Assistance. For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site: <https://www.fws.gov/program/migratory-bird-permit>. Guidance for minimizing impacts to migratory birds for communication tower projects (e.g. cellular, digital television, radio, and emergency broadcast) can be found at <https://www.fws.gov/media/communication-tower-practices-communication-tower-design-siting-construction-operation>.

The U.S. Army Corps of Engineers (Corps) may regulate activities that involve streams (including some intermittent streams) and/or wetlands. We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources, please visit [this link](https://www.fws.gov/program/national) or visit <https://www.fws.gov/program/national>.

wildliferefuge-system to locate the refuge you would be working in or around.

If your action is on tribal land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our Tribal Coordinator, John Nystedt, at 928-556-2160 or John.Nystedt@fw.gov.

We also recommend you seek additional information and coordinate your project with the Arizona Game and Fish Department. Information on known species detections, special status species, and Arizona species of greatest conservation need, such as the western burrowing owl and the Sonoran desert tortoise (*Gopherus morafraei*) can be found by using their Online Environmental Review Tool, administered through the Heritage Data Management System and Project Evaluation Program (<https://www.azgfd.com/wildlife/planning/projectevalprogram/>).

We appreciate your concern for threatened and endangered species. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office. If we may be of further assistance, please contact our Flagstaff office at 928-556-2118 for projects in northern Arizona, our general Phoenix number 602-242-0210 for central Arizona, or 520-670-6144 for projects in southern Arizona.

Sincerely,
/s/

Heather Whitlaw
Field Supervisor
Attachment

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arizona Ecological Services Field Office
9828 North 31st Ave
#63
Phoenix, AZ 85051-2517
(602) 242-0210

PROJECT SUMMARY

Project Code: 2023-0881746
Project Name: Frogged Ethic Interconnection Project - 0.5 mi buffer
Project Type: Distribution Line - New Construction - Above Ground
Project Description: Interconnection of a proposed renewable energy project to an existing transmission line

Project Location:
The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@35.63816300000006,-111.827152104061714/>



Counties: Coconino County, Arizona

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries, as USEFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

MEXICAN WOLF *Canis lupus baileyi*

Population: Wherever found, except where listed as an experimental population
No critical habitat has been designated for this species.
Species profile: <https://ecos.fws.gov/ecp/species/2916>

BIRDS

MEXICAN SPOTTED OWL *Syrinx occidentalis lucida*

Population: Western U.S. DPS
There is final critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: <https://ecos.fws.gov/ecp/species/8126>

YELLOW-BILLED CUCKOO *Coccyzus americanus*

Population: Western U.S. DPS
There is final critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: <https://ecos.fws.gov/ecp/species/2911>

INSECTS

MONARCH BUTTERFLY *Danaus plexippus*

Population: Western U.S. DPS
No critical habitat has been designated for this species.
Species profile: <https://ecos.fws.gov/ecp/species/9743>

05/13/2023 1

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

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FLOWERING PLANTS

NAME	STATUS
Fichisen Plains Cactus <i>Pediocactus peeblesianus</i> ssp. <i>fichiseni</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://www.fws.gov/species/5484	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

Exhibit C-1d. U.S. Fish and Wildlife Service IPaC report (continued).

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below:

1. The [Migratory Birds Treaty Act of 1918](#).
2. The [Bald and Golden Eagle Protection Act of 1940](#).
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(g)

MIGRATORY BIRD INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year-round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the [Probability of Presence Summary](#). [Additional measures or permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern](#) (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list

of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the [Probability of Presence Summary](#) and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Range-wide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of range-wide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the [FAQs](#) for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA XCCOS In migrative Statistical](#)

Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [naming studies](#) or contact [Caleb Spiegel](#) or [Pam Lenting](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project, not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

IRISHWATER POND

- [PUSAH](#)
- [PUSJ](#)
- [RIVERB](#)
- [R5UBI](#)
- [R4SBC](#)

05132023

IPAC USER CONTACT INFORMATION

Agency: SWCA Environmental Consultants

Name: Dorothy House

Address: 114 N. San Francisco St.

City: Flagstaff

State: AZ

Zip: 86001

Email: dhouse@swca.com

Phone: 9287745500

Exhibit C-1g. U.S. Fish and Wildlife Service IPaC report (continued).

Exhibit C-1

Exhibit C – Attachment C-2

Arizona Game and Fish Department
Arizona Environmental Online Review Tool Report
for the Forged Ethic Interconnection Project

Arizona Environmental Online Review Tool Report



To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Arizona Game and Fish Department Mission

Project Name:
Forged Ethic Interconnection Project -- Study Area

Project Description:
Interconnection between a proposed renewable energy project and an existing transmission line

Project Type:
Energy Storage/Production/Transfer, Energy Transfer, Power line/electric line (new)

Contact Person:
darothy house

Organization:
SWCA Environmental Consultants

On Behalf Of:
PRIVATE

Project ID:
HGIS-19191

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Arizona Game and Fish Department
Project ID: HGIS-19191

project_report_forged_ethic_interconnectio_01379_03224.pdf
Review Date: 5/10/2023 09:00:02 AM

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Department's review of site-specific projects.
3. The Department's Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented populations of species of special concern.
4. Arizona Wildlife Conservation Strategy (AWCS), specifically Species of Greatest Conservation Need (SGCN), represents potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

Locations Accuracy Disclaimer:

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and that the correctness of the Project Review Report content.

Exhibit C-2a. AGFD online Environmental Review Tool results.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submission of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(ies) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:

Project Evaluation Program, Habitat Branch
Arizona Game and Fish Department
5000 West Camelback Highway
Phoenix, Arizona 85006-5000
Phone Number: (602) 236-7600
Fax Number: (602) 236-7366
Or
PEP@azgfd.gov

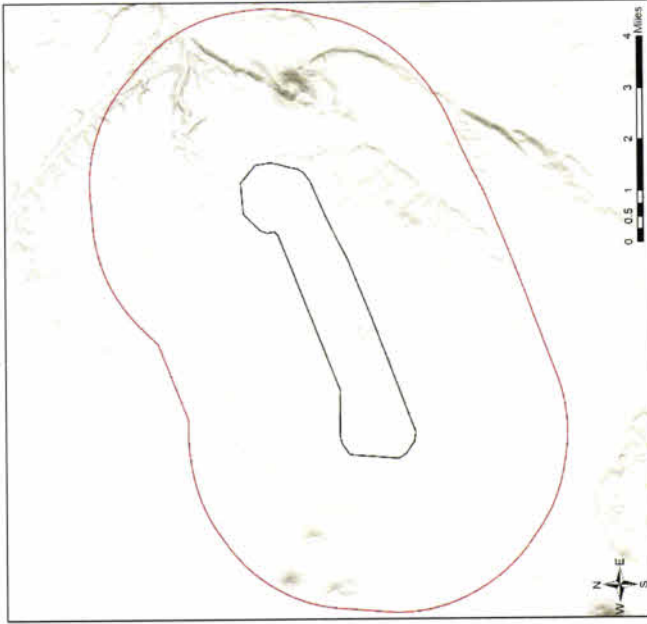
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site-specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies.

Forged Ethic Interconnection Project -- Study Area
USA Topo Basemap With Locator Map



Exhibit C-2b. AGFD online Environmental Review Tool results (continued).

Forged Ethnic Interconnection Project -- Study Area
 Web Map As Submitted By User



Forged Ethnic Interconnection Project -- Study Area
 Important Areas

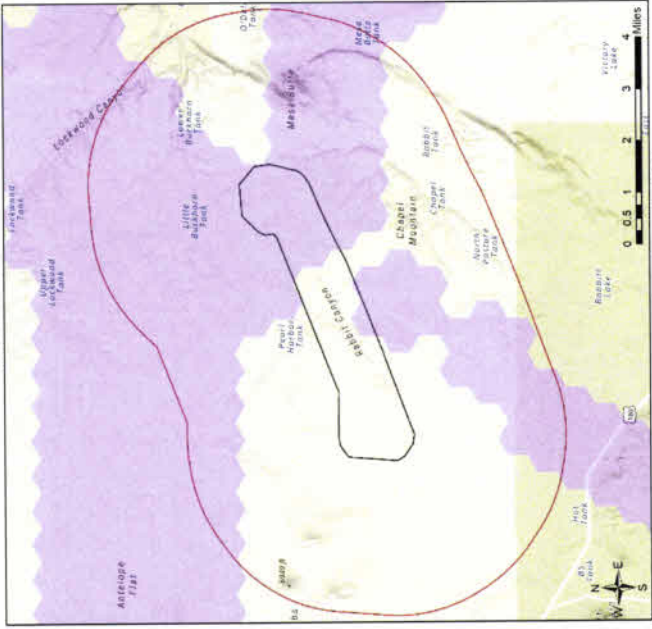
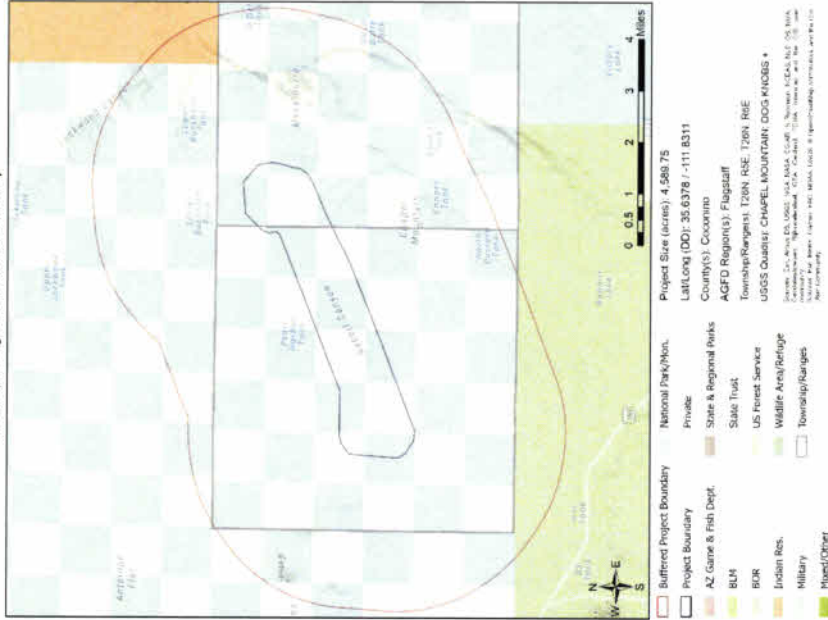


Exhibit C-2c. AGFD online Environmental Review Tool results (continued).

Forged Ethic Interconnection Project -- Study Area
 Township/Ranges and Land Ownership



Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Aquila chrysaetos</i>	Golden Eagle	BGA				2
<i>Chrysomitris mollis</i>	Tusayan Rabbibush	SC				
<i>Eremophila gouldii</i>	Diamond Valley Suncup	SC				

Note: Status code definitions can be found at https://www.usfs.gov/land/wildlife/land/wildlife_status_definitions

Special Areas Documented that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
	Coconino Plateau					
	Coconino County Wildlife Movement Area - Diffuse					
	Wildlife Connectivity					
	Important Connectivity Zone					
	South Rim - San Francisco Peaks - Coconino County Wildlife Movement Area - Diffuse					
	Woody Ridge/Bellmont area					
	Utah - San Francisco Peaks					
	Coconino County Wildlife Movement Area - Diffuse					

Note: Status code definitions can be found at https://www.usfs.gov/land/wildlife/land/wildlife_status_definitions

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Accipiter gentilis</i>	Northern Goshawk	SC				2
<i>Anaxyrus microcephalus</i>	Arizona Toad	SC				2
<i>Antilocapra americana americana</i>	American Pronghorn					2
<i>Aquila chrysaetos</i>	Golden Eagle					2
<i>Asio otus</i>	Long-eared Owl					2
<i>Baeolophus inornatus</i>	Junco					2
<i>Buteo borealis</i>	Ferruginous Hawk	SC				2
<i>Calcarius ornatus</i>	Chestnut-collared Longspur					2
<i>Chordeiles minor</i>	Common Nighthawk					2
<i>Corynorhinus townsendii pallescens</i>	Pale Townsend's Big-eared Bat	SC				1
<i>Cynomys guntoni</i>	Gunton's Prairie Dog	SC				2
<i>Empidonax inornatus</i>	Gray Flycatcher					2
<i>Euderma maculatum</i>	Spotted Bat					2
<i>Eumops perotis californicus</i>	Greater Western Bonneted Bat					2
<i>Falco mexicanus</i>	Prairie Falcon					2
<i>Falco peregrinus anatum</i>	American Peregrine Falcon					2
<i>Falco sparverius</i>	American Kestrel					2
<i>Glaucidium gnoma californicum</i>	Northern Pygmy-owl					2
<i>Gymnorhinus cyanocephalus</i>	Pinyon Jay					2

Exhibit C-2d. AGFD online Environmental Review Tool results (continued).

Species of Greatest Conservation Need Predicted that Intersect with Project Footprint as Drawn, based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Hemiphysalis cassinii</i>	Cassin's Finch					2
<i>Bufo boreas</i>	Bullfrog					2
<i>Myotisotis phyllotis</i>	Allen's Lappet-eared Bat	SC	S	S		2
<i>Lasiurus borealis</i>	Western Red Bat					2
<i>Lasiurus cinereus</i>	Hairy Bat					2
<i>Lithobates pipiens</i>	Northern Leopard Frog	S	S			1
<i>Megascops kenicottii</i>	Western Screech-owl					2
<i>Melanerpes formicivorus</i>	Lewis's Woodpecker					2
<i>Melanerpes uropygialis</i>	Gila Woodpecker					2
<i>Melospiza lincolni</i>	Lincoln's Sparrow					2
<i>Microtus longicaudus</i>	Long-tailed Vole					2
<i>Martalia nigripes</i>	Black-footed Ferret	LE, XN				1
<i>Myadestes townsendi</i>	Townsend's Solitaire					2
<i>Myotis auricolus</i>	Southwestern Myotis					2
<i>Myotis thymalodes</i>	Fringed Myotis	SC				2
<i>Myotis yumanensis</i>	Yuma Myotis	SC				2
<i>Neotoma stephensi</i>	Stephens' Woodrat					2
<i>Nyctinomus macrotis</i>	Big Free-tailed Bat	SC				2
<i>Passerculus sandwichensis</i>	Savannah Sparrow					2
<i>Proocetes gramineus</i>	Vesper Sparrow					2
<i>Rallus lincolni</i>	Virginia Rail					2
<i>Setophaga nigrescens</i>	Black-throated Gray Warbler					2
<i>Spizella breweri</i>	Brewer's Sparrow					2
<i>Stix occidentalis lucida</i>	Mexican Spotted Owl	LT				1
<i>Tadarida brasiliensis</i>	Brazilian Free-tailed Bat					2
<i>Vireo vicinior</i>	Gray Vireo					2

Species of Economic and Recreation Importance Predicted that Intersect with Project Footprint as Drawn

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Antilocapra americana americana</i>	American Pronghorn					
<i>Cervus elaphus</i>	Elk					
<i>Odocoileus hemionus</i>	Mule Deer					
<i>Falco sparverius</i>	Band-tailed Pigeon					
<i>Puma concolor</i>	Mountain Lion					
<i>Zenaidura macroura</i>	Mourning Dove					

Project Type: Energy Storage/Production/Transfer, Energy Transfer, Power Line/Electric Line (new)

Project Type Recommendations:
 Minimize the potential introduction or spread of exotic invasive species, including aquatic and terrestrial plants, animals, insects, and pathogens. Precautions should be taken to wash and/or decontaminate all equipment utilized in the project activities before entering and leaving the site. See the Arizona Department of Agriculture website for a list of prohibited and restricted noxious weeds at <https://www.azdhs.gov/dhs/divisions/agriculture/pests/pests.html> and the Arizona Native Plant Society <https://aznativeplantsociety.org/recommendations-on-how-to-control/>. To view a list of documented invasive species or to report invasive species in or near your project area visit <https://www.invasive.org/maps/index.cfm>. A national cloud-based application for tracking and managing invasive species is at <https://inmap.natureconnect.org/maps/index.cfm?app=ipmap.html>.

- To build a list zoom to your area of interest, use the Identify/measure tool to draw a polygon around your area of interest, and select "See What's Here" for a list of reported species. To export the list, you must have an account and be logged in. You can then use the export tool to draw a boundary and export the records in a csv file.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

For any powerlines built, proper design and construction of the transmission line is necessary to prevent or minimize risk of electrocution ofaptors, owls, vultures, and golden or bald eagles, which are protected under state and federal laws. Limit project activities during the breeding season for birds, generally March through late August, depending on species in the local area (aptors breed in early February through May). Conduct avian surveys to determine bird species that may be utilizing the area and develop a plan to avoid disturbance during the nesting season. For underground powerlines, trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herpetofauna (snakes, lizards, tortoises) from entering ditches. In addition, indirect effects to wildlife due to construction (liming of activity, clearing of rights-of-way, associated bridges and culverts, affects to wetlands, fences) should also be considered and mitigated.

Based on the project type entered, coordination with State Historic Preservation Office may be required (<https://azshpo.state.az.us/>).

Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment, a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation).

Project Location and/or Species Recommendations:
 Analyze indicates that your project is located in the vicinity of an identified [Wildlife Barrier/Connectivity Feature](#). The County-level Stakeholder Assessments contain five categories of data (Barrier/Connectivity, Wildlife Crossing Area, Wildlife Movement Area, Ditches, Wildlife Movement Area, Landscape, Wildlife Movement Area, Riparian/Wetland) that provide a context on select anthropogenic barriers and potential connectivity. This report provides recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to <https://www.agfd.com/wildlife/evaluation/program/assessment/evaluation/assessment.html>.

Please contact the Project Evaluation Program (Gest@agfd.gov) for specific project recommendations.

Exhibit C-2e. AGFD online Environmental Review Tool results (continued).

Arizona Game and Fish Department
Project ID: HGIS-19191

project_report_forged_ethio_interconnectio_61379_69294.pdf
Review Date: 5/10/2023 09:00:02 AM

HDMS records indicate that one or more Listed, Proposed, or Candidate species or Critical Habitat (Designated or Proposed) have been documented in the vicinity of your project. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at <http://www.fws.gov/office/arizona/ecologicalservices> or:

Phoenix Main Office
9028 North 31st Avenue #C3
Phoenix, AZ 85061-2517
Phone: 602-242-0210
Fax: 602-242-2513

Tucson Sub-Office
201 N. Bonita Suite 141
Tucson, AZ 85745
Phone: 520-670-6144
Fax: 520-670-6155

Flagstaff Sub-Office
5111 Forest Science Complex
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001
Phone: 928-666-2157
Fax: 928-666-2121

Analysis indicates that your project is located in the vicinity of an identified [wildlife habitat connectivity feature](#). The Statewide Wildlife Connectivity Assessment's Important Connectivity Zones (ICZs) represent general areas throughout the landscape which contribute the most to permeability of the whole landscape. ICZs may be used to help identify, in part, areas where more discrete corridor modeling ought to occur. The reports provide recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to: https://s3.amazonaws.com/azobisportal-s3-us-west-2-001-usfw/conten/uploads/2000101123120719/ALUMICA_Final_Report_Paek1_2013_lowres.pdf. Please contact the Project Evaluation Program (pep@azafd.gov) for specific project recommendations.

EXHIBIT D. BIOLOGICAL RESOURCES

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

List the fish, wildlife, plant life, and associated forms of life in the vicinity of the proposed site or route and describe the effects, if any, the proposed facilities will have thereon.

Introduction

The proposed Forged Ethic Wind Energy Interconnection Project (Interconnection Project) would be built on open rangeland just north of and parallel to two existing 500-kV transmission lines. Unpaved ranch roads cross under and run along the length of the existing transmission lines. The Study Area for biological resources is a 0.5-mile buffer around the project because the farthest-reaching effects associated with the Interconnection Project would most likely be noise from construction equipment and vehicle traffic, which typically extends up to 0.5 mile from the noise source (Wrigley 2018).

Methods

Biological resources in the vicinity of the proposed Interconnection Project were identified through a biotic resource review using the following resources:

- The Southwest Regional Gap Analysis Project (SWReGAP) land cover dataset (U.S. Geological Survey [USGS] 2016)
- Regional checklists, reports, and publications

Also, on October 25, 2022, a biologist with SWCA Environmental Consultants (SWCA) conducted a field reconnaissance of the Study Area. Portions of the Study Area were also visited on December 15, 2020, and on July 1, 2021. The site visits included a pedestrian survey to evaluate vegetation and landscape features considered important to the potential occurrence of special-status plant and animal species. These site visits did not include any species-specific surveys or any systematic surveys for protected biological components, such as birds' nests or vegetation densities; however, the biologist did record plant and wildlife species observations, and those observations are reported here (SWCA unpublished data).

In addition, SWCA biologists completed several systematic wildlife surveys in the vicinity of the Study Area (see Exhibit B). These surveys include avian use surveys conducted monthly at fixed points distributed throughout the associated wind farm site, commencing in June 2021 and continuing through June 2023; 2 years of raptor nest surveys on and within 2 miles of the wind farm site (February and March 2021 and 2022); raptor migration surveys in September and October 2021; and bat acoustic surveys at fixed stations conducted from February through November 2021. Since these surveys began, surveyors have been recording incidental species observations, contributing to an overall understanding of wildlife use of the area.

Results

Ecological Setting

The topography of the Study Area is characterized by flat to rolling terrain with occasional basalt or limestone benches and shallow canyons. Elevations range from approximately 6,420 feet above mean sea level (amsl) in the center of the Study Area to approximately 6,500 feet amsl at the western end.

The Study Area is in the Great Basin Conifer Woodland biotic community and borders the Great Basin Grassland biotic community (Brown 1994); it includes characteristics of both biomes. According to the SWReGAP landcover classification, the Study Area is dominated by Colorado Plateau Pinyon-Juniper Woodland, Intermountain Basins Semi-Desert Shrub Steppe, and Intermountain Basins Semi-Desert Grassland (USGS 2016).

No perennial surface waters exist within 20 miles of the Study Area. One ephemeral earthen stock tank (Oil Line Tank) lies in the center of the Study Area within the gen-tie line corridor, and several more stock tanks are scattered throughout the surrounding ranchland. Additional anthropogenic features include ranch roads and a transmission line corridor with two 500-kV transmission lines. A considerable amount of soil disturbance has occurred in and around the Study Area as a result of over a century of cattle and horse ranching.

The Study Area intersects several linkages that are used by wildlife to move between or within habitat blocks in order to complete activities necessary for survival and reproduction (Arizona Game and Fish Department 2011, 2023). See Exhibit C for details.

Vegetation

The native plant species observed during the field reconnaissance visits are listed in Table D-1 below. They are typical of plants found in the Great Basin Conifer Woodland and Great Basin Grassland biotic communities (Brown 1994). Two non-native plant species—prickly Russian thistle (*Salsola tragus*) and field bindweed (*Convolvulus arvensis*)—were also observed. Field bindweed is listed as a Class C noxious weed by the Arizona Department of Agriculture (ADA) under Arizona Administrative Code R3-4-245. A Class C noxious weed is categorized by the ADA (2023) as “a species of plant that is widespread but may be recommended for active control based on risk assessment.”

Wildlife

Wildlife species observed in the project vicinity or that could potentially occur in the Study Area are listed in Tables D-2 through D-4. These species are typical of wildlife found in the Great Basin Conifer Woodland and Great Basin Grassland biotic communities (Brown 1994).

Summary of Potential Effects

Plant Species

Construction of the proposed Interconnection Project would permanently remove vegetation on an estimated 18.18 acres. An additional 13.44 acres of vegetation would temporarily be lost, primarily at laydown and pulling and tensioning sites. Native vegetation characteristic of the Great Basin Conifer Woodland and Great Basin Grassland biotic communities is extensive in northern Arizona, and the acreage of disturbance as a percentage of the remaining habitat in Coconino County is very small. The

permanent removal of approximately 18.18 acres of vegetation would not result in significant impacts to the vegetation communities as a whole. Standard best management practices will be employed during construction to minimize the introduction and spread of noxious weeds.

Wildlife Species

Wildlife species listed in Tables D-2 through D-4 may be affected by the proposed Interconnection Project in the following ways, but none of the species are likely to be substantially affected.

- Construction-related activity and noise may disturb wildlife species in the area and cause them to avoid or move away from the site or temporarily alter their behavior in other ways (e.g., remain underground). Once construction is completed, it is expected that wildlife will return to the area and resume normal behavior patterns.
- Ground-dwelling animals (e.g., mice and reptiles) in areas of ground disturbance could be injured or killed during construction.
- Ground- and shrub-nesting birds could be disturbed during construction, and their nests, eggs, or young destroyed. To avoid this, if construction occurs during the nesting season, a pre-construction protocol survey within 7 days prior to construction would be conducted to ensure that any active nests in vegetation or on the ground are avoided. If active nests are found, an appropriate avoidance buffer would be established (per U.S. Fish and Wildlife Guidelines guidelines), and construction would not occur within that buffer until the nest becomes inactive.
- Removal of vegetation associated with clearing portions of the transmission line right-of-way, placement of support structures would result in a small loss of habitat that could provide nesting sites, cover, and/or forage for bird and mammal species or their prey. In temporarily disturbed areas along the transmission line right-of-way, species composition of birds and mammals using those areas may change over time as vegetation species and structure recover. The acreage of vegetation to be cleared is small, however, particularly relative to the large amount of comparable habitat available in the project vicinity. Removal of vegetation is expected to have negligible effects on wildlife species.
- Transmission lines do not appear to affect most wildlife movements (Bonneville Power Administration 1989; Goodwin 1975; Thompson 1977).
- The effects of exposure to electromagnetic fields (EMF) by birds nesting near power lines is largely unknown; however, in one study, Fernie et al. (2000) found that EMF exposure affected the reproductive success of kestrels (*Falco sparverius*), increasing fertility, egg size, embryonic development, and fledging success, but reducing hatching success.
- Transmission lines pose a risk of collisions and electrocution for birds, particularly eagles and other raptors. To minimize that risk, RWE Clean Energy (Applicant) will construct the proposed transmission line following the guidelines outlined in *Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006) and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012).
- Impacts of the Interconnection Project to bats in flight are expected to be negligible because bats are well adapted to avoid stationary objects by using echolocation.

Table D-1. Plant Species Observed in the Study Area or Vicinity

Common Name	Scientific Name	Common Name	Scientific Name
blue grama*	<i>Bouteloua gracilis</i>	Powell's amaranth	<i>Amaranthus powellii</i>
broom snakeweed*	<i>Gutierrezia sarothrae</i>	prickly Russian thistle†	<i>Salsola tragus</i>
cheatgrass‡	<i>Bromus tectorum</i>	puncturevine†	<i>Tribulus terrestris</i>
common purslane	<i>Portulaca oleracea</i>	redroot buckwheat	<i>Eriogonum racemosum</i>
coyote tobacco	<i>Nicotiana attenuata</i>	redstem stork's bill†	<i>Erodium cicutarium</i>
desert sweet	<i>Chamaebatiaria millefolium</i>	ring muhly	<i>Muhlenbergia torreyi</i>
evening primrose	<i>Oenothera</i> spp.	Rocky Mountain beeplant	<i>Cleome serrulata</i>
Fendler's globemallow	<i>Sphaeralcea fendleri</i>	rubber rabbitbrush	<i>Ericameria nauseosa</i>
fetid goosefoot	<i>Dysphania graveolens</i>	sand dropseed	<i>Sporobolus cryptandrus</i>
field bindweed	<i>Convolvulus arvensis</i>	sawtooth sage	<i>Salvia subincisa</i>
fleabane	<i>Erigeron</i> spp.	sideoats grama	<i>Bouteloua curtipendula</i>
fourwing saltbush	<i>Atriplex canescens</i>	slender goldenweed	<i>Machaeranthera gracilis</i>
Fremont's mahonia	<i>Mahonia fremontii</i>	small-leaf globemallow	<i>Sphaeralcea parvifolia</i>
globemallow	<i>Sphaeralcea</i> spp.	southwestern mock vervain	<i>Glandularia gooddingii</i>
Greene's rabbitbrush*	<i>Chrysothamnus greenii</i>	spiny star	<i>Escobaria vivipara</i>
greenstem paperflower	<i>Psilostrophe sparsiflora</i>	squirreltail	<i>Elymus elymoides</i>
hoary Townsend daisy	<i>Townsendia incana</i>	Stansbury cliffrose	<i>Purshia stansburiana</i>
Indian ricegrass	<i>Achnatherum hymenoides</i>	thymeleaf sandmat	<i>Chamaesyce serpyllifolia</i>
longflower rabbitbrush	<i>Chrysothamnus depressus</i>	tulip pricklypear	<i>Opuntia phaeacantha</i>
mid bladderpod	<i>Lesquerella intermedia</i>	twistspine pricklypear	<i>Opuntia macrorhiza</i>
Mormon tea	<i>Ephedra viridis</i>	twoneedle pinyon*	<i>Pinus edulis</i>
mountain pepperweed	<i>Lepidium montanum</i>	Utah juniper	<i>Juniperus oteosperma</i>
muttongrass	<i>Poa fendleriana</i>	Whipple cholla	<i>Cylindropuntia whipplei</i>
needle and thread	<i>Hesperostipa comata</i>	winged buckwheat	<i>Eriogonum alatum</i>
oneseed juniper*	<i>Juniperus monosperma</i>	winterfat	<i>Krascheninnikovia lanata</i>
pale desert-thorn	<i>Lycium pallidum</i>	yerba de pasmo	<i>Baccharis pteronioides</i>
pinkflower hedgehog cactus	<i>Echinocereus fendleri</i>		

* Dominant

† Arizona Department of Agriculture noxious weed

‡ Invasive, non-native

Table D-2. Mammal Species Potentially Occurring in the Study Area

Common Name	Scientific Name	Common Name	Scientific Name
Allen's big-eared bat†	<i>Idionycteris phyllotis</i>	long-eared myotis†	<i>Myotis evotis</i>
Arizona myotis†	<i>Myotis occultus</i>	long-legged myotis†	<i>Myotis volans</i>
Arizona pocket mouse	<i>Perognathus amplus</i>	long-tailed weasel	<i>Mustela frenata</i>
Arizona woodrat	<i>Neotoma devia</i>	mountain lion	<i>Puma concolor</i>
badger	<i>Taxidea taxus</i>	mule deer	<i>Odocoileus hemionus</i>

Common Name	Scientific Name
big brown bat†	<i>Eptesicus fuscus</i>
big free-tailed bat	<i>Nyctinomops macrotis</i>
black bear	<i>Ursus americanus</i>
black-tailed jack rabbit*	<i>Lepus californicus</i>
bobcat	<i>Lynx rufus</i>
Botta's pocket gopher	<i>Thomomys bottae</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
brush mouse	<i>Peromyscus boylii</i>
California myotis†	<i>Myotis californicus</i>
canyon bat†	<i>Parastrellus hesperus</i>
canyon mouse	<i>Peromyscus crinitus</i>
cave myotis†	<i>Myotis velifer</i>
cliff chipmunk	<i>Neotamias dorsalis</i>
coyote*	<i>Canis latrans</i>
deer mouse	<i>Peromyscus maniculatus</i>
desert cottontail*	<i>Sylvilagus audubonii</i>
desert shrew	<i>Notiosorex crawfordi</i>
elk*	<i>Cervus elaphus</i>
fringed myotis†	<i>Myotis thysanodes</i>
gray fox	<i>Urocyon cinereoargenteus</i>
greater bonneted bat†	<i>Eumops perotis</i>
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>
hoary bat†	<i>Lasiurus cinereus</i>
kit fox	<i>Vulpes macrotis</i>

Common Name	Scientific Name
northern grasshopper mouse	<i>Onychomys leucogaster</i>
Ord's kangaroo rat	<i>Dipodomys ordii</i>
pallid bat†	<i>Antrozous pallidus</i>
pinyon mouse	<i>Peromyscus truei</i>
Plains pocket mouse	<i>Perognathus flavescens</i>
pocket gopher*	<i>Thomomys</i> spp.
pocketed free-tailed bat	<i>Nyctinomops emorosaccus</i>
porcupine	<i>Erethizon dorsatum</i>
pronghorn*	<i>Antilocapra americana</i>
rock pocket mouse	<i>Perognathus intermedius</i>
rock squirrel*	<i>Spermophilus variegates</i>
silky pocket mouse	<i>Perognathus flavus</i>
silver-haired bat†	<i>Lasionycteris noctivagans</i>
southwestern myotis	<i>Myotis auriculus</i>
spotted bat†	<i>Euderma maculatum</i>
spotted ground squirrel	<i>Spermophilus spilosoma</i>
Stephens's woodrat	<i>Neotoma stephensi</i>
Townsend's big-eared bat†	<i>Corynorhinus townsendii</i>
western red bat†	<i>Lasiurus blossevillei</i>
western small-footed bat†	<i>Myotis ciliolabrum</i>
white-tailed antelope squirrel	<i>Ammospermophilus leucurus</i>
white-throated woodrat	<i>Neotoma albigula</i>
Yuma myotis†	<i>Myotis yumanensis</i>

Sources: Drost (2009); Hoffmeister (1986).

* Species or species sign observed during reconnaissance visits to the Study Area and vicinity (SWCA unpublished data).

† Species detected during bat acoustic studies in the vicinity of the Study Area.

Table D-3. Bird Species Observed in the Study Area or Vicinity

Common Name	Scientific Name
American crow	<i>Corvus brachyrhynchos</i>
American kestrel	<i>Falco sparverius</i>
American pipit	<i>Anthus rubescens</i>
American robin	<i>Turdus migratorius</i>
ash-throated flycatcher	<i>Myiarchus cinerascens</i>
bald eagle	<i>Haliaeetus leucocephalus</i>
bank swallow	<i>Riparia riparia</i>
barn swallow	<i>Hirundo rustica</i>

Common Name	Scientific Name
long-billed curlew	<i>Numenius americanus</i>
mallard	<i>Anas platyrhynchos</i>
merlin	<i>Falco columbarius</i>
mountain bluebird	<i>Sialia currucoides</i>
mountain chickadee	<i>Poecile gambeli</i>
mourning dove	<i>Zenaidra macroura</i>
Nashville warbler	<i>Oreothlypis ruficapilla</i>
northern flicker	<i>Colaptes auratus</i>

Common Name	Scientific Name
Bendire's thrasher	<i>Toxostoma bendirei</i>
Bewick's wren	<i>Thryomanes bewickii</i>
black-chinned hummingbird	<i>Archilochus alexandri</i>
black-chinned sparrow	<i>Spizella atrogularis</i>
black-headed grosbeak	<i>Pheucticus melanocephalus</i>
black-throated gray warbler	<i>Setophaga nigrescens</i>
black-throated sparrow	<i>Amphispiza bilineata</i>
blue-gray gnatcatcher	<i>Poliophtila caerulea</i>
blue-winged teal	<i>Anas discors</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Brewer's sparrow	<i>Spizella breweri</i>
broad-tailed hummingbird	<i>Selasphorus platycercus</i>
brown-headed cowbird	<i>Molothrus ater</i>
Bullock's oriole	<i>Icterus bullockii</i>
bushtit	<i>Psaltriparus minimus</i>
Cassin's kingbird	<i>Tyrannus vociferans</i>
chestnut-collared longspur	<i>Calcarius ornatus</i>
Chihuahuan meadowlark	<i>Sturnella liliana</i>
chipping sparrow	<i>Spizella passerine</i>
cliff swallow	<i>Petrochelidon pyrronota</i>
common nighthawk	<i>Chordeiles minor</i>
common raven	<i>Corvus corax</i>
Cooper's hawk	<i>Accipiter cooperi</i>
Crissal thrasher	<i>Toxostoma crissale</i>
dark-eyed junco	<i>Junco hyemalis</i>
downy woodpecker	<i>Picoides pubescens</i>
eastern meadowlark	<i>Sturnella magna</i>
European starling	<i>Sturnus vulgaris</i>
ferruginous hawk	<i>Buteo regalis</i>
golden eagle	<i>Aquila chrysaetos</i>
gray flycatcher	<i>Empidonax wrightii</i>
gray vireo	<i>Vireo vicinor</i>
great blue heron	<i>Ardea herodias</i>
greater roadrunner	<i>Geococcyx californianus</i>
green-winged teal	<i>Anas crecca</i>
hairy woodpecker	<i>Picoides villosus</i>
hepatic tanager	<i>Piranga flava</i>
horned lark	<i>Eremophila alpestris</i>
house finch	<i>Carpodacus mexicanus</i>

Common Name	Scientific Name
northern goshawk	<i>Accipiter gentilis</i>
northern harrier	<i>Circus cyaneus</i>
northern mockingbird	<i>Mimus polyglottos</i>
osprey	<i>Pandion haliaetus</i>
peregrine falcon	<i>Falco peregrines</i>
pine siskin	<i>Spinus pinus</i>
pinyon jay	<i>Gymnorhinus cyanocephalus</i>
plumbeous vireo	<i>Vireo plumbeous</i>
prairie falcon	<i>Falco mexicanus</i>
red-naped sapsucker	<i>Sphyrapicus ruber</i>
red-tailed hawk	<i>Buteo jamaicensis</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>
rock wren	<i>Salpinctes obsoletus</i>
rough-legged hawk	<i>Buteo lagopus</i>
ruby-crowned kinglet	<i>Regulus calendula</i>
ruddy duck	<i>Oxyura jamaicensis</i>
sage thrasher	<i>Oreoscoptes montanus</i>
Say's phoebe	<i>Sayornis saya</i>
Scott's oriole	<i>Icterus parisorum</i>
sharp-shinned hawk	<i>Accipiter striatus</i>
spotted towhee	<i>Pipilo maculatus</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Townsend's solitaire	<i>Myadestes townsendi</i>
Townsend's warbler	<i>Setophaga townsendi</i>
tree swallow	<i>Tachycineta bicolor</i>
turkey vulture	<i>Cathartes aura</i>
vermillion flycatcher	<i>Pyrocephalus rubinus</i>
vesper sparrow	<i>Poocetes gramineus</i>
violet-green swallow	<i>Tachycineta thalassina</i>
western bluebird	<i>Sialia mexicana</i>
western burrowing owl	<i>Athene cunicularia</i>
western kingbird	<i>Tyrannus verticalis</i>
western meadowlark	<i>Sturnella neglecta</i>
western screech-owl	<i>Megascops kennicottii</i>
western scrub-jay	<i>Apelocoma californica</i>
western tanager	<i>Piranga ludoviciana</i>
western wood-pewee	<i>Contopus sordidulus</i>
white-breasted nuthatch	<i>Sitta carolinensis</i>
white-faced ibis	<i>Plegadis chihi</i>

Common Name	Scientific Name
house wren	<i>Troglodytes aedon</i>
juniper titmouse	<i>Baeolophus ridgwayi</i>
killdeer	<i>Charadrius vociferous</i>
ladder-backed woodpecker	<i>Picoides scalaris</i>
lark sparrow	<i>Chondestes grammacus</i>
lesser goldfinch	<i>Spinus psaltria</i>
loggerhead shrike	<i>Lanius ludovicianus</i>

Common Name	Scientific Name
white-throated swift	<i>Aeronautes saxatalis</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>
Wilson's warbler	<i>Cardellina pusilla</i>
Woodhouse's scrub-jay	<i>Aphelocoma woodhouseii</i>
yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
yellow-rumped warbler	<i>Setophaga coronate</i>

Note: All species listed were observed during reconnaissance visits or during avian point count surveys in the vicinity of the Study Area.

Table D-4. Reptile Species Potentially Occurring in the Study Area

Common Name	Scientific Name
Lizards	
desert spiny lizard	<i>Sceloporus magister</i>
eastern collared lizard	<i>Crotaphytus collaris</i>
fence lizard	<i>Sceloporus undulatus</i>
leopard lizard	<i>Gambelia wislizenii</i>
lesser earless lizard	<i>Holbrookia maculata</i>
little striped whiptail	<i>Cnemidophorus inornatus</i>
orange-headed desert spiny lizard	<i>Sceloporus magister cephaloflavus</i>
plateau fence lizard	<i>Sceloporus tristichus</i>
plateau striped whiptail	<i>Cnemidophorus velox</i>
short-horned lizard	<i>Phrynosoma hernandesi</i>
side-blotched lizard	<i>Uta stansburiana</i>
tree lizard	<i>Urosaurus ornatus</i>
western collared lizard	<i>Crotaphytus bicinctores</i>
western whiptail	<i>Cnemidophorus tigris</i>
Snakes	
Arizona black rattlesnake	<i>Crotalus oreganus cerberus</i>
Arizona mountain king snake	<i>Lampropeltis pyromelana pyromelana</i>
common king snake	<i>Lampropeltis getula</i>
glossy snake	<i>Arizona elegans</i>
Great Basin gopher snake	<i>Pituophis catenifer deserticola</i>
Hopi rattlesnake	<i>Crotalus viridis nuntius</i>
night snake	<i>Hypsiglena torquata</i>
striped whipsnake	<i>Coluber taeniatus</i>
western patch-nosed snake	<i>Salvadora hexalepis</i>

Common Name	Scientific Name
western rattlesnake	<i>Crotalus viridis</i>

Sources: Brennan (2012); Drost (2009).

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EXHIBIT E. SCENIC AREAS, HISTORIC SITES AND STRUCTURES, AND ARCHAEOLOGICAL SITES

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

Describe any existing scenic areas, historic sites and structures or archaeological sites in the vicinity of the proposed facilities and state the effects, if any, the proposed facilities will have thereon.

Scenic Areas and Visual Resources

Overview

This section of Exhibit E addresses the inventory of and potential effects on visually sensitive resources in relation to construction and operation of the proposed Forged Ethic Wind Energy Interconnection Project (Interconnection Project). Specifically, this portion of Exhibit E includes a description of the methodology for assessing potential effects, an inventory of visually sensitive resources, identification of sensitive viewers near the Interconnection Project, and a discussion of the potential effects of the Interconnection Project.

Methodology

The purpose of the visual impact assessment is to identify and characterize the level of visual modification in the landscape that would result from the construction and operation of the Interconnection Project. Visual impacts are typically described in terms of the visual contrast created by a project, which can potentially affect both scenic quality and sensitive viewers. Scenic quality refers to the general characteristics and inherent aesthetic value of the landscape as a resource, regardless of specific viewers. The term “sensitive viewers” refers to specific individuals and/or groups whose views could be affected by a project. The methods used to conduct this visual impact assessment are consistent with past visual resource studies conducted for similar projects that have been approved by the Power Plant and Transmission Line Siting Committee.

RWE Clean Energy (Applicant) contracted with SWCA Environmental Consultants (SWCA) to develop an inventory of visually sensitive resources in the vicinity of the Interconnection Project by reviewing publicly available geographic information system (GIS) data, aerial photography, and on-site field verification and photographic documentation. A desktop review was conducted to identify any sites in the vicinity of the Interconnection Project that meet the following definition of “scenic area” provided in the Arizona Administrative Code at R17-3-701(A)(1)(i):

. . . any area of particular scenic beauty or historical significance as determined by the federal, state, or local officials having jurisdiction thereof, and includes interests in land which have been acquired for the restoration, preservation, and enhancement of scenic beauty.

Scenic areas so defined would include sites such as national or state parks and monuments, designated scenic overlooks, and wild and scenic river segments.

To assess how the Interconnection Project may visually modify the existing landscape, SWCA developed photo-realistic visual simulations of project components from representative positions referred to as key observation points (KOPs). In selecting KOPs, SWCA visited the area in November 2022 and April 2023, to evaluate vantage points for the Forged Ethic Wind Energy Project and the Interconnection Project. Three potentially sensitive vantage points from which the Interconnection Project would be visible were selected to include with this application. Existing conditions were photographed from each KOP for the purpose of creating visual simulations. Table E-1 lists the chosen KOPs and the reason for their inclusion.

Table E-1. Key Observation Points

Name	Location	Reason for Inclusion
KOP-1 Latitude/Longitude 35.6683, -111.8134	Approximately 1.5 miles northwest of the Project Substation and nearest transmission structure	Representative trail user on Arizona National Scenic Trail
KOP-2 Latitude/Longitude 35.5565, -111.8733	Approximately 8.1 miles southwest of the Project Substation and 4.8 miles southwest of the nearest transmission structure	Representative of travelers along U.S. Highway 180
KOP-3 Latitude/Longitude 35.646592, -111.795286	Approximately 0.6 miles southeast of the Project Substation and 0.2 miles southwest of nearest transmission structure	Representative trail user on Arizona National Scenic Trail

Photo-realistic simulations of the project components were made using ArcGIS, Google Earth Pro, Autodesk products (AutoCAD and 3DS Max), and Adobe Photoshop software for each KOP (see Exhibits E-1 though E-3). Developing visual simulations involves creating a three-dimensional model of project components, positioning the modeled components on a digital elevation model of the area, and superimposing the resulting model onto the KOP photographs of existing conditions, at the correct scale and distance. Date and time-of-day inputs determine shadows and reflected light, and the software accounts for distance and haze to increase accuracy of viewing conditions.

Using the resulting visual simulations, SWCA evaluated the potential for impacts to both scenic quality and sensitive viewers by analyzing the visual contrast the Interconnection Project would have with the existing landscape. A visual contrast analysis involves a qualitative discussion of anticipated changes in contrast between the existing landscape and the proposed facilities. Factors taken into consideration for such an analysis include distance of the proposed project elements from the viewer, existing landforms, vegetation, and built features present in the landscape. Visual contrast is described in terms of the degree of perceivable change in the basic design elements of form, line, color, texture, and scale that would be evident by the introduction of a particular project.

The level of perceived contrast between the proposed facilities and the existing landscape is classified using the following definitions:

- None: The contrast is not visible or perceived.
- Weak: The resulting contrast can be seen but does not attract attention.
- Moderate: The resulting contrast begins to attract attention and begins to dominate the characteristic landscape.

- Strong: The resulting contrast demands attention, would not be overlooked, and is dominant in the landscape.

“Sensitive viewers” refers to individuals who may be sensitive to potential changes in the scenery from a visible project. Regarding sensitive viewers, perceived contrast is dependent on several factors, including viewing distance, duration of view, viewing condition, and degree of visibility. When combined, these factors indicate the overall visual dominance of new features in a landscape.

“Viewing distance” refers to the sensitive viewer’s distance from a particular feature. The assessment of visual impacts is predicated on the fact that a person’s ability to discern details decreases as viewing distance increases. The duration of view refers to the length of time and associated viewing angle; generally, a viewer’s attention is attracted to a higher degree as the duration of view increases. Viewing conditions refer to whether the viewer is looking down at a feature from a superior position, looking up at a feature from an inferior position, or viewing it from a similar elevation (i.e., a neutral view). “Degree of visibility” refers to whether views of a feature are open and unobstructed, or partially to fully obstructed by the existing landscape (i.e., topography, vegetation, or built features). The degree of visibility also refers to whether a feature would be visible against the sky (i.e., skylined) or viewed against a backdrop of landforms, vegetation, and/or built features.

In general, residential and recreational viewers are considered to have higher sensitivities to visual changes in a landscape, while viewers moving along travel routes are considered to have low to moderate sensitivities (unless traveling along a designated scenic travel route).

Inventory Results

The existing condition of the landscape in the vicinity of the planned Interconnection Project is characterized by flat or slightly undulating open areas in the foreground, canyons in the middle ground, and distant mesas and buttes in the background. Vegetation consists mainly of large areas of light-colored (buff and light green) perennial grasses, forbs, and shrubs interspersed with dense stands of darker green pinyon and juniper trees. Pinyon-juniper forest occurs along the northern edge of the Study Area.

The most notable scenic features in the landscape are Red Butte in the pinyon-juniper-covered Kaibab National Forest south of the Grand Canyon National Park, and the San Francisco Peaks rising to 12,633 feet above mean sea level (amsl) to the southeast. Red Butte rises to 7,329 feet amsl and is a prominent feature in the broad undulating landscape. These features and the densely forested pinyon-juniper landforms to the north and south give a sense of a predominantly natural and undeveloped landscape. The Arizona National Scenic Trail (Arizona Trail) is a north-south non-motorized trail that traverses from Mexico through Arizona to Utah across the eastern side of the Interconnection Project. The Arizona Trail was designated a National Trail in 2009; it is known for its rich history and cultural sites, diverse wildlife and vegetation, and diverse terrain and scenery covering over 800 miles.

The landscape within the Study Area is mostly undeveloped but has been partially modified by human-made structures and activities. Roads, ranch infrastructure, and transmission lines have contributed to changes to the natural landscape within the Study Area, as have scattered rural residences located on subdivided lands west of the Study Area. Numerous improved and unimproved dirt roads are within the 1-mile Study Area, as well as U.S. Highway 89A and U.S. Highway 180 (U.S. 180), a primary travel route to Grand Canyon National Park. Additional human modification to the landscape includes range improvements such as the occasional earthen and metal stock tanks, corrals, and ranch outbuildings. With the exception of existing high-voltage transmission line infrastructure, the overall character of the landscape is typical of rural rangeland.

Visual Simulations and Contrast Analysis by KOP

SWCA, in coordination with the Applicant, identified and photodocumented potential KOPs. Three potentially sensitive vantage points from which the Interconnection Project would be visible were developed into visual simulations included with this application (see visual simulations in Exhibits E-1 through E-3).

Impacts to visual resources were determined by examining the simulated condition and evaluating the degree of change in landscape character (i.e., degree to which project elements contrast with existing conditions) that would result from the construction and operation of the planned Interconnection Project. The visual impact analysis for each of the three KOPs is provided below.

KOP 1: MIDDLE ARIZONA NATIONAL SCENIC TRAIL

KOP 1 (see Exhibits E-1a, E-1b, and E-1c) represents the view looking east that a recreationist may experience from the Arizona Trail. This location is approximately 0.8 miles west of the nearest visible turbine and approximately 1.5 miles northwest from the nearest transmission structure. The immediate foreground is represented by brown, beige, and light tan vegetation. Views in the middle ground include stippled, singular forms of dark pinyon-juniper contrasting with the light-colored rabbitbrush and grasses which increase in density and consistency. Distant views from this KOP consist of light-colored rabbitbrush and grasses and sparsely scattered pinyon which transition to long, smooth, irregular, undulating tan rolling hills and buttes.

From KOP 1, the viewer would be approximately 1.5 miles northwest from the nearest visible transmission structure. Based on the neutral viewing perspective and lack of intervening vegetation or topography, the Interconnection Project would attract a viewer's attention in the foreground landscape. The lines, colors, and textures of the proposed equipment would be similar to those of the existing transmission line infrastructure visible in the area. The Interconnection Project would add new forms to the landscape with the proposed H-frame type transmission structures. Despite the relatively close proximity of the trail and the anticipated long duration of view from this location, the Interconnection Project would be seen within a similar landscape with other built features visible, resulting in a weak degree of contrast and low impacts along the Arizona Trail.

KOP 2: U.S. HIGHWAY 180

KOP 2 (see Exhibits E-2a, E-2b, and E-2c) represents the view that a sensitive viewer may experience from a vehicle traveling along U.S. 180. This location is approximately 4.7 miles southwest of the nearest visible wind turbine and approximately 5.7 miles southwest from the nearest Interconnection Project transmission structure. Views in the immediate foreground are made up of a smooth, consistent, distinctive roadway with contrasting white paint markings, a repetitive three-strand barbed-wire fence with weathered T-post poles adjacent to the roadway. Brown, beige, and light tan vegetation, with dense and consistent light to dark green pinyon-juniper, continues through the middle ground of the KOP. Distant views from this KOP consist of light-colored rabbitbrush and grasses and sparsely scattered pinyon-juniper which transition to long, smooth, irregular, undulating tan rolling hills and buttes.

From KOP 2, the viewer is approximately 5.7 miles southwest from the nearest visible transmission structure. Based on the superior viewing perspective, and distance to the nearest transmission structure along with the backdrop of the pale sky, the Interconnection Project would not be perceivable to the casual observer as the forms, lines, colors, and textures would be indiscernible from the existing transmission line infrastructure common in the landscape at this distance. Interconnection Project components would begin to attract attention and introduce elements/patterns that would create weak to no

contrast and would be subordinate to other built features in the landscape during short duration of views, based on travel speeds and distance from the Interconnection Project.

KOP 3: ARIZONA NATIONAL SCENIC TRAIL (POWERLINE ROAD)

KOP 3 (see Exhibits E-3a, E-3b, and E-3c) represents a trail user's view looking north from the Arizona Trail. This location is approximately 0.7 mile south of the nearest visible wind turbine and approximately 0.3 mile from the nearest Interconnection Project transmission structure. The immediate foreground consists of dark greens, brown, beige, and light tan vegetation. Views in the middle ground include stippled, singular forms of dark pinyon-juniper contrasting with the light-colored rabbitbrush and grasses which increase in density and consistency. Middle ground views also include a dirt road and sky-lined views of tall dark steel lattice structures and conductor wires that dominate this view.

From this KOP, the viewer is approximately 0.3 mile southeast from the nearest visible transmission structure. Based on the inferior viewing perspective, and distance to the nearest structure along with the backdrop of the pale blue sky, the Interconnection Project would be perceivable to the casual observer and the lines, colors, and textures would appear similar to the existing transmission line infrastructure common in the landscape. At this close distance the Interconnection Project would add new forms to the landscape with the proposed H-frame type transmission structures. Due to the close proximity of the trail and the anticipated long duration of view from this location, the Interconnection Project could be seen and would begin to attract attention, although similar to other built features in the landscape, thus resulting in a weak to moderate degree of contrast and low impacts along the Arizona Trail.

Conclusion

Overall, the Interconnection Project would be similar in form, line, color, texture, and scale as compared to the existing Moenkopi to Cedar Mountain 500-kV transmission line. The Interconnection Project would be adjacent to existing transmission structures that are a similar height. The simulations illustrate the potential for different impacts to be experienced by sensitive viewers from various distances and locations. The simulations (see Exhibits E-1 through E-3) also show that from most middle ground and background viewing locations, the Interconnection Project would remain below the horizon line and not be backlit in the sky. Therefore, the Interconnection Project would result in a weak degree of visual contrast.

Sun and Weather



Sunny

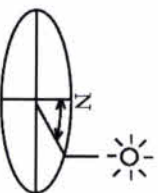
Date: **11-16-22**
Photo Time: **10:32 AM**

Visibility:



Air Quality: **Good**

Sun Azimuth:



138.15°

Sun Angle:

23.96°

Lighting Angle on Project:

Back Lit

Wind:

29 mph

Cloud Cover:

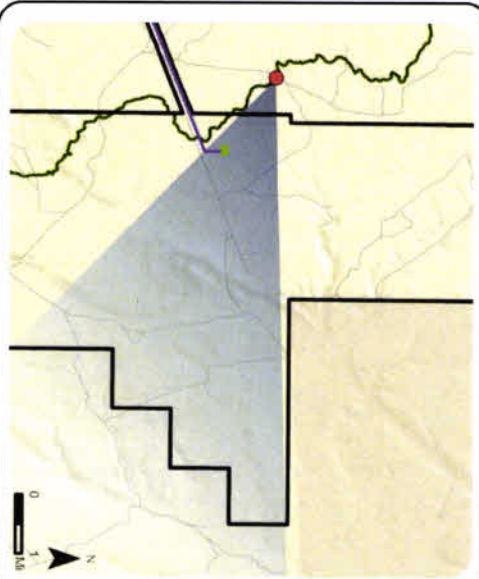
0%

Temperature (°F):

33°F

Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.

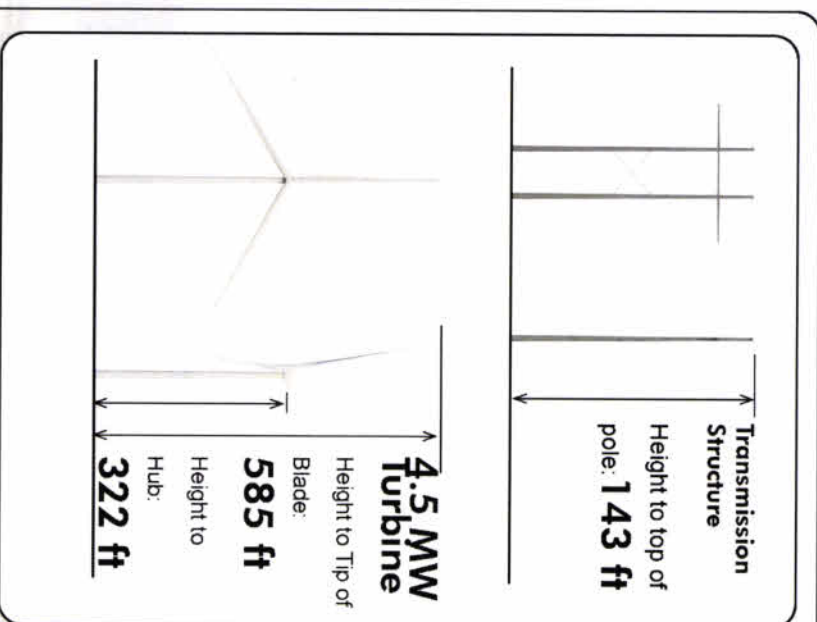
Forged Ethic Interconnection Project



- KOP 1
- Photograph Angle
- Arizona National Scenic Trail
- Interconnection Project
- Forged Ethic Wind Energy Project
- Project Substation
- Incorporated Places

Approximate Distance to Nearest Visible Transmission Structure: **1.5 miles**

Project Location



Transmission Structure
Height to top of pole: **143 ft**

4.5 MW Turbine
Height to Tip of Blade: **585 ft**
Height to Hub: **322 ft**

Structure Diagram



Extent of Single Turbine Simulation

KOP 1 - Arizona National Scenic Trail Central

Base Photographic Documentation

Latitude (°): **35.6683**
Longitude (°): **-111.8134**
Viewpoint Elevation (feet): **6479**
Camera Height (meters): **1.5**
Camera Heading (degrees): **85**

Camera Make & Model: **Canon EOS 5D Mark IV**
Camera Sensor Size (mm): **36 x 24 Full Frame**
Crop Factor: **1**

Lens Make & Model: **AF-P Nikkor**
Lens Focal Length (mm): **50**

Image Size (pixels): **6720 x 4480**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.



Exhibit E-1a. Photosimulation information for KOP 1.

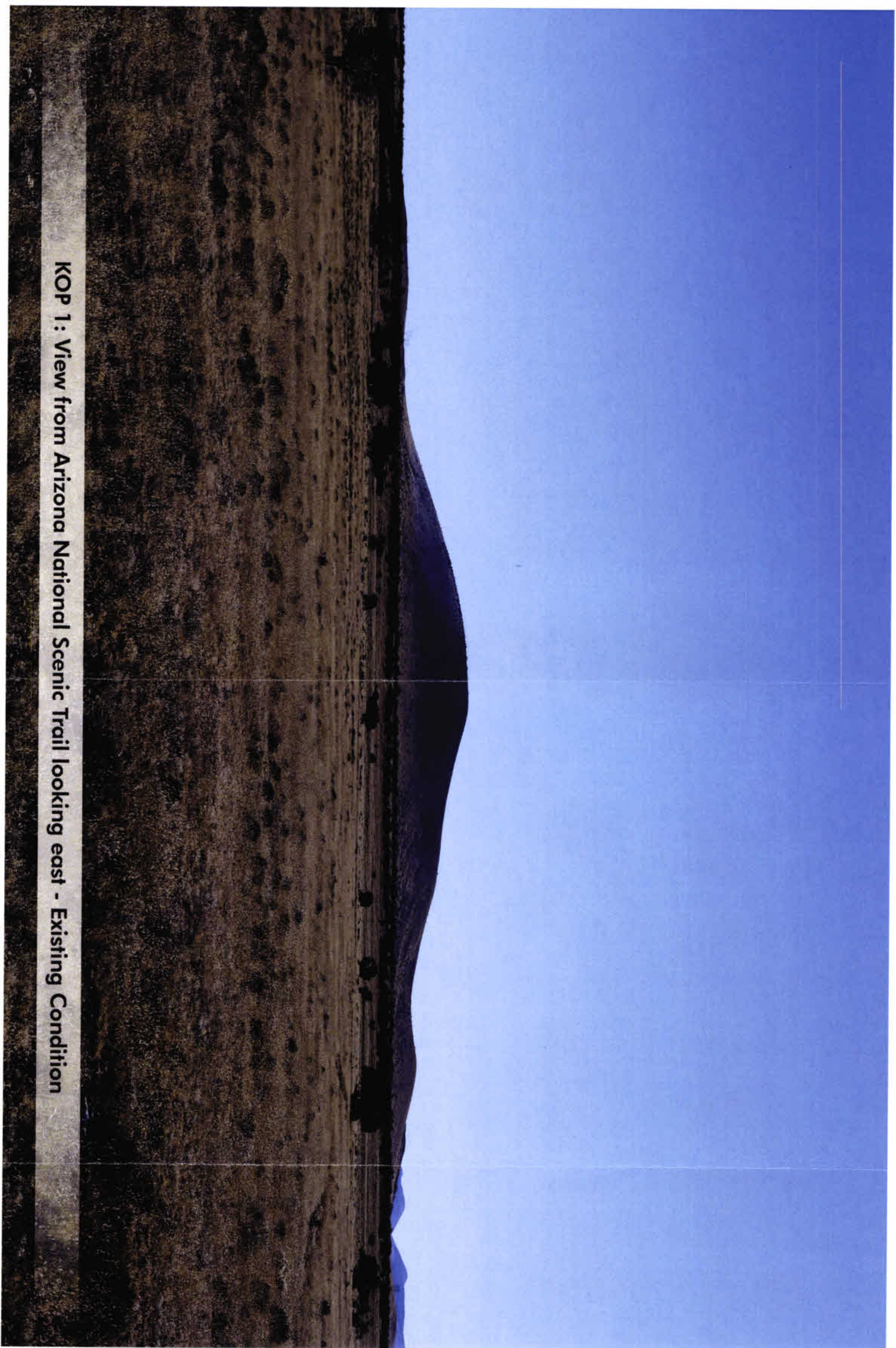


Exhibit E-1b. Existing view from KOP 1.

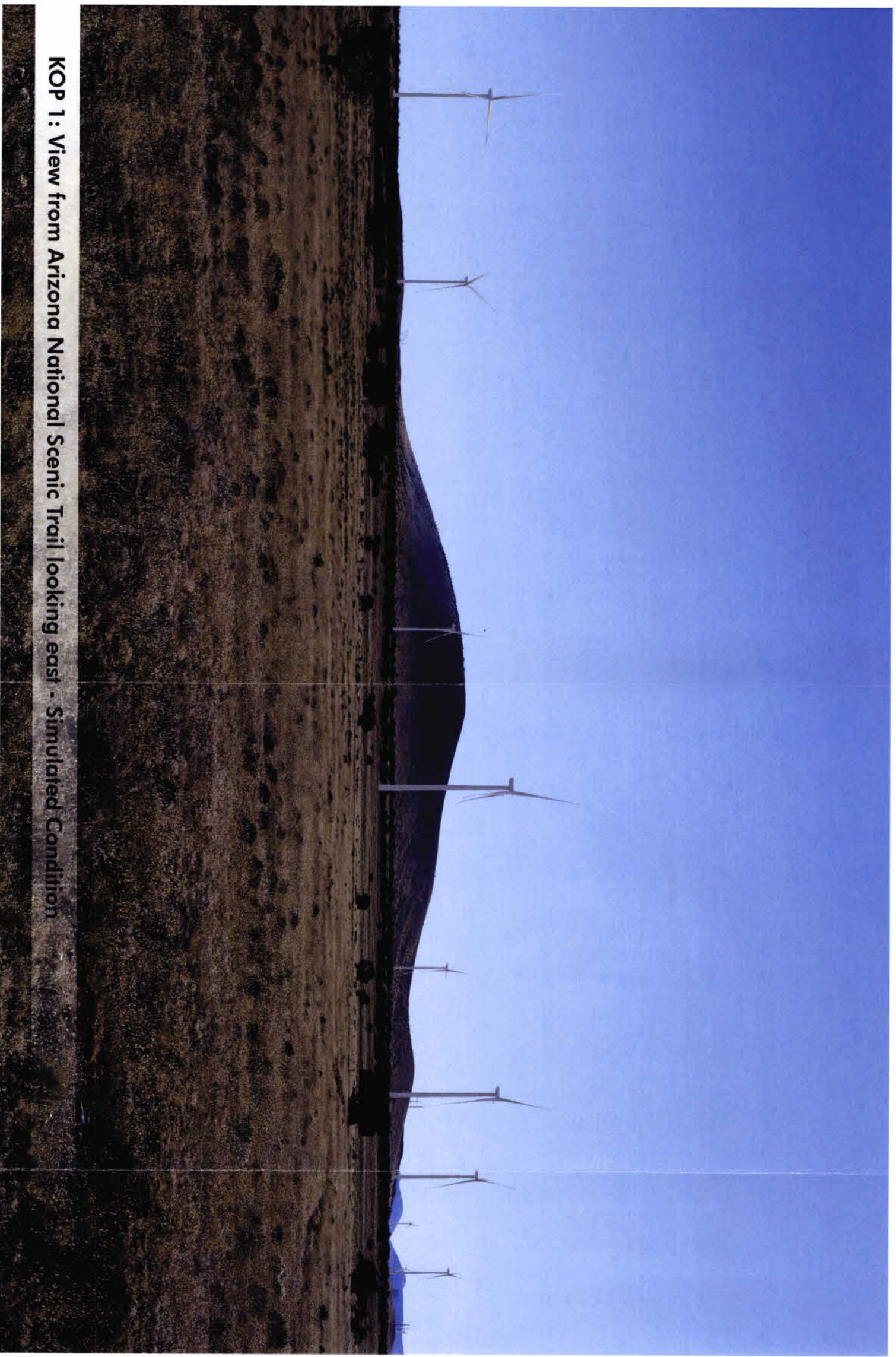
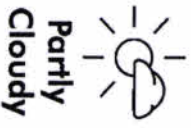


Exhibit E-1c. Photosimulation showing view from KOP 1.

Sun and Weather



Date: **11-15-22**
 Photo Time: **11:17 AM**

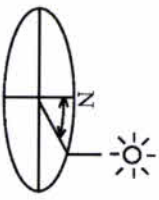
Partly Cloudy

Visibility:



Air Quality: **Good**

Sun Azimuth:



148.28°

Sun Angle:

29.70°

Lighting Angle on Project:

Back Lit

Wind:

16 mph

Cloud Cover:

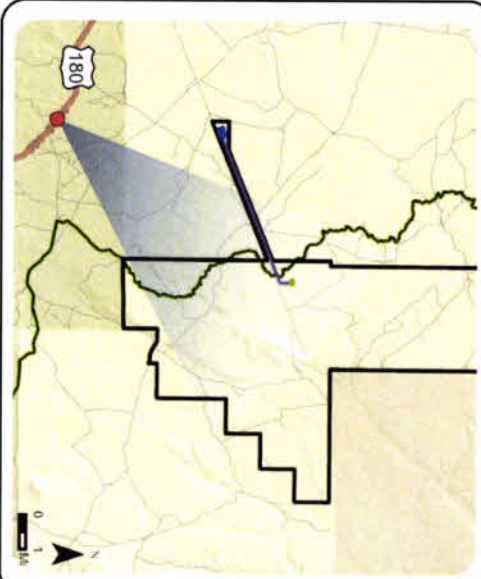
5%

Temperature (°F):

39°F

Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.

Forged Ethic Interconnection Project

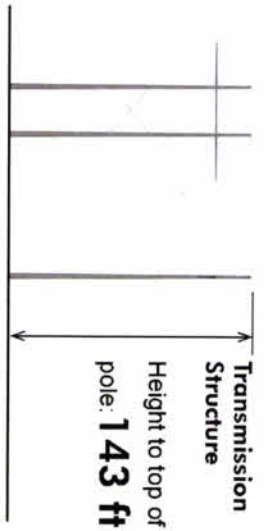


- KOP 2
- Photography Angle
- Arizona National Scenic Trail
- Interconnection Project
- Forged Ethic Wind Energy Project
- Project Substation
- APS Switchyard

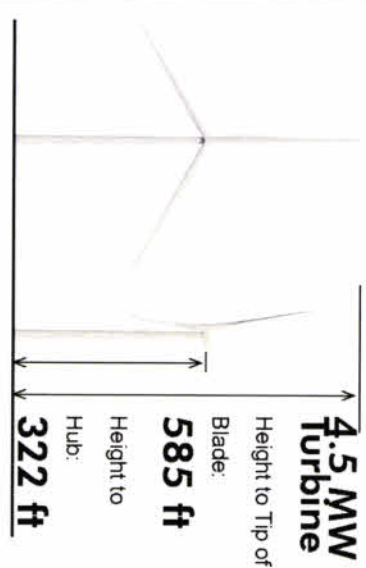
Approximate Distance to Nearest Visible Transmission Structure:

5.7 miles

Project Location



Transmission Structure
 Height to top of pole: **143 ft**



4.5 MW Turbine
 Height to Tip of Blade: **585 ft**
 Height to Hub: **322 ft**

Structure Diagram



KOP 2 - US Highway 180

Base Photographic Documentation

Latitude (°): **35.5565**
 Longitude (°): **-111.8733**
 Viewpoint Elevation (feet): **6647**
 Camera Height (meters): **1.5**
 Camera Heading (degrees): **60**
 Camera Make & Model: **Canon EOS 5D Mark IV**
 Camera Sensor Size (mm): **36 x 24 Full Frame**
 Crop Factor: **1**

Lens Make & Model: **AF-P Nikkor**
 Lens Focal Length (mm): **50**

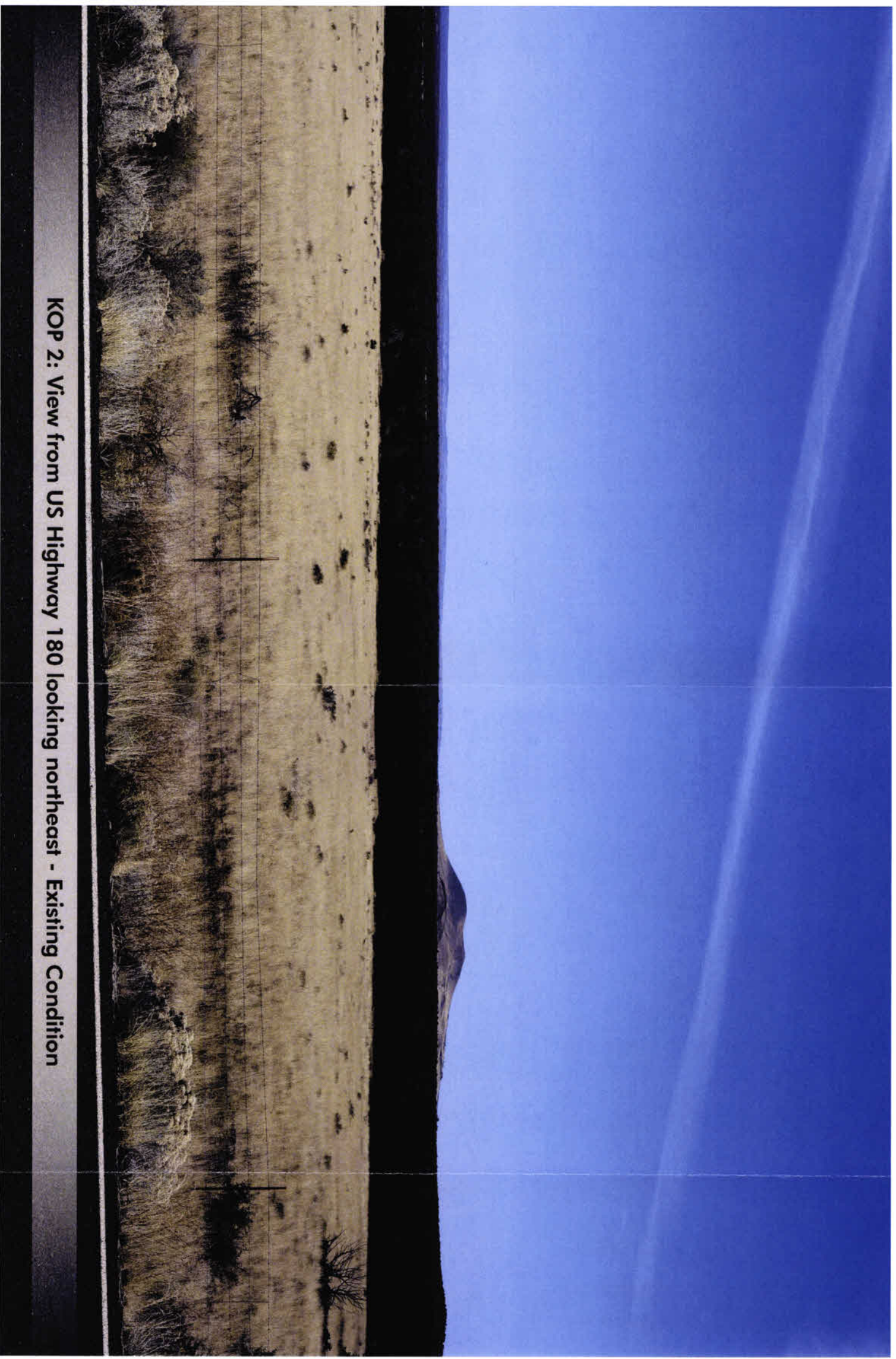
Image Size (pixels): **6720 x 4480**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.



Exhibit E-2a. Photosimulation information for KOP 2.



KOP 2: View from US Highway 180 looking northeast - Existing Condition

Exhibit E-2b. Existing view from KOP 2.



KOP 2: View from US Highway 180 looking northeast - Simulated Condition

Exhibit E-2c. Photosimulation showing view from KOP 2.

Sun and Weather



Sunny

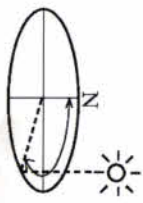
Date: **4-20-23**
Photo Time: **12:00 PM**

Visibility:



Air Quality: **Good**

Sun Azimuth:



135.04°

Sun Angle:

59.33°

Lighting Angle on Project:

Front Lit

Wind:

9 mph

Cloud Cover:

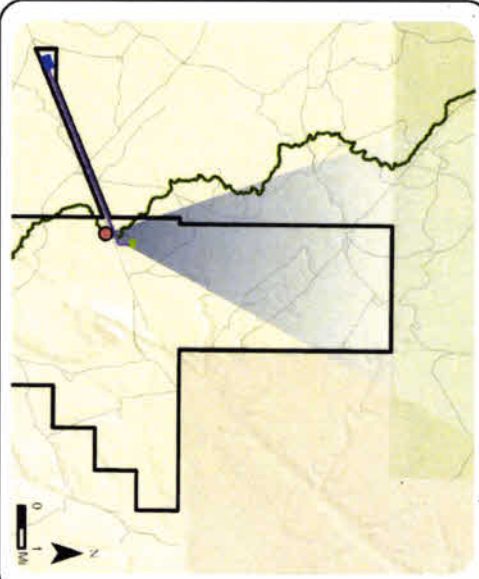
0%

Temperature (°F):

56°F

Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.

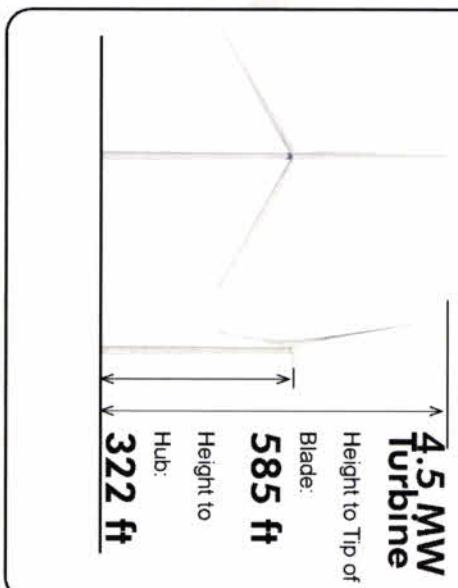
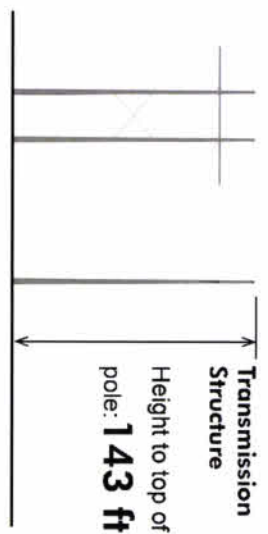
Forged Ethic Interconnection Project



- KOP 3
- Photogeography Angle
- Arizona National Scenic Trail
- Interconnection Project
- Forged Ethic Wind Energy Project
- Project Substation
- APS Switchyard

Approximate Distance to Nearest Visible Transmission Structure: **0.25 miles**

Project Location



Structure Diagram

KOP 3 - Arizona National Trail (Power-line Road)

Base Photographic Documentation

Latitude (°): **35.6465**

Longitude (°): **-111.7952**

Viewpoint Elevation (feet): **10260**

Camera Height (meters): **1.5**

Camera Heading (degrees): **5**

Camera Make & Model: **Canon EOS 5D Mark IV**

Camera Sensor Size (mm): **36 x 24 Full Frame**

Crop Factor: **1**

Lens Make & Model: **AF-P Nikkor**

Lens Focal Length (mm): **50**

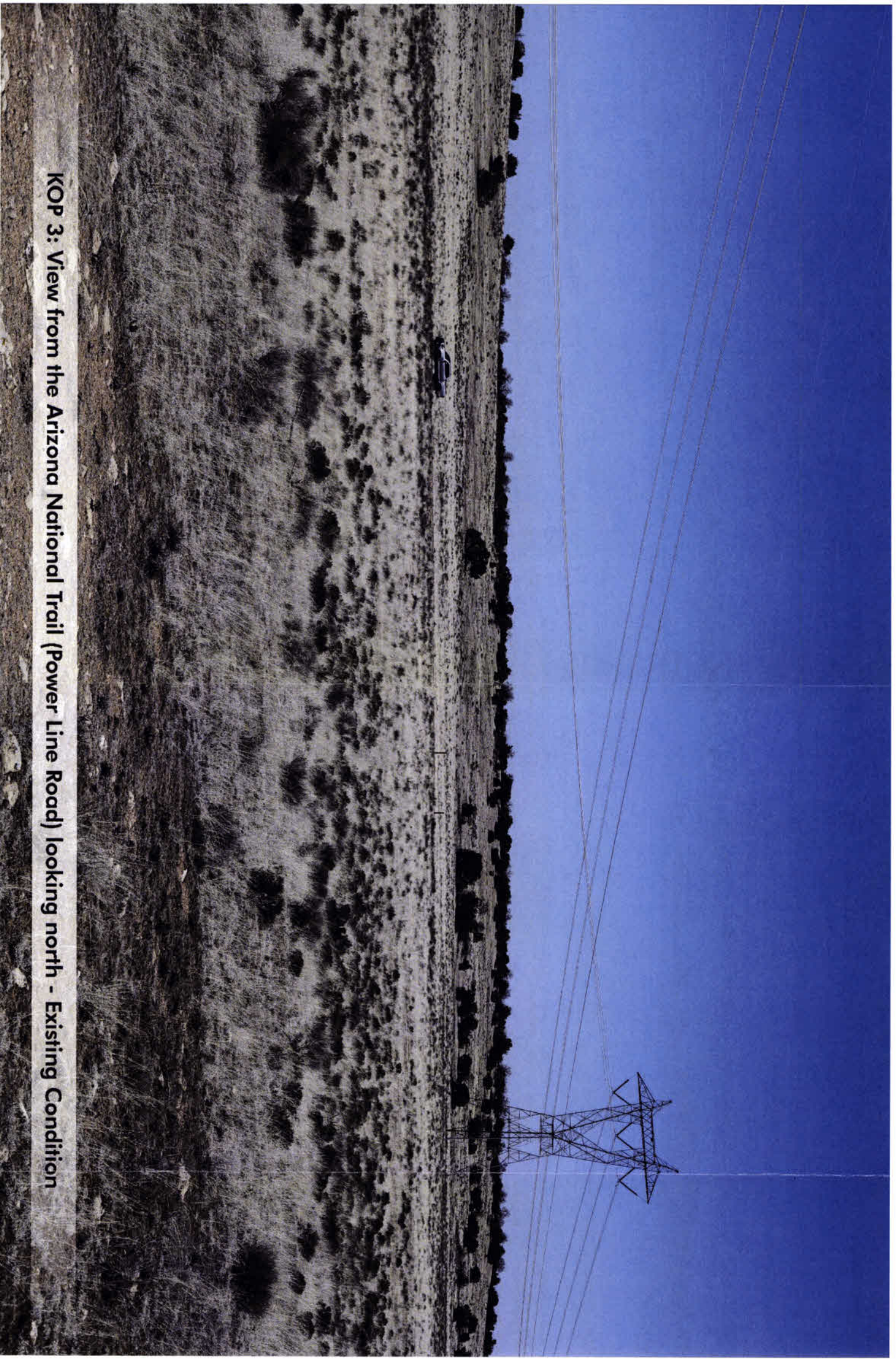
Image Size (pixels): **6720 x 4480**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.

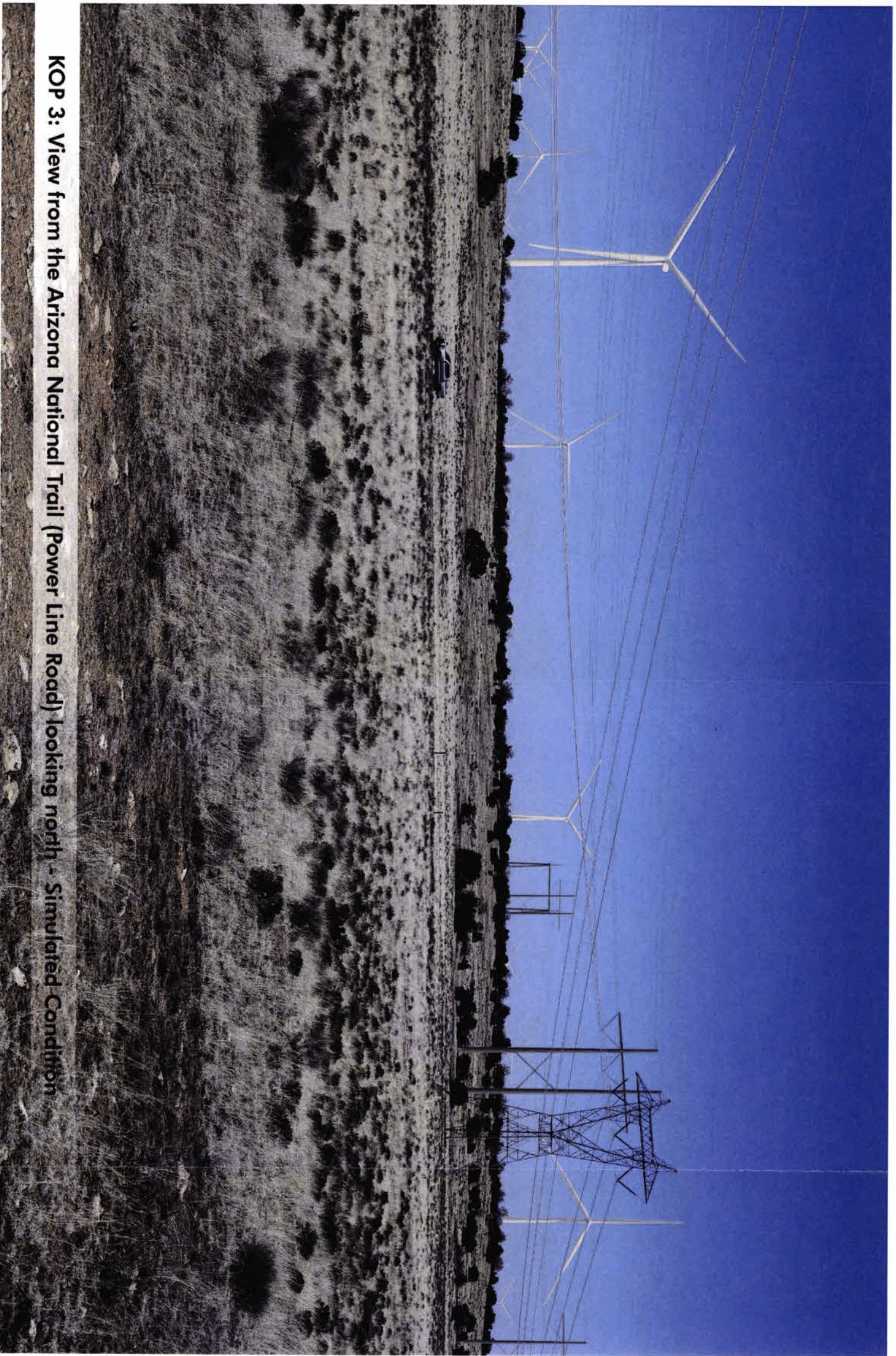


Exhibit E-3a. Photosimulation information for KOP 3.



KOP 3: View from the Arizona National Trail (Power Line Road) looking north - Existing Condition

Exhibit E-3b. Existing view from KOP 3.



KOP 3: View from the Arizona National Trail (Power Line Road) looking north - Simulated Condition

Exhibit E-3: Photosimulation showing view from KOP 3.

Historic Sites and Structures, and Archaeological Sites

As required by the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219, the potential effects of the proposed Interconnection Project on historic sites and structures and archaeological sites were assessed. The assessment also was prepared to support Arizona Corporation Commission compliance with the State Historic Preservation Act (Arizona Revised Statutes 41-861 through 41-864), which requires state agencies to consider impacts of their programs on historic properties listed in or eligible for listing in the Arizona Register of Historic Places (ARHP) and to provide the State Historic Preservation Office (SHPO) an opportunity to review and comment on the actions that affect such historic properties.

To be eligible for the ARHP, a property must be at least 50 years old (less if it has special significance) and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. It should also possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of the four following criteria:

- Criterion (a): be associated with an event that made a significant contribution to the broad pattern of history.
- Criterion (b): be associated with the life of a historically significant person.
- Criterion (c): have distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic value, or represents a significant and distinguishable entity whose components may lack individual distinction.
- Criterion (d): has yielded or is likely to yield important prehistorical or historical information.

Methodology

The Study Area for the purpose of assessing potential impacts to historic sites and structures, as well as archaeological sites, is defined as a 1-mile-radius buffer from the Interconnection Project and Project Substation. SWCA reviewed archival records to identify such properties within the Study Area. Data sources searched included AZSITE, Arizona's statewide cultural resources database, which includes records from the Arizona State Museum (ASM), Arizona State University, SHPO, and the Bureau of Land Management; the National Register of Historic Places database; the ARHP list; General Land Office (GLO) plat maps; and historic-era topographic maps.

Previous Cultural Resources Projects

The records review identified nine prior cultural resources surveys that have taken place within the 1-mile Study Area. These projects took place from 1978 to 2022 in support of mineral exploration, electrical transmission lines, gas pipelines, and alternative energy projects. Of these, eight cultural surveys intersect and cover the entire Project Area (Table E-2).

Table E-2. Previous Cultural Resources Projects Intersecting the Project Area

Agency Number	Project Name	Organization	Year
2005-708.ASM	Black Mesa Project and Kingman Re-Route	URS	2005
2007-573.ASM	Arizona Public Service 500-2 (Navajo-Westwind) Survey	Logan Simpson Design	2007
2012-525.ASM	Southern Trails Pipeline: 10 Pipeline Components	Statistical Research	2012
2013-74.ASM	Southern Trails Pipeline: Topoc Interconnection	Statistical Research	2013

Agency Number	Project Name	Organization	Year
2020-325.ASM	Babbitt Ranch Energy Center	SWCA	2020
2021-128.ASM	CO Bar Solar ASLD ROW Cultural Surveys	SWCA	2021
2021-447.ASM	CO Bar Ranch Fiber Optic and Access Road Survey	SWCA	2021
2022-395.ASM	Forged Ethic Wind Energy Center	SWCA	2022

The SHPO has provided guidance for the reliance on survey data 10 years or older (SHPO 2004). Surveys conducted before 1995 did not use the current ASM site definition criteria (ASM 1995). For the eight surveys listed in Table E-2, the principal investigators meet current state and federal professional qualification standards. In addition, the four surveys in Table E-2 conducted by SWCA covered the Project Area in its entirety and can be relied upon for current inventory purposes.

Historic-era Sites

The records review identified three historic-era sites, none of which intersect the Project Area (Table E-3). Site AZ I:5:63(ASM) is a Navajo sweat lodge and historic-era refuse scatter that was recommended eligible for the ARHP. AZ I:5:64(ASM) is a Euro-American historic-era hearth and refuse scatter that was recommended not eligible for the ARHP. AZ I:5:80(ASM) is a historic-era brush structure and refuse scatter that could be associated with Navajo or Euro-American populations that was recommended ineligible for the ARHP.

Table E-3. Previously Recorded Historic-era Sites within 1 Mile of the Project Area

Site Number	Cultural/Temporal Affiliation	Site Type	ARHP Eligibility Status	Associated Reference(s)	Distance from Project Area (miles)
AZ I:5:63(ASM)	Navajo / ca. 1930–1975	Sweat lodge and refuse scatter	Recommended eligible	Barr et al. (2021)	0.92
AZ I:5:64(ASM)	Euro-American / ca. 1930–1959	Hearth and refuse scatter	Recommended not eligible	Barr et al. (2021)	0.48
AZ I:5:80(ASM)	Navajo (?)/Euro-American (?)/ ca. 1930–1975	Brush structure and refuse scatter	Recommended not eligible	Barr et al. (2021)	0.07

Historic-era Structures

The records review did not identify any historic-era structures from the AZSITE database.

The GLO plat of Township 26 North, Range 5 East was surveyed in 1916 and approved and filed in 1918. The landscape was depicted as ranchland with little development except for dirt roads providing access to ranch land. A DAM was depicted south of the Project Area in the SE¼ of Section 15. In addition, a dirt road crosses the Project Area in the NW¼ of Section 13.

The GLO map of Township 26 North, Range 5 East was surveyed in 1916 and approved and filed in 1919. The map is consistent with the neighboring townships as ranchland with little development. It depicts a series of interconnected unnamed dirt roads that meander roughly northwest-southeast and northeast-southwest through Sections 7, 8, 17, 20, 28, 29, and 33–36. None of these roads cross the Project Area.

The 1960 U.S. Geological Survey (USGS) Ebert Mountain, Arizona, 15-minute quadrangle depicts the area as a ranching landscape with dirt roads and stock tanks. A PIPELINE parallels the transmission line corridor adjacent to the Project Area. There is a northwest-southeast-trending unnamed dirt road leading to PEARL HARBOR TANK that intersects the Project Area in Section 14; a northeast-southwest-trending unnamed dirt road leading to UPPER LOCKWOOD TANK that intersects the Project Area in Section 13; and an unnamed dirt road that parallels the pipeline adjacent to the Project Area.

Historical aerial photographs of the area from 1958 depict the same unimproved roads and pipeline that were depicted on the 1960 USGS map. Modern aerial photography indicates that the two historic-era roads intersecting the Project Area are still in use.

Archaeological Sites

There are four previously recorded archeological sites within the 1-mile Study Area that do not intersect the Project Area (Table E-4). Two sites (AZ I:5:79[ASM] and AZ I:5:81[ASM]) are Cohonina artifact scatters; one was recommended eligible (AZ I:5:81[ASM]) and one was recommended not eligible (AZ I:5:79[ASM]) for the ARHP. Two sites (AZ I:5:108[ASM] and AZ I:5:115[ASM]) are lithic scatters that could not be assigned a cultural or temporal affiliation. Both these sites were recommended not eligible for the ARHP.

Table E-4. Previously Recorded Archaeological Sites within 1 Mile of the Project Area

Site Number	Cultural/Temporal Affiliation	Site Type	ARHP Eligibility Status	Associated Reference(s)	Distance from Project Area (miles)
AZ I:5:79(ASM)	Cohonina/ca. A.D. 550–950	Artifact scatter	Recommended not eligible	Barr et al. (2021)	0.53
AZ I:5:81(ASM)	Cohonina/ca. A.D. 800–1050	Artifact scatter	Recommended eligible	Barr et al. (2021)	0.09
AZ I:5:108(ASM)	Native Archaeological Culture	Lithic scatter	Recommended not eligible	Barr et al. (2023)	0.64
AZ I:5:115(ASM)	Native Archaeological Culture	Lithic scatter	Recommended not eligible	Barr et al. (2023)	0.77

Assessment of Effects

A project can have direct and/or indirect effects on historic sites and structures and archaeological sites when it alters the characteristics that qualify it for listing in the ARHP. Effects are adverse when they diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to, the following:

- Physical destruction of or damage to all or part of the property.
- Removal of the property from its historic location.
- Change of the character of the property’s use of physical features within the property’s setting that contribute to its historic significance.
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic characteristics.
- Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe.

- Transfer, lease, or sale of a property out of government ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

DIRECT EFFECTS

The records review did not identify any sites that would be directly affected by the proposed Interconnection Project. The historical map research identified four unnamed unimproved roads intersecting the Project Area. These roads were not recorded as significant sites or structures during the previous surveys and likely would not be ARHP-eligible properties. The roads also appear to be still in use and would be avoided by Interconnection Project activities.

INDIRECT EFFECTS

Two ARHP-eligible properties were identified within the Study Area. Because of the presence of other overhead and linear structures across the landscape and adjacent to the proposed structures, the proposed Interconnection Project would not introduce any incompatible elements that are not already present. Therefore, there would be no adverse indirect impacts to the setting or integrity of the two ARHP-eligible properties nor impacts to historic properties within the Study Area.

Conclusion

The records review identified that the entire Project Area has been previously adequately surveyed for cultural resources. The available records indicated that there are no historic properties that would be affected by direct or indirect effects from implementation of the Interconnection Project. Three historic-era roads intersect the Project Area but are still in use and would be avoided by Interconnection Project activities.

Literature Cited

Arizona State Historic Preservation Office (SHPO). 2004. *SHPO Position on Relying on Old Archaeological Survey Data*. SHPO Guidance Point No. 5. Phoenix: Arizona State Parks.

Arizona State Museum (ASM). 1995. *Revised Site Definition Policy*. Tucson: Arizona State Museum, University of Arizona.

Barr, D.M.R., A.J. Lutes, E. Ayers, and A. Lewis. 2023. *Cultural Resources Survey for the Forged Ethic Wind Center Interconnection in Coconino County, Arizona (ASLD Special Land Use Permit No. 023-121105-17)*. SWCA Cultural Resources Report No. 23-149. Tucson, Arizona: SWCA Environmental Consultants.

Barr, D.M.R., A.J. Lutes, E.S. Petersen, M. Evancho, and S. Stapleton. 2021. *Archaeological Survey for the Proposed Babbitt Ranch Energy Center I Coconino County, Arizona (ASLD Right-of-Way Application No. 014-122007-00-100)*. SWCA Cultural Resources Report No. 21-383. Tucson, Arizona: SWCA Environmental Consultants.

Barr, David M. R., Annie, J. Lutes, Ethan Ayers, and Abbie Lewis (2023; *in prep*): *Cultural Resources Survey for Phase I of the Forged Ethic Wind Energy Center in Coconino County, Arizona (ASLD Special Land Use Permit No. 023-121105-17)*. SWCA Environmental Consultants, Tucson.

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EXHIBIT F. RECREATION

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-Exhibit 1, the intent of this exhibit is to:

State the extent, if any, the proposed site or route will be available to the public for recreational purposes, consistent with safety considerations and regulations and attach any plans the applicant may have concerning the development of the recreational aspects of the proposed site or route.

Introduction

The Forged Ethic Wind Energy Interconnection Project (Interconnection Project) is composed of an aboveground, 5-mile-long, 500-kilovolt (kV) generation intertie (gen-tie) transmission line (see project maps in Exhibit A). The Interconnection Project would be constructed on open ranchland just north of and parallel to two existing 500-kV transmission lines in the Navajo Southern Transmission System right-of-way. Vehicle access to the Study Area is via unpaved ranch roads.

Methods

Information regarding recreational uses of the Study Area was drawn from the Arizona Trail Association (ATA) website (ATA 2023) and the Arizona Game and Fish Department (AGFD) Online Environmental Online Review Tool Report (AGFD 2023; see Exhibit C).

Results

The only maintained recreational resource in the Study Area is a segment of the Arizona National Scenic Trail (Arizona Trail), which passes under the two existing transmission lines and would be spanned by the Interconnection Project. The Arizona Trail—an 800-mile-long trail that extends from the Arizona-Utah border south to the U.S.-Mexico border—is managed by the nonprofit ATA. Uses of the trail include hiking, trail running, horseback riding, and mountain biking (ATA 2023). For a discussion of the visual effects of the proposed Interconnection Project on trail users, see Exhibit E. For noise effects, see Exhibit I.

Additional recreational activities in the Study Area include off-highway-vehicle use and hunting. The Study Area falls within the AGFD's Game Management Unit 9. Game species identified by the AGFD as possibly occurring in the area include American pronghorn (*Antilocapra americana americana*), elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), mountain lion (*Puma concolor*), band-tailed pigeon (*Patagioenas fasciata*), and mourning dove (*Zenaida macroura*) (AGFD 2023; see Exhibit C).

The proposed project route would be available to the public for recreational purposes after construction; however, during construction, the Applicant would restrict access to work sites for public safety. Work sites that overlap with the Arizona Trail would be avoided to the extent feasible; the Applicant plans to implement safety measures trail signage and pedestrian detours around construction sites. The Applicant has no plans to develop any additional recreational opportunities in the area.

Literature Cited

Arizona Game and Fish Department (AGFD). 2023. *Arizona Environmental Review Tool Report, Forged Ethic Gen-Tie*. Development ID: HGIS-18953. May 2023.

Arizona Trail Association (ATA). 2023. Explore the Arizona Trail. Available at <https://aztrail.org/the-ata/>. Accessed April 2023.

EXHIBIT G. CONCEPTUAL DRAWINGS OF TRANSMISSION FACILITIES

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

Attach any artist's or architect's conception of the proposed plan or transmission line structures and switchyards, which applicant believes may be informative to the committee.

- Exhibit G-1: Typical 500-kV H-frame structure diagram (representative of strain dead end H-frame and tangent V-string H-frame structures)
- Exhibit G-2: Typical 500-kV three pole structure diagram (representative of 3-pole dead end, 3-pole strain dead end, and a 3-pole terminal dead end structures)
- Exhibit G-3: Typical 500-kV A-frame riser structure diagram

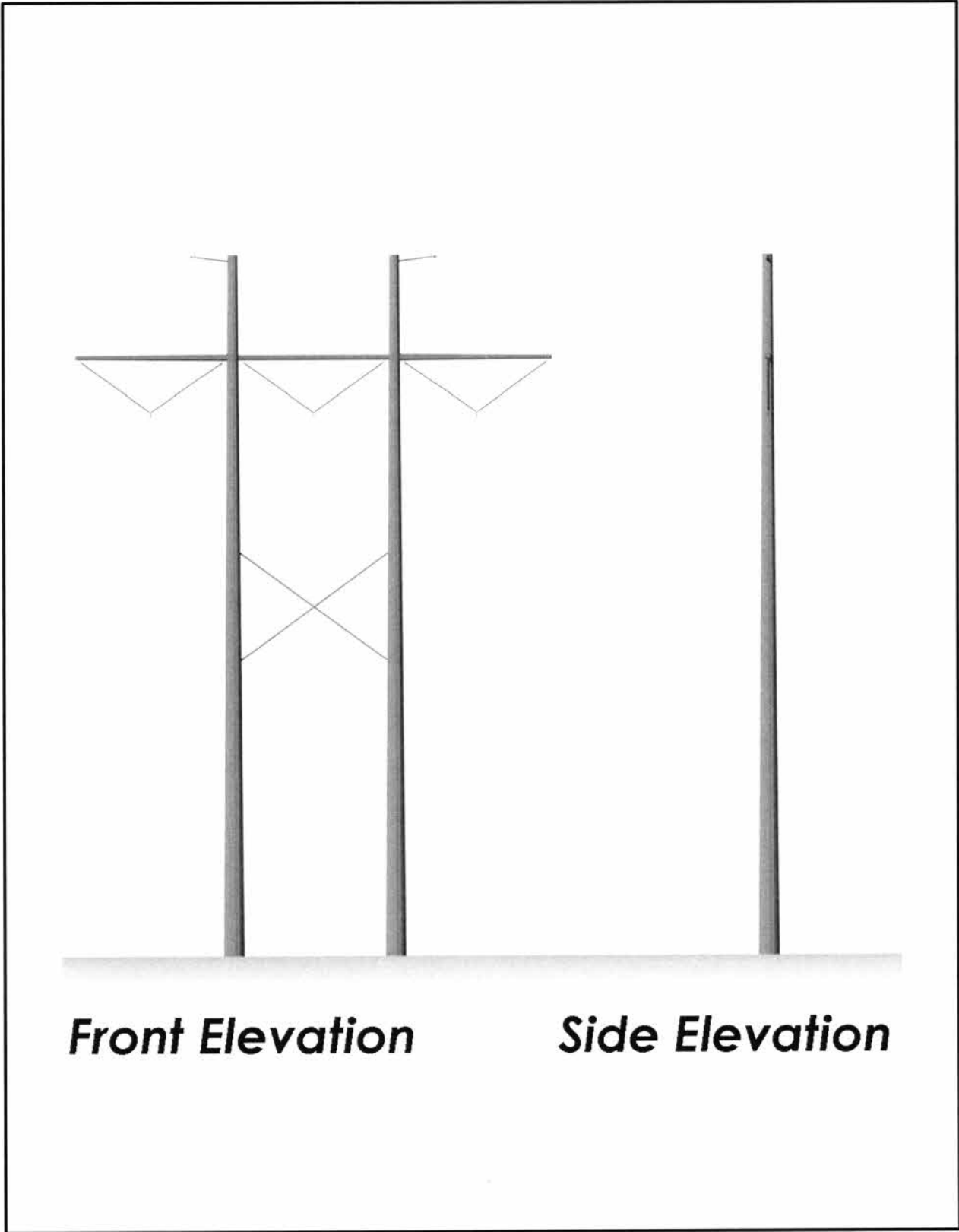


Exhibit G-1. Typical 500-kV H-frame structure diagram (representative of strain dead end H-frame and tangent V-string H-frame structures).

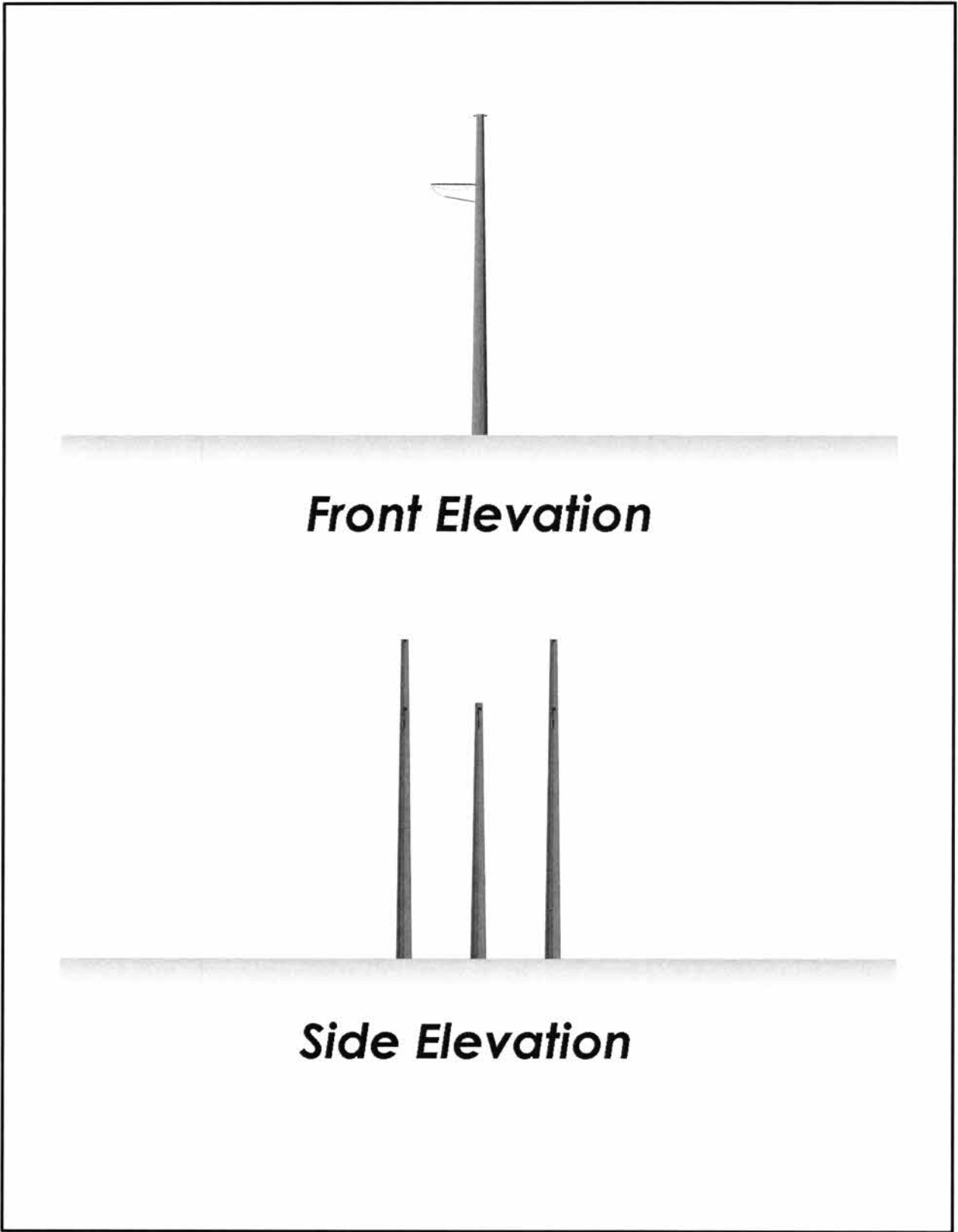


Exhibit G-2. Typical 500-kV three pole structure diagram (representative of 3-pole dead end, 3-pole strain dead end, and a 3-pole terminal dead end structures).

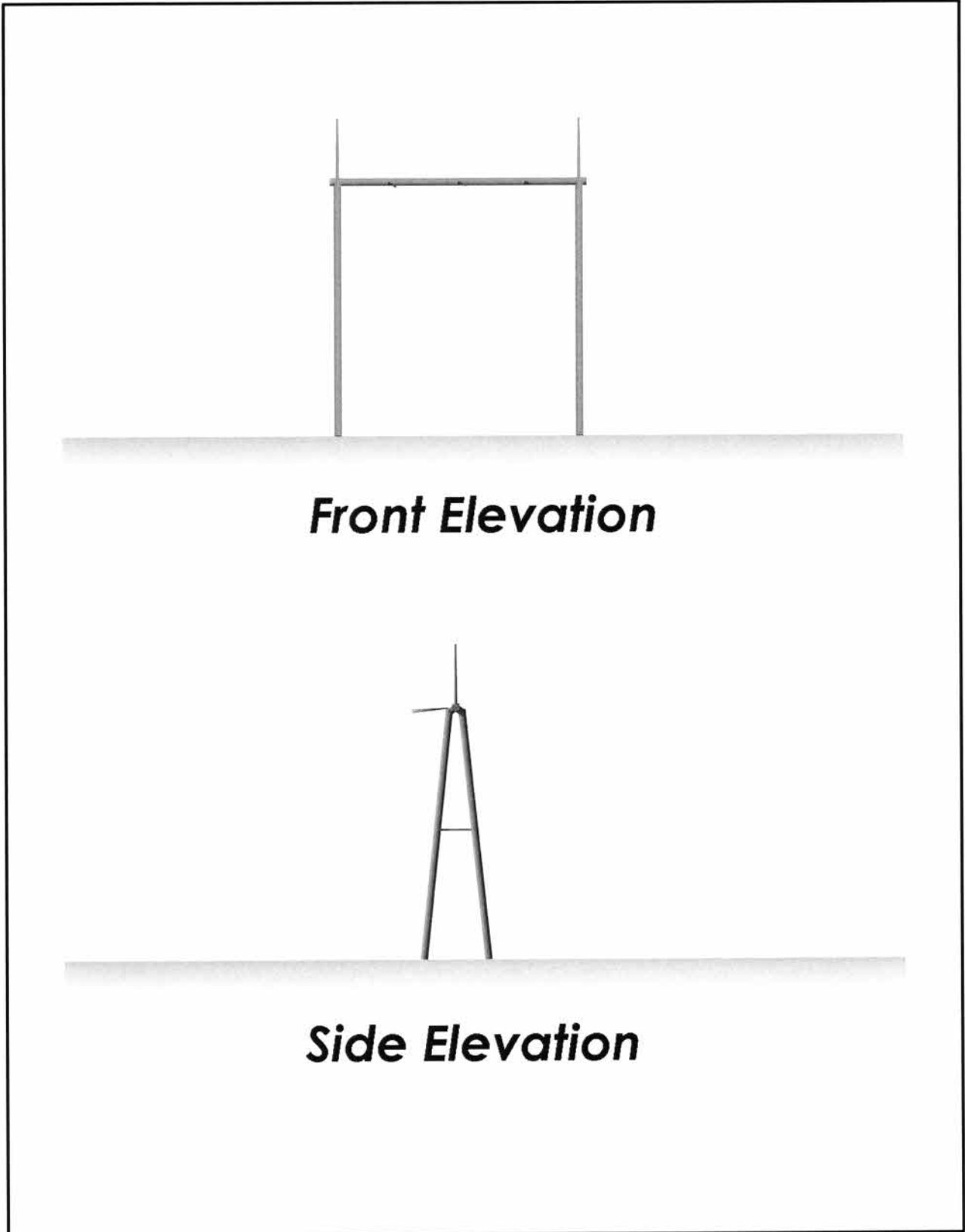


Exhibit G-3. Typical 500-kV A-frame riser structure diagram.

EXHIBIT H. EXISTING PLANS

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-220, Ex. H:

To the extent applicant is able to determine, state the existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site or route.

Overview

Existing and planned land use within the Project Area is discussed in Exhibit B and mapped in Exhibit A. To identify the existing plans of state, tribal, and local governments as well as private entities, the proposed Forged Ethic Wind Energy Interconnection Project (Interconnection Project) team mailed a letter requesting information on planned developments within the vicinity of the Interconnection Project to a list of agency, tribal, and jurisdictional entities. In addition, the Interconnection Project team reviewed publicly available information regarding other renewable energy developments. Overall, no existing plans for planned developments were identified that would be incompatible with the proposed Interconnection Project.

Outreach Letters

On May 26, 2023, the Interconnection Project team mailed letters to a broad group of stakeholders (Table H-1) to provide information about the Interconnection Project and request new or additional information regarding planned area developments. Exhibit H-1 provides a copy of the letter.

Table H-1. Entities that Received a Letter Requesting Information Regarding Other Developments

Organization	Contact Name	Contact Title
South Rim Property Owners Association*		
Arizona Trail Association	Matthew Nelson	Executive Director
Grand Canyon National Park	Jan Balsom	Chief, Communications, Partnerships & External Affairs
Kaibab National Forest	Debra Mollett	Williams District Ranger
Coconino National Forest	Matthew McGarth	Flagstaff District Ranger
U.S. Naval Observatory Flagstaff Station	Mary Beth Dreusike	Community Planning & Liaison Officer
U.S. Fish and Wildlife Service	Shaula Hedwall	Senior Fish and Wildlife Biologist, Arizona Ecological Services
U.S. Fish and Wildlife Service	Greg Beatty	Fish and Wildlife Biologist, Arizona Ecological Services
U.S. Fish and Wildlife Service	Kristen Madden	DMB Chief, Southwest Region
U.S. Fish and Wildlife Service	Kammie Kruse	Permits Branch Chief, Migratory Birds
U.S. Fish and Wildlife Service	Kirsten Cruz-McDonnell	Migratory Bird Biologist
Arizona Game and Fish Department	Tiffany Sprague	Project Evaluation Program Specialist

Organization	Contact Name	Contact Title
Arizona State Land Department	Ruben Ojeda	Rights of Way Section Manager
Coconino County	Patrice Horstman	District 1 Supervisor
Coconino County	Jeronimo Vasquez	District 2 Supervisor
Coconino County	Matt Ryan	District 3 Supervisor
Coconino County	Judy Begay	District 4 Supervisor
Coconino County	Lena Fowler	District 5 Supervisor
Coconino County	Lindsay Daley	Clerk of the Board of Supervisors
Coconino County	Bob Short	Principal Planner, Community Development
Fort Mojave Indian Tribe	Timothy Williams	Chairman
Fort Mojave Indian Tribe	Linda Otero	Director- AhaMakav Cultural Society
Havasupai Tribe	Thomas Siyuja, Sr.	Chairman
Havasupai Tribe	Travis Hamidreek	Director of Natural Resources
Havasupai Tribe	Edmond Tilousi	Vice Chairman
Hopi Tribe	Timothy L. Nuvangyaoma	Chairman
Hopi Tribe Cultural Preservation Office	Stewart Koyiyumptewa	Tribal Historic Preservation Officer
Hualapai Tribe	Sherry J. Parker	Chairperson
Hualapai Tribe	Martina Dawley	Tribal Historic Preservation Officer, Department of Cultural Resources
Pueblo of Zuni	Arden Kucate	Governor
Pueblo of Zuni - Heritage and Historic Preservation Office	Kurt Dongoske	Director, Tribal Historic Preservation Officer
Mescalero Apache Tribe	Eddie Martinez	President
Mescalero Apache Tribe	Holly Houghten	Tribal Historic Preservation Officer
Navajo Nation	Buu Nygren	President
Navajo Nation - Heritage & Historic Preservation Department	Richard Begay	Tribal Historic Preservation Officer / Heritage & Historic Preservation Department Director
Navajo Nation Division of Natural Resources	Rudy R. Shebala, Ph.D.	Executive Director Division of Natural Resources
Navajo Nation, Cameron Chapter	Charlie Smith Jr.	President
Navajo Nation, Cameron Chapter	Candis Yazzie	Vice President
San Carlos Apache Tribe	Terry Rambler	Chairman
San Carlos Apache Tribe	Vernelda Grant	Tribal Historic Preservation Officer
Yavapai-Apache Nation	Tanya Lewis	Chairwoman
Yavapai-Apache Nation	Chris Coder	Tribal Archaeologist

* indicates that the letter was addressed to the jurisdiction/agency/entity in general, rather than to a specific person.

The Applicant received a comment letter from the US Forest Service (Forest Service) in response to the May 26, 2023, outreach letter requesting information about known plans for development. The Forest Service comment letter is dated June 23, 2023, and is attached as Exhibit H-2. In summary, the Forest Service noted that it has delegated management responsibilities for the Arizona Trail under the National Trails Systems Act. According to their letter, the Forest Service is in the process of developing a Comprehensive Plan that will establish a 1-mile planning corridor (i.e., ½ on each side of the trail); the Forest Service anticipates releasing the Comprehensive Plan to the public by the end of 2023. The Forest

Service comment letter states: “We recognize the proposed project would be constructed on private property and Arizona State Trust Land (the area generally known as the Babbitt Ranches) therefore the property owners are not subject to regulations pursuant to the NTSA in the same manner as lands under federal management.” The Forest Service recommends mitigating potential impacts to the Arizona trail by “locating the proposed facilities outside the 1-mile [Arizona Trail] right-of-way, or as far as possible from it.”

As noted in Exhibit F, the Interconnection Project will span the Arizona Trail at a location where the trail already crosses beneath the existing Moenkopi-to-Cedar Mountain 500kV transmission line. The Applicant will endeavor to locate transmission structures as far from the Arizona Trail as engineering constrains allow.

The Applicant received a comment letter from the Arizona Game and Fish Department in response to the June 2, 2023, outreach letter requesting information about known plans for development; the AGFD letter is included as Exhibit H-3. The AGFD letter includes recommended best management practices for the Interconnection Project. The AGFD letter does not identify any plans for development.

Existing Plans for Other Developments

In addition to the Forged Ethic Wind Energy Project, the team is aware of two planned utility-scale energy facilities within the vicinity of the Interconnection Project—the Babbitt Ranch Energy Center Project and the CO Bar Solar Complex. Based on publicly available information, it appears both projects intend to interconnect to the APS Switchyard (Coconino County 2022:130; U.S. Bureau of Reclamation [Reclamation 2022]).

Babbitt Ranch Energy Center Project, Arizona

The Babbitt Ranch Energy Center is a 161-megawatt (MW) renewable energy project that consists of a proposed 160-MW wind energy facility, a 60-MW photovoltaic solar energy facility, and up to 60 MW of energy (battery) storage located on private and ASLD lands in Coconino County, Arizona. The Babbitt Ranch Energy Center also includes a 7.25-mile access road from U.S. Highway 180 to the project. Construction of this project began at the end of 2022 with a target completion date of December 2023. The Babbitt Ranch Energy Center is also planned on the CO Bar Ranch, west of the Interconnection and Wind Projects. Reclamation published an Environmental Assessment in December 2022 for the project’s interconnection transmission line (Reclamation 2022).

CO Bar Solar Complex

The CO Bar Solar Complex is a 400-MW solar project on approximately 2,400 acres of private lands northwest of Flagstaff in Coconino County, Arizona. Construction of this project is anticipated to begin in 2023, with a target completion year of 2024 (Reclamation 2022). The CO Bar Solar Complex is also planned on the CO Bar Ranch, west of the Interconnection and Wind Projects (Coconino County 2022).



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May 26, 2023

Mr. Timothy Williams
Fort Mojave Indian Tribe
500 Merriman Ave.
Needles, CA 92363

Re: Forged Ethic Wind Energy Interconnection Project

Dear Mr. Williams,

RWE Clean Energy (RWECE) plans to file an application for a Certificate of Environmental Compatibility (CEC) with the Arizona Power Plant and Transmission Line Siting Committee (Siting Committee) for a new generation inter-tie (gen-tie) transmission line in unincorporated Coconino County, Arizona, approximately 25 miles north of Flagstaff. The gen-tie is referred to as the Forged Ethic Wind Energy Interconnection Project (Project). The Project involves a new, approximately 5-mile-long, 500-kilovolt (kV) gen-tie that would connect a planned 323-megawatt (MW) wind energy facility to the regional power grid at the planned, Arizona Public Service (APS) switchyard along the Moenkopi to Cedar Mountain 500-kilovolt transmission line. The proposed route for the Project is shown on the enclosed map. Additional information about the Project is available on the Project website: <https://americas.rwe.com/forged-ethic-wind-farm>.

RWECE and its environmental consultant, SWCA Environmental Consultants (SWCA), are preparing a CEC application for the Project. The CEC application will include environmental studies that evaluate potential environmental impacts for the proposed Project route. Our planning studies support that the Project follows a direct route to the planned APS switchyard that will minimize the potential for environmental impacts. RWECE plans to submit its CEC application in July 2023.

Arizona Administrative Code Rule R14-3-219 requires that CEC applications include an exhibit that identifies "the existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site or route."

This letter is an opportunity for your organization to provide information or comments regarding plans for development in the vicinity of the Project for inclusion in the CEC application. We respectfully request your response in writing; specifically, please advise us of any relevant existing or future development plans in the vicinity of the proposed Project.

For RWECE to include your information with its CEC application, please forward your written comments to SWCA by July 7, 2023, via email at dean.hazle@swca.com, or by physical mail: Attn: Dean Hazle, SWCA Environmental Consultants, 1645 S Plaza Way, Flagstaff, Arizona 86001. Additionally, you may reach me directly by phone at (413) 658-2062.

Thank you for your cooperation.

Sincerely,

Dean G. Hazle

Dean Hazle, Northern Arizona Planning Team Lead
SWCA Environmental Consultants

Exhibit H-1a. Example May 2023 Exhibit H letter.



Forest Service
Southwestern Region
Regional Office

333 Broadway SE
Albuquerque, NM 87102
505-842-3292
Fax: 505-842-3800

File Code: 2350
Date: June 23, 2023

Dean Hazle, Northern Arizona Planning Team Lead
SWCA Environmental Consultants
1645 South Plaza Way
Flagstaff, AZ 86001
SUBJECT: Forged Ethic Wind Energy Interconnection Project

Dear Mr. Hazle,

The Arizona Trail Association shared our letter (May 26, 2023) which outlines the proposed route for a five-mile-long wind farm and associated transmission lines near the Arizona National Scenic Trail (AZNST). The letter solicits information and comments regarding plans for development in the vicinity of the project for inclusion in an application for a Certificate of Environmental Compatibility (CEC). Please consider this letter as a written comment from our organization. In the future, please add this office as a project consulting party at this address:

ATTN: Arizona Trail Administrator
Forest Service, Southwestern Region
333 Broadway Blvd SE
Albuquerque NM 87102

Per the National Trails Systems Act (NTSA) as amended (PL. 90-543) Congress added the AZNST to the National Trails System in 2009 and simultaneously assigned the Secretary of Agriculture as the Administrator of the Trail. The Secretary has delegated that responsibility to the Southwestern Region of Forest Service since a majority of the 800 plus mile AZNST is located on four Arizona National Forests. Pursuant to Section 5(a) of the NTSA, the AZNST Comprehensive Plan will establish a planning corridor Right-of-Way (ROW) 1/2 mile from center line on each side of the Trail. We are working on public release of the Comprehensive Plan by the end of this calendar year. Your letter included an attached map that depicts the proposed wind farm and facilities in proximity to the AZNST, especially along the southwestern portion of the project boundary. The map depicts the proposed project within, and close to the planning corridor ROW.

Pursuant to the Act, among the responsibilities for oversight of the AZNST is the protection of the "Nature and Purposes" of the Trail. In developing the nature and purposes of the AZNST, consideration has been given to the basic intent of the Act, subsequent Executive Orders, and legislative history. House Report No. 90-1631, which accompanied the Act, clarified the intent of specific wording in the Act, and therefore the intent of Congress:

"...selection of routes for National Scenic Trails – Such rights-of-way shall be (1) of sufficient width and so located to provide the maximum retention of natural conditions, scenic and historic



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Exhibit H-2a. US Forest Service Comment Letter.

features, and primitive character of the trail area, to provide campsites, shelters, and related public-use facilities, and to provide reasonable public access; and (2) located to avoid, insofar as practicable, established highways, motor roads, mining areas, power transmission lines, existing commercial and industrial developments, range fences and improvements, private operations, and any other activities that would be incompatible with the protection of the trail in its natural condition and its use for outdoor recreation.... National scenic trails shall be administered, protected, developed, and maintained to retain their natural, scenic, and historic features; and provision may be made for campsites, shelters, and related public-use facilities; and other uses that will not substantially interfere with the nature and purposes of the trails may be permitted or authorized, as appropriate; Provided, That the use of motorized vehicles by the general public along any national scenic trail shall be prohibited... (1968 U.S. Code Cong. & Admin. News 3855, 3863-3864, 3867)."

Addressing scenery is an important management challenge on a national scenic trail. A section of the draft Comprehensive Plan is intended to guide the management of scenery resources and the mitigation of land uses that diminish scenic quality. The proposed route for the project would likely adversely affect the viewshed and scenic values associated with the AZNST. We recognize the proposed project would be constructed on private property and Arizona State Trust Land (the area generally known as the Babbitt Ranches) therefore the property owners are not subject to regulations pursuant to the NTSA in the same manner as lands under federal management. However, we would welcome the opportunity to propose mitigation suggestions and measures that would seek to minimize adverse effects to the viewshed and scenic values if the proposed project is in or near the Trail ROW. The mitigation would include locating the proposed facilities outside the one-mile AZNST right-of-way, or as far as possible from it. If you feel this is possible we can share the GIS authoritative data to use to consider in the planning.

Thank you for the opportunity to comment on this proposal. If you have questions about the comments, or want to further discuss the proposal contact Marcy DeMillion, Arizona Trail Administrator at marcella.demillion@usda.gov.

Sincerely,

/s/ Zachary Parsons
ZACHARY PARSONS
RHWR Deputy Director

Exhibit H-2b. US Forest Service Comment Letter.



July 13, 2023

Forged Ethic Wind Energy Project
Attn: Dean Hazle
1645 S. Plaza Way
Flagstaff, Arizona 86001

Electronically submitted to matthew.rvan@rwe.com and dean.hazle@swca.com

RE: Forged Ethic Wind Energy and Interconnection Project

Dear Mr. Hazle:

The Arizona Game and Fish Department (Department) appreciates the opportunity to review the proposed Forged Ethic Wind Energy and Interconnection Project. The Department understands that RWE Clean Energy (RWECE) proposes to construct a 323-megawatt wind energy facility on 29,106 acres of private and Arizona State Trust Land approximately 25 miles north of Flagstaff, Arizona, with approximately 102 turbines, meteorological towers, underground electrical collection lines, substation, laydown yard, operations and maintenance building, and access roads. The project also includes an approximately 5-mile generation-tie (gen-tie) transmission line and interconnection with the existing Moenkopi to Cedar Mountain transmission line. Project access would be from US Hwy 89. The project would be located in desert grassland and pinyon juniper woodland and savanna vegetation types. RWECE is in the process of developing a Conditional Use Permit for Coconino County and is seeking a Certificate of Environmental Compatibility with the Arizona Power Plant and Transmission Line Siting Committee for the gen-tie line.

The Department has a long successful history of working with Babbitt Ranches and Billy Cardasco and looks forward to the continued partnership. The Babbitt Ranches has been a leader in proactively incorporating wildlife conservation actions as stewards of public and private lands, and the Department continues to offer its data and expertise where it can assist Babbitt Ranches in achieving desired conservation outcomes during the development of this project.

Under Title 17 of the Arizona Revised Statutes, the Department, by and through the Arizona Game and Fish Commission (Commission), has jurisdictional authority and public trust responsibilities to conserve and protect the state fish and wildlife resources. In addition, the Department manages threatened and endangered species through authorities of Section 6 of the Endangered Species Act and the Department's Section 10(a)(1)(A) permit. It is the mission of the Department to conserve and protect Arizona's diverse fish and wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

azgfd.gov | 928.774.5045

FLAGSTAFF OFFICE: 3500 S. LAKE MARY ROAD, FLAGSTAFF AZ 86005

**GOVERNOR: KATIE HOBBS COMMISSIONERS: CHAIRMAN TODD G. GEILER, PRESCOTT | CLAY HERNANDEZ, TUCSON | MARSHA PETRIE SUE, SCOTTSDALE
JEFF BUCHANAN, PATACONIA | JAMES E. GOUGHNOUR, PAYSON DIRECTOR: TY E. GRAY DEPUTY DIRECTOR: TOM P. FINLEY**

Exhibit H-3a. AGFD Comment Letter.

The Department recognizes the importance of planning efforts to develop energy locations that contribute to regional and state economic growth and looks forward to continuing to work with RWECE, Babbitt Ranches, and SWCA Environmental Consultants (SWCA) during the planning and development of this facility. The Department recognizes that appropriate placement, proper planning, and voluntary implementation of best management practices allow projects to be developed that avoid, minimize, and/or offset potential impacts to wildlife and recreational access during development and operation of the facilities. The Department appreciates the continued coordination on this project regarding completed and ongoing pre-construction wildlife studies. Based on the information received to date, the Department provides the following comments for consideration, based on the agency's statutory authorities, public trust responsibilities, and special expertise related to wildlife resources and recreation:

Northern Arizona has recently seen an increase in the number of proposed and in-development renewable energy generation projects and associated infrastructure, and several wind and solar projects have been built or proposed in the vicinity of Forged Ethic. Although each of these projects individually may have a limited impact on the broader landscape, these projects cumulatively could result in wildlife mortality, loss of habitat, reduced wildlife movements, and influences on wildlife-related recreation. Additionally, long-term effects to wildlife can extend several kilometers beyond the project area footprints (Sawyer et al. 2022¹). It is important to evaluate potential cumulative impacts in order to determine appropriate project siting and conservation measures to minimize impacts to wildlife. The Department looks forward to continued communications regarding this project and including opportunities to minimize, offset or avoid potential cumulative impacts.

Maintaining habitat connectivity is a priority for the Department, and wildlife movement corridors are important for wildlife to respond to changing environmental conditions. As outlined in SWCA's 2022 Preliminary Site Evaluation and Characterization Report for Wildlife, several wildlife corridors are present within the project area. As an example, Department data shows that the project area encompasses the primary seasonal migration corridor for mule deer movements between the San Francisco Peaks and the south rim of Grand Canyon (see attachment). The project area is also used extensively by resident and migratory pronghorn. The Department would like to work with RWECE on opportunities to minimize fragmentation of the landscape and to incorporate wildlife connectivity into the project design, including the following measures:

- Department staff are available to assist with project design features that can help maintain connectivity for wildlife within the project area, including increased inter-turbine distance, as feasible, and fence designs and locations that will achieve their objective while reducing potential impacts to wildlife. The Department recommends minimizing fencing within the project area to what is required by law or for safety. The Department's [Wildlife Compatible Fencing Guidelines](#)² provide information on how fencing impacts

¹ <https://esajournals.onlinelibrary.wiley.com/doi/10.1002/fee.2498>

² https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/planning/for/wildlifeFriendlyGuidelines/110125_AGFD_fencing_guidelines.pdf

Exhibit H-3b. AGFD Comment Letter.

wildlife, ways to design fencing to prevent wildlife entanglement and impalement, and to ensure wildlife movement is not restricted.

- Regarding the 5-mile transmission line, the Department recommends co-locating the new line with existing transmission lines, to the extent feasible.
- The Department recommends minimizing the number and extent of new access roads and recommends restoring disturbed areas post-construction.

The Department appreciates the wildlife surveys that have been conducted to date and understands that one year of raptor nest surveys, avian use counts, bat acoustic surveys, and raptor migration surveys have been completed. Based on the results of these surveys, the Department has the following recommendations; please refer to the [Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona](#)³ for further information:

- The Department notes that two active golden eagle nests were located within 2 miles of the project area during the 2022 raptor nest surveys. Several potential, non-active eagle nests were also located within 2-miles of the project area. The Department recommends that RWECE complete a second year of eagle and raptor nest surveys using the same protocols as the first year study. The Department recommends that turbines be sited a minimum of 2 miles from active eagle nests, as per U.S. Fish and Wildlife Service (USFWS) guidelines, and incorporating 0.25-mile buffers around ferruginous hawk and other raptor nests during turbine siting plan development.
- As turbine siting plans are developed, the Department recommends surveys to identify presence/absence of Gunnison's prairie dog colonies near turbines to further minimize potential for golden eagle fatalities post-construction. Avoidance of both occupied and unoccupied colonies could be considered as prairie dog populations expand and contract over time depending on habitat and disease constraints.
- The Department recommends incorporating weather data into bat analyses to better pair bat activity with weather conditions. This data can be used to help inform targeted adaptive conservation strategies within the Bird and Bat Conservation Strategy as appropriate.
- When analyzing survey results and assessing potential impacts to wildlife, the Department encourages incorporation of the State's Species of Greatest Conservation Need (SGCN). Please note that the Arizona State Wildlife Action Plan was recently updated, and the Department has an interactive website, [Arizona Wildlife Conservation Strategy](#)⁴, that includes the most recent list of SGCN to help navigate and identify conservation opportunities.
- Birds of prey, such as raptors, owls, vultures, and eagles, are vulnerable to powerline strikes and electrocution during construction and operation of transmission lines; power poles can also serve as perches for birds of prey. The Department recommends incorporating design features to minimize impacts to these important species, including following standards established by the Avian Power Line Interaction Committee (APLIC), which can be found in [Suggested Practices for Avian Protection on Power](#)

³<https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/planningFor/wildlifeFriendlyGuidelines/RevisedAZWindGuidelinesOctober2012.pdf>

⁴<https://awcs.azgfd.com>

Exhibit H-3c. AGFD Comment Letter.

[Lines: The State of the Art in 2006⁵](#) and [Reduced Avian Collisions with Power Lines: The State of the Art in 2012⁶](#). Tuk Jacobson, the Department's Raptor Coordinator, can provide further information on specific design features and best management practices; he can be contacted at raptors@azgfd.gov or 623-236-7575.

- Avian species that are regulated under the Migratory Bird Treaty Act (MBTA) and protected under state law may nest within the project area. Peak breeding season for birds in the project vicinity is generally mid-March through late July; breeding season for raptors is January through late June. If it is anticipated the project will not be in compliance with the MBTA, the Department recommends contacting the [USEWS⁷](#) for technical assistance and compliance options. Additionally, if any nesting raptors are detected, the Department recommends planning construction activities for the non-breeding season or coordinating with the Department's Raptor Coordinator on appropriate set-backs from active raptor nests.
- The Department recommends reducing construction disturbances during pronghorn fawning (May through mid-June) by phasing construction to reduce the amount of area disturbed at a given time.
- If other wildlife are encountered during construction activities, the Department recommends moving them out of harm's way, no more than 0.25 mile outside the project boundary within similar habitat.

The Department offers the following best management practices to further minimize wildlife impacts:

- If trenching or digging of large holes is necessary for anchoring project infrastructure, the Department recommends trenching/digging and backfilling crews be close together to minimize the amount of open holes at any given time. Where trenches or holes cannot be back-filled immediately, the Department recommends escape ramps be constructed at least every 90 meters. Escape ramps can be short lateral trenches or wooden planks sloping to the surface. The Department recommends that slopes be less than 45 degrees (1:1) and trenches and holes that have been left open be inspected to remove animals prior to backfilling.
- Artificial lighting could impair the ability of nocturnal animals to navigate (e.g., owls, migratory birds, bats, and other nocturnal mammals) and may affect wildlife behavior and populations ([Davies et. al. 2013⁸](#)). The Department recommends using only the minimum amount of light needed for safety and encourages the use of motion sensing and narrow spectrum lighting wherever possible. All lighting should be shielded, canted, or cut to ensure that light reaches only areas needing illumination.
- To minimize the potential introduction or spread of exotic invasive species, including terrestrial plants, animals, insects, and pathogens, the Department encourages taking precautions to wash and/or decontaminate equipment before entering and leaving the site. See the [Arizona Department of Agriculture website⁹](#) for a list of prohibited and restricted

⁵ [https://www.aplic.org/uploads/files/2643/SuggestedPractices2006\(LR-2\).pdf](https://www.aplic.org/uploads/files/2643/SuggestedPractices2006(LR-2).pdf)

⁶ https://www.aplic.org/uploads/files/15518/Reducing_Avian_Collisions_2012watermarkLR.pdf

⁷ <https://www.fws.gov/office/arizona-ecological-services/contact-us>

⁸ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3657119>

⁹ <https://agriculture.az.gov/pestspest-control/agriculture-pests/noxious-weeds>

Exhibit H-3d. AGFD Comment Letter.

noxious weeds and the [Arizona Native Plant Society](#)¹⁰ for recommendations on how to control them. To view a list of documented invasive species or to report invasive species in or near your project area, visit [iMapInvasives](#)¹¹, which is a national cloud-based application for tracking and managing invasive species.

- The Department recommends revegetating disturbed areas with native drought-tolerant species that represent the natural surrounding landscape. Landscaping with native plants can help support wildlife and pollinator species in the area while reducing dust and erosion. In addition, the applicable land management agencies should be consulted regarding guidelines for revegetation efforts.

Post-construction surveys and monitoring are important to help inform adaptive management strategies. To help reduce wildlife injury and mortality during facility operation, the Department provides the following suggestions:

- The Department recommends developing a Wildlife Conservation Strategy (WCS), a Bird and Bat Conservation Strategy (BBCS), and an Eagle Conservation Plan (ECP) as part of the project planning. These are voluntary plans put forth by developers in order to proactively address potential impacts to wildlife resulting from the construction, maintenance, and operation of a wind facility. Guidelines for these plans can be found in the Department's [Guidelines for Reducing Impacts to Wildlife for Wind Energy Development in Arizona](#). The Department would like to review and discuss these plans prior to finalization of the project design and commencement of construction. The Department also encourages these plans to be living documents that can be updated based on the best available science and evolving technology.
- The Department recommends development of a post-construction wildlife fatality monitoring plan. The Department would like the opportunity to review and provide feedback for this plan prior to implementation and to receive the results of the post-construction wildlife fatality monitoring on an annual basis. In addition to annual reporting, the Department requests and remains available for ongoing quarterly communication during post construction monitoring in efforts to collaboratively assess results and to maximize opportunities for timely response and identification of adaptive management strategies if warranted. It would also be beneficial to identify protocols within the post construction monitoring plan for rapid implementation of adaptive management responses during monitoring should data indicate the need.
- The Department would like to be notified as soon as possible of injuries or mortalities to sensitive species and is available to assist in identifying timely responsive management strategies. Being informed of these occurrences when they occur, rather than only during annual reporting, enables timely response and benefits the project by reducing the need for additional future monitoring and coordination.
- When developing the BBCS, it is important to consider adaptive management measures, such as smart curtailment, cut-in speeds, and deterrents, based on both known and probable species occurrence; Department staff are available to assist in identifying appropriate measures. If adaptive management is needed, continuing post-construction

¹⁰ <https://aznps.com/invas>

¹¹ <https://imap.natureserve.org/imap/services/page/imap.html>

Exhibit H-3e. AGFD Comment Letter.

monitoring after implementation, will allow evaluation of any conservation measures and continued implementation of adaptive measures if necessary.

Finally, to reduce impacts during hunting seasons, the Department requests continued coordination on proposed construction starting/ending times/dates. Notification of the construction timeline will enable the Department to account for any necessary adjustments.

Thank you for the opportunity to provide input on the Forged Ethic Wind Energy Project. For further coordination, please contact Hannah Griscom at hgriscom@azgfd.gov or 928-214-1253.

Sincerely,



Larry Phoenix
Regional Supervisor, Region 2 (Flagstaff)

Attachment (1)

cc: Billy Cardasco – Executive Director, Babbitt Ranches
Jessica Simmons – Wildlife Planner, Coconino County
Bob Short – Planner, Coconino County
Shaula Hedwall – Fish and Wildlife Biologist, U.S. Fish and Wildlife Service
Ginger Ritter – Project Evaluation Program Supervisor
Tiffany Sprague – Project Evaluation Program Specialist

AZGFD #M23-06145438

Exhibit H-3f. AGFD Comment Letter.

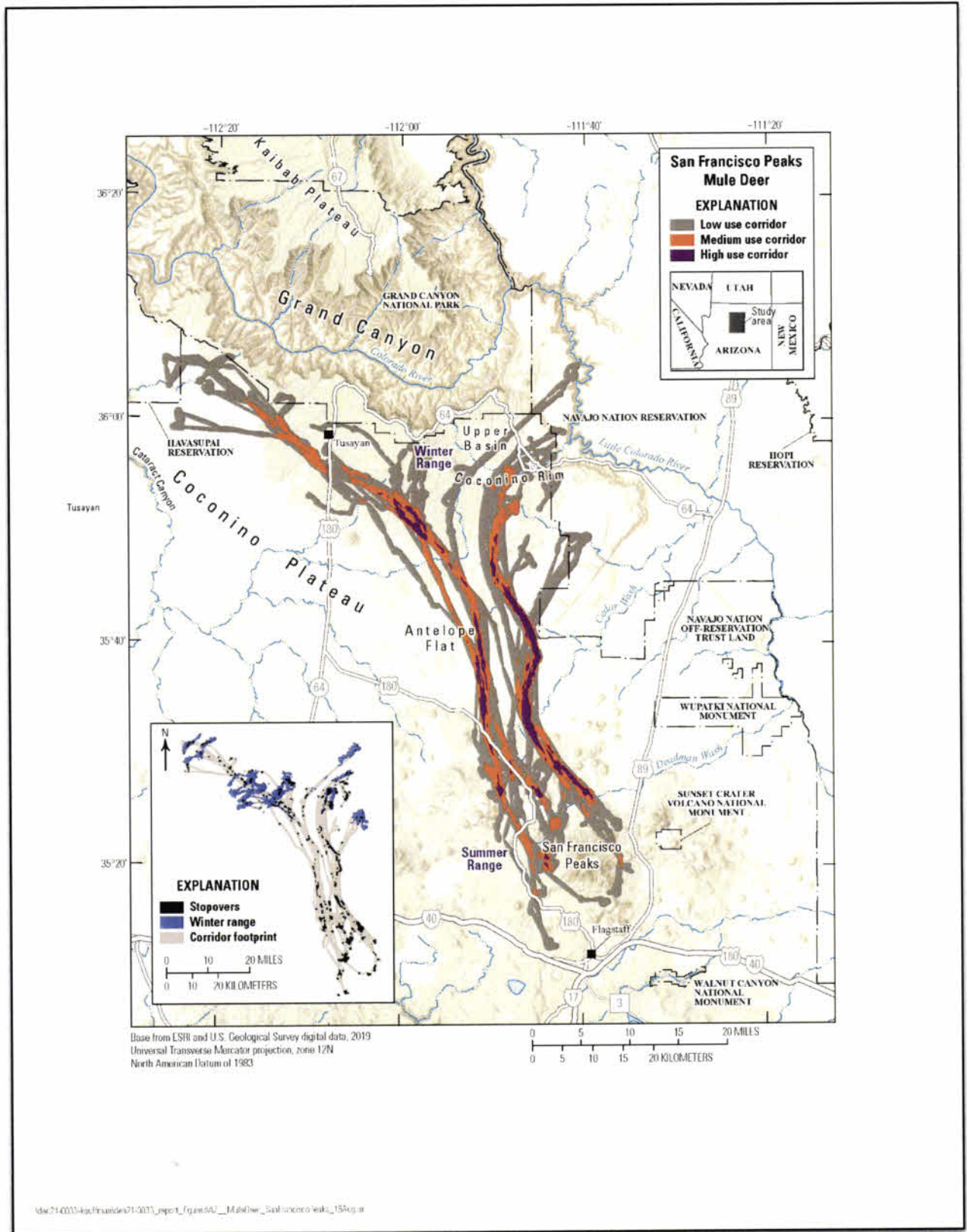


Exhibit H-3g. AGFD Comment Letter.

Literature Cited

Coconino County. 2022. Preliminary CO Bar Solar Facility Project Map. Presented at Coconino Planning and Zoning Commission Public Meeting, June 29, 2022. Available at: <https://coconino.az.gov/AgendaCenter/ViewFile/Agenda/06292022-5889>. Accessed May 2023.

U.S. Bureau of Reclamation (Reclamation). 2022. *Final Environmental Assessment for the Babbitt Ranch Energy Center Interconnection Project*. Glendale, Arizona: U.S. Department of the Interior, Bureau of Reclamation, Phoenix Area Office. December. Available at: https://www.usbr.gov/lc/phoenix/reports/BREC/FinalEA_BREC_Interconection_Project.pdf. Accessed May 2023.

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EXHIBIT I. NOISE AND INTERFERENCE

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-220, Ex. I:

Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.

Introduction

The Interconnection Project would be built on open ranchland just north of and parallel to two existing 500-kV transmission lines. Unpaved ranch roads cross under and run along the length of the existing transmission lines. The Study Area for noise is a 0.5-mile buffer around the Interconnection Project. Beyond this distance, the loudest project-related noise (from construction equipment and vehicles) is unlikely to be discernable from ambient sounds (Wrigley 2018).

Noise

Existing Sound Levels

The Interconnection Project would traverse rural, largely vacant land used primarily for livestock grazing, related ranching activities, and dispersed recreation. Ambient sound levels in such areas are generally quiet, ranging from 23 to 37 A-weighted decibels (dBA) (mean = 30 dBA) during nighttime hours and from 33 to 47 dBA (mean = 40 dBA) during daytime hours (Eldred 1982). According to the U.S. Environmental Protection Agency (1981), this range roughly equates to the sound of a soft whisper at 15 feet (30 dBA) to light automobile traffic at 100 feet (50 dBA).

Existing sources of noise in the vicinity include the two existing 500-kV transmission lines and occasional vehicles traveling ranch roads. The existing transmission lines can produce noise from corona discharge, which is the electrical breakdown of air into charged particles. Under dry weather conditions, the audible noise from corona is minor and rarely noticed. During wet and humid conditions, which are atypical in the Study Area, water drops can collect on the conductors and increase corona activity. Under these conditions, a crackling or humming sound may be heard in the immediate vicinity of the line.

Noise Sensitive Areas

A noise sensitive area (NSA) is a location where a state of quietness is a basis for use or where excessive noise interferes with the normal use of the location. Typical NSAs include residential areas, parks, and wilderness areas. The only NSA in the Study Area is the Arizona National Scenic Trail (Arizona Trail). Approximately 2.4 miles of the trail fall within the Study Area. Over this distance, the trail parallels and crosses roads likely to be used by construction equipment. It also crosses the gen-tie line corridor and comes within approximately 0.2 mile (1,070 feet) of the Project Substation. The next closest NSA, Tubb Ranch Camp, is approximately 3.8 miles southeast of the nearest project component.

Anticipated Noise during Interconnection Project Construction

Ground-based equipment needed to construct a transmission project usually includes heavy earthmoving vehicles, cranes, compressors, generators, and trucks. The maximum instantaneous construction noise levels from these sources typically range from 80 to 90 dBA at 50 feet from any work site (Crocker and Kessler 1982). Because portions of the trail are in close proximity to places where heavy construction equipment and vehicles would be operating, construction-related noise levels at the trail would, at times, exceed the existing sound levels at portions of the Arizona Trail by at least 10 dBA, constituting a noticeable impact. The construction noise impact would be temporary, however, ceasing when construction ends.

Anticipated Noise during Interconnection Project Operation

During project operation, the Interconnection Project would produce noise. As noted above, the primary noise generated by transmission lines is from the corona effect. Under fair weather conditions, corona noise from a 500-kV transmission line would be approximately 33 dBA directly under the transmission line (Idaho Power 2013). This sound level is only slightly above the typical mean rural nighttime ambient sound levels of 30 dBA and would be below the typical mean rural daytime ambient sound levels of 40 dBA. In the worst-case scenario (a 500-kV transmission line in wet conditions), corona noise would be approximately 58 dBA directly under the transmission line (Idaho Power 2013). People approaching and passing under the transmission line on the Arizona Trail would likely hear the noise in wet conditions. It is important to note, however, that during such conditions, the ambient sound level would also increase due to wind, rain, thunder, and other natural sounds associated with wet weather, masking the corona effect to some degree.

Communication Signal Interference

Continuous radio frequency emissions can be generated during normal operations of substations and transmission lines. These emissions can cause interference to AM radio and television signal reception at nearby properties. Objectionable radio frequency noise is generally a product of unintended sparking but can also be produced by corona (McDonald 2012).

Existing Sources of Signal Interference

Radio frequency emissions from the two existing 500-kV transmission lines have the potential to interfere with radio reception in vehicles traveling on ranch roads under or near the lines.

Anticipated Interference Effects

The Interconnection Project may extend any current radio interference to the north along the road that would cross under the proposed gen-tie line, but only for a short distance, and any difference from existing conditions would likely not be noticed.

Electric Fields

According to the National Institute of Environmental Health Sciences (NIEHS), EMF are naturally occurring when any substance has an electrical current running through it, including power lines, electrical wiring, and other electrical equipment. Electric and electromagnetic fields are found naturally

occurring in the world in the range of 12 to 150 kV/meter. Electric fields created by televisions and other video display units typically occur in the range of 20 kV/meter (NIEHS 2002).

As shown in Exhibit I-1, electric fields and magnetic fields dissipate rapidly as distance increases away from a transmission line. For example, Exhibit I-1 indicates that, for a typical 500kV transmission line, electric fields occur in the range of 7.0 kV/meter directly beneath the line, 3.0 kV/meter at 65 feet, 1.0 kV/meter at 100 feet, and 0.1 kV/meter at 300 feet. Given the rural nature of the Study Area and lack of long-term receptors, levels of electric fields and magnetic fields at these distances would be *de minimis*.

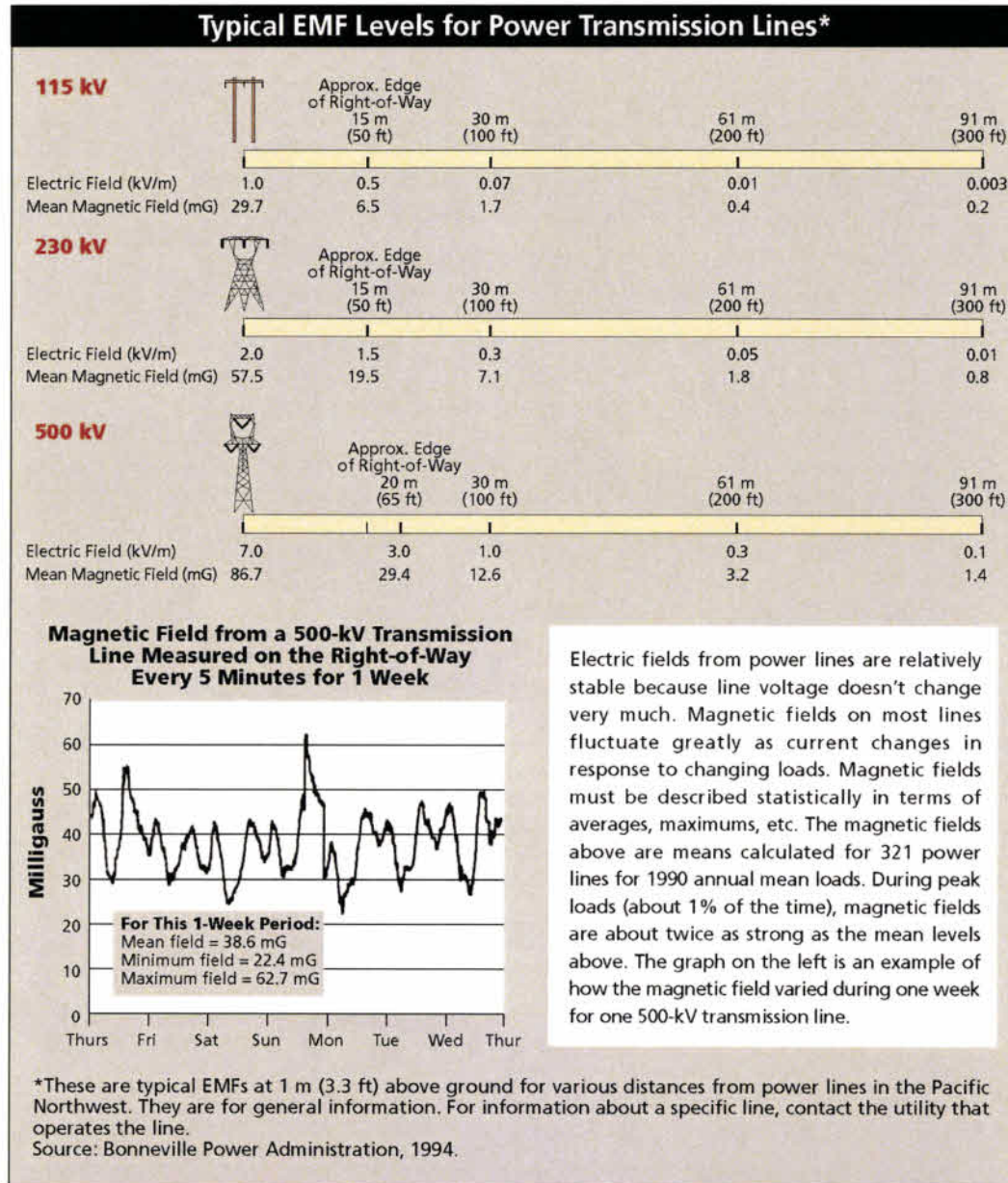


Exhibit I-1. Typical EMF levels for power transmission lines.

Literature Cited

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Eldred, K.M. 1982. Standards and criteria for noise control; An overview. *Noise Control Engineering* 18(1):16–23.

Idaho Power. 2013. *Boardman to Hemingway Transmission Line Project, Exhibit X Noise*. Available at: https://union-county.org/wp-content/uploads/2016/01/24_Exhibit-X_Noise.pdf. Accessed April 2023.

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National Institute of Environmental Health Sciences (NIEHS). 2002. *Electric and Magnetic Fields Associated with the Use of Electric Power*. Available at: https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf. Accessed May 2023.

U.S. Environmental Protection Agency. 1981. *Noise and its Measurement*. Available at: <http://nonoise.org/epa/Roll19/roll19doc49.pdf>. Accessed April 2023.

Wrigley, M. 2018. *Biological Assessment Handbook*. Revised Version 3.1. Lakewood, Colorado: National Park Service, Intermountain Regional Office.

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EXHIBIT J. SPECIAL FACTORS

As stated in the Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

Describe any special factors not previously covered herein, which applicant believes to be relevant to an informed decision on its application.

Introduction

This exhibit describes the public involvement program that was conducted for the proposed Forged Ethic Wind Energy Interconnection Project (Interconnection Project). These outreach efforts provided information about the Interconnection Project to agencies and community members, and solicited feedback, comments, and information.

Public Involvement Program Summary

The Interconnection Project team initiated the public involvement program to provide community members and relevant jurisdictions and agencies with the opportunity to provide comments and relay information or potential concerns. The public involvement program followed a comprehensive communication strategy designed to reach stakeholders near the Interconnection Project. The public involvement program included the following items, each described in more detail below: a public notice letter, a newspaper advertisement, a Facebook advertisement, an in-person open house, and a website for the Interconnection Project.

Interconnection Project Contact Information

Dedicated points of contact for public comments and questions were established for the Interconnection Project. The following mailing address and email address were included in all public-facing communications:

Forged Ethic Wind Energy Project
1645 S. Plaza Way
Flagstaff, Arizona 86001
matthew.ryan@rwe.com

The email address noted above is for the lead developer of the Forged Ethic Wind Energy Project. Additionally, the Interconnection Project website included a “contact us” form that, when completed, submits an email directly to a representative of the Interconnection Project team.

Public Notice Letter

The public involvement program involved mailing public notice letters to the 24 entities identified by the Coconino County Assessor’s Office as owning property within 10 miles of the Forged Ethic Wind Energy Project. A 10-mile property-owner mailing list was used for Certificate of Environmental Compatibility (CEC) communications to maintain consistency with public notice mailing requirements established for the Coconino County Conditional Use Permit. In general, the purpose of the public notice letter was to

provide information on the Interconnection Project, request comments, and announce the in-person open house. In addition to property owners, the public notice letter was mailed to representatives from the following agencies/organizations:

- Arizona Trail Association
- Grand Canyon National Park
- Kaibab National Forest
- Coconino National Forest
- U.S. Naval Observatory Flagstaff Station
- U.S. Fish and Wildlife Service
- Arizona Game and Fish Department
- Arizona State Land Department
- Coconino County
- South Rim Property Owners Association

The public notice letter was also mailed to representatives from the following tribes:

- Fort Mojave Indian Tribe
- Havasupai Tribe
- Hopi Tribe
- Hualapai Tribe
- Pueblo of Zuni
- Mescalero Apache Tribe
- Navajo Nation
- San Carlos Apache
- Yavapai-Apache Nation

The public notice letter was mailed on April 26, 2023. A copy of the public notice letter is included as Exhibit J-1.

Additionally, SWCA provided the Cameron Chapter House of the Navajo Nation with 20 additional copies of the public notice letter (mailed April 26). The cover letter for the enclosed additional copies requested that “in the interest of reaching residents of the Navajo Nation in the vicinity of the proposed project, we respectfully request that the enclosed copies of our community outreach letter be made available to those residents and others interested at the Cameron Chapter House.” The Cameron Chapter House is the nearest Chapter House to the Interconnection Project. A copy of the cover letter providing additional copies of the public notice letter to the Cameron Chapter House is included as Exhibit J-2.

In response to the outreach letter, Coconino County Supervisor Judy Begay’s assistant requested that the Applicant schedule a meeting with Supervisor Begay and the Navajo Nation Cameron Chapter President Mr. Charlie Smith, Jr. The virtual meeting was held on June 1, 2023. During the meeting, RWE clarified that the Wind Project is on the CO Bar Ranch (Babbitt Ranches) and ASLD lands and that the Wind Project is not on the Navajo Nation. Mr. Smith inquired if the Applicant would consider a Navajo hiring

preference and requested that the Applicant attend an upcoming Cameron Chapter meeting. As of June 2023, the Applicant is coordinating to attend a Cameron Chapter meeting.

Newspaper Advertisement for the In-Person Open House

The Interconnection Project team placed a legal advertisement in the *Arizona Daily Sun*, a newspaper of general circulation in the vicinity of the Interconnection Project, on May 10 and 12, 2023. According to *Arizona Daily Sun* staff, the newspaper has a subscriber circulation (combined print and digital) of approximately 6,500; the *Arizona Daily Sun* estimates it has 225,000 unique website users per month. The purpose of the newspaper advertisement was to announce the Interconnection Project, provide notice of the in-person public open house (scheduled for May 16, 2023), provide opportunities for public comment, and provide key contact information for the Interconnection Project team. The newspaper advertisement also included a website address where additional information about the Interconnection Project was available.

A copy of the newspaper legal advertisement is included as Exhibit J-3.

Facebook Advertisement for the In-Person Open House

The Interconnection Project team placed an advertisement through Facebook that ran from May 9 to May 16, 2023. The target area for this advertisement was a 14-mile radius around the approximate center point of the Interconnection Project; this target area was established to match the extent of property owner mailing list. The purpose of the Facebook advertisement was to announce the Interconnection Project, provide notice of the in-person public open house (scheduled for May 16, 2023), and direct interested parties to the project website. The Facebook advertisement also included a website address where additional information about the Interconnection Project was available. Facebook advertising metrics indicate that the advertisement reached 2,362 unique accounts, was clicked on 21 times, and received three comments (two from the public and one reply from SWCA Environmental Consultants).

A copy of the Facebook advertisement is included as Exhibit J-4.

In-Person Open House

The Interconnection Project team hosted an in-person open house for the Interconnection Project on May 16, 2023, in Flagstaff, Arizona. The meeting used an informal “open house” format, allowing community members to attend at their convenience, review displays, and speak with members of the Interconnection Project team.

Materials provided at the open house included a set of 15 posters (see Exhibit J-5) and copies of the public notice letter (see Exhibit J-1). The poster information included a description of the Interconnection Project, a summary of the Arizona Corporation Commission’s CEC process, visual simulations showing Interconnection Project and the Wind Project, information on land use and about major permits, and information about where to go to learn more about the Interconnection Project and submit comments. Photographs from the open house are included as Exhibit J-6. An official sign-in sheet was available to record attendees (Exhibit J-7), and comment forms were also available (Exhibit J-8). One member of the public attended the open house.

Project Website

The Interconnection Project team created and maintained a website dedicated to the Interconnection Project (<https://americas.rwe.com/projects-and-locations/forged-ethic-wind-energy-project/>) to provide stakeholders with current information about the Interconnection Project. The website was initially launched on April 24, 2023, ahead of the May 2023 open house. The website included the project description, permitting requirements (Coconino County Conditional Use Permit, Arizona Corporation Commission CEC, and Bureau of Reclamation National Environmental Policy Act), the development schedule, a comment submittal form, and contact information for the Interconnection Project team. The website allowed interested parties to visit and review the materials at their convenience. A copy of the website information is included in Exhibit J-9.

Public Comment

Throughout the public involvement program, the Interconnection Project team solicited comments from the public. A listing of the comments is included in Table J-1.

Table J-1. Comments Received

Commentor ID#	Date / Received Through	Comment
1	May 11, 2023 / Facebook advertisement	"This is not proposed as they have already started it." The Applicant replied to this commentor noting that there is at least one other, unaffiliated renewable energy project already under construction in the vicinity of the Forged Ethic Wind Energy Project.
2 / Grand Canyon National Park	June 14, 2023 / Mail	The Grand Canyon National Park comment letter included requests for information about the specifications of the proposed wind turbine technology and further visual analysis of lighting associated with the Wind Project facilities. Grand Canyon National Park did not remark on the Interconnection Project. As of July, 2023, the Applicant is coordinating to provide Grand Canyon National Park with 1) further information completed visual analyses and planned visual mitigation for the Wind Project, and 2) schedule a meeting with Grand Canyon National Park staff.



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350 N. Clark Street
Chicago, IL 60654
U.S.A.
T: 312-922-8463
F: 312-922-8460
www.rwe.com/us

April 26, 2023

Re: Proposed Forged Ethic Wind Energy Project, Coconino County, Arizona

Dear Neighbor,

RWE Clean Energy, LLC (RWECE) is applying for a Conditional Use Permit (CUP) from Coconino County and a Certificate of Environmental Compatibility (CEC) from the Arizona Corporation Commission to construct and operate the proposed Forged Ethic Wind Energy Project (Project) and associated generation-tie transmission line. The Project is located on approximately 29,106 acres of private land and Arizona State Trust Land, in an area that is commonly known as the Babbitt Ranches approximately 25 miles north of Flagstaff, Arizona (see enclosed map).

The Project includes the construction and operation of a 324-megawatt wind energy facility consisting of approximately 102 turbines, meteorological evaluation towers, underground electrical collection lines, project substation, lay-down yard, operations and maintenance building, and access roads. The Project also includes an approximately 5-mile generation-tie transmission line and interconnection with the existing Moonlight to Cedar Mountain 500-kilovolt transmission line operated by Arizona Public Service. The Project would be accessed during construction and operations from U.S. Highway 89 via both existing and proposed access roads. Once constructed, the Project would have an operational lifespan of approximately 35 years.

The overall Project area is approximately 29,106 acres; however, the actual wind facility disturbance footprint would be less than 5% of the total area. The final location and placement of wind turbines will be determined based upon site constraints (e.g., topography, geology, cultural resources). The Project will be designed consistent with the Coconino County Renewable Energy Ordinance. To help minimize Project impacts and support permitting requirements, RWECE has commissioned multiple surveys and investigations for visual simulations, cultural resources, natural resources, and wildlife studies.

Additionally, RWECE is conducting ongoing agency consultation and tribal outreach to identify resource constraints and incorporate feedback into the Project. Additional Project information is available on the Project website:

<https://arizona.rwe.com/forged-ethic-wind-farm>

Public Open House

Before submittal of permit applications with Coconino County and the Arizona Corporation Commission, RWECE would like to collect public input on the project and will be hosting an in-person open house to meet our team, learn more about our company and the project, and have your questions answered by subject matter experts.

Forged Ethic Wind Energy Project – Neighborhood Letter

Public Open House
May 16, 2023
5:30 p.m. – 7:00 p.m.
Double Tree by Hilton Flagstaff
1175 W Route 66
Flagstaff, Arizona 86001

Public Comment

To submit comments, please visit the Project website or send them via U.S. mail or email using the addresses below. We respectfully request any comments or questions be provided to us by June 16, 2023, to be incorporated into our CUP and CEC applications.

Forged Ethic Wind Energy Project
1645 S. Plaza Way
Flagstaff, Arizona 86001
matthew.ryan@rwe.com

As RWECE moves forward with a formal application for a CUP and CEC, this Project will become a case at a public hearing of the Coconino County Planning and Zoning Commission and Board of Supervisors, as well as the Arizona Corporation Commission. Notifications of future hearings will be posted on the Project website and may be mailed directly by the county. The Coconino County Community Development Department can be contacted at 928-679-8850 if you have questions about their public hearing process.

Sincerely,

Matthew Ryan, Manager of Utility-Scale Development
RWE Clean Energy, LLC

Kimberly Comacho, Manager of Utility-Scale Development
RWE Clean Energy, LLC

Enclosure

Exhibit J-1a. Public notice letter (April 2023).



1645 South Plaza Way
Flagstaff, Arizona 86001
Tel 928.774.5500 Fax 928.779.2709
www.swca.com

2136
Sound Science. Creative Solutions.®

April 26, 2023

Louise Kerley, Secretary/Treasurer
Cameron Chapter of the Navajo Nation
P.O. Box 669
Cameron, Arizona 86020

Re: Proposed Forged Ethic Wind Energy Project, Coconino County, Arizona

Dear Ms. Kerley:

RWE Clean Energy, LLC (RWECE), a leading developer of renewable energy projects, plans to apply for a Conditional Use Permit from Coconino County and a Certificate of Environmental Compatibility from the Arizona Corporation Commission to construct and operate RWECE's proposed Forged Ethic Wind Energy Project (Project) and associated generation-tie transmission line. The Project is located on approximately 29,106 acres of private land and Arizona State Trust Land, in an area that is commonly known as the Babbitt Ranches approximately 25 miles north of Flagstaff, Arizona (see enclosed map). SWCA Environmental Consultants (SWCA) is providing RWECE with environmental and community outreach services for the Project.

Prior to submitting permit applications with Coconino County and the Arizona Corporation Commission RWECE is collecting public input on the Project. The enclosed letter contains further information about the Project, a map of the Project area, information about an upcoming public open house, and contact information for the Project team. Copies of the enclosed letter were mailed to property owners near the Project, regulatory agencies, and tribal representatives including Mr. Charlie Smith Jr., Cameron Chapter President, and Ms. Candis Yazzie, Cameron Chapter Vice President.

In the interest of reaching residents of the Navajo Nation in the vicinity of the proposed project, we respectfully request that the enclosed copies of our community outreach letter be made available to those residents and others interested at the Cameron Chapter House. RWECE welcomes comments, or questions about the Project and attendance at our public open house. Additionally, you may learn more at the Project's website: <https://americas.rwe.com/forged-ethic-wind-farm>. Please do not hesitate to reach Ms. Jenn Katalinich, SWCA Project Manager (jennifer.katalinich@swca.com; 720-808-6806), or Mr. Matthew Ryan, RWECE Manager of Utility-Scale Development (matthew.ryan@rwe.com; 312-783-1515) with any questions.

Sincerely,

Jenn Katalinich
SWCA Project Manager

Enclosures:

Project area map (1)

Additional copies of the Forged Ethic Wind Energy Project Neighborhood Letter (25)

Exhibit J-2a. Additional copies of the public notice letter provided to the Cameron Chapter House (continued).

Forged Ethic Wind Energy Project

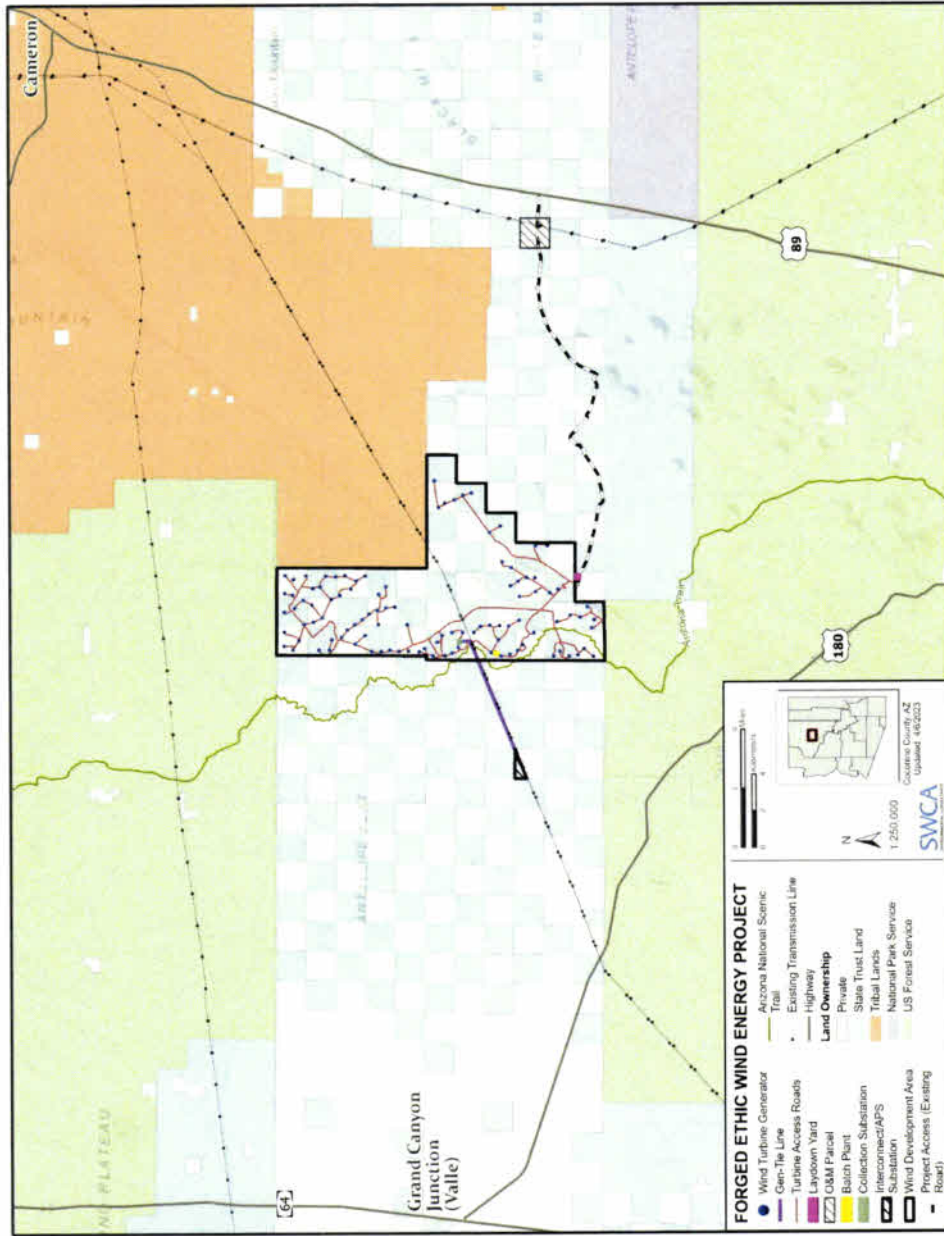


Exhibit J-2b. Additional copies of the public notice letter provided to the Cameron Chapter House (continued).

*** Proof of Publication ***

STATE OF INDIANA) ss.
County of Lake

SWCA Environmental Consultants - Legals
Dean Hazle
1645 S PLAZA WAY
FLAGSTAFF AZ 86001

ORDER NUMBER 131666

I, Lanette Brazil, being first duly sworn deposes and says: That I am the legal clerk of The Arizona Daily Sun, a newspaper published at Flagstaff, Coconino County, Arizona; a copy of which is hereunto attached, was first published in said newspaper, and that said notice was published in the regular and entire issue of the paper during that period and times of publication, and was published in the newspaper proper and not in the supplement.

Lanette Brazil
SIGNATURE

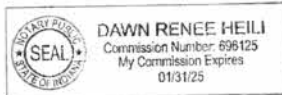
Section: Legals
Category: 999 Public Notice
PUBLISHED ON: 05/10/2023, 05/12/2023

TOTAL AD COST: 227.41

FILED ON: 5/23/2023

Subscribed and sworn to before me this 23 day of May, 2023

Dawn Renee Heili
Notary Public



PUBLIC NOTICE
RWE Clean Energy, LLC (RWECE) is applying for a Conditional Use Permit from Coconino County and a Certificate of Environmental Compatibility from the Arizona Corporation Commission to construct and operate the Forged Ethic Wind Energy Project (Project) and associated generation-tie transmission line. The Project is located on approximately 29,106 acres of private and Arizona State Trust lands in an area that is commonly known as the Babbitt Ranches, approximately 25 miles north of Flagstaff, Arizona. The Project includes the construction and operation of a 323-megawatt wind energy facility consisting of approximately 102 turbines, meteorological evaluation towers, underground electrical collection lines, project substation, laydown yard, operations and maintenance building, and access roads. The Project also includes an approximately 5-mile generation-tie transmission line and interconnection with the existing Moenkopi to Cedar Mountain 500-kilovolt transmission line operated by Arizona Public Service. The Project would be accessed during construction and operations from U.S. Highway 89 via both existing and proposed access roads. Once constructed, the Project would have an operational lifespan of approximately 35 years. The overall Project area is approximately 29,106 acres; however, the actual wind facility disturbance footprint would be less than 5% of the total area. The final location and placement of wind turbines will be determined based upon site constraints (e.g., topography, geology, cultural resources). The Project will be designed consistent with the Coconino County Renewable Energy Ordinance. To help minimize Project impacts and support permitting requirements, RWECE has commissioned multiple surveys and investigations for visual simulations, cultural resources, natural resources, and wildlife studies. Additionally, RWECE is conducting ongoing agency consultation and tribal outreach to identify resource constraints and incorporate feedback into the Project. A public open house will be held on May 18th at the DoubleTree by Hilton Flagstaff, 1175 W. Route 66, Flagstaff, Arizona 86001, from 5:30 p.m. to 7:00 p.m. RWECE and members of the Project team will be in attendance to answer questions from the public. The public can also learn more about the project and submit comments online at <https://americas.rwe.com/forged-ethic-wind-farm>.
5/10, 5/12 131666

Exhibit J-3a. Newspaper legal advertisement – published in the *Arizona Daily Sun* (May 2023).



SWCA Environmental Consultants

Sponsored ·



We want to hear from you regarding RWE Clean Energy's proposed Forged Ethic Wind Energy Project. The Forged Ethic Wind Energy Project would be in an area commonly known as the Babbit Ranches, approximately 25 miles north of Flagstaff. Click to learn more about the open house and share your comments.

RWE

**Forged Ethic
Wind Energy Project**

RWE Clean Energy invites you to learn more about
the proposed Forged Ethic Wind Energy Project
located in Coconino County, Arizona

Public Open House

May 16, 2023
5:30 - 7:00 PM

DoubleTree by Hilton Flagstaff
1175 W. Route 66, Flagstaff, Arizona 86001

AMERICAS.RWE.COM

Open House May 16

[Learn more](#)

Forged Ethic Wind Energy Project is a 323 mega...

Like

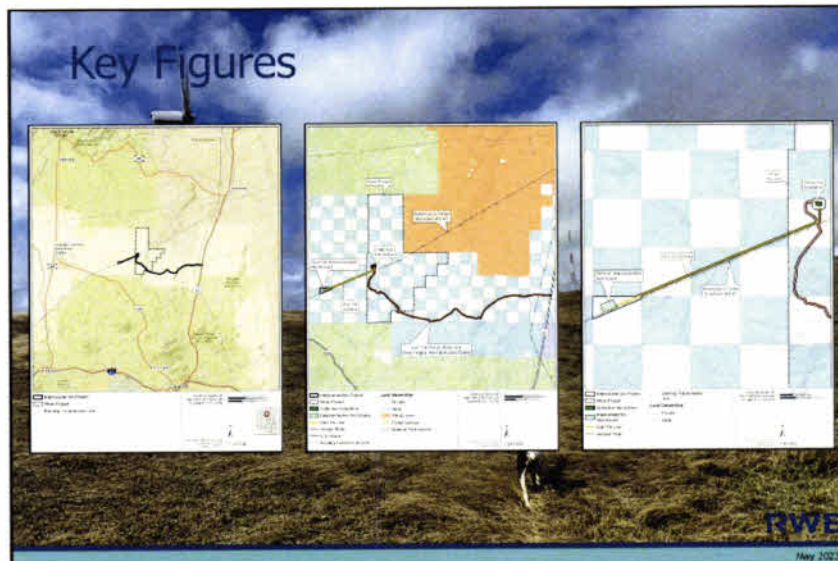
Comment

Share

Exhibit J-4. Open house Facebook advertisement (May 2023).



1





2

1

Exhibit J-5a. In-person open house welcome sign and presentation boards (May 2023).

RWE Clean Energy




- RWE Clean Energy is one of the largest global players in renewable energy and develops, owns, and operates some of the most efficient, highest performing renewable energy projects in the United States.
- In the US, RWE Clean Energy employs around 1,500 people and is focused on growing the company's portfolio of renewable energy projects. Working together with communities, RWE Clean Energy will take the expansion of renewable energy to the next level and secure the clean energy future of communities in the Americas.
- RWE Clean Energy is developing and operating numerous renewable energy projects across the US, including several onshore wind projects.

1

Forged Ethic Wind Energy Project

- The Forged Ethic Wind Energy Project (Project) is a renewable energy wind farm proposed on 29,106 acres of private and Arizona State Trust land in an area commonly known as the Babbitt Ranches
- Project capacity: 323 megawatts (enough electricity for up to 85,000 homes)
- The Project would allow for delivery of renewable energy into the regional transmission grid in northern Arizona and the southwestern
- Wind energy has become one of the most affordable and reliable sources of electricity available today. Wind farms increase the resiliency of Arizona's electric grid while protecting consumers from the volatility and rising costs of traditional energy sources.

2

Exhibit J-5b. In-person open house presentation boards (May 2023) (continued).

Key Project Facilities

- Approx. 102 wind turbines
- Underground collection lines
- Step-up substation
- 5-mile-long, 500KV generation intertie transmission line
- Interconnection switchyard
- Meteorological evaluation towers
- Laydown yard
- Operation and maintenance building
- Access roads

May 2023

3

Land Use

- **Project Area:** 29,106 acres, ~25 miles north of Flagstaff in an area commonly known as the Babbitt Ranches
 - Checkerboard of private and Arizona State Trust Lands
 - The wind facility disturbance footprint will be less than 5% of the total Project Area.
- **County Zoning: General (G)**
 - The General zone is a rural land use designation for unincorporated areas of Coconino County
 - Construction and operation of a wind farm is considered a conditionally permissible use, 107 according with the County's conditional use permit process and utility state-integrated energy systems ordinance
- **Existing Land Use: Cattle ranching**
 - Cattle ranching is a compatible land use that can continue throughout the Project's anticipated 35-year operational lifespan
- **Surrounding Land Uses** consist predominately of livestock grazing and ranching activities
 - South of the Project are lands managed by the Kaibab and Coconino National Forests. Kaibab National Forest lands are also located north of the Project.
 - To the north and east is the Navajo Nation.
 - The nearest residential areas are the communities of Gray Mountain, Cottonwood, and Vail.
 - Approximately 26 miles to the northeast and west of the Project is the Hartshead wind

May 2023

4

Exhibit J-5c. In-person open house presentation boards (May 2023) (continued).

Environmental Studies

Wildlife Studies

June 2020: Pre-construction Wildlife Survey Plan prepared and agreed upon with U.S. Fish and Wildlife Service (USFWS) and Arizona Game and Fish Department prior to initiation of avian and bat studies

June 2021 - June 2023: WEG-based Tier 3 Preconstruction Wildlife Surveys conducted and ongoing within the project area, providing a comprehensive familiarity with the site's wildlife habitat conditions

Sept. 20 - Oct. 1, 2021: Raptor Migration Survey

Feb. 2021 - Nov. 2021: Bat Acoustic Survey

Sept. 2022: USFWS Land-Based Wind Energy Assessing (WEGA) Tier 1 Field Evaluation report

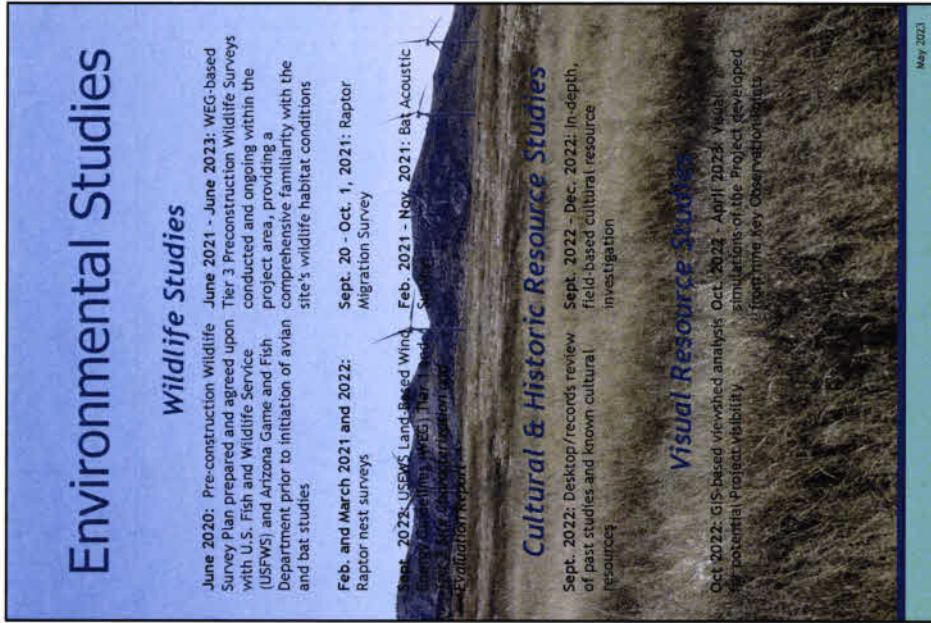
Cultural & Historic Resource Studies

Sept. 2022: Desktop/records review of past studies and known cultural resources

Sept. 2022 - Dec. 2022: In-depth, field-based cultural resource investigation

Visual Resource Studies

Oct. 2022 - April 2023: Visual simulations of the Project developed from nine key observation points

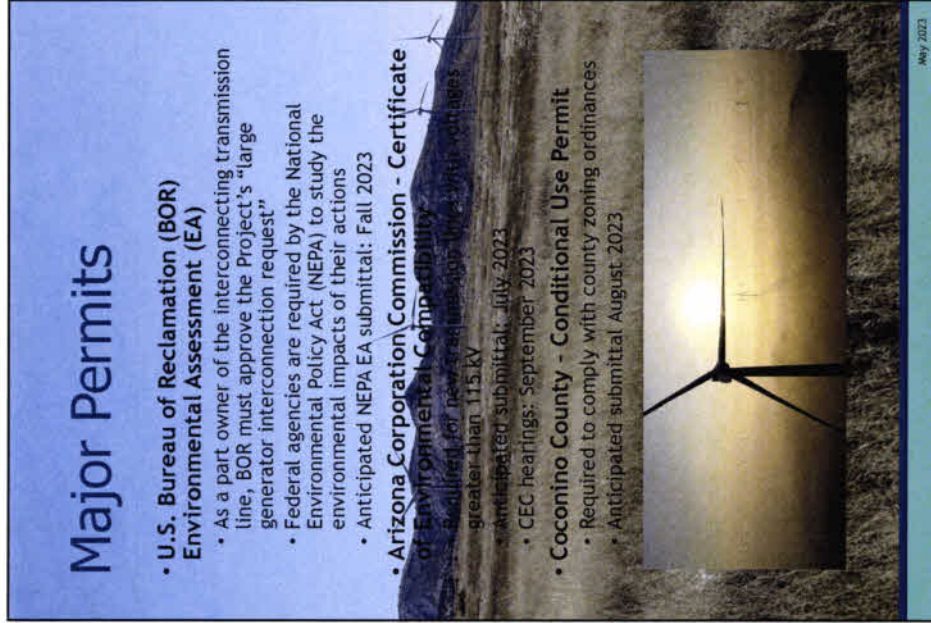


May 2023

5

Major Permits

- **U.S. Bureau of Reclamation (BOR) Environmental Assessment (EA)**
 - As a part owner of the interconnecting transmission line, BOR must approve the Project's "large generator interconnection request"
 - Federal agencies are required by the National Environmental Policy Act (NEPA) to study the environmental impacts of their actions
 - Anticipated NEPA EA submittal: Fall 2023
- **Arizona Corporation Commission - Certificate of Environmental Compatibility**
 - Required for new transmission lines with voltages greater than 115 kV
 - Anticipated submittal: July 2023
 - CEC hearings: September 2023
- **Coconino County - Conditional Use Permit**
 - Required to comply with county zoning ordinances
 - Anticipated submittal August 2023



May 2023

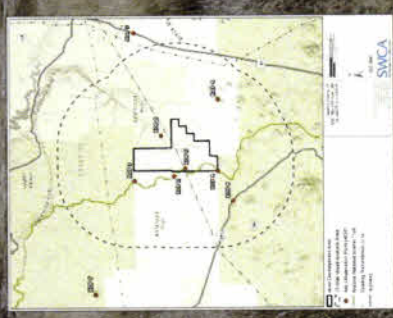
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3

Exhibit J-5d. In-person open house presentation boards (May 2023) (continued).

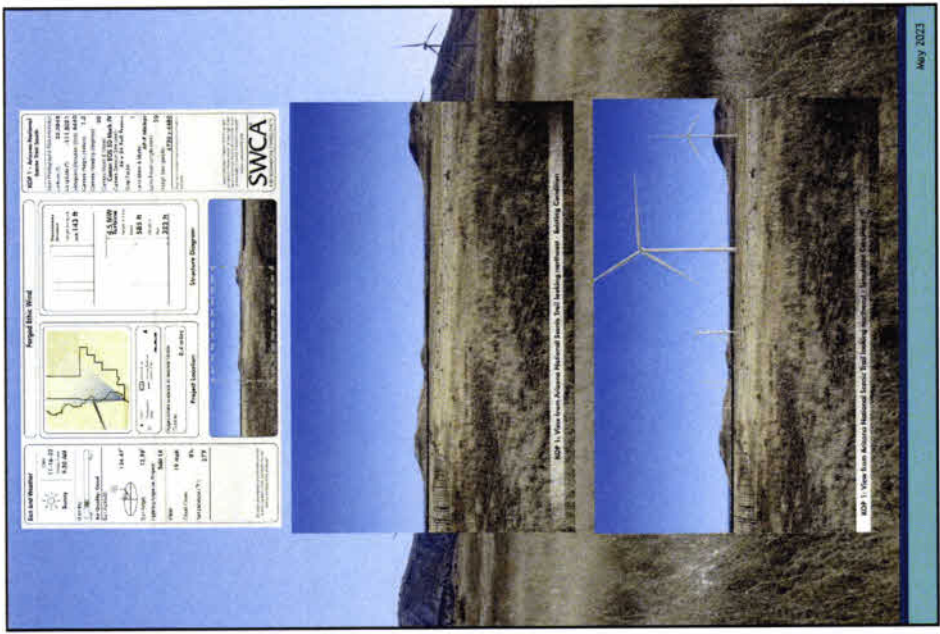
Visual Simulations

- Potential visual impacts of the Project will be assessed by multiple regulatory agencies during the permitting process.
- Visual simulations are created by photographing existing conditions of the Project Area from “key observation points” (KOPs)
- KOPs were selected to represent sensitive viewing locations
- Scaled models of project facilities are added to the existing conditions photographs at each KOP



May 2023

7



Key and Symbols

1000' 2000' 3000' 4000' 5000'

1:10,000

SWCA

Project Area

Project Location

SWCA

SWCA Project Information

Project Name: [REDACTED]

Project Number: [REDACTED]

Project Location: [REDACTED]

Project Status: [REDACTED]

Project Date: [REDACTED]

Project Contact: [REDACTED]

Project Description: [REDACTED]

Project Objectives: [REDACTED]

Project Benefits: [REDACTED]

Project Risks: [REDACTED]

Project Mitigation: [REDACTED]

Project Monitoring: [REDACTED]

Project Reporting: [REDACTED]

Project Compliance: [REDACTED]

Project Approval: [REDACTED]

Project Implementation: [REDACTED]

Project Completion: [REDACTED]

Project Evaluation: [REDACTED]

Project Review: [REDACTED]

Project Feedback: [REDACTED]

Project Improvement: [REDACTED]

Project Sustainability: [REDACTED]

Project Resilience: [REDACTED]

Project Adaptability: [REDACTED]

Project Inclusivity: [REDACTED]

Project Transparency: [REDACTED]

Project Accountability: [REDACTED]

Project Integrity: [REDACTED]

Project Honesty: [REDACTED]

Project Fairness: [REDACTED]

Project Equity: [REDACTED]

Project Justice: [REDACTED]

Project Respect: [REDACTED]

Project Dignity: [REDACTED]

Project Compassion: [REDACTED]

Project Empathy: [REDACTED]

Project Understanding: [REDACTED]

Project Tolerance: [REDACTED]

Project Open-mindedness: [REDACTED]

Project Flexibility: [REDACTED]

Project Creativity: [REDACTED]

Project Innovation: [REDACTED]

Project Progress: [REDACTED]

Project Change: [REDACTED]

Project Growth: [REDACTED]

Project Development: [REDACTED]

Project Improvement: [REDACTED]

Project Advancement: [REDACTED]

Project Success: [REDACTED]

Project Achievement: [REDACTED]

Project Excellence: [REDACTED]

Project Quality: [REDACTED]

Project Standard: [REDACTED]

Project Benchmark: [REDACTED]

Project Best Practice: [REDACTED]

Project Innovation: [REDACTED]

Project Leadership: [REDACTED]

Project Vision: [REDACTED]

Project Mission: [REDACTED]

Project Values: [REDACTED]

Project Principles: [REDACTED]

Project Ethics: [REDACTED]

Project Integrity: [REDACTED]

Project Honesty: [REDACTED]

Project Fairness: [REDACTED]

Project Equity: [REDACTED]

Project Justice: [REDACTED]

Project Respect: [REDACTED]

Project Dignity: [REDACTED]

Project Compassion: [REDACTED]

Project Empathy: [REDACTED]

Project Understanding: [REDACTED]

Project Tolerance: [REDACTED]

Project Open-mindedness: [REDACTED]

Project Flexibility: [REDACTED]

Project Creativity: [REDACTED]

Project Innovation: [REDACTED]

Project Progress: [REDACTED]

Project Change: [REDACTED]

Project Growth: [REDACTED]

Project Development: [REDACTED]

Project Improvement: [REDACTED]

Project Advancement: [REDACTED]

Project Success: [REDACTED]

Project Achievement: [REDACTED]

Project Excellence: [REDACTED]

Project Quality: [REDACTED]

Project Standard: [REDACTED]

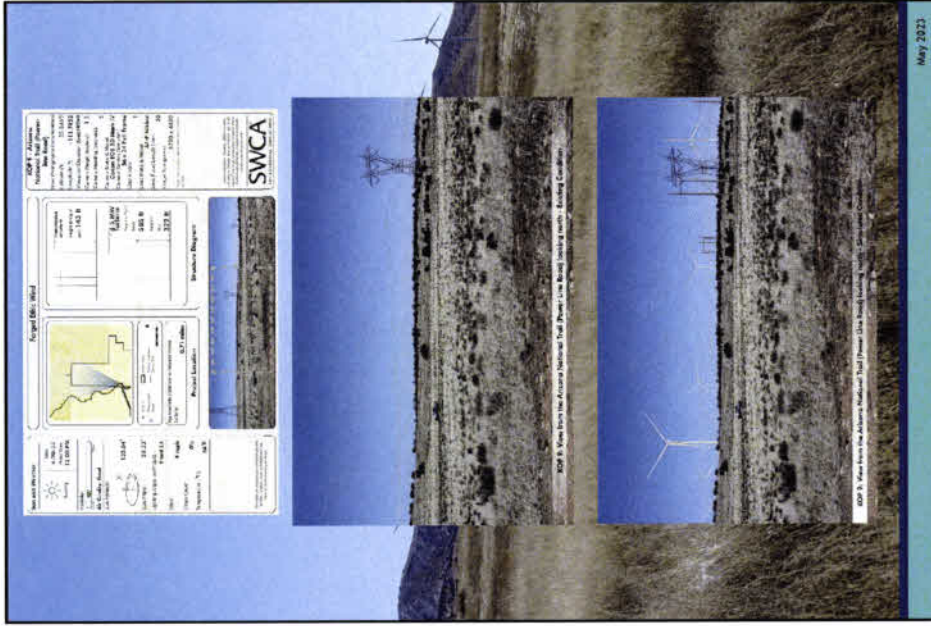
Project Benchmark: [REDACTED]

Project Best Practice: [REDACTED]

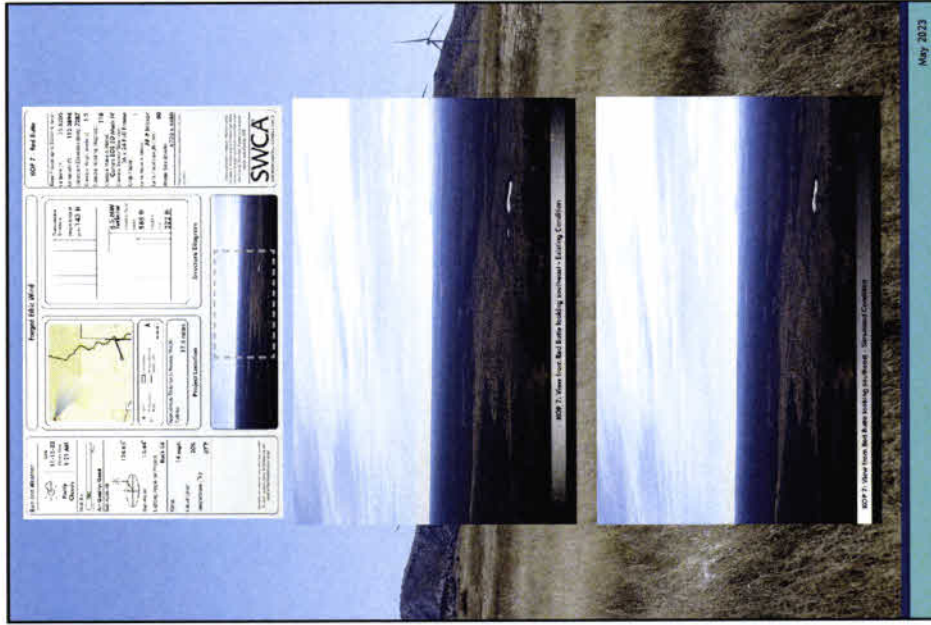
May 2023

8

Exhibit J-5e. In-person open house presentation boards (May 2023) (continued).



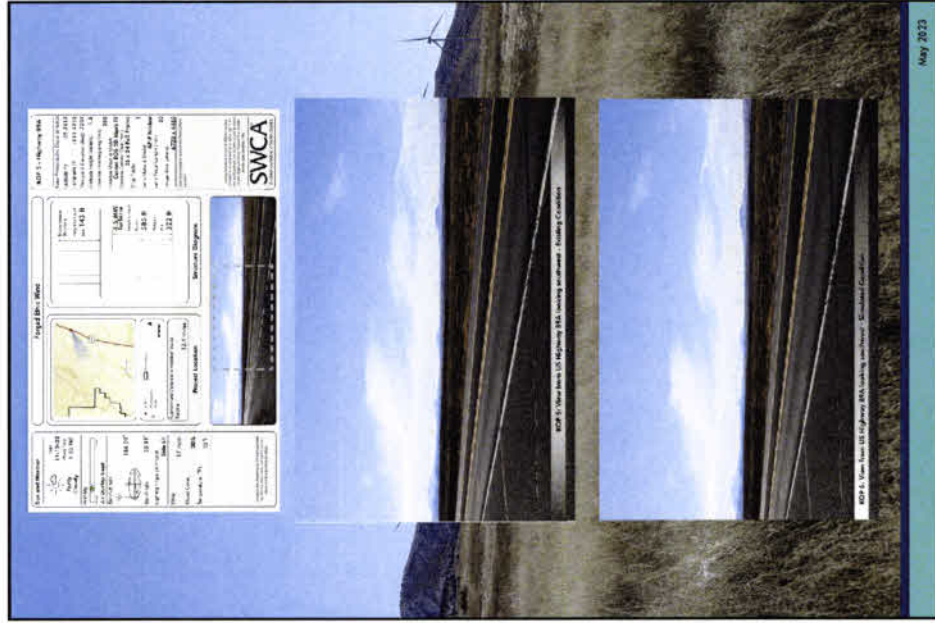
12



11

Exhibit J-5g. In-person open house presentation boards (May 2023) (continued).

5/10/2023



13

Exhibit J-5h. In-person open house presentation boards (May 2023) (continued).



Exhibit J-6a. View of in-person open house displays.



Exhibit J-6b. View of in-person open house displays (continued).



Exhibit J-6c. View of in-person open house displays (continued).

May 16th, 2023

RWE Forged Ethic Wind Energy Project Open House Sign-In Sheet



Please write legibly

Full Name	Email Address	Telephone	Want to receive project updates?*
PAUL RAY		480.415.4437	No.

*By providing your information, you agree RWE may contact you at the number you provided above with information about the project in the future. We will not share your information with any 3rd party sources.

Exhibit J-7. In-person open house sign-in sheet (May 2023).

Comment Form

RWE Forged Ethic Wind Energy Project

Public Open House Meeting

Tuesday, May 16th, 2023

5:30 PM – 7:30 PM

Name: _____

Affiliation: _____

Email: _____

Phone: _____

Address: _____

City _____ State _____ Zip _____

Comment: _____

Exhibit J-8. In-person open house comment form (May 2023).



Exhibit J-9a. Project website.



Exhibit J-9b. Project website (continued).

Facts & Figures


323 megawatt (MW)
wind farm

Up to 85,000
homes powered¹


More than 500
million gallons
of water saved per year²

¹Homes powered is calculated using EPRI's GreenPower Sizing and Capacity Calculator.
²Assumes 0.58 gallons of water consumed per kWh of conventional electricity from: see, Han, & Figuring, 2015.


Project Benefits



Supporting Communities




Supporting Ranchers



Support Rural Economies

Exhibit J-9c. Project website (continued).

Stronger Electric Grid




Wind energy has become one of the most affordable and reliable sources of electricity available today. Wind farms increase the resiliency of Arizona's electric grid while protecting consumers from the volatility and rising costs of traditional energy sources.

Protecting the Environment and Community

Forged Ethic Wind Energy Project will be designed to complement existing ranching land uses, protect the soil, and avoid impacts to wildlife.

Wind farms produce electricity without generating any pollution, resulting in cleaner air and water when compared to traditional power plants. The average wind farm leaves 98% of the land undisturbed, leaving it free for other uses like farming and ranching.



Comprehensive studies are required as part of the planning and permitting process to protect public safety and the environment. Wind energy is a major climate change solution, which is the largest threat to many species and their habitats. Wind power is far less harmful to wildlife than traditional energy sources it displaces, including to birds and their critical habitats.

At the end of Forged Ethic Wind Energy Projects useful life, equipment will be removed and the land can be returned to its original uses.

Exhibit J-9d. Project website (continued).

Approval Process

Cocoonino County Permitting

The Cocoonino County zoning ordinance was updated in June 2022 to include Section 3.19 Utility Scale Renewable Energy Systems to establish a process, rules, and standards for the construction, siting and operation of Utility Scale Renewable Energy Systems (Cocoonino County 2022). The Project will comply with the requirements of this zoning ordinance and describe all requested information in the project's Conditional Use Permit (CUP) application.

The Cocoonino County Renewable Energy Ordinance requires a visual resource overview and simulations. The preliminary visual assessment for the Project identified existing visual resources within 10 miles of the proposed project. Scenic simulations illustrate the proposed facility including wind turbines, structures, substations, overhead transmission lines, and equipment facilities. The photos' locations, determined in coordination with the Cocoonino County planning staff, are identified and labeled on a map demonstrating the visual line of sight from the resource to the facility.

Facility lighting, such as safety lighting at the operations and maintenance building and substation control building, will be designed in compliance with Cocoonino County Zoning Ordinance lighting performance standards.

Public Involvement

The public is invited to learn more about the Forged Ethic Wind Energy Project at an open house on **May 16, 2023, at the Double Tree Hilton from 5:30 pm to 7:00 pm 1175 West Route 66, Flagstaff, AZ, 86001, US**

Project developers and planners will be available to address comments and questions during this time. Additionally, there will be an opportunity for the public to submit written comments.

Public comments may be submitted at any time via email, online using the form below, or via U.S. mail to:

Matthew Ryan, Manager, Utility-Scale Development

RWE Clean Energy, LLC
20 California Street, Floor 5
San Francisco, CA 94111

[Send email](#)

Exhibit J-9e. Project website (continued).

RWE will submit an application for a Conditional Use Permit from Cocoonino County.

CUP Application Materials (to be posted here when available)

- CUP Application and Exhibits
- County Planning and Zoning Commission and Board of Supervisors Hearing Dates

The Cocoonino Planning and Zoning Commission typically meets in the First Floor Meeting Room at the Cocoonino County Administration Building, 219 East Cherry Avenue in Flagstaff, Arizona. However, these meetings are currently occurring in a virtual format as related to the Covid-19 pandemic. The Cocoonino County Community Development Department can be contacted at 928-679-8850 if you have questions about their public hearing process.

Certificate of Environmental Compatibility

In Arizona, proposed transmission lines of 115-kV or greater with a "series of structures" are subject to Arizona Corporation Commission (ACC) jurisdiction and are required to apply for and receive a Certificate of Environmental Compatibility (CEC) prior to construction. The Arizona Power Plant and Transmission Line Siting Committee (Line Siting Committee) considers, during public hearings, the matters contained in CEC applications relative to a series of factors specified in Section 40-360.06, Arizona Revised Statutes. During the public hearings, the Committee deliberates and makes a recommendation to the ACC regarding whether to approve, approve with conditions, or reject the CEC. Subsequently, the ACC Commissioners vote on the CEC matter during an open meeting and may accept, reject, or modify the Committee's recommendations.

The Forged Ethic Wind Energy Project will contribute to the delivery of renewable energy into the transmission grid in the southwestern United States. The Project interconnection point is with the Moenkapi to Cedar Mountain 500-kV transmission line via a planned Arizona Public Service (APS) 500-kV switchyard. This transmission line runs northeast-southwest through the Forged Ethic Wind Energy Project. The electricity generated by the Project would be routed to a Project substation via 34.5-kV underground collection lines, where the voltage will be stepped-up to 500-kV. The substation will include two (2) main power transformers of 108/144/280MVA, one (1) 500-kV circuit breaker, and six (6) 34.5-kV MV circuit breakers to increase the voltage to the 500-kV transmission line voltage. An approximately 5-mile-long, 500-kV generation-tie transmission line (gen-tie) will be constructed from the Forged Ethic Wind Project substation to the APS switchyard. The interconnection Project, subject to the requirements of a CEC, includes the 500-kV Project substation, 5-mile-long 500-kV gen-tie, and switchyard upgrades at the planned APS 500-kV switchyard.

RWE will apply for a CEC from the ACC line siting committee. The Line Siting Committee hearing is scheduled for September 6, 2023 (time and location TBD).

CEC Application and Exhibits (to be posted here when available)

- Pre-filing conference transcript and exhibits
- Pre-hearing conference transcript and exhibits

Exhibit J-9f. Project website (continued).

