APPENDIX H

Biological Technical Report

FINAL

Campo Wind Project with Boulder Brush Facilities
Biological Technical Report

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ACOE	U.S. Army Corps of Engineers
AECOM BSA	biological study area defined by AECOM in 2010
amsl	above mean sea level
APLIC	Avian Power Line Interaction Committee
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BTR	Biological Technical Report
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CWA	federal Clean Water Act
dBA	A-weighted decibel
DS	Data Station
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FR	Federal Register
gen-tie line	generation transmission line
GIS	geographic information system
I	Interstate
IA	index of activity
kV	kilovolt
L_{eq}	equivalent continuous sound level
MBTA	Migratory Bird Treaty Act
MM	Mitigation Measure
MW	megawatt
NEPA	National Environmental Policy Act
NWP	Nationwide Permit
O&M	operation and maintenance
OHWM	ordinary high-water mark
SWPPP	stormwater pollution prevention plan
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRRS	Worker Response Reporting System

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SUMMARY

This Biological Technical Report was prepared to evaluate the proposed Campo Wind Project with Boulder Brush Facilities (Project), located on the Campo Band of Diegueño Mission Indians Reservation (Reservation) and adjacent private lands in southeast San Diego County. The Reservation lands are held in trust by the federal government, as administered by the Bureau of Indian Affairs. The Project includes Campo Wind Facilities On-Reservation and Boulder Brush Facilities on adjacent land to the northeast of the Reservation leased from a private landowner (Off-Reservation). The Campo Wind facilities consist of up to 60 wind turbines, an electrical collection and communication system, approximately 5 miles of On-Reservation generation transmission (gen-tie) line, a Project collector substation, an operation and maintenance facility and associated parking areas, temporary staging areas, meteorological towers, and access roads. The Boulder Brush Facilities consist of approximately 3.5 miles of Off-Reservation gen-tie line, a high-voltage substation, a switchyard to interconnect the Project to the existing San Diego Gas & Electric Company (SDG&E) Sunrise Powerlink, and access roads.

Vegetation mapping, formal jurisdictional delineation of waters and wetlands, and focused surveys were conducted in 2017 and/or 2018, including Quino checkerspot butterfly (*Euphydryas editha quino*) surveys. Additional surveys to document avian, eagle, and raptor activity were completed in 2017 through 2019. This report documents the results of Dudek's field work, along with previous studies of the Project Area, and an analysis of the impacts and mitigation measures related to the Project.

Dudek biologists mapped 26 vegetation communities and land cover types within the study area: big sagebrush scrub (including disturbed), coast live oak woodland (including open and dense), emergent wetland, freshwater marsh, granitic chamise chaparral, granitic northern mixed chaparral, montane buckwheat scrub, mulefat scrub, non-native grassland, non-native grassland broadleaf-dominated, red shank chaparral, scrub oak chaparral, semi-desert chaparral, southern coast live oak riparian forest, southern arroyo willow riparian forest, southern willow scrub, upper Sonoran subshrub scrub, valley sacaton grassland, wildflower field, developed, disturbed habitat, unvegetated stream channel, and eucalyptus woodland.

Dudek biologists detected the following federally protected species during surveys: golden eagle (*Aquila chrysaetos*), as well as a number of migratory birds and bats. While not detected during the 2018 surveys, Quino checkerspot butterfly was observed during 2010 focused surveys by AECOM On-Reservation and Off-Reservation in 2019.

The Project would result in impacts to approximately 920.40 acres. This includes impacts to 1.55 acres of non-wetland waters and 0.68 acres of wetland waters of the United States. The

Project would result in potentially significant direct impacts to special-status wildlife species habitat. Mitigation would include pre-construction monitoring and other best management practices, fire protection, and any conditions that accompany any necessary federal agency permits. All significant impacts would be reduced to less than significant with implementation of mitigation measures.

1 INTRODUCTION

1.1 Purpose of the Report

This Biological Technical Report analyzes the impacts to biological resources potentially resulting from construction and operation and maintenance (O&M) of the Project. The purpose of this report is to (1) describe the existing conditions of biological resources within the Project Area (composed of the entire approximately 16,000-acre Reservation Boundary and approximately 2,000 acres of private parcels within the Boulder Brush Boundary), including federally regulated vegetation communities, jurisdictional water and wetland resources, plants, wildlife, and wildlife movement; (2) discuss potential impacts to biological resources that would result from development of the property and describe those impacts in terms of biological significance in view of federal policies; and (3) recommend mitigation measures for potential impacts to federally regulated biological resources. Recommendations follow federal laws and regulations, including the National Environmental Policy Act (NEPA). The Project is described in detail in Appendix B, Project Description Details, of the Environmental Impact Statement (EIS), and the Boulder Brush Facilities portion is under the jurisdiction of the County of San Diego (County). Part of the County's review includes the preparation of an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) that will also be subject to public review and comment and addresses state and local regulated species potentially impacted by the Project.

1.2 Project Location

The Project is located on the Reservation in southeastern San Diego County and neighboring private lands under the jurisdiction of the County, approximately 50 miles east of the City of San Diego, California. The Reservation is located in the southern Laguna Mountains and surrounded by the unincorporated communities of Campo, Boulevard, and Live Oak Springs (Figure 1, Project Location; all figures provided in Appendix A). The Reservation covers approximately 16,000 acres and includes lands both north and south of Interstate (I) 8 along the Tecate Divide, and extends from the Manzanita Indian Reservation south to approximately 0.25 miles from the U.S./Mexico international border. Collectively, the land within both the Reservation Boundary and the Boulder Brush Boundary compose the Project Area (Figure 1). The Project Area is surrounded by low-density rural commercial and residential developments throughout the Reservation and nearby communities; Church Road and I-8 bisect the study area. The Campo Wind Facilities would be located within a corridor of approximately 2,200 acres of land (Campo Corridor) within the approximately 16,000 acres of Reservation land inside the Reservation Boundary. The Boulder Brush Facilities would be located within a corridor of approximately 320 acres of land (Boulder Brush Corridor) within the approximately 2,000 acres of Private Lease land inside the Boulder Brush Boundary adjacent to the northeast

portion of the Reservation. The Project Site is approximately 2,520 acres consisting of the Campo Corridor and the Boulder Brush Corridor. Disturbance limits of approximately 930 acres would occur within the Project Site (approximately 800 acres within the Campo Corridor and approximately 130 acres within the Boulder Brush Corridor).

1.3 Project Description

The Project includes two main components: (1) the Campo Wind Facilities, including associated buildings and infrastructure, and (2) the Boulder Brush Facilities. The Project would include construction of up to 60 wind turbines, electrical collection and communication system, a generation transmission (gen-tie) line, a collector substation, a high-voltage substation, a 500 kilovolt (kV) switchyard and incoming/outgoing connection lines to connect the 500 kV switchyard to the Sunrise Powerlink, an O&M facility and associated parking areas, temporary staging areas, permanent and temporary meteorological towers, and access roads. A detailed Project description is provided in Appendix B, Project Description Details, of the EIS.

Alternative 2 (Reduced Intensity – Approximately 202 MW) would include a reduction in the Project's footprint, number of turbines, and generating capacity of approximately 20%, with 48 turbines that would produce approximately 4.2 megawatts (MW) each, for a total production of approximately 202 MW. All Alternative 2 components, including general location of the turbines and Project Area, phases of construction, and substation locations, would be similar to those of Alternative 1, with the exception of the strings of turbines in the southwest and northwest of the Reservation, which would be eliminated, reducing the number of wind turbines.

It is assumed that the Campo Wind Facilities would operate for the term of the lease between the Campo Band of Diegueño Mission Indians (Tribe) and Terra-Gen Development Company LLC (Developer) (Campo Lease). Prior to decommissioning of the Campo Wind Facilities, a decommissioning plan would be prepared and implemented consistent with the requirements of the Campo Lease to remove the energy facilities and electrical equipment from the Reservation.

Decommissioning of the Boulder Brush Facilities, except for the San Diego Gas & Electric Company (SDG&E)-owned and operated switchyard and connection lines to Sunrise Powerlink and the paved access road, would occur at the end of the Campo Lease and any renewal extension. Decommissioning of the Off-Reservation gen-tie line and high-voltage substation within the Boulder Brush Corridor would minimize new site disturbance and removal of native vegetation to the extent practicable. All decommissioning activities would take place in accordance with all applicable laws, regulations, and terms of the Private Lease.

1.4 Standard Best Management Practices

Standard best management practices (BMPs) would be implemented during construction, O&M, and decommissioning of the Project. Table 1 outlines BMPs relevant for avoidance and minimization of impacts to biological resources.

Table 1
Standard Best Management Practices

Project Action	General Description
Equipment maintenance	All equipment operating on site would be in good working condition and free of leaks.
Trash abatement	Spoils, trash, or any construction-generated debris would be removed to an approved off-site disposal facility. A trash abatement program would be established. Trash and food items would be contained in closed containers and removed daily to reduce the attraction of opportunistic predators such as common ravens and feral cats and dogs that may prey on sensitive species.
Wildfire prevention	Wildfires would be prevented by exercising care when driving and by not parking vehicles where catalytic converters could ignite dry vegetation. All construction vehicles would carry water and shovels or fire extinguishers in the field, or high fire risk installations (e.g., electric lines) may need to be delayed. The use of shields, protective mats, or other fire-prevention equipment would be used during grinding and welding to prevent or minimize the potential for fire. Smoking would take place within designated areas and away from vegetated areas. Cigarette butts would be disposed of in proper receptacles (e.g., vehicle ashtrays or outdoor metal cigarette ashtrays).
Erosion, runoff, and sedimentation prevention	All construction activities would cease during heavy rains (i.e., rainfall over 0.2 inches within a 24-hour period) to prevent unnecessary erosion, runoff, and sedimentation and would not resume until conditions are suitable for the movement of equipment and materials. Additionally, construction activities would be subject to restrictions and requirements that address erosion and runoff, including the federal Clean Water Act and the National Pollution Discharge Elimination System program. Preparation and implementation of a Project-specific stormwater pollution prevention plan will be required.
Toxic substances	Vehicles would carry a Hazardous Material Spill Kit for use in the event of a spill. All personnel working on site would be trained in using these kits. Spill containment materials must be on site or readily available for any equipment maintenance or refueling.
Pets and firearms	Workers would be prohibited from bringing domestic pets and firearms to the site.
Speed limit	Vehicle speeds on site would be restricted to 15 miles per hour (24 kilometers per hour) during all phases of the Project. Speed limit signs would be posted throughout the site to remind personnel of travel speed restrictions.
Work hours	Construction would occur during the daytime only, and no construction would take place at night.[a] "Night" is defined as between 7:00 p.m. and 7:00 a.m.
Lighting	Construction activities would not include nighttime lighting. Temporary security lighting around staging areas may be required for safety during construction activities up until 7:00 p.m. Operations-related lighting is limited to (1) restricted exterior lighting installed on turbines for Federal Aviation Administration aviation warning lights and (2) permanent motion-sensitive, directional security lights installed to provide adequate illumination around the Project collector substation. All lighting would be shielded and directed downward to minimize the potential for glare or spillover onto adjacent properties.

[a] No construction activities will occur at night; however, due to the California Department of Transportation (Caltrans) restriction on oversize loads during peak traffic hours, some equipment deliveries may occur after hours.

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2 REGULATORY SETTING

This chapter provides general background about the Project's regulatory setting. The majority of the Project would occur on the Reservation. The Tribe and the Reservation are subject to federal and Tribal law. However, Tribal law is not applicable to the Project pursuant to the Campo Lease between the Tribe and the Developer. The Reservation is not under the jurisdiction of the state or County.

Federal laws, regulations, and guidance applicable to the Project are listed below, and include NEPA, the federal Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), the federal Clean Water Act (CWA), and Executive Orders (EOs) 11988, 11990, and 13112. The Project also followed the U.S. Fish and Wildlife Service (USFWS) voluntary Land-Based Wind Energy Guidelines (Guidelines) (USFWS 2012).

A separate biological resources technical report will be prepared pursuant to CEQA for the Boulder Brush Facilities located on land under County jurisdiction. The EIR BTR will outline the state and local regulations associated with the Boulder Brush Facilities. State and local regulations applicable to the Boulder Brush Facilities includes California Endangered Species Act (CESA), California Fish and Game Code, Porter-Cologne Water Quality Control Act, CEQA, the draft East County Multiple Species Conservation Program (MSCP) Plan, the Planning Agreement for the East County MSCP (County of San Diego 2014), and County Resource Protection Ordinance (RPO).

2.1 National Environmental Policy Act

The approval of a land lease by the Bureau of Indian Affairs (BIA) constitutes a federal action, subject to compliance with NEPA (42 USC, Sections 4321–4347, as amended). The purpose of NEPA is to ensure that potential environmental impacts of any proposed federal action are fully considered and made available for public review. The scope of the NEPA analysis considers the effects of proposed and alternative actions on the human environment, which includes biological resources and non-biological resources, such as cultural resources. The BIA can approve a land lease only after the NEPA review process has been completed.

2.2 Endangered Species Act

The ESA (16 USC 1531 et seq.) is implemented by USFWS through a program that identifies and provides for protection of various species of fish, wildlife, and plants deemed to be in danger of or threatened with extinction. As part of this regulatory act, the ESA provides for designation of critical habitat, defined in ESA Section 3(5)(A) as specific areas within the geographical range occupied by a species where physical or biological features "essential to the conservation of the species" are found and that "may require special management considerations or protection." Critical habitat may also include areas outside the current geographical area occupied by the species that are nonetheless "essential for the conservation of the species."

2.3 USFWS Land-Based Wind Energy Guidelines

The Department of the Interior's USFWS and the Wind Turbine Guidelines Federal Advisory Committee developed the Guidelines. These voluntary Guidelines provide a structured, scientific process for addressing wildlife conservation concerns at all stages of land-based wind energy development. They also promote effective communication among wind energy developers and federal, state, and local conservation agencies and tribes. When used in concert with appropriate regulatory tools, the Guidelines form the best practical approach for conserving species of concern and help minimize impacts on wildlife and their habitats from the growing wind energy economy.

2.4 Migratory Bird Treaty Act

The MBTA prohibits the intentional take of any migratory bird or any part, nest, or eggs of any such bird. Under the MBTA, "take" is defined as pursuing, hunting, shooting, capturing, collecting, or killing, or attempting to do so (16 USC 703 et seq.). In December 2017, Department of the Interior Principal Deputy Solicitor Jorjani issued a memorandum (M-37050) that interprets the MBTA's "take" prohibition to apply only to affirmative actions that have as their purpose the taking or killing of migratory birds, their nests, or their eggs. Unintentional or accidental take is not prohibited (DOI 2017). Additionally, EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, requires that any project with federal involvement address impacts of federal actions on migratory birds with the purpose of promoting conservation of migratory bird populations (66 FR 3853–3856). The EO requires federal agencies to work with USFWS to develop a memorandum of understanding. USFWS reviews actions that might affect these species.

2.5 Bald and Golden Eagle Protection Act

Bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) are federally protected under the BGEPA, which was passed in 1940 to protect bald eagles and amended in 1962 to include golden eagles (16 USC 668 et seq.). This act prohibits the take, possession, sale, purchase, barter, offer to sell or purchase, export or import, or transport of bald eagles and golden eagles or their parts, eggs, or nests without a permit issued by USFWS. The definition of "take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. The definition of "disturb" has been further clarified by regulation as follows: "Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (50 CFR, Part 22.3).

The BGEPA prohibits any form of possession or taking of both eagle species, and the statute imposes criminal and civil sanctions, as well as an enhanced penalty provision for subsequent offenses. Further, the BGEPA provides for the forfeiture of anything used to acquire eagles in violation of the statute. The statute exempts from its prohibitions on possession the use of eagles or eagle parts for exhibition, scientific, or Native American religious uses.

In November 2009, USFWS published the Final Eagle Permit Rule (74 FR 46836–46879) providing a mechanism to permit and allow for incidental (i.e., nonpurposeful) take of bald and golden eagles pursuant to the BGEPA (16 USC 668 et seq.). The previous year, 2008, USFWS adopted 50 CFR Part 22.11(a), which provides that a permit authorizing take under ESA Section 10 applies with equal force to take of golden eagles authorized under the BGEPA. These regulations were followed by issuance of guidance documents for inventory and monitoring protocols and for avian protection plans (USFWS 2010). In January 2011, USFWS released its Draft Eagle Conservation Plan Guidance aimed at clarifying expectations for acquiring take permits by wind power projects, consistent with the 2009 rule (USFWS 2011).

On December 16, 2016, USFWS adopted additional regulations regarding incidental take of golden eagles and their nests (81 FR 91494 et seq.). Most of the new regulations address "programmatic eagle nonpurposeful take permits" such as those typically requested by members of the alternative energy industry, including wind farms. For example, the new regulations extend the duration of such permits from 5 to 30 years. In addition, the new regulations modify the definition of the BGEPA "preservation standard" to mean "consistent with the goals of maintaining stable or increasing breeding populations in all eagle management units and the persistence of local populations throughout the service range of each species" (81 FR 91496–91497). This process has also resulted in standardizing mitigation options for permitted take.

2.6 Clean Water Act

Pursuant to CWA Section 404, the U.S. Army Corps of Engineers (ACOE) regulates the discharge of dredged and/or fill material into "waters of the United States." The term "wetlands" (a subset of waters of the United States) is defined in 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." In the absence of wetlands, the limits of ACOE jurisdiction in nontidal waters, such as intermittent streams, extend to the "ordinary high-water mark" (OHWM), which is defined in 33 CFR 328.3(e).

2.7 EO 11988, Floodplain Management

EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. This EO provides an eight-step process that agencies carry out as part of their decision-making process for projects that have potential impacts to or within a floodplain.

2.8 EO 11990, Protection of Wetlands

Pursuant to EO 11990, each federal agency is responsible for preparing implementing procedures for carrying out the provisions of the EO. The purpose of this EO is to "minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands." Each agency, to the extent permitted by law, must avoid undertaking or providing assistance for any activity located in wetlands, unless the head of the agency finds that there is no practical alternative to such activity, and the proposed action includes all practical measures to minimize harm to wetlands that may result from such actions. In making this finding, the head of the agency may take into account economic, environmental, and other pertinent factors. Each agency must also provide opportunity for early public review of any plans or proposals for new construction in wetlands. The evaluation process follows the same eight steps as for EO 11988, Floodplain Management.

2.9 EO 13112, Invasive Species

EO 13112 requires federal agencies to "prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health effects that invasive species cause." An invasive species is defined by the EO as "an alien species [a species not native to the region or area) whose introduction does or is likely to cause economic or environmental harm or harm to human health."

2.10 EO 13807, Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects

EO 13807, published in 2017, is intended to provide more efficient decisions in processing environmental reviews and authorization decisions regarding infrastructure projects, including energy production and generation projects. The EO states, "Federal agencies should follow transparent and coordinated processes for conducting environmental reviews and making authorization decisions. These processes must include early and open coordination among Federal, State, tribal, and local agencies and early engagement with the public." Additionally, it states that

projects must identify milestones and completion dates for action items by each agency on federal environmental review or authorization required for a project within a specific timeframe. The timeframe for "processing of environmental reviews and authorization decisions for new major infrastructure projects should be reduced to not more than an average of approximately 2 years, measured from the date of the publication of a notice of intent to prepare an environmental impact statement." Order No. 3355 implementing this EO further streamlined NEPA review, including process changes such as a limit of 150 pages and review timelines to 1 year from Notice of Intent to Final EIS, with delays of greater than 3 months requiring approval by the Assistant Secretary.

2.11 California Endangered Species Act

California Department of Fish and Wildlife (CDFW) administers the CESA (California Fish and Game Code (CFGC) Section 2050 et seq.), which prohibits the "take" of plant and animal species designated by the California Fish and Game Commission as endangered or threatened in California. Under CESA Section 86, take is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA Section 2053 stipulates that state agencies may not approve projects that will "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy."

CFGC Sections 3511, 4700, and 5515 designate certain birds, mammals, and fish as "fully protected" species. These species may not be taken or possessed without a permit from the Fish and Game Commission, and such take may only occur pursuant to scientific research or in connection with an authorized Natural Communities Conservation Plan (NCCP). No "incidental take" of fully protected species is allowed.

CESA Sections 2080 through 2085 address the taking of threatened, endangered, or candidate species by stating, "No person shall import into this state, export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the Commission determines to be an endangered species or a threatened species, or attempt any of those acts, except as otherwise provided in this chapter, the Native Plant Protection Act (CFGC Sections 1900–1913), or the California Desert Native Plants Act (Food and Agricultural Code, Section 80001)."

CFGC Section 2081(b) and (c) authorizes take of endangered, threatened, or candidate species if take is incidental to otherwise lawful activity and if specific criteria are met. In such cases, CDFW issues the applicant an incidental take permit, which functions much like an incidental take statement in the federal context. CDGC Sections 2081(b) and (c) also require CDFW to coordinate consultations with USFWS for actions involving federally listed species that are also state-listed species. In certain circumstances, Section 2080.1 of CESA allows CDFW to adopt a federal

incidental take statement or a 10(a) permit as its own, based on its findings that the federal permit adequately protects the species and is consistent with state law. CDFW may not issue a Section 2081(b) incidental take permit for take of "fully protected" species. The CFGC lists the fully protected species in Section 3511 (birds), Section 4700 (mammals), Section 5050 (reptiles and amphibians), and Section 5515 (fish).

2.12 California Fish and Game Code

Streambed Alteration Agreement

Pursuant to CFGC Section 1602, CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. A Streambed Alteration Agreement (CFGC Section 1602 et seq.) is required for impacts to jurisdictional resources, including streambeds and associated riparian habitat.

Birds and Mammals

According to CFGC Sections 3511 and 4700, which regulate birds and mammals, a fully protected species may not be taken or possessed. CDFW may not authorize the take of such species except for necessary scientific research, for the protection of livestock, and when the take occurs for fully protected species within an approved NCCP.

In addition, CDFW affords protection over the destruction of nests or eggs of native bird species (CFGC Section 3503), and it states that no birds in the orders of Falconiformes or Strigiformes (birds of prey) can be taken, possessed, or destroyed (CFGC Section 3503.5). CDFW cannot issue permits or licenses that authorize the take of any fully protected species, except under certain circumstances such as scientific research and live capture and relocation of such species pursuant to a permit for the protection of livestock (CFGC Section 3511). Separate from federal and state designations of species, CDFW designates certain vertebrate species as Species of Special Concern based on declining population levels, limited ranges, and/or continuing threats that have made them vulnerable to extinction.

California Native Plant Protection Act

The Native Plant Protection Act of 1977 (CFGC Section 1900–1913) directed CDFW to carry out the legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The Native Plant Protection Act gave the California Fish and Game Commission the power to designate native plants as "endangered" or "rare," and to protect endangered and rare plants from take. When CESA was passed in 1984, it expanded on the original Native Plant Protection Act, enhanced legal protection for plants, and created the categories of "threatened" and "endangered" species to parallel FESA. CESA categorized all rare animals as threatened species under CESA,

but did not do so for rare plants, which resulted in three listing categories for plants in California: rare, threatened, and endangered. The Native Plant Protection Act remains part of the CFGC, and mitigation measures for impacts to rare plants are specified in a formal agreement between CDFW and project proponents.

2.13 Porter–Cologne Water Quality Control Act

The Porter–Cologne Water Quality Control Act protects water quality and the beneficial uses of water. It applies to surface water and groundwater. Under this law, the State Water Resources Control Board develops statewide water quality plans, and the Regional Water Quality Control Boards (RWQCBs) develop regional basin plans that identify beneficial uses, water quality objectives, and implementation plans. The RWQCBs have the primary responsibility to implement the provisions of statewide plans and basin plans. Waters regulated under the Porter–Cologne Water Quality Control Act include isolated waters that are no longer regulated by ACOE. Developments with impacts to jurisdictional waters must demonstrate compliance with the goals of the act by developing Stormwater Pollution Prevention Plans (SWPPPs), standard urban stormwater mitigation plans, and other measures to obtain regulatory permits from the RWQCB.

2.14 California Environmental Quality Act

CEQA requires identification of a project's potentially significant impacts on biological resources and feasible mitigation measures and alternatives that could avoid or reduce significant impacts. CEQA Guideline 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors". A rare animal or plant is defined in CEQA Guideline 15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guideline 15380(c). CEQA also requires identification of a project's potentially significant impacts on riparian habitats (such as wetlands, bays, estuaries, and marshes) and other sensitive natural communities, including habitats occupied by endangered, rare, and threatened species.

2.15 East County Multiple Species Conservation Program Plan

The County is in the process of developing the East County MSCP Plan. The East County MSCP Plan is currently in draft form with no current schedule for completion. The intent of preparing the East County Plan is to create a large, connected preserve system that addresses the regional habitat needs for multiple species. The future East County MSCP Plan would cover approximately 1.6 million acres within the eastern unincorporated portion of the San Diego County. The Cleveland National Forest is located along the western boundary of the East County MSCP Plan area. The East County MSCP Plan area is bounded by Riverside County to the north, Imperial County on the east, and Mexico to the south. Tribal lands will be excluded from the East County MSCP Plan. The East County MSCP Plan is a cooperative effort among the County of San Diego, USFWS, and CDFW. Authority for this process comes from the California Natural Community Conservation Planning Act and Section 10(a) of FESA that addresses habitat conservation plans.

The Project Site is located within the draft East County MSCP Plan area. Projects in this area are subject to the Planning Agreement for the East County MSCP (County of San Diego 2014), which is intended to determine if project approval would have an effect on the preparation and approval of the draft East County MSCP. A Preliminary Planning Map has been completed for the East County MSCP. According to this map, the Project Site falls partially within a preliminarily delineated Focused Conservation Area of the East County MSCP Planning area, which suggests that the area has regional conservation value.

Until the East County MSCP Plan is drafted and approved, the Planning Agreement between the County and the Resource Agencies (County of San Diego 2014) remains in place and applies to the Project. The Planning Agreement outlines Preliminary Conservation Objectives for the East County MSCP (County of San Diego 2014). In addition to the preliminary conservation objectives, the Planning Agreement for the draft East County MSCP Plan identifies an interim project review process, including a set of preserve design principles that interim projects are evaluated against during the period when the East County MSCP Plan is in preparation. The County and federal and state resource agencies consult regularly on projects within the Plan Area on the potential effects of these projects' goals, impacts, and mitigation on the East County MSCP. The Boulder Brush Facilities, located Off-Reservation, would not interfere with the implementation of the East County MSCP Plan.

2.16 County Resource Protection Ordinance

The RPO, administered by the County, regulates biological and other natural resources within the County. These resources include wetlands, wetland buffers, floodways, floodplain fringe, steep slope lands, sensitive habitat lands, and significant prehistoric or historic sites. The RPO stipulates

that no impacts may occur to wetlands except for scientific research; removal of diseased or invasive exotic plant species; wetland creation and habitat restoration; revegetation and management projects; and crossings of wetlands for roads, driveways, or trails/pathways when certain conditions are met. The same exemptions apply to impacts to wetland buffer areas and improvements necessary to protect adjacent wetlands. Sensitive habitat lands are unique vegetation communities, and support sensitive species, lands essential to the healthy functioning of a balanced natural ecosystem, and wildlife corridors. Impacts to sensitive habitat lands may be allowed "when all feasible measures necessary to protect and preserve the sensitive habitat lands are required as a condition of permit approval and where mitigation provides an equal or greater benefit to the affected species" (County of San Diego 2012).

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3 METHODS

3.1 Literature Review

Special-status plant and wildlife species present or potentially present within the Project Site were identified through an extensive literature and desktop mapping review of the following sources: USFWS Critical Habitat and Occurrence Data (USFWS 2018a), U.S. Geological Survey (USGS) California condor data (USGS 2018, 2019), CDFW's California Natural Diversity Database (CNDDB) (CDFW 2018a, 2018b, 2018c), California Native Plant Society's Online Inventory of Rare and Endangered Vascular Plants (CNPS 2018), and the San Diego Plant Atlas (SDNHM 2018). In addition, previous work conducted by AECOM that overlaps with the Project Site was reviewed and incorporated into this report where appropriate.

3.2 Field Reconnaissance

3.2.1 On-Reservation

In 2010, AECOM conducted the following surveys within an area larger than and generally encompassing the Campo Corridor development limits on the Reservation: vegetation mapping; jurisdictional delineation; rare plant surveys; general wildlife surveys; and protocol surveys for Quino checkerspot butterfly, arroyo toad, least Bell's vireo, and southwestern willow flycatcher. The following avian and bat field surveys were conducted: raptor nest searches (including aerial and ground-based nest searches); 30-minute point counts; all-day eagle point counts; bird area searches; and bat use studies (including active and passive bat surveys). In 2010 and 2011, aerial and ground-based golden eagle nest searches were conducted by Bloom Biological and WRI. AECOM, the Tribe and the previous applicant consulted the USFWS regarding the proposed biological surveys.

Between 2017 and 2019, Dudek conducted a Quino checkerspot butterfly habitat assessment and focused surveys, avian field surveys (including raptor nest searches, 30-minute point counts, and all-day eagle point counts), vegetation mapping, and a jurisdictional delineation of waters and wetlands within the study area in support of the Project. Table 2a lists the dates, conditions, and survey focus for each survey performed on the Reservation.

All surveys were conducted by personnel qualified to perform the biological surveys. Special-status biological resources were mapped within the Project Site (i.e., areas of proposed disturbance). Any special-status species observed during these surveys are included in the biological analysis of this report.

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
Vegetation Mapping, Jurisdictional Delineation, and Rare Plant Surveys				
2010-04-13 to 2012-09-20	Varied	Varied	VEG/RP	Varied[a]
2012-02-21 to 2010-09-27	Varied	Varied	JD	Varied[a]
2017-09-27	9:15 a.m.–2:03 p.m.	CJA, KCD	JD, reconnaissance	70°F–78°F; 0% cc; 0–2 mph wind
2017-10-02	8:15 a.m.–4:20 p.m.	KCD, RM	VEG/JD	60°F–67°F; 0%–10% cc; 2–10 mph wind
2017-10-04	10:22 a.m.–3:03 p.m.	PCS, RM	VEG/JD	73°F–76°F; 0% cc; 0–1 mph wind
2017-10-06	8:15 a.m.–4:00 p.m.	RM	VEG/JD	55°F–68°F; 30%–40% cc; 2–4 mph wind
2017-10-16	8:06 a.m.–3:39 p.m.	CJA, MF, RM	VEG/JD	73°F–83°F; 0% cc; 0–8 mph wind
2017-10-17	8:42 a.m.–3:36 p.m.	CJA, MF, KCD, MO	VEG/JD	76°F–87°F; 40% cc; 0–5 mph wind
2017-10-18	7:35 a.m.–3:32 p.m.	KCD, MO, RM	VEG/JD	65°F–80°F; 0%–70% cc; 1–20 mph wind
2017-10-19	8:10 a.m.–3:20 p.m.	KCD, MO, RM	VEG/JD	53°F–70°F; 20%–30% cc; 2–22 mph wind
2017-10-24	9:22 a.m.–4:44 p.m.	CJA, KCD, OK, ME, MO	VEG/JD	80°F–82°F; 0% cc; 0–20 mph wind
2017-10-25	7:37 a.m.–3:30 p.m.	CJA, MF, KCD, MO	VEG/JD	70°F–85°F; 0% cc; 1–6 mph wind
2017-10-26	7:30 a.m.–3:02 p.m.	KCD, MO	VEG/JD	53°F–79°F; 0% cc; 1–10 mph wind
2018-07-10	7:30 a.m.–2:55 p.m.	LM, MF	JD	74°F–82°F; 100% cc; 0 mph wind
2018-07-12	7:45 a.m.–2:15 p.m.	LM	JD	74°F–88°F; 40%–100% cc; 1–5 mph wind
2018-07-17	7:20 a.m.–3:50 p.m.	MF, MO	JD	74°F–90°F; 70%–90% cc; 0–3 mph wind
2018-07-18	7:19 a.m.–3:59 p.m.	LM, MO	JD	74°F–88°F; 40%–90% cc; 0–5 mph wind
2018-07-24	7:25 a.m.–2:30 p.m.	MF, OK	JD	75°F–105°F; 0%–10% cc; 0–8 mph wind
2018-07-25	7:05 a.m.–3:29 p.m.	LM, MF	JD	83°F–103°F; 0%–30% cc; 0–3 mph wind
2018-07-26	7:30 a.m.–2:40 p.m.	BB, LM, MO, OK	JD	80°F–99°F; 0%–10% cc; 0–8 mph wind
2018-07-30	7:50 a.m.–2:45 p.m.	BM, MF, RM, SL	VEG/JD	80°F–96°F; 0% cc; 0–5 mph wind
2018-07-31	6:27 a.m.–2:20 p.m.	BM, SL	VEG/JD	70°F–95°F; 0%–50% cc; 5–10 mph wind
2018-08-01	6:31 a.m.–3:06 p.m.	BM, SL	VEG/JD	71°F–90°F; 0%–70% cc; 0–5 mph wind
2018-08-02	6:30 a.m.–2:19 p.m.	BM, SL	VEG/JD	67°F–90°F; 10%–30% cc; 0–10 mph wind
2018-08-03	6:19 a.m.–2:34 p.m.	BM	VEG/JD	70°F–90°F; 0%–10% cc; 3–10 mph wind
2018-08-06	6:30 a.m.–2:21 p.m.	BM	VEG/JD	72°F–101°F; 0% cc; 0–7 mph wind
2018-08-07	6:23 p.m.–2:30 p.m.	BM, SL	VEG/JD	66°F–101°F; 0%–10% cc; 0–10 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-08-08	6:00 a.m.–2:15 p.m.	BM, SL	VEG/JD	68°F–96°F; 0%–40% cc; 2–10 mph wind
2018-09-25	9:09 a.m.–4:07 p.m.	CA, PS	JD	81°F–85°F; 0% cc; 0–2 mph wind
2018-10-05	9:06 a.m.–5:07 p.m.	CA, EB	JD	68°F–73°F; 0%–30% cc; 0–1 mph wind
Quino Checkerspot Butterfly Habitat Assessment and Focused Surveys				
2010-03-01 to 2012-09-20	Varied	AECOM	QCB habitat assessment	Varied[a]
2010-03-22 to 2010-05-20	Varied	AECOM	QCB focused surveys	Varied[a]
2018-03-12 to 2018-05-16	Varied	Dudek and subconsultants	QCB	Varied[c]
Arroyo Toad Surveys				
2010-04-25 to 2010-06-10	Varied	AECOM	ARTO	Varied[a]
Avian and Bat Field Surveys				
2010-03-30 to 2010-06-04	Varied	AECOM	2010 eagle aerial nest searches	Varied[a]
2011-02-14 to 2011-05-11	Varied	AECOM	2011 eagle aerial nest searches	Varied[a]
2010-04-11 to 2010-05-08	Varied	AECOM	2010 ground-based nest search	Varied[a]
2011-04-16 to 2011-07-07	Varied	AECOM	2011 ground-based nest search	Varied[a]
2010-04-15 to 2011-04-15	Varied	AECOM	30-minute point counts	Varied[a]
2010-04-23 to 2010-10-15	Varied	AECOM	Bird area searches	Varied[a]
2012-05-07 to 2012-05-31	Varied	AECOM	All-day point counts	Varied[a]
2010-05-13 to 2011-05-03	Varied	AECOM	Bat roost site/ hibernacula searches and acoustic monitoring at potential roosting/ foraging areas	Varied[a]
2017-09-08	9:49 a.m.–5:58 p.m.	MF, SC	Avian point count (30-minute interval)	78°F–84.6°F; 20%–70% cc; 0–3 mph wind
2017-09-14	7:23 a.m.–4:57 p.m.	KS	Avian point count (30-minute interval)	53°F–67°F; 0% cc; 7–20 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2017-09-22	11:03 a.m.–5:44 p.m.	SC	Avian point count (30-minute interval)	55.4°F–61.6°F; 0%–10% cc; 1–9 mph wind
2017-09-25	7:27 a.m.–2:13 p.m.	KS	Avian point count (30-minute interval)	55°F–75°F; 30%–10% cc; 0–5 mph wind
2017-10-02	8:29 a.m.–3:15 p.m.	KS	Avian point count (30-minute interval)	57°F–74°F; 0% cc; 0–13 mph wind
2017-10-02	3:21 p.m.–3:27 p.m.	AC	All-day eagle counts	69°F–77°F; 0%–10% cc; 0–10 mph wind
2017-10-03	8:00 a.m.–4:00 p.m.	SCA, AC	All-day eagle counts	52.4°F–71.2°F; 0%–80% cc; 2–9 mph wind
2017-10-04	8:00 a.m.–2:00 p.m.	MF, SCA, AC	All-day eagle counts	64°F–81°F; 0% cc; 0–8 mph wind
2017-10-05	10:00 a.m.–4:00 p.m.	SCA	All-day eagle counts	76.4°F–85.8°F; 0% cc; 1–8 mph wind
2017-10-09	8:20 a.m.–6:01 p.m.	KS, SC, DS	Avian point count (30-minute interval)	60°F–62.1°F; 0% cc; 4–5 mph wind
2017-10-09	8:06 a.m.–3:00 p.m.	SCA, MP	All-day eagle counts	62.1°F–71.3°F; 0% cc; 14–24 mph wind
2017-10-10	8:17 a.m.–2:21 p.m.	KS, DS, AB, DM	Avian point count (30-minute interval)	64°F–73°F; 0% cc; 3–5 mph wind
2017-10-10	7:00 a.m.–3:30 p.m.	MP, DB	Raptor survey	NR
2017-10-10	8:00 a.m.–3:00 p.m.	AB, SCA, AC	All-day eagle counts	63°F–83°F; 0% cc; 3–5.1 mph wind
2017-10-11	7:48 a.m.–2:15 p.m.	KS	Avian point count (30-minute interval)	64°F–76°F; 10% cc; 0–5 mph wind
2017-10-11	7:40 a.m.–3:30 p.m.	AC, SCA	All-day eagle counts	65°F–81°F; 10% cc; 0–16 mph wind
2017-10-12	8:28 a.m.–2:54 p.m.	SCA, MF, AB, AC	All-day eagle counts	69.2–76.5°F; 0% cc; 0–12 mph wind
2017-10-16	9:30 a.m.–5:04 p.m.	SC	Avian point count (30-minute interval)	79.8–81°F; 0% cc; 0–8 mph wind
2017-10-16	7:56 a.m.–2:58 p.m.	SCA, AC	All-day eagle counts	75.4°F–89.6°F; 10% cc; 5–12 mph wind
2017-10-17	8:22 a.m.–2:22 p.m.	KS, OK	Avian point count (30-minute interval)	73°F–88°F; 40%–50% cc; 0–7 mph wind
2017-10-17	8:19 a.m.–2:51 p.m.	FH	All-day eagle counts	76°F–88°F; 40%–70% cc; 1.5–6.8 mph wind
2017-10-18	7:57 a.m.–1:33 p.m.	SC	Avian point count (30-minute interval)	71.3°F–88.7°F; 20%–60% cc; 0–13 mph wind
2017-10-18	7:56 a.m.–2:59 p.m.	MP, SCA, FH	All-day eagle counts	67.3°F–82.6°F; 20%–70% cc; 0–20 mph wind
2017-10-19	7:45 a.m.–2:54 p.m.	KS	Avian point count (30-minute interval)	60°F–73°F; 30%–70% cc; 0–5 mph wind
2017-10-19	8:08 a.m.–2:47 p.m.	FH, SCA, MP	All-day eagle counts	62.2°F–75°F; 20%–90% cc; 1.2–12.7 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2017-10-20	8:12 a.m.–2:57 p.m.	SCA, FH, MP	All-day eagle counts	53.6°F–57.9°F; 80%–100% cc; 8–17 mph wind
2017-10-23	7:48 a.m.–1:40 p.m.	SC	Avian point count (30-minute interval)	73.6°F–86.4°F; 0% cc; 5–11 mph wind
2017-10-23	7:47 a.m.–2:58 p.m.	SCA, RS	All-day eagle counts	73.2°F–90.1°F; 0% cc; 12–13 mph wind
2017-10-24	8:47 a.m.–1:35 p.m.	SC	Avian point count (30-minute interval)	75°F–80°F; 0% cc; 10–35 mph wind
2017-10-24	8:01 a.m.–3:08 p.m.	FH, SV, MP	All-day eagle counts	71°F–85°F; 0%–10% cc; 7.8–14.8 mph wind
2017-10-25	8:00 a.m.–3:00 p.m.	RS, FH	All-day eagle counts	69°F–84°F; 0% cc; 9–15 mph wind
2017-10-26	8:12 a.m.–2:54 p.m.	FH, SCA, RS	All-day eagle counts	70.3°F–87.5°F; 0% cc; 2.3–10.2 mph wind
2017-10-27	7:59 a.m.–2:07 p.m.	MF	Avian point count (30-minute interval)	67°F–86°F; 0% cc; 1–3 mph wind
2017-10-27	8:53 a.m.–2:51 p.m.	FH, SCA	All-day eagle counts	77.2°F–90°F; 0% cc; 1.4–4.5 mph wind
2017-10-30	7:35 a.m.–2:16 p.m.	KS, OK	Avian point count (30-minute interval)	46°F–64°F; 0–10% cc; 0–15 mph wind
2017-10-30	7:04 a.m.–3:12 p.m.	MO, MF, SCA, MP	All-day eagle counts	50°F–61°F; 10–100% cc; 0–20 mph wind
2017-10-31	7:37 a.m.–1:11 p.m.	KS	Avian point count (30-minute interval)	49°F–61°F; 100% cc; 2–3 mph wind
2017-10-31	7:35 a.m.–3:13 p.m.	MO, MF	All-day eagle counts	52°F–60°F; 90%–100% cc; 2–8 mph wind
2017-11-01	7:35 a.m.–1:40 p.m.	KS, SC	Avian point count (30-minute interval)	47°F–66°F; 0%–40% cc; 0–11 mph wind
2017-11-01	7:58 a.m.–3:00 p.m.	MF, SCA	All-day eagle counts	48°F–65°F; 0%–10% cc; 0–7 mph wind
2017-11-03	7:36 a.m.–3:12 p.m.	MO, SCA, RS	All-day eagle counts	42°F–65°F; 30%–100% cc; 0–4 mph wind
2017-11-06	6:40 a.m.–1:28 p.m.	KS, OK	Avian point count (30-minute interval)	54°F64°F; 10%–80% cc; 2–5 mph wind
2017-11-06	07:54 a.m.–15:03 p.m.	RS, SC	All-day eagle counts	46°F–64°F; 10%–100% cc; 5–20 mph wind
2017-11-07	7:40 a.m.–12:07 p.m.	KS, SC, OK	Avian point count (30-minute interval)	56°F–63.1°F; 90%–100% cc; 0–6 mph wind
2017-11-07	8:00 a.m.–3:16 p.m.	RS, SCA	All-day eagle counts	56°F–64°F; 100% cc; 2–10 mph wind
2017-11-08	8:16 a.m.–3:13 p.m.	BD, SC, OK	Avian point count (30-minute interval)	49°F–64°F; 80%–90% cc; 4–7 mph wind
2017-11-08	7:18 a.m.–3:10 p.m.	MO, DM, RS	All-day eagle counts	51°F–69°F; 70%–100% cc; 0–12 mph wind
2017-11-09	7:41 a.m.–3:08 p.m.	MO, SCA, DM, MF	All-day eagle counts	48°F–67°F; 0% cc; 0–10 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2017-11-13	7:27 a.m.–1:09 p.m.	KS	Avian point count (30-minute interval)	60°F–76°F; 80%–90% cc; 0–4 mph wind
2017-11-13	8:02 a.m.–3:03 p.m.	RS, KCD, SCA	All-day eagle counts	60°F–72°F; 50%–100% cc; 0–12 mph wind
2017-11-14	7:42 a.m.–1:28 p.m.	SC, OK	Avian point count (30-minute interval)	64.1°F–79.3°F; 30% cc; 0–6 mph wind
2017-11-14	8:01 a.m.–3:01 p.m.	RS, MF, SCA	All-day eagle counts	63°F–76°F; 60%–90% cc; 2–12 mph wind
2017-11-15	7:50 a.m.–12:01 p.m.	KS, OK	Avian point count (30-minute interval)	67°F–79°F; 80% cc; 0–2 mph wind
2017-11-15	8:00 a.m.–3:00 p.m.	MF, SCA, RS	All-day eagle counts	68°F–79°F; 40%–90% cc; 0–5 mph wind
2017-11-16	7:49 a.m.–1:53 p.m.	KS, MF	Avian point count (30-minute interval)	70°F–76°F; 20%–40% cc; 0–5 mph wind
2017-11-16	8:01 a.m.–2:56 p.m.	SCA, SC	All-day eagle counts	74.2°F–75.7°F; 40%–50% cc; 2–12 mph wind
2017-11-17	8:30 a.m.–2:55 p.m.	RS, SCA	All-day eagle counts	61°F–60°F; 80%–90% cc; 8–20 mph wind
2017-11-20	7:59 a.m.–3:03 p.m.	KS, SC, OK	Avian point count (30-minute interval)	61°F–73°F; 20%–30% cc; 0–8 mph wind
2017-11-20	8:20 a.m.–2:10 p.m.	KP, DM, FH	All-day eagle counts	68°F–74°F; 40%–70% cc; 2–15 mph wind
2017-11-21	8:18 a.m.–1:08 p.m.	KS, SC, OK	Avian point count (30-minute interval)	68°F–78°F; 10% cc; 3–5 mph wind
2017-11-21	11:04 a.m.–3:00 p.m.	MO, DM, SCA	All-day eagle counts	77°F–74°F; 10%–20% cc; 2–10 mph wind
2017-11-22	8:01 a.m.–3:10 p.m.	DM, SCA	All-day eagle counts	64°F–76°F; 0% cc; 4–20 mph wind
2017-11-27	8:28 a.m.–1:40 p.m.	KS, MF, SC, OK	Avian point count (30-minute interval)	52°F–60°F; 70%–100% cc; 2–5 mph wind
2017-11-27	8:43 a.m.–2:57 p.m.	MO	All-day eagle counts	49°F–51°F; 60%–90% cc; 0–25 mph wind
2017-11-28	7:48 a.m.–12:53 p.m.	DM, OK, KS, MF	Avian point count (30-minute interval)	54°F–60°F; 40%–80% cc; 6–8 mph wind
2017-11-28	7:55 a.m.–3:00 p.m.	RS	All-day eagle counts	54°F–59°F; 50%–100% cc; 9–15 mph wind
2017-11-29	7:45 a.m.–3:13 p.m.	MO, KP, CJA	All-day eagle counts	53°F–58°F; 90% cc; 2–30 mph wind
2017-11-30	8:31 a.m.–3:00 p.m.	RS, KP, DM	All-day eagle counts	59°F–65°F; 100% cc; 6–1 mph wind
2017-12-01	9:15 a.m.–3:00 p.m.	KP	All-day eagle counts	69°F–72°F; 10% cc; 2–7 mph wind
2017-12-05	8:00 a.m.–2:36 p.m.	DM, OK	Avian point count (30-minute interval)	44°F–53°F; 20% cc; 25–30 mph wind
2017-12-06	8:12 a.m.–12:16 p.m.	DM, MF, OK	Avian point count (30-minute interval)	48°F–50°F; 0%–10% cc; 3–20 mph wind
2017-12-07	7:16 a.m.–1:41 p.m.	MF	Avian point count (30-minute interval)	48°F–56°F; 0% cc; 5–15 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2017-12-11	8:24 a.m.–12:05 p.m.	MF, OK	Avian point count (30-minute interval)	61°F–66°F; 0% cc; 1–3 mph wind
2017-12-14	7:41 a.m.–1:44 p.m.	MF, OK	Avian point count (30-minute interval)	57°F–62°F; 0%–10% cc; 3–20 mph wind
2017-12-19	7:29 a.m.–1:43 p.m.	MF, OK	Avian point count (30-minute interval)	50°F–68°F; 0% cc; 0–4 mph wind
2017-12-20	7:33 a.m.–12:33 p.m.	MF, OK	Avian point count (30-minute interval)	43°F–59°F; 10%–20% cc; 0–3 mph wind
2017-12-21	7:55 a.m.–2:32 p.m.	MF, OK	Avian point count (30-minute interval)	37°F–48°F; 0% cc; 2–5 mph wind
2017-12-26	8:14 a.m.–1:06 p.m.	KS	Avian point count (30-minute interval)	61°F–66°F; 40%–80% cc; 0–3 mph wind
2017-12-27	7:55 a.m.–11:43 a.m.	OK	Avian point count (30-minute interval)	55°F–71°F; 10% cc; 2–6 mph wind
2017-12-28	8:00 a.m.–1:43 p.m.	SC	Avian point count (30-minute interval)	61°F–75°F; 0% cc; 0–10 mph wind
2017-12-29	7:28 a.m.–2:35 p.m.	OK	Avian point count (30-minute interval)	52°F–78°F; 0% cc; 0–2 mph wind
2018-01-02	8:07 a.m.–4:00 p.m.	KS, SC	Avian point count (30-minute interval)	62°F–67°F; 10% cc; 2–8 mph wind
2018-01-03	7:43 a.m.–12:15 p.m.	MF	Avian point count (30-minute interval)	60°F–61°F; 100% cc; 1–4 mph wind
2018-01-04	7:48 a.m.–1:55 p.m.	MF	Avian point count (30-minute interval)	60°F–69°F; 0% cc; 0–3 mph wind
2018-02-09	8:18 a.m.–5:00 p.m.	BD	Avian point count (30-minute interval)	50°F–74°F; 0%–50% cc; 0–0 mph wind
2018-07-11	7:53 a.m.–12:58 p.m.	MF, SCA	Avian point count (30-minute interval)	80°F–79.3°F; 10%–90% cc; 0–11 mph wind
2018-07-13	7:26 a.m.–12:49 p.m.	SCA	Avian point count (30-minute interval)	80.9°F–84.1°F; 10%–40% cc; 0–15 mph wind
2018-07-18	7:33 a.m.–1:34 p.m.	SCA	Avian point count (30-minute interval)	76.5°F–86.9°F; 50%–80% cc; 3–17 mph wind
2018-07-19	8:51 a.m.–2:03 p.m.	SC	Avian point count (30-minute interval)	82°F–92°F; 0%–40% cc; 5–15 mph wind
2018-07-20	7:59 a.m.–12:20 p.m.	KS	Avian point count (30-minute interval)	76°F–90°F; 0%–10% cc; 0–7 mph wind
2018-07-23	7:34 a.m.–1:01 p.m.	SCA	Avian point count (30-minute interval)	73°F–102.1°F; 0%–20% cc; 0–2 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-07-24	7:43 a.m.–1:55 p.m.	KS	Avian point count (30-minute interval)	90°F–106°F; 10% cc; 0–5 mph wind
2018-07-25	8:00 a.m.–12:48 p.m.	SCA	Avian point count (30-minute interval)	90.5°F–98.2°F; 0%–40% cc; 3–18 mph wind
2018-07-31	6:46 a.m.–12:43 p.m.	SCA	Avian point count (30-minute interval)	79.7°F–100.2°F; 20%–70% cc; 0–13 mph wind
2018-08-01	8:28 a.m.–12:35 p.m.	KS	Avian point count (30-minute interval)	80°F–93°F; 0%–80% cc; 0–17 mph wind
2018-08-03	6:46 a.m.–1:30 p.m.	OK	Avian point count (30-minute interval)	67°F–91°F; 0% cc; 0–15 mph wind
2018-08-07	7:03 a.m.–11:07 a.m.	KS	Avian point count (30-minute interval)	85°F–100°F; 0% cc; 0–4 mph wind
2018-08-08	6:39 a.m.–11:40 a.m.	SCA	Avian point count (30-minute interval)	74.9°F–93.9°F; 10%–20% cc; 1–4 mph wind
2018-08-09	6:43 a.m.–12:45 p.m.	SCA	Avian point count (30-minute interval)	75.7°F–91.7°F; 10–50% cc; 2–11 mph wind
2018-08-09	6:25 a.m.–8:15 p.m.	AC	Avian point count (30-minute interval)	75°F–84°F; 10%–20% cc; 2–6 mph wind
2018-08-13	6:52 a.m.–1:14 p.m.	OK, SCA	Avian point count (30-minute interval)	62°F–86°F; 0%–10% cc; 3–6 mph wind
2018-08-14	6:34 a.m.–11:29 a.m.	SCA, AC	Avian point count (30-minute interval)	61.2°F–81°F; 0%–10% cc; 1–7 mph wind
2018-08-20	6:55 a.m.–11:17 a.m.	SCA, KS	Avian point count (30-minute interval)	71.3°F–84.9°F; 20%–50% cc; 1–12 mph wind
2018-08-21	6:44 a.m.–12:04 p.m.	SCA, AC	Avian point count (30-minute interval)	68.3°F–87.2°F; 10%–20% cc; 1–12 mph wind
2018-08-27	6:45 a.m.–11:18 a.m.	OK	Avian point count (30-minute interval)	60°F–79°F; 0%–30% cc; 2–9 mph wind
2018-08-28	6:46 a.m.–10:31 a.m.	SCA	Avian point count (30-minute interval)	65.1°F–77.9°F; 20%–40% cc; 2–13 mph wind
2018-08-29	6:28 a.m.–12:11 p.m.	SCA	Avian point count (30-minute interval)	61°F–89.2°F; 20%–40% cc; 0–9 mph wind
2018-08-30	6:48 a.m.–11:16 a.m.	KS	Avian point count (30-minute interval)	70°F–92°F; 0%–10% cc; 0–3 mph wind
2018-09-04	9:05 a.m.–1:52 p.m.	SCA	Avian point count (30-minute interval)	79.2°F–83.8°F; 10% cc; 5–18 mph wind
2018-09-05	7:44 a.m.–11:53 a.m.	SCA	Avian point count (30-minute interval)	73.4°F–88°F; 0% cc; 1–4 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-09-06	7:33 a.m.–12:14 p.m.	OK	Avian point count (30-minute interval)	70°F–83°F; 0% cc; 0–7 mph wind
2018-09-07	7:53 a.m.–1:20 p.m.	KS	Avian point count (30-minute interval)	81°F–96°F; 10% cc; 0–4 mph wind
2018-09-11	7:34 a.m.–12:2 p.m.	SCA	Avian point count (30-minute interval)	70°F–91.3°F; 0% cc; 1–5 mph wind
2018-09-12	7:44 a.m.–12:52 p.m.	SCA	Avian point count (30-minute interval)	70.5°F–86.2°F; 0% cc; 1–20 mph wind
2018-09-13	7:40 a.m.–11:44 a.m.	OK	Avian point count (30-minute interval)	68°F–83°F; 0% cc; 6 mph wind
2018-09-14	7:42 a.m.–1:18 p.m.	OK	Avian point count (30-minute interval)	72°F–91°F; 0% cc; 0–13 mph wind
2018-09-17	7:52 a.m.–11:50 a.m.	SCA	Avian point count (30-minute interval)	72°F–84.2°F; 10% cc; 1–9 mph wind
2018-09-18	7:35 a.m.–10:47 a.m.	SCA	Avian point count (30-minute interval)	69.2°F–85.8°F; 0% cc; 1–5 mph wind
2018-09-20	7:37 a.m.–1:40 p.m.	OK	Avian point count (30-minute interval)	69°F–83°F; 0–30% cc; 6–7 mph wind
2018-09-21	7:35 a.m.–1:04 p.m.	SCA	Avian point count (30-minute interval)	74.1°F–91.5°F; 0–40% cc; 2–10 mph wind
2018-09-24	7:57 a.m.–12:27 p.m.	OK	Avian point count (30-minute interval)	66°F–79°F; 0% cc; 0–16 mph wind
2018-09-25	7:34 a.m.–12:00 p.m.	SC	Avian point count (30-minute interval)	64°F–84°F; 0% cc; 0–13 mph wind
2018-09-27	7:28 a.m.–1:07 p.m.	MF	Avian point count (30-minute interval)	73°F–95°F; 0% cc; 0–2 mph wind
2018-09-28	8:12 a.m.–2:29 p.m.	SC	Avian point count (30-minute interval)	78°F–90°F; 0% cc; 3–17 mph wind
2018-10-01	7:34 a.m.–12:03 p.m.	SC	Avian point count (30-minute interval)	72°F–73°F; 80–100% cc; 0–20 mph wind
2018-10-02	8:26 a.m.–1:46 p.m.	SC	Avian point count (30-minute interval)	64°F–70°F; 90%–100% cc; 0–10 mph wind
2018-10-02	8:08 a.m.–3:50 p.m.	FH	All-day eagle counts	64°F–67°F; 100% cc; 2–11 mph wind
2018-10-03	9:04 a.m.–2:24 p.m.	KS	Avian point count (30-minute interval)	64°F–73°F; 30%–90% cc; 1–12 mph wind
2018-10-03	8:21 a.m.–3:00 p.m.	RS, FH	All-day eagle counts	60°F–76°F; 20%–80% cc; 2–9 mph wind
2018-10-04	8:06 a.m.–12:18 p.m.	MF	Avian point count (30-minute interval)	54°F–61°F; 60%–70% cc; 2–3 mph wind
2018-10-04	9:13 a.m.–3:00 p.m.	RS, FH	All-day eagle counts	55°F–66°F; 30%–90% cc; 3–13 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-10-05	7:54 a.m.–3:54 p.m.	FH	All-day eagle counts	55°F–74°F; 10% cc; 2–8 mph wind
2018-10-06	8:30 a.m.–4:05 p.m.	DM, FH	All-day eagle counts	52°F–65°F; 20%–60% cc; 5–19 mph wind
2018-10-08	8:07 a.m.–2:58 p.m.	RS, FH	All-day eagle counts	62°F–74°F; 0%–60% cc; 1–21 mph wind
2018-10-09	8:12 a.m.–2:25 p.m.	SC	Avian point count (30-minute interval)	65°F–74°F; 0% cc; 0–9 mph wind
2018-10-09	8:30 a.m.–2:49 p.m.	RS, FH	All-day eagle counts	65°F–84°F; 0% cc; 1–3 mph wind
2018-10-10	7:49 a.m.–12:11 p.m.	KS	Avian point count (30-minute interval)	55°F–76°F; 0%–10% cc; 0–5 mph wind
2018-10-10	8:03 a.m.–4:00 p.m.	RS, PL	All-day eagle counts	62°F–63°F; 0% cc; 0–16 mph wind
2018-10-11	9:02 a.m.–2:45 p.m.	KS	Avian point count (30-minute interval)	52°F–71°F; 10%–90% cc; 3–5 mph wind
2018-10-11	8:04 a.m.–4:05 p.m.	RS, OK	All-day eagle counts	53°F–72°F; 10%–100% cc; 2–3 mph wind
2018-10-12	8:27 a.m.–12:08 p.m.	SC	Avian point count (30-minute interval)	55°F–66°F; 20%–60% cc; 7–20 mph wind
2018-10-12	8:00 a.m.–4:00 p.m.	RS, OK, PL	All-day eagle counts	60°F–71°F; 10% cc; 8–21 mph wind
2018-10-15	8:01 a.m.–12:35 p.m.	SC	Avian point count (30-minute interval)	57°F–62°F; 10% cc; 8–30 mph wind
2018-10-15	8:22 a.m.–3:53 p.m.	RS, OK, FH	All-day eagle counts	53°F–54°F; 0%–10% cc; 10–30 mph wind
2018-10-16	8:31 a.m.–2:45 p.m.	SC	Avian point count (30-minute interval)	59°F–70°F; 0% cc; 5–15 mph wind
2018-10-16	8:07 a.m.–3:58 p.m.	OK, FH	All-day eagle counts	54°F–61°F; 0% cc; 13–16 mph wind
2018-10-17	7:46 a.m.–1:53 p.m.	OK	Avian point count (30 minute interval)	50°F–66°F; 0% cc; 3–5 mph wind
2018-10-17	8:00 a.m.–4:00 p.m.	KS, MF, FH	All-day eagle counts	54°F–64°F; 0% cc; 1–25 mph wind
2018-10-18	7:47 a.m.–11:13 a.m.	OK	Avian point count (30-minute interval)	57°F–68°F; 0% cc; 3–15 mph wind
2018-10-18	7:21 a.m.–3:30 p.m.	FH, MF	All-day eagle counts	57°F–67°F; 0% cc; 9–26 mph wind
2018-10-19	8:38 a.m.–3:10 p.m.	OK	Avian point count (30-minute interval)	65°F–70°F; 0% cc; 3–20 mph wind
2018-10-19	7:30 a.m.–3:58 p.m.	FH	All-day eagle counts	63°F–66°F; 0% cc; 14–25 mph wind
2018-10-22	8:20 a.m.–3:52 p.m.	RS, FH, SC	All-day eagle counts	72°F–75°F; 0%–100% cc; 0–1 mph wind
2018-10-23	8:14 a.m.–12:21 p.m.	KS, SC	Avian point count (30-minute interval)	64°F–75°F; 0%–30% cc; 3–17 mph wind
2018-10-23	8:13 a.m.–4:00 p.m.	RS, FH	All-day eagle counts	65°F–75°F; 0% cc; 0–5 mph wind
2018-10-24	8:02 a.m.–4:00 p.m.	RS, FH, PL	All-day eagle counts	68°F–84°F; 0%–10% cc; 0–3 mph wind
2018-10-25	7:30 a.m.–11:38 a.m.	OK	Avian point count (30-minute interval)	56°F–80°F; 0% cc; 0–3 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-10-26	7:31 a.m.–12:25 p.m.	MF	Avian point count (30-minute interval)	62°F–76°F; 0% cc; 0–8 mph wind
2018-10-26	8:35 a.m.–3:45 p.m.	RS, FH	All-day eagle counts	74°F–76°F; 0% cc; 7–14 mph wind
2018-10-29	8:10 a.m.–3:00 p.m.	FH, RS, OK	All-day eagle counts	62°F–75°F; 70%–80% cc; 3–13 mph wind
2018-10-30	8:00 a.m.–4:45 p.m.	FH, OK, RS	All-day eagle counts	53°F–74°F; 0%–10% cc; 0–23 mph wind
2018-10-31	8:12 a.m.–2:48 p.m.	FH	Avian point count (30-minute interval)	53°F–72°F; 0%–10% cc; 3–20 mph wind
2018-10-31	7:43 a.m.–4:00 p.m.	MF, PL, RS	All-day eagle counts	54°F–66°F; 0%–10% cc; 1–23 mph wind
2018-11-01	8:27 a.m.–2:03 p.m.	KS, OK	Avian point count (30-minute interval)	62°F–74°F; 0%–50% cc; 2–20 mph wind
2018-11-01	7:45 a.m.–4:00 p.m.	FH, PL, RS	All-day eagle counts	45°F–73°F; 0%–50% cc; 2–34 mph wind
2018-11-05	8:00 a.m.–4:00 p.m.	OK, RS	All-day eagle counts	63°F–77°F; 0%–10% cc; 2–20 mph wind
2018-11-06	9:05 a.m.–1:40 p.m.	OK	Avian point count (30-minute interval)	69°F–75°F; 0% cc; 1–14 mph wind
2018-11-06	7:45 a.m.–4:20 p.m.	FH, KS, RS	All-day eagle counts	62°F–77°F; 0% cc; 1–12 mph wind
2018-11-07	7:49 a.m.–1:05 p.m.	KS	Avian point count (30-minute interval)	66°F–81°F; 0% cc; 0–7 mph wind
2018-11-07	7:59 a.m.–4:00 p.m.	FH, PL, RS	All-day eagle counts	62°F–80°F; 0%–10% cc; 0–16 mph wind
2018-11-08	7:32 a.m.–12:30 p.m.	MF, OK	Avian point count (30-minute interval)	59°F–70°F; 0% cc; 0–25 mph wind
2018-11-08	7:25 a.m.–4:04 p.m.	PL, RS	All-day eagle counts	59°F–72°F; 0% cc; 0–19 mph wind
2018-11-09	8:15 a.m.–4:30 p.m.	FH, SC	All-day eagle counts	52°F–66°F; 0%–10% cc; 9–35 mph wind
2018-11-13	7:35 a.m.–4:28 p.m.	AC, FH, PL	All-day eagle counts	43°F–58°F; 10%–50% cc; 3–44 mph wind
2018-11-14	7:46 a.m.–3:41 p.m.	FH, OK	Avian point count (30-minute interval)	48°F–57°F; 10%–100% cc; 5–30 mph wind
2018-11-14	8:00 a.m.–4:00 p.m.	RS, SC	All-day eagle counts	51°F–58°F; 0%–90% cc; 2–40 mph wind
2018-11-15	8:08 a.m.–3:30 p.m.	FH, KS	Avian point count (30-minute interval)	56°F–67°F; 10%–60% cc; 0–37 mph wind
2018-11-15	7:28 a.m.–4:00 p.m.	AC, PL, RS	All-day eagle counts	54°F–69°F; 0%–100% cc; 0–22 mph wind
2018-11-16	8:00 a.m.–4:01 p.m.	AC, RS, SC, SCA	All-day eagle counts	61°F–75°F; 0%–70% cc; 0–12 mph wind
2018-11-19	7:36 a.m.–4:00 p.m.	AC, OK, PL, RS	All-day eagle counts	53°F–67°F; 30%–100% cc; 1–34 mph wind
2018-11-20	8:10 a.m.–3:22 p.m.	MF, OK	Avian point count (30-minute interval)	52°F–69°F; 0%–10% cc; 0–18 mph wind
2018-11-20	7:39 a.m.–4:00 p.m.	AC, OK, PL, RS	All-day eagle counts	51°F–71°F; 0%–10% cc; 0–12 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-11-21	7:34 a.m.–2:28 p.m.	MF, SC	Avian point count (30-minute interval)	51°F–71°F; 10%–40% cc; 0–10 mph wind
2018-11-21	7:31 a.m.–4:00 p.m.	AB, AC, KS, RS	All-day eagle counts	52°F–74°F; 20%–80% cc; 0–10 mph wind
2018-11-26	7:42 a.m.–11:54 a.m.	SC	Avian point count (30-minute interval)	52°F–58°F; 0% cc; 1–18 mph wind
2018-11-26	7:43 a.m.–4:00 p.m.	AC, PL, SCA	All-day eagle counts	49°F–66°F; 0%–30% cc; 1–22 mph wind
2018-11-27	7:48 a.m.–12:07 p.m.	KS	Avian point count (30-minute interval)	58°F–72°F; 0%–10% cc; 0–12 mph wind
2018-11-27	8:00 a.m.–4:00 p.m.	AC, RS, SCA	All-day eagle counts	55°F–75°F; 0%–60% cc; 0–16 mph wind
2018-11-28	7:43 a.m.–1:40 p.m.	KS, SC	Avian point count (30-minute interval)	56°F–68°F; 0%–20% cc; 0–16 mph wind
2018-11-28	7:54 a.m.–4:00 p.m.	AB, AC, RS, SCA	All-day eagle counts	54°F–66°F; 0%–40% cc; 0–24 mph wind
2018-12-03	8:00 a.m.–2:20 p.m.	SC	Avian point count (30-minute interval)	45°F–51°F; 0% cc; 3–18 mph wind
2018-12-04	7:55 a.m.–2:26 p.m.	OK	Avian point count (30-minute interval)	44°F–53°F; 30%–80% cc; 5–25 mph wind
2018-12-05	8:15 a.m.–12:50 p.m.	SC	Avian point count (30-minute interval)	52°F–62°F; 10%–60% cc; 1–10 mph wind
2018-12-07	9:16 a.m.–12:50 p.m.	SC	Avian point count (30-minute interval)	45°F–52°F; 40%–100% cc; 1–10 mph wind
2018-12-10	8:00 a.m.–3:03 p.m.	SC	Avian point count (30-minute interval)	55°F–60°F; 100% cc; 1–12 mph wind
2018-12-11	7:51 a.m.–1:45 p.m.	OK, SC	Avian point count (30-minute interval)	49°F–58°F; 0%–80% cc; 2–20 mph wind
2018-12-13	8:53 a.m.–1:29 p.m.	OK	Avian point count (30-minute interval)	57°F–60°F; 0% cc; 10–35 mph wind
2018-12-18	7:39 a.m.–2:20 p.m.	OK, SC	Avian point count (30-minute interval)	50°F–67°F; 0%–10% cc; 0–12 mph wind
2018-12-20	7:27 a.m.–12:23 p.m.	OK, SC	Avian point count (30-minute interval)	55°F–80°F; 10%–20% cc; 0–15 mph wind
2018-12-27	7:43 a.m.–3:10 p.m.	KS, SC	Avian point count (30-minute interval)	39°F–50°F; 30%–100% cc; 0–20 mph wind
2018-12-28	7:38 a.m.–1:47 p.m.	KS, SC	Avian point count (30-minute interval)	32°F–45°F; 0% cc; 2–14 mph wind
2019-01-03	7:44 a.m.–12:56 p.m.	KS, SC	Avian point count (30-minute interval)	40°F–53°F; 0% cc; 3–23 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-01-04	7:56 a.m.–11:21 a.m.	SC	Avian point count (30-minute interval)	43°F–65°F; 0% cc; 0–15 mph wind
2019-01-05	7:44 a.m.–1:49 p.m.	SC	Avian point count (30-minute interval)	44°F–49°F; 100% cc; 0–16 mph wind
2019-01-07	7:40 a.m.–1:44 p.m.	OK	Avian point count (30-minute interval)	45°F–59°F; 0%–10% cc; 1–10 mph wind
2019-01-08	8:20 a.m.–12:51 p.m.	SC	Avian point count (30-minute interval)	50°F–63°F; 20% cc; 1–23 mph wind
2019-01-09	7:46 a.m.–2:43 p.m.	OK	Avian point count (30-minute interval)	48°F–71°F; 0%–30% cc; 1–7 mph wind
2019-01-10	7:25 a.m.–10:34 a.m.	KS	Avian point count (30-minute interval)	42°F–55°F; 0% cc; 0–6 mph wind
2019-01-14	7:35 a.m.–12:40 p.m.	OK, SC	Avian point count (30-minute interval)	39°F–45°F; 90%–100% cc; 0–18 mph wind
2019-01-18	7:30 a.m.–1:15 p.m.	KS, OK	Avian point count (30-minute interval)	44°F–60°F; 20%–90% cc; 0–15 mph wind
2019-01-21	8:22 a.m.–1:35 p.m.	KS	Avian point count (30-minute interval)	40°F–49°F; 10%–90% cc; 2–30 mph wind
2019-01-22	7:48 a.m.–11:56 a.m.	KC	Avian point count (30-minute interval)	43°F–46°F; 0% cc; 5–27 mph wind
2019-01-23	8:04 a.m.–1:50 p.m.	OK	Avian point count (30-minute interval)	44°F–61°F; 0% cc; 1–15 mph wind
2019-01-24	7:28 a.m.–10:53 a.m.	KS	Avian point count (30-minute interval)	48°F–54°F; 0%–10% cc; 5–28 mph wind
2019-01-28	8:42 a.m.–3:49 p.m.	OK	Avian point count (30-minute interval)	61°F–71°F; 30%–90% cc; 2–13 mph wind
2019-01-29	7:59 a.m.–12:36 p.m.	OK	Avian point count (30-minute interval)	63°F–73°F; 30%–70% cc; 0–13 mph wind
2019-01-30	7:30 a.m.–1:08 p.m.	OK	Avian point count (30-minute interval)	53°F –65°F; 40%–70% cc; 3–13 mph wind
2019-01-31	7:39 a.m.–10:50 a.m.	MF	Avian point count (30-minute interval)	49°F–62°F; 10%–50% cc; 0–6 mph wind
2019-02-04	7:50 a.m.–10:55 a.m.	SC	Avian point count (30-minute interval)	38°F–41°F; 100% cc; 5–32 mph wind
2019-02-06	8:36 a.m.–1:42 p.m.	OK	Avian point count (30-minute interval)	32°F–42°F; 10%–60% cc; 5–28 mph wind
2019-02-07	7:50 a.m.–12:57 p.m.	OK	Avian point count (30-minute interval)	36°F–43°F; 0% cc; 6–23 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-02-08	8:13 a.m.–1:53 p.m.	KS	Avian point count (30-minute interval)	40°F–58°F; 0%–10% cc; 0–9 mph wind
2019-02-12	8:08 a.m.–1:29 p.m.	SC	Avian point count (30-minute interval)	45°F–59°F; 30%–60% cc; 3–14 mph wind
2019-02-13	7:25 a.m.–10:49 a.m.	KS	Avian point count (30-minute interval)	46°F–56°F; 90%–100% cc; 1–23 mph wind
2019-02-15	8:06 a.m.–2:54 p.m.	OK, SC	Avian point count (30-minute interval)	40°F–50°F; 50%–100% cc; 5–35 mph wind
2019-02-18	8:42 a.m.–1:38 p.m.	SC	Avian point count (30-minute interval)	35°F–38°F; 70%–80% cc; 3–17 mph wind
2019-02-19	7:40 a.m.–1:19 p.m.	KS	Avian point count (30-minute interval)	35°F–44°F; 0% cc; 0–12 mph wind
2019-02-20	7:36 a.m.–11:27 a.m.	OK	Avian point count (30-minute interval)	30°F–38°F; 10%–60% cc; 4–20 mph wind
2019-02-25	8:12 a.m.–12:06 p.m.	SC	Avian point count (30-minute interval)	49°F–60°F; 20%–30% cc; 0–10 mph wind
2019-02-27	7:52 a.m.–1:41 p.m.	OK	Avian point count (30-minute interval)	51°F–66°F; 0%–10% cc; 3–10 mph wind
2019-02-28	7:42 a.m.–11:43 a.m.	MF	Avian point count (30-minute interval)	49°F–65°F; 30%–100% cc; 0–7 mph wind
2019-03-01	7:39 a.m.–1:08 p.m.	MF	Avian point count (30-minute interval)	59°F–68°F; 20%–60% cc; 0–16 mph wind
2019-03-04	7:32 a.m.–1:11 p.m.	MF	Avian point count (30-minute interval)	47°F–51°F; 20%–80% cc; 0–7 mph wind
2019-03-05	8:26 a.m.–1:27 p.m.	SC	Avian point count (30-minute interval)	65°F–77°F; 0%–10% cc; 0–15 mph wind
2019-03-06	7:54 a.m.–11:40 a.m.	OK	Avian point count (30-minute interval)	50°F–56°F; 20%–60% cc; 5–23 mph wind
2019-03-07	7:48 a.m.–1:43 p.m.	OK	Avian point count (30-minute interval)	47°F–52°F; 70%–100% cc; 5–30 mph wind
2019-03-12	8:20 a.m.–1:15 p.m.	DM	Avian point count (30-minute interval)	41°F–45°F; 20%–40% cc; 1–2 mph wind
2019-03-13	9:14 a.m.–11:15 a.m.	DM	Avian point count (30-minute interval)	40°F–45°F; 50%–60% cc; 1–5 mph wind
2019-03-14	7:42 a.m.–1:58 p.m.	KD	Avian point count (30-minute interval)	40°F–53°F; 0% cc; 3–35 mph wind
2019-03-15	7:55 a.m.–2:27 p.m.	OK	Avian point count (30-minute interval)	46°F–53°F; 40%–70% cc; 4–27 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-03-18	8:20 a.m.–2:20 p.m.	DM	Avian point count (30-minute interval)	60°F–74°F; 0%–60% cc; 2–20 mph wind
2019-03-19	8:10 a.m.–2:20 p.m.	DM	Avian point count (30-minute interval)	61°F–75°F; 0%–20% cc; 2–14 mph wind
2019-03-20	7:43 a.m.–12:55 p.m.	DM	Avian point count (30-minute interval)	40°F–49°F; 100% cc; 1–19 mph wind
2019-03-21	7:26 a.m.–10:55 a.m.	KS	Avian point count (30-minute interval)	37°F–47°F; 70%–100% cc; 1–18 mph wind
2019-03-25	10:10 a.m.–3:38 p.m.	DM	Avian point count (30-minute interval)	68°F–74°F; 0% cc; 2–12 mph wind
2019-03-26	8:19 a.m.–2:12 p.m.	DM	Avian point count (30-minute interval)	45°F–71°F; 40%–100% cc; 0–12 mph wind
2019-03-28	7:30 a.m.–1:32 p.m.	KS	Avian point count (30-minute interval)	46°F–66°F; 0%–50% cc; 0–23 mph wind
2019-04-02	8:16 a.m.–3:05 p.m.	MF, SC	Avian point count (30-minute interval)	53°F–69°F; 0%–30% cc; 0–20 mph wind
2019-04-03	7:23 a.m.–10:28 a.m.	KS	Avian point count (30-minute interval)	45°F–49°F; 90%–100% cc; 3–17 mph wind
2019-04-04	7:33 a.m.–12:45 p.m.	KS	Avian point count (30-minute interval)	47°F–57°F; 30%–100% cc; 0–17 mph wind
2019-04-10	7:45 a.m.–2:03 p.m.	DM, OK	Avian point count (30-minute interval)	40°F–65°F; 0% cc; 0–17 mph wind
2019-04-11	7:34 a.m.–2:11 p.m.	KS, OK	Avian point count (30-minute interval)	48°F–75°F; 0%–60% cc; 0–28 mph wind
2019-04-16	7:46 a.m.–1:15 p.m.	OK	Avian point count (30-minute interval)	43°F–48°F; 100% cc; 3–13 mph wind
2019-04-17	7:37 a.m.–1:10 p.m.	OK	Avian point count (30-minute interval)	46°F–66°F; 0%–70% cc; 0–13 mph wind
2019-04-18	7:35 a.m.–1:33 p.m.	MF	Avian point count (30-minute interval)	63°F–77°F; 10%–30% cc; 2–22 mph wind
2019-04-24	7:59 a.m.–1:58 p.m.	OK	Avian point count (30-minute interval)	70°F–83°F; 0% cc; 1–10 mph wind
2019-04-25	7:47 a.m.–11:12 a.m.	MF	Avian point count (30-minute interval)	63°F–80°F; 0% cc; 0–10 mph wind
2019-05-02	8:12 a.m.–3:00 p.m.	OK	Avian point count (30-minute interval)	55°F–73°F; 70%–90% cc; 0–11 mph wind
2019-05-03	8:13 a.m.–3:52 p.m.	DM	Avian point count (30-minute interval)	51°F–77°F; 0% cc; 0–7 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-05-06	7:40 a.m.–3:05 p.m.	OK	Avian point count (30-minute interval)	47°F–55°F; 70%–100% cc; 3–20 mph wind
2019-05-08	7:25 a.m.–1:56 p.m.	KS	Avian point count (30-minute interval)	46°F–59°F; 100% cc; 1–8 mph wind
2019-05-09	7:24 a.m.–2:09 p.m.	KS	Avian point count (30-minute interval)	46°F–58°F; 50%–100% cc; 1–15 mph wind
2019-05-14	8:00 a.m.–10:23 a.m.	DM	Avian point count (30-minute interval)	57°F–76°F; 0% cc; 0–2 mph wind
2019-05-15	8:01 a.m.–4:42 p.m.	DM	Avian point count (30-minute interval)	54°F–72°F; 0%–60% cc; 0–11 mph wind
2019-05-16	8:42 a.m.–10:55 p.m.	DM	Avian point count (30-minute interval)	44°F–45°F; 100% cc; 8–25 mph wind
2019-05-20	8:50 a.m.–12:36 p.m.	DM	Avian point count (30-minute interval)	47°F–52°F; 100% cc; 8–22 mph wind
2019-05-21	8:05 a.m.–1:35 p.m.	DM	Avian point count (30-minute interval)	40°F–53°F; 50%–100% cc; 0–30 mph wind
2019-05-22	7:45 a.m.–11:58 a.m.	KD	Avian point count (30-minute interval)	44°F–51°F; 80%–100% cc; 5–40 mph wind
2019-05-23	7:55 a.m.–2:03 p.m.	SC	Avian point count (30-minute interval)	45°F–56°F; 70%–100% cc; 3–12 mph wind
2019-05-28	7:34 a.m.–2:10 p.m.	OK	Avian point count (30-minute interval)	45°F–66°F; 0%–70% cc; 0–10 mph wind
2019-05-29	7:58 a.m.–2:08 p.m.	DM	Avian point count (30-minute interval)	55°F–77°F; 0%–20% cc; 0–9 mph wind
2019-05-30	8:19 a.m.–12:56 p.m.	SV	All-day eagle counts	69°F–82°F; 0%–20% cc; 0–10 mph wind
2019-05-31	7:30 a.m.–11:05 a.m.	AC	All-day eagle counts	54°F–70°F; 0% cc; 0–6 mph wind
2019-06-03	8:54 a.m.–4:05 p.m.	SC	Avian point count (30-minute interval)	60°F–84°F; 0%–20% cc; 2–15 mph wind
2019-06-04	8:12 a.m.–1:54 p.m.	DM	Avian point count (30-minute interval)	61°F–84°F; 0% cc; 1–5 mph wind
2019-06-05	8:45 a.m.–3:20 p.m.	DM	Avian point count (30-minute interval)	73°F–87°F; 0%–10% cc; 0–9 mph wind
2019-06-06	7:45 a.m.–12:04 p.m.	DM	Avian point count (30-minute interval)	68°F–84°F; 0% cc; 0–6 mph wind
2019-06-11	7:38 a.m.–11:39 a.m.	SV	All-day eagle counts	82°F–93°F; 0%–20% cc; 1–11 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-06-12	8:43 a.m.–3:27 p.m.	DM	Avian point count (30-minute interval)	80°F–93°F; 0% cc; 0–14 mph wind
2019-06-13	7:57 a.m.–2:13 p.m.	DM	Avian point count (30-minute interval)	63°F–82°F; 0%–40% cc; 3–21 mph wind
2019-06-14	8:00 a.m.–2:00 p.m.	DM	Avian point count (30-minute interval)	59°F–77°F; 0% cc; 3–13 mph wind
2019-06-18	8:09 a.m.–1:45 p.m.	SC	Avian point count (30-minute interval)	70°F–85°F; 0% cc; 1–7 mph wind
2019-06-19	7:30 a.m.–3:00 p.m.	DM	Avian point count (30-minute interval)	63°F–84°F; 0% cc; 0–6 mph wind
2019-06-20	8:00 a.m.–1:29 p.m.	OK	Avian point count (30-minute interval)	67°F–77°F; 0% cc; 2–18 mph wind
2019-06-21	8:25 a.m.–11:45 a.m.	DM	Avian point count (30-minute interval)	59°F–63°F; 0%–100% cc; 8–18 mph wind
2019-06-25	8:08 a.m.–3:04 p.m.	DM	Avian point count (30-minute interval)	62°F–77°F; 0%–60% cc; 0–9 mph wind
2019-06-26	8:36 a.m.–2:26 p.m.	DM	Avian point count (30-minute interval)	63°F–78°F; 0%–10% cc; 0–9 mph wind
2019-06-28	7:46 a.m.–11:13 a.m.	OK	Avian point count (30-minute interval)	70°F–79°F; 0%–10% cc; 0–11 mph wind
2019-07-01	8:10 a.m.–2:45 p.m.	DM	Avian point count (30-minute interval)	70°F–91°F; 0% cc; 1–16 mph wind
2019-07-02	7:43 a.m.–2:07 p.m.	DM	Avian point count (30-minute interval)	59°F–87°F; 0% cc; 1–7 mph wind
2019-07-03	7:31 a.m.–12:19 p.m.	KS, SC	Avian point count (30-minute interval)	63°F–77°F; 0%–10% cc; 1–25 mph wind
2019-07-08	7:48 a.m.–2:33 p.m.	SC	Avian point count (30-minute interval)	68°F–87°F; 0% cc; 2–23 mph wind
2019-07-10	7:39 a.m.–1:13 p.m.	KS	Avian point count (30-minute interval)	74°F–94°F; 0% cc; 0–7 mph wind
2019-07-12	7:30 a.m.–12:01 p.m.	OK	Avian point count (30-minute interval)	76°F–96°F; 10%–30% cc; 0–11 mph wind
2019-07-16	8:25 a.m.–11:57 a.m.	DM	Avian point count (30-minute interval)	74°F–90°F; 0% cc; 2–9 mph wind
2019-07-17	7:45 a.m.–12:27 p.m.	KS	Avian point count (30-minute interval)	74°F–93°F; 0% cc; 0–7 mph wind
2019-07-18	7:30 a.m.–1:12 p.m.	DM	Avian point count (30-minute interval)	62°F–88°F; 0%–10% cc; 0–7 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-07-22	7:54 a.m.–12:25 p.m.	KS	Avian point count (30-minute interval)	80°F–97°F; 20%–60% cc; 0–7 mph wind
2019-07-23	7:27 a.m.–10:30 a.m.	KS	Avian point count (30-minute interval)	72°F–88°F; 60%–90% cc; 0–4 mph wind
2019-07-24	7:52 a.m.–1:27 p.m.	SV	All-day eagle counts	79°F–89°F; 20%–70% cc; 1–12 mph wind
2019-07-30	7:48 a.m.–2:40 p.m.	DM	Avian point count (30-minute interval)	69°F–94°F; 10%–60% cc; 0–9 mph wind
2019-07-31	8:16 a.m.–1:32 p.m.	SV	All-day eagle counts	82°F–92°F; 20%–80% cc; 1–11 mph wind
2019-08-01	7:58 a.m.–12:03 p.m.	SC	Avian point count (30-minute interval)	84°F–97°F; 0%–10% cc; 0–10 mph wind
2019-08-02	8:14 a.m.–12:45 p.m.	DM	Avian point count (30-minute interval)	72°F–94°F; 10%–20% cc; 0–6 mph wind
2019-08-05	7:35 a.m.–5:08 p.m.	OK, SC	Avian point count (30-minute interval)	82°F–105°F; 10%–60% cc; 0–12 mph wind
2019-08-06	8:03 a.m.–12:24 p.m.	SC	Avian point count (30-minute interval)	83°F–101°F; 30%–80% cc; 1–12 mph wind
2019-08-13	7:44 a.m.–2:18 p.m.	DM	Avian point count (30-minute interval)	67°F–96°F; 0% cc; 0–5 mph wind
2019-08-14	8:22 a.m.–11:36 a.m.	DM	Avian point count (30-minute interval)	76°F–96°F; 0% cc; 1–5 mph wind
2019-08-15	7:53 a.m.–12:25 p.m.	OK	Avian point count (30-minute interval)	80°F–98°F; 0% cc; 1–12 mph wind
2019-08-16	7:49 a.m.–2:08 p.m.	SC	Avian point count (30-minute interval)	78°F–101°F; 0%–10% cc; 0–10 mph wind
2019-08-20	8:43 a.m.–12:17 p.m.	SC	Avian point count (30-minute interval)	82°F–97°F; 0% cc; 2–10 mph wind
2019-08-21	8:57 a.m.–3:52 p.m.	SC	Avian point count (30-minute interval)	84°F–103°F; 0% cc; 0–16 mph wind
2019-08-21	8:15 a.m.–12:52 p.m.	SV	All-day eagle counts	76°F–95°F; 0% cc; 0–11 mph wind
2019-08-23	8:11 a.m.–1:29 p.m.	OK	Avian point count (30-minute interval)	78°F–93°F; 0% cc; 0–13 mph wind
2019-08-26	7:49 a.m.–2:07 p.m.	SC	Avian point count (30-minute interval)	78°F–97°F; 0%–20% cc; 0–8 mph wind
2019-08-27	7:56 a.m.–12:29 p.m.	KS	Avian point count (30-minute interval)	79°F–94°F; 0%–10% cc; 0–8 mph wind
2019-08-28	7:53 a.m.–1:54 p.m.	OK	Avian point count (30-minute interval)	80°F–93°F; 0% cc; 0–10 mph wind

Table 2a
Schedule of Surveys – On-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-08-29	7:25 a.m.–11:25 a.m.	OK	Avian point count (30-minute interval)	77°F–90°F; 0% cc; 0–11 mph wind
2019-09-03	8:00 a.m.–11:35 a.m.	SC	Avian point count (30-minute interval)	77°F–90°F; 0%–20% cc; 0–5 mph wind
2019-09-04	7:36 a.m.–1:22 p.m.	SC	Avian point count (30-minute interval)	73°F–100°F; 30%–50% cc; 0–13 mph wind
2019-09-05	7:35 a.m.–12:23 p.m.	OK	Avian point count (30-minute interval)	84°F–89°F; 10%–70% cc; 0–9 mph wind
2019-09-06	7:46 a.m.–1:02 p.m.	OK	Avian point count (30-minute interval)	74°F–92°F; 10%–20% cc; 0–9 mph wind
2019-09-09	8:04 a.m.–11:53 a.m.	OK	Avian point count (30-minute interval)	66°F–79°F; 0% cc; 1–10 mph wind
2019-09-11	8:00 a.m.–2:31 p.m.	OK	Avian point count (30-minute interval)	65°F–83°F; 0% cc; 0–8 mph wind
2019-09-17	8:03 a.m.–12:43 p.m.	OK	Avian point count (30-minute interval)	63°F–78°F; 0%–10% cc; 5–18 mph wind
2019-09-19	7:43 a.m.–1:03 p.m.	OK	Avian point count (30-minute interval)	59°F–74°F; 0% cc; 1–19 mph wind
2019-09-25	7:38 a.m.–1:57 p.m.	OK	Avian point count (30-minute interval)	68°F–81°F; 30%–70% cc; 1–20 mph wind
2019-09-26	7:45 a.m.–1:36 p.m.	OK	Avian point count (30-minute interval)	58°F–67°F; 70%–100% cc; 1–7 mph wind
Riparian Birds				
2010-04-23 to 2010-07-16	Varied	AECOM	LBVI	Varied[a]
2010-05-27 to 2010-07-16	Varied	AECOM	SWFL	Varied[a]

Personnel: AB = Abby Bergsma; AC = Alex Chaney; BB = Bryon Bigrigg; BD = Ben Delancey; BM = Brynne Mulrooney; CJA = Callie Amoaku; DB = Durk Batey; DM = Dilip Mahto; FH = Fern Hoffman; KCD = Kathleen Dayton; KP = Kim Parsons; LM = Lindsy Mobley; ME = Megan Enright; MF = Mackenzie Forgey; MO = Monique O'Conner; MP = Marshall Paymard; OK = Olivia Koziel; PCS = Patricia Schuyler; PL = Paul Lemons; RM = Randall McInvale; RS = Rachael Smith; SC = Shana Carey; SCA = Susan Carlton; SL = Shelley Lawrence; SV = Shane Valiere.
Survey Designations/Focus: RP = rare plant surveys; VEG = vegetation mapping; JD = jurisdictional delineation; QCB = Quino checkerspot butterfly; ARTO = arroyo toad; LBVI = least Bell's vireo; SWFL = southwestern willow flycatcher.
Notes: °F = degrees Fahrenheit; cc = cloud cover; mph = miles per hour.

[a] AECOM 2012.
[b] The schedule for the 2011 focused Quino checkerspot butterfly surveys is included in Appendix B-2, 2011 Focused Quino Checkerspot Butterfly Survey for the Jewell Valley Wind Project, San Diego County, California.
[c] The schedule for the 2018 focused Quino checkerspot butterfly surveys is included in Appendix C-1, 2018 Focused Quino Checkerspot Butterfly Survey Report for the Campo Wind Project, Campo, San Diego County, California.

3.2.1.1 Vegetation Community and Land Cover Mapping

Vegetation communities and existing land uses within the Project Site were mapped in the field using a geographic information system (GIS) application or directly onto a 200-foot-scale (1 inch = 200 feet) aerial photograph–based field map of the study area. Following completion of the fieldwork, vegetation polygons were transferred to a topographic base and digitized using ArcGIS. Once in ArcGIS, the acreage of each vegetation community and land cover present within the study area was determined. Vegetation community classifications used in this report follow Holland (1986) and Oberbauer et al. (2008).

3.2.1.2 Plants and Wildlife

Plant species encountered during the field surveys were identified and recorded. Latin and common names for plant species with a California Rare Plant Rank (formerly California Native Plant Society List) follow the California Native Plant Society's Online Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2018). For plant species without a California Rare Plant Rank, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2018), and common names follow the U.S. Department of Agriculture's Natural Resources Conservation Service PLANTS Database (USDA 2018a).

Wildlife species observed or detected during the field surveys were recorded. In addition to species actually detected, expected wildlife use of the study area was determined based on known habitat preferences of local species and knowledge of their relative distributions in the area. Latin and common names of animals follow Crother (2012) for reptiles and amphibians, the American Ornithological Society for birds (AOS 2017), the North American Butterfly Association for butterflies (NABA 2016), and Wilson and Reeder (2005) for mammals.

3.2.2 Off-Reservation

The following surveys for the Off-Reservation portion of the Project were conducted by Dudek between 2017 and 2019:

- Spring season rare plant surveys (two seasons)
- Late season rare plant surveys with a focus on Tecate tarplant (*Deinandra floribunda*) (two seasons)
- Laguna Mountain skipper (*Pyrgus ruralis lagunae*) habitat assessments (specific search for host plant Cleveland's horkelia (*Horkelia clevelandii*))

- Quino checkerspot butterfly (*Euphydryas editha quino*) habitat assessments and focused surveys
- Vegetation mapping
- Golden eagle (*Aquila chrysaetos*) habitat assessment
- Bird utilization counts and small bird counts
- Raptor surveys
- Least Bell's vireo (*Vireo bellii pusillus*) southwestern willow flycatcher (*Empidonax traillii extimus*) habitat assessment and focused surveys
- Peninsular bighorn sheep (*Ovis canadensis nelsoni*) focused surveys
- Jurisdictional delineation

Table 2b lists the dates, conditions, and survey focus for each survey performed.

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
Vegetation Mapping and Jurisdictional Delineation				
2018-06-06	8:20 a.m.–6:12 p.m.	EJB	VEG	75°F–76°F
2018-06-07	9:15 a.m.–4:51 p.m.	EJB, MF	VEG	75°F–84°F; 0% cc; 0–5 mph wind
2018-06-08	10:16 a.m.–4:30 p.m.	LM	VEG	70°F–80°F; 0% cc; 1–3 mph wind
2018-06-11	6:19 a.m.–7:07 p.m.	EJB	VEG	66°F–77°F; 0–60% cc; 0–2 mph wind
2018-06-12	7:04 a.m.–3:28 p.m.	EJB	VEG	64°F–82°F; 0% cc; 0–1 mph wind
2018-06-20	8:56 a.m.–4:57 p.m.	CJA, PCS	JD	82°F–90°F; 0% cc; 0–2 mph wind
2018-07-03	7:40 a.m.–2:18 p.m.	CJA, JM, LM, PCS	JD	80°F–87°F; 0% cc; 0–1 mph wind
2018-07-05	8:00 a.m.–2:13 p.m.	CJA, MF	JD	87°F–97°F; 0% cc; 0–1 mph wind
2018-09-06	6:28 a.m.–5:07 p.m.	EJB	VEG, JD	57°F–80°F; 0%-100% cc; 0–8 mph wind
Rare Plant Survey				
2017-05-11	10:14 a.m.–12:00 p.m.	EJB	RP	Air Temp: 73°F–76°F; Ground Temp: 77°F; 0% cc; 0–1 mph wind; clear
2017-05-17	9:11 a.m.–5:27 p.m.	EJB, JW, ME	RP	59°F–66°F; 80%–100% cc; 0–3 mph wind
2017-05-18	8:19 a.m.–4:12 a.m.	EJB, JM, JW, ME, SCG	RP	59°F–76°F; 0% cc; 0–3 mph wind
2017-05-19	8:18 a.m.–2:18 p.m.	EJB, ME, SCG	RP	60°F–78°F; 0%–90% cc; 0–3 mph wind
2017-07-17	7:50 a.m.–2:35 p.m.	EJB, KCD	RP	77°F–96°F; 0%–30% cc; 1–10 mph wind

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
2017-07-18	6:50 a.m.–1:00 p.m.	EJB, MO	RP	71°F–91°F; 0%–10% cc; 0–3 mph wind
2017-07-21	6:43 a.m.–12:30 p.m.	EJB, KCD	RP	62°F–95°F; 0% cc; 1–5 mph wind
2017-07-26	6:11 a.m.–11:42 a.m.	EJB	RP	55°F–89°F; 0%–20% cc; 0–3 mph wind
2017-07-27	6:20 a.m.–11:30 a.m.	EJB, KCD	RP	68°F–91°F; 0%–10% cc; 0–2 mph wind
2018-05-08	7:00 a.m.–5:04 p.m.	EJB	RP	62°F–78°F; 0%–20% cc; 0–1 mph wind
2018-05-10	6:44 a.m.–6:18 p.m.	EJB	RP	60°F–87°F; 0%–100% cc; 0–1 mph wind
2018-05-11	7:21 a.m.–4:14 p.m.	EJB	RP	65°F–70°F; 0%–40% cc; 0–1 mph wind
2018-05-12	7:41 a.m.–5:28 p.m.	EJB	RP	61°F–67°F; 0%–70% cc; 0–1 mph wind
2018-05-13	8:38 a.m.–5:49 p.m.	EJB	RP	67°F–70°F; 10% cc; 0–2 mph wind
2018-05-15	7:32 a.m.–5:34 p.m.	EJB	RP	60°F–71°F; 0%–40% cc; 0–1 mph wind
2018-05-16	8:44 a.m.–4:20 p.m.	EJB, LM	RP	67°F–74°F; 20%–30% cc; 0–1 mph wind
2018-05-17	8:23 a.m.–4:17 p.m.	EJB, LM	RP	64°F–69°F; 50%–70% cc; 0–3 mph wind
2018-05-18	7:43 a.m.–2:02 p.m.	EJB, MF	RP	68°F–75°F; 10%–20% cc; 0–2 mph wind
2018-05-24	8:03 a.m.–5:10 p.m.	EJB, MF	RP	65°F–75°F; 0% cc; 0–2 mph wind
2018-05-25	8:14 a.m.–1:58 p.m.	EJB, LM	RP	71°F–78°F
2018-06-01	7:49 a.m.–5:19 p.m.	EJB, LM	RP	69°F–74°F; 0%–60% cc; 0–1 mph wind
2018-08-01	7:09 a.m.–3:07 p.m.	EJB	RP	68°F–95°F; 0%–10% cc; 0–2 mph wind
2018-08-02	9:06 a.m.–3:58 p.m.	EJB	RP	75°F–105°F; 0%–20% cc; 0–4 mph wind
2018-08-03	7:49 a.m.–3:56 p.m.	EJB	RP	75°F–108°F; 0%–10% cc; 0–4 mph wind
Quino Checkerspot Butterfly Habitat Assessment and Focused Surveys				
2011-03-11 to 2011-04-10	Varied	Dudek and subconsultants	QCB	Varied[a]
2018-02-16 to 2018-04-06	Varied	Dudek and subconsultants	QCB	Varied[b]
2019-03-15 to 2019-05-13	Varied	Dudek and subconsultants	QCB	Varied[c]
All-Day Eagle Counts and 30-Minute Avian Point Counts				
2017-09-08	9:49 AM–4:48 PM	MF, SC	30-minute point counts	75°F–95°F; 50–100% cloud cover; 0–5 mph wind
2017-09-14	7:23 AM–4:57 PM	KS	30-minute point counts	53°F –74°F; 0% cloud cover; 0–30 mph wind
2017-09-22	11:03 AM–5:44 PM	SC	30-minute point counts	55°F –75°F; 0–10% cloud cover; 1–12 mph wind

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
2017-09-25	7:27 AM–2:13 PM	KS	30-minute point counts	55°F –75°F; 0–50% cloud cover; 0–15 mph wind
2017-10-02	8:29 AM–3:15 PM	KS	30-minute point counts	57°F –75°F; 0% cloud cover; 0–15 mph wind
2017-10-09	9:33 AM–6:01 PM	SC	30-minute point counts	61°F –69°F; 0% cloud cover; 0–22 mph wind
2017-10-16	9:30 AM–5:04 PM	SC	30-minute point counts	79°F –87°F; 0% cloud cover; 0–12 mph wind
2017-10-27	7:59 AM–2:07 PM	MF	30-minute point counts	67°F –86°F; 0–10% cloud cover; 0–7 mph wind
2017-10-30	7:35 AM–2:16 PM	KS, OK	30-minute point counts	46°F –66°F; 0–10% cloud cover; 0–20 mph wind
2017-11-06	6:40 AM–1:28 PM	KS, OK	30-minute point counts	54°F –69°F; 10–90% cloud cover; 1–10 mph wind
2017-11-13	7:27 AM–1:09 PM	KS	30-minute point counts	60°F –78°F; 60–100% cloud cover; 0–7 mph wind
2017-11-20	7:08 AM–3:03 PM	SC, OK	30-minute point counts	43°F –80°F; 20–40% cloud cover; 0–12 mph wind
2017-11-27	7:07 AM–1:40 PM	SC, OK	30-minute point counts	57°F –61°F; 70–100% cloud cover; 2–20 mph wind
2017-12-07	7:16 AM–1:41 PM	MF	30-minute point counts	45°F –59°F; 0% cloud cover; 2–30 mph wind
2017-12-21	7:17 AM–2:32 PM	OK	30-minute point counts	38°F –48°F; 0% cloud cover; 0–6 mph wind
2017-12-29	7:28 AM–2:35 PM	OK	30-minute point counts	52°F –78°F; 0% cloud cover; 0–3 mph wind
2018-01-02	8:00 AM–4:00 PM	SC	30-minute point counts	61°F –69°F; 10% cloud cover; 0–15 mph wind
2018-05-15	10:10 a.m.–5:52 p.m.	FH	All-day eagle counts	71°F–77°F; 0%–10% cc; 0–25 mph wind
2018-05-16	9:05 a.m.–5:03 p.m.	FH, AC	All-day eagle counts	71°F–83°F; 0% cc; 4–26 mph wind
2018-05-17	8:23 a.m.–4:18 p.m.	FH	All-day eagle counts	60°F–75°F; 0% cc; 4–25 mph wind
2018-05-21	8:20 a.m.–4:14 p.m.	FH	All-day eagle counts	56°F–75°F; 0%–20% cc; 3–21 mph wind
2018-05-22	8:13 a.m.–4:14 p.m.	FH	All-day eagle counts	62°F–85°F; 0%–10% cc; 0–15 mph wind

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-05-23	8:18 a.m.–4:04 p.m.	FH	All-day eagle counts	73°F–78°F; 0%–10% cc; 1–14 mph wind
2018-05-24	9:50 a.m.–6:37 p.m.	FH	All-day eagle counts	62°F–88°F; 0%–20% cc; 1–19 mph wind
2018-05-31	6:32 a.m.–12:43 p.m.	KS	30-minute point counts	54°F–76°F; 0%–40% cc; 0–30 mph wind
2018-06-01	7:55 a.m.–3:50 p.m.	AC	All-day eagle counts	68°F–80°F; 0% cc; 4–16 mph wind
2018-06-04	8:14 a.m.–4:21 p.m.	FH	All-day eagle counts	84°F–97°F; 10%–20% cc; 1–12 mph wind
2018-06-07	6:20 a.m.–12:32 p.m.	KS	30-minute point counts	53°F–84°F; 0% cc; 0–22 mph wind
2018-06-07	8:50 a.m.–5:18 p.m.	FH	All-day eagle counts	74°F–78°F; 0% cc; 3–19 mph wind
2018-06-08	8:00 a.m.–4:00 p.m.	SC	All-day eagle counts	74°F–91°F; 0% cc; 5–15 mph wind
2018-06-11	8:45 a.m.–4:06 p.m.	FH	All-day eagle counts	74°F–86°F; 0%–10% cc; 1–14 mph wind
2018-06-12	9:45 a.m.–5:45 p.m.	FH	30-minute point counts	83°F–94°F; 10%–30% cc; 1–15 mph wind
2018-06-13	8:24 a.m.–4:00 p.m.	FH	All-day eagle counts	81°F–91°F; 10%–20% cc; 2–18 mph wind
2018-06-18	8:40 a.m.–4:31 p.m.	FH	All-day eagle counts	63°F–88°F; 0% cc; 2–13 mph wind
2018-06-19	9:30 a.m.–5:17 p.m.	FH	30-minute point counts	80°F–89°F; 0% cc; 0–11 mph wind
2018-06-20	8:40 a.m.–4:46 p.m.	FH	All-day eagle counts	76°F–95°F; 10% cc; 4–17 mph wind
2018-06-21	8:30 a.m.–4:31 p.m.	FH	All-day eagle counts	75°F–94°F; 10% cc; 2–15 mph wind
2018-06-25	8:45 a.m.–4:10 p.m.	FH	All-day eagle counts	79°F–93°F; 0% cc; 2–15 mph wind
2018-06-26	9:25 a.m.–4:40 p.m.	FH	30-minute point counts	84°F–95°F; 0% cc; 2–17 mph wind
2018-06-27	8:30 a.m.–4:35 p.m.	FH	All-day eagle counts	73°F–90°F; 0% cc; 6–23 mph wind
2018-06-28	8:13 a.m.–4:29 p.m.	FH	All-day eagle counts	76°F–87°F; 0% cc; 2–27 mph wind

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-07-02	7:20 a.m.–1:10 p.m.	SC	30-minute point counts	68°F–94°F; 0%–20% cc; 2–19 mph wind
2018-07-12	6:55 a.m.–12:45 p.m.	KS	30-minute point counts	70°F–87°F; 0%–30% cc; 0–10 mph wind
2018-07-16	9:53 a.m.–3:46 p.m.	RM, OK	30-minute point counts	88.5°F–95°F; 10%–90% cc; 0–8 mph wind
2018-07-26	9:30 a.m.–3:50 p.m.	FH	30-minute point counts	93°F–96°F; 0%–40% cc; 1–14 mph wind
2018-08-03	11:28 a.m.–5:47 p.m.	FH	30-minute point counts	88°F–98°F; 10% cc; 8–12 mph wind
2018-08-09	11:15 a.m.–5:20 p.m.	FH	30-minute point counts	84°F–88°F; 50%–90% cc; 3–9 mph wind
2018-09-05	12:00 p.m.–7:00 p.m.	FH	30-minute point counts	74°F–84°F; 10% cc; 2–3 mph wind
2018-09-11	11:00 a.m.–6:12 p.m.	FH	30-minute point counts	74°F–84°F; 0% cc; 2–14 mph wind
2018-09-18	8:00 a.m.–2:04 p.m.	KS	30-minute point counts	77°F–90°F; 0% cc; 1–8 mph wind
2018-09-27	8:06 a.m.–2:45 p.m.	SC	30-minute point counts	65°F–92°F; 0% cc; 0–9 mph wind
2018-10-02	8:00 a.m.–4:00 p.m.	PL	All-day eagle counts	64°F–73°F; 50%–90% cc; 1–16 mph wind
2018-10-04	8:02 a.m.–4:00 p.m.	PL	All-day eagle counts	58°F–70°F; 70%–90% cc; 2–18 mph wind
2018-10-05	8:00 a.m.–4:00 p.m.	PL	All-day eagle counts	55°F–70°F; 40%–90% cc; 1–15 mph wind
2018-10-10	8:09 a.m.–4:00 p.m.	FH	All-day eagle counts	57°F–67°F; 10% cc; 4–22 mph wind
2018-10-11	8:08 a.m.–3:56 p.m.	FH	All-day eagle counts	54°F–60°F; 10% cc; 9–15 mph wind
2018-10-11	8:08 a.m.–3:45 p.m.	SC	30-minute point counts	55°F–71°F; 20%–50% cc; 6–17 mph wind
2018-10-17	7:58 a.m.–3:57 p.m.	PL	All-day eagle counts	56°F–59°F; 0% cc; 2–17 mph wind
2018-10-18	8:00 a.m.–4:00 p.m.	KS	All-day eagle counts	56°F–63°F; 0% cc; 8–25 mph wind
2018-10-25	8:38 a.m.–2:40 p.m.	MF	30-minute point counts	68°F–79°F; 0%–30% cc; 0–4 mph wind

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
2018-10-26	7:50 a.m.–3:50 p.m.	PL	All-day eagle counts	58°F–75°F; 0%–10% cc; 1–12 mph wind
2018-10-31	8:00 a.m.–4:00 p.m.	KS	All-day eagle counts	52°F–66°F; 0%–10% cc; 7–18 mph wind
2018-11-02	7:56 a.m.–2:44 p.m.	SC	30-minute point counts	67.5°F–70.1°F; 0% cc; 1–8.1 mph wind
2018-11-06	8:15 a.m.–4:15 p.m.	PL	All-day eagle counts	63°F–73°F; 0%–10% cc; 1–8 mph wind
2018-11-07	8:10 a.m.–3:05 p.m.	SC	30-minute point counts	70.6°F–76.3°F; 0% cc; 1–10.3 mph wind
2018-11-12	9:08 a.m.–3:25 p.m.	OK	30-minute point counts	50°F–55°F; 0% cc; 10–23 mph wind
2018-11-16	7:40 a.m.–3:42 p.m.	PL	All-day eagle counts	54°F–65°F; 0%–10% cc; 3–10 mph wind
2018-11-20	7:02 a.m.–12:16 p.m.	KS	30-minute point counts	48°F–62°F; 0%–30% cc; 0–4 mph wind
2018-11-27	7:41 a.m.–3:43 p.m.	PL	All-day eagle counts	50°F–64°F; 0%–10% cc; 0–7 mph wind
2018-11-28	8:00 a.m.–4:00 p.m.	SV	All-day eagle counts	55°F–57°F; 0%–10% cc; 0–17 mph wind
2018-11-28	9:10 a.m.–3:23 p.m.	OK	30-minute point counts	58°F–61°F; 0%–10% cc; 10–16 mph wind
2018-12-08	8:33 a.m.–2:46 p.m.	OK	30-minute point counts	51°F–55°F; 0% cc; 2–13 mph wind
2018-12-14	8:56 a.m.–3:29 p.m.	OK	30-minute point counts	53°F–55°F; 0%–30% cc; 1–2 mph wind
2018-12-26	8:46 AM–3:27 PM	SC	30-minute point counts	49°F–58°F; 0–30% cloud cover; 0–13 mph wind
2019-01-02	8:32 AM–3:25 PM	OK	30-minute point counts	37°F –44°F; 0% cloud cover; 3–25 mph wind
2019-01-10	8:53 AM–3:15 PM	SC	30-minute point counts	60°F –66°F; 0% cloud cover; 0–8 mph wind
2019-01-16	7:48 AM–1:36 PM	KS	30-minute point counts	44°F –62°F; 20–100% cloud cover; 1–12 mph wind
2019-01-24	8:09 AM–4:06 PM	SC	30-minute point counts	52°F –58°F; 0–90% cloud cover; 2–21 mph wind
2019-01-30	7:56 AM–1:53 PM	KS	30-minute point counts	50°F –67°F; 50–70% cloud cover; 0–8 mph wind

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-02-07	7:40 AM–1:24 PM	KS	30-minute point counts	32°F –42°F; 0% cloud cover; 0–10 mph wind
2019-02-13	8:21 AM–2:35 PM	OK	30-minute point counts	50°F –57°F; 70–100% cloud cover; 4–20 mph wind
2019-02-28	7:38 AM–1:39 PM	KS	30-minute point counts	50°F –59°F; 10–50% cloud cover; 2–19 mph wind
2019-03-08	9:25 AM–3:41 PM	SC	30-minute point counts	39°F –47°F; 20–80% cloud cover; 4–44 mph wind
2019-03-13	8:52 AM–3:25 PM	SC	30-minute point counts	41°F –55°F; 10–80% cloud cover; 1–22 mph wind
2019-03-20	7:58 AM–2:24 PM	KS	30-minute point counts	44°F –59°F; 40–100% cloud cover; 2–26 mph wind
2019-03-26	7:57 AM–2:54 PM	SC	30-minute point counts	57°F –73°F; 70–100% cloud cover; 0–19 mph wind
2019-04-01	8:31 AM–3:30 PM	SC	30-minute point counts	63°F –74°F; 10–70% cloud cover; 0–11 mph wind
2019-04-09	8:00 AM–3:10 PM	DP	30-minute point counts	59°F –65°F; 0–10% cloud cover; 1–30 mph wind
2019-04-25	8:56 AM–3:23 PM	OK	30-minute point counts	73°F –84°F; 0–10% cloud cover; 1–10 mph wind
2019-04-30	8:37 AM–3:18 PM	OK	30-minute point counts	49°F –53°F; 70–100% cloud cover; 3–28 mph wind
2019-05-17	8:15 AM–2:23 PM	DP	30-minute point counts	44°F –46°F; 0–10% cloud cover; 5–26 mph wind
2019-05-24	8:45 AM–3:42 PM	OK	30-minute point counts	54°F –67°F; 0–40% cloud cover; 2–13 mph wind
2019-06-06	7:47 AM–1:39 PM	KS	30-minute point counts	78°F –92°F; 0–20% cloud cover; 0–12 mph wind
2019-06-10	9:36 AM–4:32 PM	SC	30-minute point counts	86°F –96°F; 10–40% cloud cover; 1–13 mph wind
2019-03-26	7:57 AM–2:54 PM	SC	30-minute point counts	57°F –73°F; 70–100% cloud cover; 0–19 mph wind
2019-04-01	8:31 AM–3:30 PM	SC	30-minute point counts	63°F –74°F; 10–70% cloud cover; 0–11 mph wind
2019-04-09	8:00 AM–3:10 PM	DP	30-minute point counts	59°F –65°F; 0–10% cloud cover; 1–30 mph wind
2019-04-25	8:56 AM–3:23 PM	OK	30-minute point counts	73°F –84°F; 0–10% cloud cover; 1–10 mph wind

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
2019-04-30	8:37 AM–3:18 PM	OK	30-minute point counts	49°F –53°F; 70–100% cloud cover; 3–28 mph wind
2019-05-17	8:15 AM–2:23 PM	DP	30-minute point counts	44°F –46°F; 0–10% cloud cover; 5–26 mph wind
2019-05-24	8:45 AM–3:42 PM	OK	30-minute point counts	54°F –67°F; 0–40% cloud cover; 2–13 mph wind
2019-06-06	7:47 AM–1:39 PM	KS	30-minute point counts	78°F –92°F; 0–20% cloud cover; 0–12 mph wind
2019-06-10	9:36 AM–4:32 PM	SC	30-minute point counts	86°F –96°F; 10–40% cloud cover; 1–13 mph wind
2019-06-20	8:15 AM–1:36 PM	DM	30-minute point counts	66°F –75°F; 0% cloud cover; 1–17 mph wind
2019-06-27	9:00 AM–3:20 PM	OK	30-minute point counts	75°F –82°F; 0% cloud cover; 2–11 mph wind
2019-07-03	8:10 AM–2:16 PM	DM	30-minute point counts	64°F –83°F; 0–10% cloud cover; 3–16 mph wind
2019-07-09	7:20 AM–1:49 PM	KS	30-minute point counts	67°F –93°F; 0% cloud cover; 0–8 mph wind
2019-07-18	8:12 AM–3:09 PM	OK	30-minute point counts	79°F –89°F; 0–20% cloud cover; 3–20 mph wind
2019-07-26	8:40 AM–3:23 PM	OK	30-minute point counts	81°F –92°F; 0–60% cloud cover; 1–7 mph wind
2019-08-01	8:02 AM–1:45 PM	DM	30-minute point counts	71–96°F; 0–20% cloud cover; 0–9 mph wind
2019-08-06	9:58 AM–2:47 PM	PL	30-minute point counts	88–95°F; 50–90% cloud cover; 0–12 mph wind
2019-08-15	8:05 AM–1:40 PM	DM	30-minute point counts	73–98°F; 0% cloud cover; 0–9 mph wind
2019-08-27	8:28 AM–3:28 PM	OK	30-minute point counts	82–95°F; 0% cloud cover; 1–11 mph wind
2019-08-23	7:05 AM–12:29 PM	KS	30-minute point counts	68–94°F; 0% cloud cover; 0–12 mph wind
Riparian Bird Surveys				
2018-05-19 through 2018-07-28	Varied	Varied	LBVI and SWFL	Varied[d]

Table 2b
Schedule of Surveys – Off-Reservation

Date	Hours	Personnel	Focus	Conditions
Peninsular Bighorn Sheep Survey				
2018-07-23	7:45 a.m.–11:45 a.m.	KS, SC	Peninsular bighorn sheep	70°F–95°F; 0%–10% cc; 2–7 mph wind
2018-07-26	6:00 a.m.–12:00 p.m.	KS, SC	Peninsular bighorn sheep	64°F–95°F; 0% cc; 0–5 mph wind
Bat Surveys				
2011-09-27 through 2012-06-19	Varied	Varied	Acoustic bat surveys	Varied

Personnel: AC = Alex Chaney; CJA = Callie Amoaku; EJB = Erin Bergman; FH = Fern Hoffman; JM = Jake Marcon; JW = Janice Wondolleck; KCD = Kathleen Dayton; KS = Kevin Shaw; LM = Lindsy Mobley; ME = Megan Enright; MF = Mackenzie Forgey; MO = Monique O'Conner; OK = Olivia Koziel; PCS = Patricia Schuyler; PL = Paul Lemons; RM = Randall McInvale; SC = Shana Carey; SCG = Scott Gressard; SV = Shane Valiere.
Survey Designations/Focus: RP = rare plant surveys; VEG = vegetation mapping; JD = jurisdictional delineation; QCB = Quino checkerspot butterfly; LBVI = least Bell's vireo; SWFL = southwestern willow flycatcher.
Notes: °F = degrees Fahrenheit; cc = cloud cover; mph = miles per hour.

[a] The schedule for the 2011 focused Quino checkerspot butterfly surveys is included in Appendix B-2, 2011 Focused Quino Checkerspot Butterfly Survey for the Jewell Valley Wind Project, San Diego County, California.

[b] The schedule for the 2018 focused Quino checkerspot butterfly surveys is included in Appendix C-2, 2018 Focused Quino Checkerspot Butterfly Survey Report for the Torrey Wind Project, Boulevard, San Diego County, California.

[c] The schedule for the 2019 focused Quino checkerspot butterfly surveys is included in Appendix C-3, 2019 Focused Quino Checkerspot Butterfly Survey for Proposed Wind Energy Facilities, Boulevard, San Diego County, California.

[d] The schedule for the 2018 focused least Bell's vireo and southwestern willow flycatcher surveys is included in Appendix D-2, 2018 Least Bell's Vireo and Southwestern Willow Flycatcher Focused Survey Report for the Torrey Wind Project, Boulevard, San Diego County, California.

3.3 Focused Surveys for Candidate, Proposed, or Listed Species under ESA and/or Federally Regulated Resources

3.3.1 Federally Listed Plants

There are no federally listed plants with a potential to occur within the Project Site. Focused special-status plant surveys were not conducted on the Reservation, but they were conducted in the Off-Reservation portion of the Project to support the CEQA analysis not included in this report. As a preliminary step, Dudek has reviewed the physical characteristics of the Project Site (including biology, geography, elevation, vegetation, soils, etc.), other projects near the Project Site, and the CNDDB and California Native Plant Society records to compile a list of federally listed or candidate species with potential to occur on site. Special-status plants with potential to occur that have been recorded within the Campo, Cameron Corners, Live Oak Springs, and Tierra Del Sol USGS quadrangles and surrounding quadrangles (CNPS 2018; CDFW 2018d) include only one federally listed plant: San Bernardino blue grass (*Poa atropurpurea*). San Bernardino blue grass is a federally endangered plant that typically blooms May to July (or sometimes April to

August) and occurs in mesic meadows and seeps (CNPS 2018). No critical habitat for San Bernardino blue grass occurs in the Project Site, and the nearest record for this species is approximately 10 miles north of the Project Site, with all other occurrences farther north (USFWS 2018a; CDFW 2018d). Since the Project Site is outside the known range for the species and there is no suitable habitat for this species in the Project Site, focused surveys were not conducted for special-status plants. In addition, AECOM conducted rare plant surveys in areas that overlap the Project Site and also determined that there are no federally listed plant species with a potential to occur in the Project Site.

3.3.2 Jurisdictional Waters and Wetlands Delineation Surveys

Dudek biologists and subconsultants conducted a formal jurisdictional delineation for the Project Site from September through October 2017 and again in July through October 2018. The delineations were conducted in accordance with the methods prescribed in the 1987 Wetland Delineation Manual (ACOE 1987), the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (ACOE 2008a), and A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual (ACOE 2008b). The information required to process an approved jurisdictional determination in accordance with the Clean Water Rule was gathered for the Project Site. During the jurisdictional delineation surveys, the Project Site was walked and evaluated for evidence of an OHWM, surface water, saturation, wetland vegetation, and nexus to a traditional navigable water of the United States. The extent of any identified jurisdictional areas was determined by mapping the areas with similar vegetation and topography to the sampled locations. Jurisdictional features were mapped using either the ESRI Collector mobile application or a GPS unit.

Pursuant to the CWA, ACOE wetland waters include those supporting all three wetlands criteria described in the ACOE Manual: hydric soils, hydrology, and hydrophytic vegetation.

3.3.3 Quino Checkerspot Butterfly Surveys

3.3.3.1 2010 AECOM Quino Checkerspot Butterfly Habitat Assessment and Protocol Surveys

In 2010, AECOM biologists completed a site habitat assessment in accordance with the 2002 Quino Checkerspot Butterfly Survey Protocol (USFWS 2002) to determine presence or absence of the species and identify potential Quino checkerspot butterfly resources (i.e., suitable habitat and potential host plants) (Figure 2, 2010 Quino Checkerspot Butterfly Survey Area). The 2010 USFWS protocol surveys conducted by AECOM overlapped with a large portion (63%) of the

study area. In accordance with the then-current USFWS 2002 survey protocol for the Quino checkerspot butterfly, the initial habitat assessment conducted by permitted biologists in March 2010 identified approximately 1,806 acres (731 hectares) that required adult USFWS protocol surveys (Quino checkerspot butterfly survey area) within what AECOM described as the "biological study area" (AECOM BSA).

Following the initial habitat assessment, USFWS protocol surveys were conducted by permitted Quino checkerspot butterfly biologists to determine presence or absence of the species within the Quino checkerspot butterfly survey area (see Figure 2). The Quino checkerspot butterfly survey area was expanded by 516 acres (209 hectares) after additional suitable open habitat within chaparral and scrub communities was discovered. Therefore, the Quino checkerspot butterfly survey area increased to approximately 2,322 acres (940 hectares). Detailed survey methods and results can be found in the Quino checkerspot butterfly report submitted to USFWS (Appendix B-1).

3.3.3.2 2011 Protocol Surveys

The 2011 focused Quino checkerspot butterfly surveys were performed for a different proposed project (Jewell Valley Wind Project) and different project applicant (Figure 3, 2011 Quino Checkerspot Butterfly Survey Area – Boulder Brush). The surveyed areas were developed based on discussions with the Jewell Valley Wind project applicant that identified potential areas on site that would likely be most suitable for development. Portions of these focused surveys overlap with the Project Site.

Focused Quino checkerspot butterfly surveys were conducted over five visits within a 5-week period between March 9 and April 15, 2011. Surveys were conducted by Quino checkerspot butterfly-permitted biologists Anita Hayworth (TE-781084), Brock Ortega (TE-813545-5), David Waller (TE-025394-2), Jeffrey Priest (TE-840619-2), Kamarul Muri (TE-051250-0), Paul Lemons (TE-051248-2), Tricia Wotipka (TE840619-2), Vipul Joshi (TE-019949-0), and Viviane Marquez (TE-800930-9) in accordance with the most current USFWS protocol for that period (USFWS 2002; 67 FR 18355–18395).

The site was divided into five survey polygons, each representing a single-day survey effort (i.e., in accordance with USFWS protocol) (Figure 3). These survey areas were numbered and assigned to Dudek's permitted biologists. The biologists were provided with 200-scale (1 inch = 200 feet) aerial photographs of each survey polygon. These photographs were used for mapping host plant populations. Binoculars were used to aid in detecting and identifying butterfly and other wildlife species. GPS units also were available for recording locations of host plant populations.

The survey methods consisted of slowly walking roughly parallel transects throughout all potential habitat within the survey area (i.e., all areas that are not excluded per the survey protocol, generally including sage scrub, open chaparral, grasslands, open or sparsely vegetated areas, hilltops, ridgelines, rocky outcrops, trails, and dirt roads). Survey routes were arranged to thoroughly cover the survey area at a rate of no more than 10–15 acres per hour.

Surveys were conducted only during acceptable weather conditions (i.e., surveys were not conducted during fog, drizzle, or rain; sustained winds greater than 15 miles per hour measured 4–6 feet above ground level; temperature in the shade at ground level less than 60°F on a clear, sunny day; or temperature in the shade at ground level less than 70°F on an overcast or cloudy day). Survey times, personnel, and conditions during the Quino checkerspot butterfly survey are provided in the 45-day report in Appendix B-2, 2011 Focused Quino Checkerspot Butterfly Survey for the Jewell Valley Wind Project, San Diego County, California.

3.3.3.3 2018 Quino Checkerspot Butterfly Habitat Assessment and Protocol Surveys

Dudek biologists conducted a site habitat assessment for Quino checkerspot butterfly in 2018 per the Quino checkerspot butterfly survey guidelines published on December 15, 2014 (USFWS 2014). Prior to the focused surveys, Dudek biologists conducted a habitat assessment within the study area to identify suitable habitat and exclude unsuitable habitat. Excluded areas consisted of developed areas and densely vegetated chaparral with tall shrubs forming closed canopies. Host plant surveys were performed in concert with the habitat assessment and augmented during the survey effort.

Focused Quino checkerspot butterfly surveys were conducted over 10 visits between March 3, 2018, and May 15, 2018, per the Quino checkerspot butterfly survey guidelines published on December 15, 2014 (USFWS 2014).[1] The survey area consisted of suitable habitat for Quino checkerspot butterfly (Figure 4, 2018 Quino Checkerspot Butterfly Survey Areas). Surveys were conducted by Quino checkerspot butterfly-permitted biologists Anita Hayworth (TE-781084-9.1), Brock Ortega (TE-813545-6), Callie Amoaku (TE-36118B-1), Erin Bergman (TE-813545-5), Darin Busby (initially working under Melissa Busby's permit until permit renewal of TE-115373-4), Melissa Busby (TE-0807792-3), David Erik LaCoste (TE-027736-6), Paul Lemons (TE-051248-5), Margie Mulligan (TE-88969B-0), Jeffrey Priest (TE-840619-6), Diana Saucedo (TE-221287-1), Patricia Schuyler (TE-27502B-1), and Tricia Wotipka (working under TE-840619-6).

[1] Only nine passes were completed at survey area 1 due to weather-related survey cancellations. These weather-related delays were discussed with USFWS staff, who provided permission to edit the survey timing to better match climatic conditions at this higher-elevation site.

The biologists were provided with 200-scale (1 inch = 200 feet) aerial maps of the survey area. Binoculars were used to aid in detecting and identifying butterfly and other wildlife species. Prior to the focused surveys in 2018, Dudek biologists conducted host plant mapping as well as a habitat assessment within the study area in order to identify suitable habitat and exclude unsuitable habitat. Excluded areas consisted of developed areas and densely vegetated chaparral with tall shrubs forming closed canopies. While host plant surveys were performed in concert with the habitat assessment, surveyors also looked for host plants during the focused surveys to document any changes from the initial host plant mapping effort. No Quino checkerspot butterfly host plants were observed within the survey areas in 2018; however, surveyors did observe some dead *Cordylanthus rigidus* remaining from the previous year's rainfall; however, since only live host plants were mapped during this effort, these locations were not recorded.

The survey methods consisted of slowly walking roughly parallel transects spaced approximately 30 feet (10 meters) apart throughout all suitable habitats within the study area. The Project Site was divided into 10 survey areas, ranging from 62 to 82 acres (Figures 2–6, Survey Results, of Appendix C-1, and Figures 1–3 of Appendix C-2). Survey routes were arranged to thoroughly cover the survey area at a rate of no more than 5 to 10 acres per person-hour.

Surveys were conducted only during acceptable weather conditions (i.e., surveys were not conducted during fog, drizzle, or rain; winds greater than 15 mph measured 4 to 6 feet above ground level for more than 30 seconds; temperature in the shade at ground level less than 60°F on a clear, sunny day; or temperature in the shade at ground level less than 70°F on an overcast or cloudy day). Survey times, personnel, and conditions during the Quino checkerspot butterfly survey are shown in Table 1 of the focused survey reports provided in Appendices C-1 and C-2.

3.3.3.4 2019 Quino Checkerspot Butterfly Protocol Surveys

Additional focused Quino checkerspot butterfly surveys were conducted in 2019 on the Off-Reservation portion of the Project Site (Boulder Brush Corridor). In 2019, focused Quino checkerspot butterfly surveys were conducted over nine visits from March 15, 2019, through May 13, 2019, per the 2014 USFWS Quino Checkerspot Butterfly Survey Guidelines. The survey area consisted of suitable habitat for Quino checkerspot butterfly (Figures 1–4 of Appendix C-3). Surveys were conducted by Quino checkerspot butterfly-permitted biologists Andrew Borcher (TE-092162-4), Antonette Gutierrez (TE-50992-B), Brock Ortega (TE-813545-6), Callie Amoaku (TE-36118B-1), David Erik LaCoste (TE-027736-6), Diana Saucedo (TE-221287-1), Erin Bergman (TE-53771B-2), Garrett Huffman (TE-20186A-2.1), Jeff Priest (TE-840619-6), Lindsay Willrick (TE-61175B-0), Margie Mulligan (TE-88969B-0), Patricia Schuyler (TE-27502B-1), and Victor Novik (TE-069534).

Survey times, personnel, and conditions during the Quino checkerspot butterfly survey are shown in Table 2 of the focused survey report provided in Appendix C-3.

2019 Habitat Assessment and Host Plant Mapping

For the 2019 surveys, Dudek biologists conducted two passes of Quino checkerspot butterfly host plant mapping surveys between March 6 and May 2, 2019. Botanical surveys were conducted by biologists Patricia Schuyler, Shana Carey, Olivia Koziel, and Margie Mulligan. All surveys were conducted on foot. Approximately 10 person-days were spent conducting host plant surveys within the study area. Host plant mapping surveys searched for the six recognized host plants and one potential host plant for Quino checkerspot butterfly: dwarf plantain (*Plantago erecta*), woolly plantain (*P. patagonica*), Coulter's snapdragon (*Antirrhinum coulterianum*), purple Chinese houses (*Collinsia heterophylla*), rigid bird's beak (*Cordylanthus rigidus*) and exserted Indian paintbrush (*Castilleja exserta*) (USFWS 2014; Pratt and Pierce 2010). Purple Chinese houses do not have an eastern San Diego county distribution and would not occur on site. Chinese houses (*Collinsia concolor*) is a potential larval host plant (Pratt and Pierce 2010). Nectar plants were recorded each week of surveys.

Dudek biologists recorded locations of Quino checkerspot butterfly host plants using a mobile application. Data collected included the surveyor(s), date, species of host plant, and density of the host plant at the point at which the host plant was found. All host plant occurrences were mapped as points. Density was collected using the following classes:

- Very Low: 1–19 plants
- Low: 20–100 plants
- Medium: 100–500 plants
- High: 500–10,000+ plants

Points were collected within patches of host plant at least as close as every 3 meters (10 feet). At the conclusion of surveys, Dudek GIS analysts created a GIS coverage for host plants. After review by a biologist, a geodatabase was created to ensure these data were topologically correct and met final quality control and assurance procedures.

3.3.4 Arroyo Toad Surveys

AECOM biologists conducted USFWS protocol surveys for arroyo toad (*Anaxyrus californicus*) in 2010. Prior to surveys, an arroyo toad habitat assessment was conducted to determine the extent of potentially suitable habitat within the AECOM BSA. Based on the habitat assessment, four

areas within the AECOM BSA were found to support potentially suitable arroyo toad breeding and aestivating habitat (state of dormancy somewhat similar to hibernation to prevent dehydration during hot or dry times of the year), totaling approximately 3 acres. No arroyo toads were observed during the 2010 focused surveys. The 2010 habitat assessment and focused survey concluded that the AECOM BSA supports moderate habitat for arroyo toad due to the presence of sandy stream channel substrates, flat sandy terraces adjacent to stream channels, and a watercourse of braided channels in some locations (AECOM 2012). However, most of these habitat components were minimally represented, and the suitable drainages that do occur are isolated from known arroyo toad populations in the region (AECOM 2012). The closest known arroyo toad occurrences are located approximately 5.5 miles west of the study area in the Cottonwood Creek area (USFWS 2018a). There are no records of arroyo toad east of this location (USFWS 2018a; CDFW 2018a), and the closest watersheds supporting arroyo toad are the Morena Reservoir–Cottonwood Creek (HUC 180703050103) and Kitchen Creek–Cottonwood Creek (HUC 180703050102) watersheds, approximately 11 miles west and 26 miles south of the Project Site, respectively. There is one record at the southern edge of the Bell Valley–Campo Creek watershed (HUC 180703050303) in Campo Creek near the Mexico border approximately 10 miles downstream from the Reservation Boundary (USFWS 2018a). Dispersal distances for arroyo toad are estimated at 2 miles (USFWS 1999). Therefore, arroyo toad is not expected to occur within the Project Site.

Additionally, the four suitable areas surveyed in 2010 are located outside of the Project Site. Due to the low potential for arroyo toads to occur based on limited habitat, lack of records in nearby watersheds, and the negative surveys from 2010 conducted nearby, it was determined that updated protocol surveys were not required for the Project.

The Boulder Brush Corridor lacks suitable habitat for this species, such as perennial or intermittent stream channels; therefore, no focused surveys were conducted.

3.3.5 Riparian Bird Surveys

3.3.5.1 2010 USFWS Protocol Surveys

AECOM conducted USFWS protocol surveys for least Bell's vireo in April through July 2010. Per the current USFWS survey protocol for the species, qualified biologists conducted eight surveys separated by at least 10 days each during the breeding season from April 10 through July 31, 2010, following the initial habitat assessment (USFWS 2001). USFWS protocol surveys were completed between dawn and 11:00 a.m. and involved walking through suitable habitat and stopping frequently to listen and look for the species. Data recorded during each survey included date of survey, survey number, time, weather conditions, field biologists, and all wildlife species observed.

Permitted biologists conducted USFWS protocol surveys for southwestern willow flycatcher following the currently accepted USFWS survey protocol for the species (Sogge et al. 2010). Per the USFWS survey protocol, one survey is to be made between May 15 and May 31, two surveys between June 1 and 24, and two surveys between June 25 and July 17. USFWS protocol surveys were separated by at least 5 days and conducted between dawn and 11 a.m. Surveys involved walking through suitable habitat and stopping frequently to look and listen for the species. If individuals were not observed after a few minutes of passive observation, a tape of recorded southwestern willow flycatcher vocalizations was used to induce southwestern willow flycatcher responses in the immediate vicinity. Data recorded during each survey included date of survey, survey number, time, weather conditions, field biologists, and all wildlife species observed. Detailed survey methods and results can be found in the focused survey report submitted to USFWS (Appendix D-1).

Based on the low potential to occur, prior negative surveys within the Reservation Boundary in 2010 and the Boulder Brush Boundary in 2018, and the long distance to the closest known record of the species (approximately 25 miles for southwestern willow flycatcher and 6 miles for least Bell's vireo), updated surveys were not performed in 2018. However, pre-construction surveys for nesting birds (including neotropical riparian species) will be conducted to verify that neither least Bell's vireo nor southwestern willow flycatcher are breeding in the Project Site.

3.3.5.2 2018 Riparian Bird Survey Area

Suitable habitat areas within and surrounding the Boulder Brush Corridor were surveyed eight times for vireo and five times for flycatcher (Figure 5, Riparian Bird Survey Area and Acoustical Bat Survey). Focused surveys for these species were initiated on May 19, 2018, and continued through July 28, 2018. The survey report is provided in Appendix D-2, 2018 Least Bell's Vireo and Southwestern Willow Flycatcher Focused Survey Report for the Torrey Wind Project, Boulevard, San Diego County, California. Surveys for least Bell's vireo and flycatcher were not conducted concurrently. Due to differences in detectability, surveys were conducted sequentially, with surveys for the flycatcher first (i.e., first thing in the morning) and surveys for the vireo conducted immediately after flycatcher surveys. Additionally, for linear survey routes within a riparian corridor, flycatchers were surveyed from the starting point to the end, and vireos were surveyed on the way back. All surveys consisted of slowly walking a methodical, meandering transect within and adjacent to all riparian habitat on site. The perimeter also was surveyed. This route was arranged to cover all suitable habitat on site. A vegetation map (1:2,400 scale; 1 inch = 200 feet) of the biological study area was available to record any detected vireo or flycatcher. Binoculars were used to aid in detecting and identifying wildlife species.

The five surveys conducted for flycatcher followed the currently accepted protocol (Sogge et al. 2010), which states that a minimum of five survey visits is needed to evaluate a project's effects on flycatchers. The protocol recommends one survey between May 15 and 31, two surveys between June 1 and June 24, and two surveys between June 25 and July 17. Consistent with the protocol, surveys during the final period (June 25 and July 17) were separated by at least 5 days. A tape of recorded flycatcher vocalizations was used, approximately every 50 to 100 feet within suitable habitat, to induce flycatcher responses. If flycatcher were detected, tape playback ceased immediately to avoid harassment.

In concurrence with the accepted Least Bell's Vireo Survey Guidelines (USFWS 2001), eight focused surveys were conducted by qualified Dudek biologist within all riparian areas and any other potential vireo habitats between April 10 and July 31, 2018. The site visits were conducted at least 10 days apart to maximize the detection of early and late arrivals, females, non-vocal birds, and nesting pairs. Taped playback of vireo vocalizations was not used during the surveys. Surveys were conducted between dawn and noon and were not conducted during periods of excessive or abnormal cold, heat, wind, rain, or other inclement weather.

3.3.6 Golden Eagle Aerial and Ground Nest Searches

3.3.6.1 2010–2011 Aerial-Based Nest Searches and Monitoring

In 2010 and again in 2011, aerial nest searches for eagles were conducted to inventory eagle nests within an approximately 10-mile (16-kilometer) radius of the AECOM BSA identified in the AECOM biological resources technical report (AECOM 2012). These surveys were conducted via helicopter in 2010 by Bloom Biological and WRI on behalf of the project as described in the AECOM report, and in 2011 by the San Diego Zoo Institute for Conservation Research and WRI. Per USFWS-recommended methods (USFWS 2010, 2011), eagle aerial nest searches were conducted in all suitable habitat within an approximately 10-mile (16-kilometer) radius from the Eagle Project Footprint[2] (Figure 6, 2010 and 2011 Eagle Nest Surveys (see Appendix A)). The 10-mile (16-kilometer) radius from the Eagle Project Footprint extends into northern Baja California, Mexico; searches of the Mexico portion of the survey area were conducted on June 4, 2010, by WRI and on May 4, 2011, by the San Diego Zoo Institute for Conservation Research.

In the U.S. portion of the survey area, searches were conducted between February and June 2010 and 2011, when resident eagles are actively nesting. Aerial nest searches were conducted in accordance with low-disturbance protocols described in the USFWS Interim Golden Eagle Inventory and Monitoring Protocols (USFWS 2010) and Draft Eagle Conservation Plan Guidance (USFWS 2011). Each aerial nest search was conducted using one helicopter with at least two raptor

[2] The "Eagle Project Footprint" is defined as the minimum convex polygon that encompasses the 2010 Project components, plus a 328-foot (100-meter) radius (USFWS 2011).

specialists on board. Raptor specialists had at least three field seasons of experience conducting helicopter-borne raptor surveys around cliff ecosystems. The helicopter was flown systematically over all suitable eagle nesting habitat such as cliffs, transmission towers, large trees, and known nest locations within the survey area. Nests of other raptor species were also recorded. The following data were collected during the golden eagle aerial nest searches:

- Unique identification number;
- Name of observer(s);
- Date and time of observation;
- Location (GPS coordinates and plotted on an aerial photograph);
- Species and age class;
- Status of the nest (e.g., active (nesting behavior/sign observed) or inactive (nesting behavior/sign not observed));
- Number of eggs or young present;
- Nest substrate (e.g., tree species, cliff face);
- Nest elevation;
- Weather during observation;
- Detailed notes on nesting chronology (incubation behavior, hatch date, fledge date, date nesting failure first observed/or confirmed, number of young present at each visit at greater than 51 days of age); and
- A photograph with the nest location indicated.

3.3.6.2 2010–2011 Ground-Based Nest Searches and Monitoring

Ground-based nest searches were conducted by Bloom Biological from April through July 2010 and 2011 throughout the Reservation to inventory raptor nests that are not typically visible from the air. After raptor nest inventory was completed (via aerial and ground-based searches), active raptor nests (all species) within the Reservation boundary were revisited to document and monitor nesting status and success. The data collected for each nest location and/or raptor observation was the same as listed above for the aerial nest searches, with emphasis on documenting nesting chronology and habitat associations. Raptor nests were classified as either active-failed (nest was used in that calendar year, but did not fledge any chicks), active-fledged (nest was used that calendar year and fledged at least one chick), inactive (no refurbishment of historic nest; nest was not used in that calendar year), or unknown (it could not be determined if the nest had been active that calendar year). In 2011, raptor chicks in nests found within the Reservation were banded to the extent feasible in an

effort to further understand nest success and local demographics, and to allow for individual identification should carcasses be recovered during post-construction monitoring.

3.3.6.3 2017–2019 Eagle Point Counts

Surveys were conducted within the study area from October through December 2017, and in October through November 2018 (Figure 7, 2017–2019 Eagle and Bird Count Surveys). These surveys follow the techniques outlined in the USFWS Land-Based Wind Energy Guidelines (USFWS 2012) and the California Guidelines (CEC and CDFG 2007). Surveys are performed from observation points on ridgelines or hilltops selected to provide the best visual coverage of the Project site with unobstructed views of the surrounding areas. The USFWS guidelines (USFWS 2012) recommend at least 30% of the area within a 0.62-mile (1-kilometer) radius of potential wind turbine locations be covered or sampled by point counts (USFWS 2012) (see Figure 7). Surveys are conducted between 0800 and 1600 hours, or as close to those hours as possible given Tribal constraints. Surveys are performed during the spring and fall periods and included three surveys each week at each point. Weather conditions (time, temperature, maximum and minimum wind speeds, wind direction, cloud cover, and visibility) are collected at the beginning, ending, and each hour of the survey. The following data are recorded for each golden eagle and/or raptor (not including corvids):

- Unique identification number
- Name of observers
- Date and time of observation
- Species
- Number of individuals, sex, and age class
- Detection type (visual or auditory)
- Location of initial detection (distance/direction from observer and plotted on aerial imagery)
- Behaviors observed (soaring, flapping, circling, hunting, perching, territorial, and/or other)
- Duration of observation
- Flight heights above the ground at initial detection, maximum, and minimum heights
- Flight path and direction (plotted on aerial imagery)

The data collected during these surveys (e.g., species occurrence, basic site use) are intended to support potential future agency coordination.

3.3.7 Bat Surveys

3.3.7.1 2010–2011 Bat Surveys

Bat surveys conducted in 2010 and 2011 included surveys to identify and passively monitor potential roost sites/hibernacula, and passive monitoring of bat activity across the AECOM BSA. Bat specialists conducted roost site/hibernacula (hibernation sites) surveys to identify potential bat roost sites and hibernacula within the AECOM BSA and immediate vicinity. Prior to leading field surveys, an initial habitat assessment was conducted to review vegetation mapping and topography that would be suitable for roosting and hibernation sites within rock outcrops, caves, abandoned mines, potentially suitable tree roots, and foraging areas in the AECOM BSA and immediate vicinity (AECOM 2012).

Following an initial habitat assessment, roost site/hibernacula searches identified potential sites that could support high densities of individuals (e.g., maternal roost sites) to assist in characterizing bat use of the AECOM BSA and immediate vicinity. Sites searched by biologists that potentially support individuals include abandoned buildings, occupied buildings, railroad trestles, cliff edges, tree snags, underground bunkers, culverts, boulder crevices, and highway overpasses for potential roost sites and hibernacula. Urine stains or guano identified during the searches were indicators of past and/or present roosting. Visual inspections for urine stains at potential roosting locations were performed using infrared lighting. The presence of guano or urine staining did not necessarily indicate that bats are currently using a roost site, but did inform the suitability assessment of the potential roost site.

Two potential roosting and/or foraging areas were identified within the AECOM BSA and immediate vicinity. Bat use at these sites was passively monitored using AnaBat SD1 ultrasonic detectors (Titley Electronics Pty Ltd., NSW, Australia). One detector was placed at a pond in the central portion of the Reservation for two nights in May 2010. Bat species often frequent ponds due to high concentrations of insect prey and to drink (Lauber 1968, as cited in AECOM 2012). A second detector was placed within oak woodland habitat at the south end of the Reservation for two nights in May 2011. Bat species may roost or forage within and around oak woodland habitats (Stokes 2011 pers. comm., as cited in AECOM 2012).

Signals were recorded onto a high-speed CompactFlash disk (SanDisk 2 to 4 GB or equivalent) in each SD1 unit. Recorded data were analyzed using AnalookW, a software program that generates and date/timestamps time-frequency spectrograms of each signal. Bat species were identified by visually comparing each spectrogram of bat echolocation calls to a library of spectrograms of known bat species.

Identification of bat species based on echolocation calls relied on analysis of a number of call parameters, including base frequency, call shape (slope as measured in octaves per second and overall pattern), pattern of calls within a sequence, inter-pulse interval, and call duration (Pierson et al. 2006, as cited in AECOM 2012). Due to identification constraints, only those spectrograms that could be reliably matched to the spectrograms of known species were identified to the species level. Some species are readily distinguished from other taxa based on particular combinations of call characteristics. While all species produce sequences that are diagnostic, a large percentage of calls cannot be assigned to a species unless the animal has also been visually observed. Spectrograms that were indistinguishable within a group of species were assigned to a frequency category for that group (e.g., 50 kilohertz for California myotis (*Myotis californicus*) and Yuma myotis (*M. yumanensis*), and 40 kilohertz for small-footed myotis (*M. ciliolabrum*) and long-legged myotis (*M. volans*)).

Bat use across the AECOM BSA was passively monitored from May 2010 to May 2011 using 12 AnaBat SD1 ultrasonic detectors. Two AnaBat detectors were attached to each of the six temporary meteorological towers located within the AECOM BSA. The microphones of each AnaBat detector were enclosed in a bat-hat (a protective PVC shroud; EME Systems, Berkeley, California) and attached to the tower at two heights. An AnaBat microphone was attached to each tower at approximately 190 feet (58 meters) above ground level, a height selected to optimize recording of bat activity within the rotor-swept zone of wind turbines. An AnaBat microphone was also attached to each tower at a height just above the canopy level of the surrounding vegetation (approximately 16 to 33 feet (5 to 10 meters) above ground level). Each microphone was attached to the SD1 receivers via shielded cabling wrapped and taped around each tower. The two receivers at each tower were housed in a weatherproof enclosure attached to the base of the tower. Both receivers were powered by a single solar panel connected to a voltage regulator and 12-volt battery (also housed in the enclosure).

Each AnaBat receiver located at the six temporary meteorological towers was programmed to record ultrasonic signals from approximately sunset to sunrise every day for 1 year. Signals were recorded onto a high-speed CompactFlash disk located in each SD1 unit. These data were transferred biweekly to a computer and analyzed using AnalookW. Each spectrogram of bat echolocation calls was visually compared to a library of spectrograms of known bat species to determine, where possible, species identity.

The impacts analysis for this report included the data collected for and documented in the 2012 AECOM report.

3.3.7.2 2011–2012 Bat Surveys

Dudek conducted passive acoustic bat surveys from September 2011 to September 2012 to determine general bat presence, activity levels, and species composition in proposed turbine areas. Dudek used broadband acoustic detectors (AnaBat SD2) that are programmed to record bat calls each day from one half-hour before sunset to one half-hour after sunrise each day of the study.

Dudek attached two bat echolocation microphones to two different meteorological towers on a project site immediately east of the study area. While this survey was not completed within the Campo Corridor, the towers were approximately 1 and 3 miles from the study area within similar vegetation communities and topography represented in the study area. Therefore, the data provides information that can be applied to the surrounding areas. The location of the survey area is shown on Figure 5. One microphone was mounted approximately 15 feet from the ground (low mic) while the second microphone was mounted near the top of the tower, approximately 200 feet from the ground. The microphone enclosures are fitted with Plexiglas sound reflector plates positioned at 45 degrees below horizontal so that the angle of the call reception is pointed upward at 45 degrees. The AnaBat detector is powered by a 12-volt battery that is recharged daily by a 10-watt solar panel attached to the tower. The microphones were rotated between the two heights on a biweekly basis to ensure bat calls are recorded at different heights.

Identification of species used the methods of O'Farrell and Miller (1999) based on frequency characteristics, call shape, and comparison with a comprehensive library of vocal signatures developed by O'Farrell and Miller. An index of activity, or the magnitude of each species' contribution to spatial use, was obtained for the monitoring station using the sum of 1-minute time increments for which a species was detected as present divided by the number of nights of sampling (Miller 2001). The index of activity was multiplied by a factor of 100 to scale the smallest index values up to whole numbers and rounded to the nearest whole number for ease in interpreting the tables.

3.3.8 Peninsular Bighorn Sheep Surveys

Dudek performed a pedestrian transect survey in July 2018 in open habitats within and surrounding the Boulder Brush Boundary to search for Peninsular bighorn sheep sign, including tracks and pellets. This effort was concentrated on the more open northeastern and southwestern habitat on the Boulder Brush Boundary and was not constrained to just the study area; instead, it focused on areas where there could be a potential for bighorn sheep to occur. Subsequent to the surveys, USFWS confirmed that focused surveys were not necessary because the species range was further to the east.

3.3.9 30-Minute Avian Point Counts

Surveys were conducted within the Campo Corridor from September 2017 to September 2019 (Figure 7). These surveys follow the techniques outlined in the USFWS Land-Based Wind Energy Guidelines (USFWS 2012) and the California Guidelines (CEC and CDFG 2007). These surveys function as both Bird Utilization Counts and Small Bird Counts. The methods used are described below.

Permanent and geo-referenced count locations were established a minimum of 2,625 feet (800 meters) apart, with an attempt to maintain coverage over the entire anticipated wind turbine area within the Campo Corridor. A total of 20 point-count stations (Locations H through AD) were required to minimally cover the projected wind turbine locations within the Project Site. Seven additional stations were surveyed (A–G) and overlap the Off-Reservation gen-tie line alignment and infrastructure area, but were not included in this analysis. Surveys were conducted weekly for more than a year, beginning on September 8, 2017, through February 9, 2018, and then from July 18, 2018, through July 23, 2019. During each sampling event, each point was visited for 30 minutes. The first 10 minutes focused on recording the activities of small birds (less than 10 inches) within 328 feet (100 meters) and the remaining 20 minutes focused on the activities of medium and large birds within 2,625 feet (800 meters). Surveys were conducted throughout the day, beginning from 1/2 hour after sunrise to 1 hour before sunset to account for species with varying activity periods. Additionally, the starting survey location was rotated on a weekly basis.

Weather conditions (time, temperature, maximum and minimum wind speeds, wind direction, cloud cover, and visibility) were collected at the beginning, ending, and each hour of the survey. Data collected includes site location number; observer name; survey period start and end times; weather (temperature, wind speed/direction, precipitation, percent cloud cover, visibility) at the start and end of each survey period; time and duration of observation (duration is rounded up to 1-minute increments; e.g., an eagle flying for about 15 seconds is 1 eagle minute, and another observed for about 1 minute 10 seconds is 2 eagle minutes); bird identification tag (letter code; e.g., A = first bird, B = second bird); detection type (visual, aural); species (American Ornithologists' Union four-letter code, including an "unknown" category); number of individuals, sex, and age class; location first observed (horizontal distance/bearing from observer); activity/behavior (e.g., perching, soaring, flapping, circling, hunting, other); flight height above ground (at location of bird) when first observed, when closest to the observer, at maximum height, and at minimum height; flight direction; flight paths for all raptors (delineated on a map); and notes (e.g., contour flying, following ridgeline, flying through a pass, flying over top of hills, location information on incidental bird sightings).

Data were analyzed to determine the species richness, number of individuals, relative abundance, frequency of species occurrence, and Shannon Diversity Index for all point-count locations, and for point-count locations grouped by the different habitats surveyed. Birds documented as flyovers and birds documented beyond the 100/800-meter radius from the observer were not included in this analysis due to the likelihood of their not breeding in the 100-meter-radius count circle. However, any eagle data was incorporated into the larger analysis and for all birds observed, the behaviors, flight heights, and flight directions were summarized. All results from the 30-minute point-count study are discussed in Section 4.9, Other Avian Data Collected.

The results of this study were compared to other similar studies by calculating risk (R) to determine the statistical probability that an event (i.e., bird observations, behaviors, flight heights, and flight directions) would occur. This index only addresses flight characteristics. Data analysis is summarized in the Bird Data Analysis section (4.9.1) of this report and also will be discussed in the forthcoming Bird and Bat Conservation Strategy (BBCS) to be prepared for the Project.

3.4 Survey Limitations

Focused wildlife surveys were conducted per the appropriate protocols, where required, which resulted in most wildlife surveys being conducted during the day. Birds represent the largest component of the vertebrate fauna. Because birds are active in the day, diurnal surveys maximized the number of observations of this portion of the fauna. Daytime surveys, however, may result in fewer observations of animals that are more active at night, such as mammals. Similarly, many species of reptiles and amphibians are nocturnal or cryptic in their habits and may be difficult to observe using standard meandering transects. Performance of diurnal surveys are standard practice, however, the 2010 arroyo toad surveys included nocturnal surveys, which allowed identification of amphibians and reptiles detectable in those habitat types.

4 EXISTING CONDITIONS

4.1 Project Site Description

The Project Area (composed of the Reservation Boundary and the Boulder Brush Boundary) is located in the inner-montane zone of southeastern San Diego County, west of a desert transition zone associated with the Sonoran Desert. Elevation within the entire Reservation ranges from 3,000 feet above mean sea level (amsl) to 4,450 feet amsl. Topography of the Reservation exhibits a range from moderate to steep ridges, to semiarid plateaus and valleys. The Project Area is in a desert transition zone, supporting desert and high desert habitats and vegetative communities. The Project Area is in the central area of the Peninsular Ranges geomorphic province. Altitude and relief generally decrease from east to west toward the Pacific Ocean. Seismicity is common throughout the Southern California region, with the San Andreas Fault located approximately 65 miles east-northeast near the Salton Sea. Although, areas like the Project Area appear to be relatively quiescent compared to nearby fault lines.

The Reservation supports large, intact expanses of relatively undisturbed habitats characteristic of the region. Dense chaparral covers much of the undeveloped portions of the Reservation, with oak woodlands and riparian habitats present along scattered canyons. A series of north–south-oriented ridges separated by the occasional broad valley or narrow drainages dominate the topography, and various large rock outcrops occur primarily along the ridgelines. Scattered, low-density commercial and residential developments are located within and adjacent to the Reservation. Other development features present include major transportation corridors (I-8 and State Route (SR) 94), asphalt and compacted earthen roads, trails, and fencing.

Drainage patterns on the Reservation vary greatly across topographic changes. Campo Creek flows in an east–west direction through the southern portion of the Reservation. There are numerous tributaries to Campo Creek, as well as seeps and springs on the Reservation. Surface water on the Reservation is not sufficient to support domestic uses; therefore, domestic water resources are solely from groundwater wells.

The Boulder Brush Boundary, located on private land, covers approximately 2,000 acres consisting of private parcels in southeastern San Diego County, California (Figure 1, Project Location). This portion of the Project Area is on private land in the McCain Valley area, north of the community of Boulevard, and is accessed via I-8 and Ribbonwood Road. The Boulder Brush Corridor is 320 acres (approximately 100-foot buffer from Project components).

The Boulder Brush Corridor lies between two major drainage divides: the Tecate Divide to the west, and the In-Ko-Pah Mountains to the east. It occurs within the Live Oak Springs and Sombrero

Peak USGS topographic quadrangles. The landscape consists of a mixture of large-lot rural residences and open space with mountainous terrain consisting of steep slopes, prominent ridgelines, and rock outcroppings. The terrain in the area ranges from valley bottoms to house-sized boulder-covered ridgelines. The elevation ranges across the Boulder Brush Corridor from approximately 3,600 feet amsl to approximately 4,000 feet amsl. The U.S. Department of Agriculture Soil Survey mapped the Boulder Brush Corridor as being underlain by the following soil types: Calpine coarse sandy loam, 5% to 9% slopes; La Posta loamy coarse sand, 5% to 30% slopes, eroded; La Posta rocky loamy coarse sand, 5% to 30% slopes, eroded; Loamy alluvial land; Mottsville loamy coarse sand, 2% to 9% slopes; and Tollhouse rocky coarse sandy loam, 5% to 30% slopes, eroded (USDA 2018b).

The Project Area is primarily undeveloped. A number of dirt roads and trails that provide access to each parcel crisscross this portion of the Project site. The area consists of private lands which have historically been used for recreational vehicle activity, including motocross, all-terrain vehicle use, and other recreational off-highway sporting use. This is a licensed use for the site and is expected to continue after Project construction. Portions of the Project Area have been, and continue to be, used for horseback riding, hiking, mountain biking, off-roading, motorcycling, and shooting. Existing land uses within the vicinity of the Project Area can be characterized as predominantly rural, large-lot ranches and single-family homes with a mixture of small-scale agriculture, recreational, and open space, with the exception of the Tule Wind Project, located on both Bureau of Land Management and County of San Diego lands. The 500 kV Sunrise Powerlink traverses the northern portion of the Project Area.

4.2 Vegetation Communities, Land Covers, and Floral Diversity

Twenty-six vegetation communities and land cover types were mapped by Dudek within the Project Area. Native vegetation communities within the Project Area include big sagebrush scrub (including disturbed), coast live oak woodland (including open and dense), emergent wetland, freshwater marsh, granitic chamise chaparral, granitic northern mixed chaparral, montane buckwheat scrub, mulefat scrub, non-native grassland, non-native grassland broadleaf-dominated, red shank chaparral, scrub oak chaparral, semi-desert chaparral, southern coast live oak riparian forest, southern arroyo willow riparian forest, southern willow scrub, upper Sonoran subshrub scrub, valley sacaton grassland, and wildflower field. Developed, disturbed habitat, unvegetated stream channel, and eucalyptus woodland occur within the Project Area. These vegetation communities follow the *Draft Vegetation Communities of San Diego County* (Oberbauer et al. 2008). The vegetation communities and land cover types listed above are summarized in Table 3 and further described below. Their spatial distributions are presented on the Figure 8 series (Existing Biological Resources; see Appendix A).

Table 3
Vegetation Communities and Land Cover Types in the Project Site

General Vegetation Community/ Land Cover Category	Vegetation Type (Holland/Oberbauer Code[a])	On-Reservation (Acres)	Off-Reservation (Acres)	Total (Acres)
Disturbed and Developed Areas (10000)	Disturbed Habitat (11300)	80.6	10.9	91.5
	Urban/Developed (12000)	19.7	0.2	19.9
	Eucalyptus Woodland (79100)	—	2.3	2.3
	Disturbed and Developed Areas Subtotal[b]	*100.3*	*13.4*	*113.7*
Scrub and Chaparral (30000)	Montane Buckwheat Scrub (32800)	131.2	44.4	175.6
	Big Sagebrush Scrub (35210)	94.4	32.2	126.6
	Disturbed Big Sagebrush Scrub (35210)	0.3	—	0.3
	Granitic Northern Mixed Chaparral (37131)	242.2	87.1	329.3
	Granitic Chamise Chaparral (37210)	1,256.9	11.5	1,268.4
	Red Shank Chaparral (37300)	116.8	46.0	162.8
	Semi-Desert Chaparral (37400)	—	42.7	42.7
	Scrub Oak Chaparral (37900)	46.6	—	46.6
	Upper Sonoran Subshrub Scrub (39000)	44.5	—	44.5
	Scrub and Chaparral Subtotal[b]	*1,932.9*	*263.9*	*2,196.8*
Grasslands, Vernal Pools, Meadows, and other Herb Communities (40000)	Valley Sacaton Grassland (42120)	0.5	—	0.5
	Non-Native Grassland (42200)	60.0	—	60.0
	Non-Native Grassland Broadleaf-Dominated (42210)	3.7	—	3.7
	Wildflower field (42300)	—	14.8	14.8
	Grasslands, Vernal Pools, Meadows, and other Herb Communities Subtotal[b]	*64.2*	*14.8*	*79.0*

Table 3
Vegetation Communities and Land Cover Types in the Project Site

General Vegetation Community/ Land Cover Category	Vegetation Type (Holland/Oberbauer Code[a])	On-Reservation (Acres)	Off-Reservation (Acres)	Total (Acres)
Bog and Marsh (50000)	Freshwater Marsh (52400)	<0.1	—	<0.1
	Emergent Wetland (52440)	3.3	3.4	6.7
	Bog and Marsh Subtotal[b]	*3.3*	*3.4*	*6.7*
Riparian and Bottomland Habitat (60000)	Southern Coast Live Oak Riparian Forest (61310)	5.3	—	5.3
	Southern Arroyo Willow Riparian Forest (61320)	—	0.9	0.9
	Mulefat Scrub (63310)	0.2	—	0.2
	Southern Willow Scrub (63320)	0.8	—	0.8
	Riparian and Bottomland Habitat Subtotal[b]	*6.3*	*0.9*	*7.2*
Woodland (70000)	Coast Live Oak Woodland (71160)	69.5	19.4	88.9
	Open Coast Live Oak Woodland (71161)	1.4	0.5	1.9
	Dense Coast Live Oak Woodland (71162)	1.3	—	1.3
	Woodland Subtotal[b]	*72.2*	*19.9*	*92.1*
Unvegetated Stream Channel	Unvegetated Stream Channel	5.5	1.1	6.6
	Unvegetated Stream Channel Subtotal[b]	*5.5*	*1.1*	*6.6*
	Total[b]	**2,184.7**	**317.4**	**2,502.1**

[a] Holland (1986) as modified by Oberbauer et al. (2008).
[b] Totals may not sum due to rounding.

4.2.1 Big Sagebrush Scrub (35210)

Big sagebrush scrub contains soft-woody shrubs, from 1.5 to 6.5 feet tall, with bare ground underneath and between shrubs (Oberbauer et al. 2008). Big sagebrush scrub typically occurs on a wide variety of soils and terrain, including rocky, well-drained slopes and fine-textured valley soils with high water table. In San Diego County, this vegetation community occurs on alluvial washes along dry margins of high desert and montane valleys. Characteristic species include big sagebrush (*Artemisia tridentata*), four-winged saltbush (*Atriplex canescens*), blackbrush (*Coleogyne ramosissima*), and California brome (*Bromus carinatus*).

Within the study area, areas mapped as big sagebrush scrub are dominated by big sagebrush. Less commonly occurring species interspersed within this vegetation community include slender woolly buckwheat (*Eriogonum gracile*), shortpod mustard (*Hirschfeldia incana*), California buckwheat (*Eriogonum fasciculatum*), cheatgrass (*Bromus tectorum*), and wild tarragon (*Artemisia dracunculus*). Disturbed big sagebrush is mapped where non-native grasses and herbs are present at 20% to 50% absolute cover.

4.2.2 Coast Live Oak Woodland (71160)

Coast live oak woodland is dominated by a single evergreen species: coast live oak (*Quercus agrifolia*) with a canopy height reaching 32.8 to 82.0 feet (10 to 25 meters). This vegetation community generally occurs along drainages. The shrub layer is poorly developed but may include toyon (*Heteromeles arbutifolia*), gooseberry (*Ribes* spp.), or laurel sumac. The herb component is continuous, dominated by a variety of introduced species (Oberbauer et al. 2008). Open coast live oak woodland and dense coast live oak woodland are similar to coast live oak woodland; however, open coast live oak woodland has a canopy cover less than 50% and dense coast live oak woodland has a canopy cover between 50% and 75% (Oberbauer et al. 2008).

Within the study area, areas mapped as coast live oak woodland are dominated by coast live oak with an understory of ripgut brome (*Bromus diandrus*), bare ground, and small scattered subshrubs. Less-common associated species include California buckwheat, big sagebrush, and Douglas' knotweed (*Polygonum douglasii*).

4.2.3 Developed (12000)

Developed refers to areas that have been constructed upon or disturbed so severely that native vegetation is no longer supported. Developed land includes areas with permanent or semi-permanent structures, pavement or hardscape, landscaped areas, and areas with a large amount of debris or other materials (Oberbauer et al. 2008).

Within the study area, developed areas include roads, buildings, and the I-8 freeway.

4.2.4 Disturbed Habitat (11300)

Disturbed habitats are areas that have been physically disturbed and are no longer recognizable as a native or naturalized vegetation association (Oberbauer et al. 2008). These areas may continue to retain soil substrate. If vegetation is present, it is almost entirely composed of non-native vegetation, such as ornamentals or ruderal exotic species. Examples of these areas may include graded landscapes or areas, graded firebreaks, graded construction pads, temporary construction staging areas, off-road-vehicle trails, areas repeatedly cleared for fuel management, or areas that are repeatedly used in ways that prevent revegetation (e.g., parking lots, trails that have persisted for years).

Within the study area, dirt roads, prominent dirt trails, and off-highway-vehicle areas are mapped as disturbed habitat. The disturbed habitat mostly consists of bare ground with few plant species. Plant species that were present within the disturbed habitat include big sagebrush, California buckwheat, and salt heliotrope (*Heliotropium curassavicum*) on some of the dirt roads and trails.

4.2.5 Emergent Wetland (52440)

Emergent wetland is a generally persistent wetland dominated by low-growing, perennial plant species. It occurs in channels, seeps, and springs, and along the margins of perennial aquatic features. This vegetation community can be dominated by various wetland plant species, including sedges (*Carex* spp.), pale spike rush (*Eleocharis macrostachya*), rushes (*Juncus* spp.), curly dock (*Rumex salicifolius*), and many others (Oberbauer et al. 2008).

Within the study area, areas mapped as emergent wetland are dominated by Mexican rush (*Juncus mexicanus*), curly dock (*Rumex crispus*), cocklebur (*Xanthium strumarium*), smartweed (*Persicaria lapathifolia*), lambsquarters (*Chenopodium album*), prostrate pigweed (*Amaranthus albus*), annual rabbitsfoot grass (*Polypogon monspeliensis*), shortpod mustard, and Canadian horseweed (*Erigeron canadensis*). Less commonly occurring species within the fringes of this vegetation community include tamarisk (*Tamarix ramosissima*), mulefat (*Baccharis salicifolia*), Fremont cottonwood (*Populus fremontii*), arroyo willow (*Salix lasiolepis*), salt heliotrope (*Heliotropium curassavicum*), and sandbar willow (*Salix exigua*).

4.2.6 Eucalyptus Woodland (79100)

Eucalyptus woodland is not recognized by Holland (1986), but is recognized by Oberbauer et al. (2008). This "naturalized" vegetation community is fairly widespread in Southern California and is considered a woodland habitat. It typically consists of monotypic stands of introduced Australian eucalyptus trees (*Eucalyptus* spp.). The understory is either depauperate (i.e., lacking species variety) or absent, owing to high leaf litter. Although eucalyptus woodlands are of limited value to most native plants and animals, they frequently provide nesting and perching sites for several raptor species.

4.2.7 Freshwater Marsh (52400)

Freshwater marsh is a wetland habitat that develops at permanently flooded sites by freshwater lacking a significant current (Oberbauer et al. 2008). Because it is permanently flooded by fresh water, there is an accumulation of deep, peaty soils. It typically is dominated by species such as cattails (*Typha* spp.), sedge (*Carex* spp.), yellow nutsedge (*Cyperus esculentus*), and bulrushes (*Scirpus* spp.).

Within the study area, areas mapped as freshwater marsh are dominated by broadleaf cattail (*Typha latifolia*).

4.2.8 Granitic Chamise Chaparral (37210)

Granitic chamise chaparral contains shrubs, overwhelmingly dominated by chamise (*Adenostoma fasciculatum*), from 3 to 10 feet tall, with little cover provided by other species. Mature stands of granitic chamise are densely interwoven and contain few herbaceous species within the understory (Oberbauer et al. 2008). Stump sprouting allows this vegetation to adapt to repeated fires. Granitic chamise chaparral typically occurs on dry slopes and ridges (Holland 1986). The chamise chaparral alliance is ranked by CDFW as a G5S5 alliance (CDFG 2010). This ranking indicates that globally and within California the alliance is widespread, abundant, and is considered secure (CDFG 2010; NatureServe 2014).

Within the study area, areas mapped as granitic chamise chaparral is dominated by chamise. Associated species include California buckwheat, cheatgrass, and common Mediterranean grass (*Schismus barbatus*). Other less commonly occurring species include Mojave yucca (*Yucca schidigera*), manzanita (*Arctostaphylos* sp.), big sagebrush, hybrid oak (*Quercus ×acutidens*), and deer weed (*Acmispon glaber*).

4.2.9 Granitic Northern Mixed Chaparral (37131)

Granitic northern mixed chaparral is similar to northern mixed chaparral but with granitic soils. Granitic northern mixed chaparral contains broad-leaved sclerophyll shrubs, from 6.5 to 13 feet tall, with little to no understory vegetation (Oberbauer et al. 2008). Granitic northern mixed chaparral forms on granitic soils on dry, rocky, often steep slopes. The shrubs form a dense layer, are typically deep rooted, and are adapted to repeated fires, to which many species respond by stump sprouting. Plant growth is highest in the spring, reduced in the late summer-fall dry season, and the flowering season extends from late winter to early summer. Characteristic species include chamise, chaparral white thorn (*Ceanothus leucodermis*), desert ceanothus (*Ceanothus perplexans*), bigberry manzanita (*Arctostaphylos glauca*), sugarbush (*Rhus ovata*), and birch leaf mountain mahogany (*Cercocarpus betuloides*).

Within the study area, areas mapped as granitic northern mixed chaparral are dominated by chamise, birchleaf mountain mahogany (*Cercocarpus betuloides* var. *betuloides*), California buckwheat, and holly leaf cherry (*Prunus ilicifolia*). Less commonly occurring species within this vegetation community include manzanita, cheatgrass, common Mediterranean grass, California cholla (*Cylindropuntia californica*), chaparral white thorn (*Ceanothus leucodermis*), and redshank (*Adenostoma sparsifolium*).

4.2.10 Montane Buckwheat Scrub (32800)

Flat-topped buckwheat is a monoculture community usually resulting from a disturbance and transitioning to coastal sage scrub or chaparral (Oberbauer et al. 2008). Dominant species include California buckwheat and deerweed.

Within the study area, areas mapped as flat-topped buckwheat are dominated by California buckwheat (*Eriogonum fasciculatum* var. *polifolium*). Less commonly occurring species within this vegetation community include chamise, hybrid oak (*Quercus* × *acutidens*), birchleaf mountain mahogany, manzanita, cheatgrass, and common Mediterranean grass.

4.2.11 Mulefat Scrub (63310)

Mulefat scrub is a depauperate, tall, herbaceous riparian scrub strongly dominated by mulefat. This early seral community is maintained by frequent flooding. Site factors include intermittent stream channels with fairly coarse substrate and moderate depth to the water table (Oberbauer et al. 2008). This community type is widely scattered along intermittent streams and near larger rivers.

Within the study area, areas mapped as mulefat scrub are dominated by mulefat. Less commonly occurring species within this vegetation community include western ragweed and wild tarragon.

4.2.12 Non-Native Grassland (42200)

Non-native grassland consist of dense to sparse cover of annual grasses with flowering culms between 0.5 to 3 feet in height (Oberbauer et al. 2008). Non-native grassland generally occurs on fine-textured loam or clay soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall.

Within the study area, areas mapped as non-native grassland are dominated by cheatgrass and common Mediterranean grass. Less commonly occurring species within this vegetation community include slender woolly buckwheat and longstem buckwheat (*Eriogonum elongatum*).

4.2.13 Non-Native Grassland Broadleaf-Dominated (42210)

Non-native grassland broadleaf-dominated is dominated by one or several non-native, invasive broadleaf species for more than 50% of the total vegetated cover (Oberbauer et al. 2008). Non-native grassland broadleaf-dominant is a subset of the non-native grassland vegetation community and resulted in the establishment of extensive dominant broadleaf species caused by disturbance and/or a nearby seed source. Characteristic species include black mustard (*Brassica nigra*), shortpod mustard, fennel (*Foeniculum vulgare*), and *Centaurea* spp.

Within the study area, areas mapped as non-native grassland are dominated by prickly lettuce (*Lactuca serriola*) and bull thistle (*Cirsium vulgare*).

4.2.14 Red Shank Chaparral (37300)

Red shank chaparral is dominated by pure stands of redshank of at least 50% cover (Oberbauer et al. 2008). Red shank chaparral shrub layer is typically open, 6.5 to 13 feet in height, and confined to granitic soils. This vegetation community occurs on interior cismontane slopes between 300 and 6,000 feet with greater precipitation and colder winters. Plant species observed within this vegetation community include chamise, tulip pricklypear (*Opuntia phaeacantha*), desert ceanothus, and bigberry manzanita.

Within the study area, areas mapped as red shank chaparral are dominated by redshank. Areas mapped as redshank chaparral consisted of redshank communities with over 75% cover of redshank. Less commonly occurring species include California buckwheat, *Cercocarpus* sp., and non-native grasses.

4.2.15 Scrub Oak Chaparral (37900)

Scrub oak chaparral is a dense, evergreen chaparral up to 20 feet tall (Oberbauer et al. 2008). Scrub oak chaparral is dominated by scrub oak (*Quercus berberidifolia*) of at least 50% cover and usually occurs in small patches within a variety of other communities. This mesic community occurs at elevations up to 5,000 feet and recovers from fire more quickly than other chaparrals. In San Diego County, scrub oak chaparral occurs on north-facing or mesic slopes. Characteristic species include *Quercus* spp., Eastwood manzanita (*Arctostaphylos glandulosa*), *Ceanothus* spp., toyon, and California buckthorn (*Frangula californica* ssp. *californica*).

Within the study area, areas mapped as scrub oak chaparral are dominated by hybrid oak, chamise, birchleaf mountain mahogany, and California buckwheat.

4.2.16 Semi-Desert Chaparral (37400)

Semi-desert chaparral contains 5- to 10-foot-tall sclerophylls in an open layer dominated by *Juniperus*, *Eriogonum*, and *Opuntia* (Oberbauer et al. 2008). Semi-desert chaparral occurs in dry, cold winters and dry, hot summers, and on rocky soils or recently burned sites. This vegetation community is less fire-prone than other chaparrals due to lower fuel loads. Semi-desert chaparral is found in San Diego County on high desert plateaus and escarpment of the Peninsular Range. Characteristic species include chamise, bigberry manzanita, California buckwheat, and California juniper (*Juniperus californica*).

Within the study area, semi-desert chaparral is dominated by cactus species and characteristic desert associates including California joint fir (*Ephedra californica*), flatbud prickly poppy (*Argemone munita*), numerous combseeds (*Pectocarya* spp.), California buckwheat, tulip pricklypear, Gander's buckhorn cholla (*Cylindropuntia ganderi*), and brownspined pricklypear (*Cylindropuntia californica* var. *parkeri*). Less commonly occurring associates within this community include California juniper (*Juniperus californica*) and desert ceanothus.

4.2.17 Southern Coast Live Oak Riparian Forest (61310)

Southern coast live oak riparian forest is a dense riparian forest dominated by coast live oak, often with an herbaceous understory. This community occurs along the bottom or outer slopes of larger streams (Oberbauer et al. 2008). Southern coast live oak riparian forest is found in canyons and valleys of coastal Southern California and drainages throughout San Diego County. Areas mapped as oak riparian forest are dominated by coast live oak.

Within the study area, southern coast live oak riparian forest is dominated by coast live oak, red willow (*Salix laevigata*), and mulefat, and associated species include yerba mansa (*Anemopsis californica*), Mexican rush, and western ragweed (*Ambrosia psilostachya*).

4.2.18 Southern Arroyo Willow Riparian Forest (61320)

Southern arroyo willow riparian forest is a winter-deciduous riparian forest dominated by broad-leafed trees and arroyo willow. Typically it consists of a moderately tall, closed, or nearly closed canopy, with an understory of shrubby willows (Oberbauer et al. 2008). Southern arroyo willow riparian forest is characterized by the presence of several species besides arroyo willow, including San Diego sagewort (*Artemisia palmeri*), mulefat, Cucamonga manroot (*Marah macrocarpa*), California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), Goodding's willow (*Salix gooddingii*), sandbar willow (*Salix exigua*), and yellow willow (*Salix lasiandra*) (Oberbauer et al. 2008). Southern arroyo willow riparian forest occurs in sub-irrigated and frequently overflowed areas along rivers and streams that are perennially wet (Oberbauer et al. 2008).

Within the study area, areas mapped as southern arroyo willow riparian forest are dominated by red willow, mulefat, broom baccharis (*Baccharis sergiloides*), and arroyo willow with associated species including yerba mansa, Mexican rush, western ragweed, Mexican whorled milkweed (*Asclepias fascicularis*), salt cedar, wild tarragon and stinging nettle (*Urtica dioica* ssp. *holosericea*). Some sections of the southern arroyo willow riparian forest consisted of little to no herbaceous perennial plant species, and other areas were abundant with Mexican rush, yerba mansa, western ragweed and wild tarragon.

4.2.19 Southern Willow Scrub (63320)

Southern willow scrub is a dense, broad-leafed, winter-deciduous riparian thicket dominated by several willow species (*Salix* spp.), with scattered emergent Fremont cottonwood and California sycamore. This community was formerly extensive along the major rivers of coastal Southern California, but now much reduced (Oberbauer et al. 2008).

Within the study area, areas mapped as southern willow scrub are dominated by Mexican rush, arroyo willow, and western ragweed. Less commonly occurring species within this vegetation community include wild tarragon, big sagebrush, yerba mansa, and red willow.

4.2.20 Unvegetated Stream Channel (N/A)

Unvegetated stream channel is a category not recognized by Holland (1986) or Oberbauer et al. (2008). Unvegetated stream channels occur along Campo Creek and Tule Creek and throughout portions of the study area. These resources are discussed more in Section 4.7, Jurisdictional Wetlands and Non-Wetland Waters.

4.2.21 Upper Sonoran Subshrub Scrub (39000)

Upper Sonoran subshrub scrub is a short, open scrub community that is dominated by soft-wooded, summer-dormant, drought-tolerant shrubs (Oberbauer et al. 2008). This vegetation type occurs in patches on relatively level, seasonally dry areas with soils with insufficient water-holding capacity to maintain larger shrubs.

Within the study area, areas mapped as Sonoran subshrub scrub are dominated by slender woolly buckwheat. Less commonly occurring species within this vegetation community include California buckwheat, big sagebrush, cheatgrass, common Mediterranean grass, and holly leaf cherry.

4.2.22 Valley Sacaton Grassland (42120)

Valley sacaton grassland is a midheight (3-foot) tussock-forming grassland dominated by alkali sacaton (*Sporobolus airoides*) (Oberbauer et al. 2008). Soils associated with this vegetation community are generally fine textured, poorly drained, and usually alkaline soils.

Within the study area, areas mapped as valley sacaton grassland are dominated by alkali sacaton. The areas mapped as valley sacaton grassland consisted of over 75% cover of alkali sacaton. Less commonly occurring species within this vegetation community include ripgut brome, cheatgrass, and Mexican rush. It is located within a floodplain.

4.2.23 Wildflower Field (42300)

Wildflower fields consist of native herb dominated communities. Wildflower fields are noted for an obvious annual wildflower display. Dominance of flowers varies from year to year depending on rainfall patterns. Site factors include being associated with grasslands and oak woodlands. Within San Diego County, sandy soils are often present within these vegetation communities.

Wildflower fields in the study area consist of abandoned pasture for grazing animals. Range managers may have irrigated some of these areas historically, since leftover water pipes and irrigation equipment were found in some sections of these pasture lands. During the spring season, needle goldfields dominated this vegetation community, creating a blanket of yellow across the range. Less commonly occurring wildflowers like variable linanthus (*Leptosiphon parviflorus*) were also mixed in with the needle goldfields. In the late season giant woollystar (*Eriastrum densifolium*) dominated the community, creating a blanket of purple in some areas of the wildflower fields. Jacumba milk-vetch also dominated the wildflower field community and is positively affected by disturbance; one example of disturbance being that of historically grazed lands. Other dominant perennial herbs and annuals within the pasture include western tansymustard (*Descurainia pinnata*), tall tumblemustard (*Sisymbrium altissimum*), and herb Sophia (*Descurainia sophia*). Grass species were scattered within the vegetation community and include slender oat (*Avena barbata*), mouse barley (*Hordeum murinum*), compact brome (*Bromus madritensis* ssp. *madritensis*), and rat-tail fescue (*Festuca myuros*). Less commonly occurring species include cheatgrass, Mediterranean grass, shortpod mustard, and London rocket (*Sisymbrium irio*).

4.3 Floral Diversity

During surveys conducted by Dudek biologists on the Reservation, 119 vascular plant species, consisting of 96 native species (81%) and 23 non-native species (19%), were recorded during vegetation mapping, jurisdictional delineation, and Quino checkerspot butterfly surveys. In 2010, AECOM performed focused rare plant surveys. An additional 237 vascular plant species were recorded during these previous surveys conducted by AECOM, including an additional 218 native

species and 19 non-native species.[3] Fifty-nine families are represented on site, with nearly half of the species coming from the Asteraceae, Boraginaceae, Poaceae, Fabaceae, and Brassicaceae families. No federally listed plant species were observed in the Project Site. A cumulative list of plant species observed during these surveys is provided in Appendix E-1.

Within the Boulder Brush Corridor, a total of 321 vascular plant species, consisting of 287 native species (89%) and 34 non-native species (11%), were recorded during surveys conducted in 2017, 2018, and 2019.[4] Fifty-seven families are represented, with nearly half of species coming from the Asteraceae, Boraginaceae, Poaceae, Polemoniaceae, Fabaceae, and Brassicaceae families. No federally listed species were observed. A cumulative list of plants species observed during these surveys is provided in Appendix E-2.

4.4 Wildlife Diversity

The Project Site supports habitat for common upland and riparian species. Chaparral, sagebrush scrub, woodland, and riparian habitat within the study area provide foraging and nesting habitat for migratory and resident birds and other wildlife species. Rock outcroppings, chaparral, sagebrush scrub, and woodlands in the Project Site provide cover and foraging opportunities for wildlife species, including reptiles and mammals.

On the Reservation, 184 wildlife species were observed in the Project Site by Dudek biologists during Quino checkerspot butterfly surveys, bird count surveys, eagle surveys, and 2011–2012 bat surveys. In 2010, AECOM conducted Quino checkerspot butterfly surveys, arroyo toad surveys, riparian bird surveys, eagle surveys, and bat surveys. An additional 124 species were observed in the study area during these previous surveys, conducted by AECOM. Of the 308 total species observed, 83 were butterflies and moths, 16 were reptiles, 3 were amphibians, 174 were avian species, 16 were terrestrial mammal species, and 16 were bat species.[5] A cumulative list of wildlife species observed during these surveys is provided in Appendix F-1.

Commonly observed reptiles include western fence lizard (*Sceloporus occidentalis*), common side-blotched lizard (*Uta stansburiana*), and gophersnake (*Pituophis catenifer*).

Commonly observed birds include western meadowlark (*Sturnella neglecta*), California scrub-jay (*Aphelocoma californica*), red-tailed hawk (*Buteo jamaicensis*), Anna's hummingbird (*Calypte anna*), house finch (*Haemorhous mexicanus*), turkey vulture (*Cathartes aura*), wrentit (*Chamaea*

[3] Many more plant species were observed during the previous efforts because focused plant surveys were performed in 2010. Focused plant surveys were not performed on the Reservation as part of this current effort.

[4] These species were recorded as part of efforts for a different wind project, the Torrey Wind Project, within the Boulder Brush Corridor.

[5] Bat species recorded within the study area were noted during acoustical bat surveys conducted from September 2011 to September 2012.

fasciata), common raven (*Corvus corax*), greater roadrunner (*Geococcyx californianus*), California towhee (*Melozone crissalis*), northern mockingbird (*Mimus polyglottos*), ash-throated flycatcher (*Myiarchus cinerascens*), phainopepla (*Phainopepla nitens*), spotted towhee (*Pipilo maculatus*), bushtit (*Psaltriparus minimus*), and Bewick's wren (*Thryomanes bewickii*).

Commonly observed mammals included desert cottontail (*Sylvilagus audubonii*), brush rabbit (*Sylvilagus bachmani*), California ground squirrel (*Spermophilus (Otospermophilus) beecheyi*), and coyote (*Canis latrans*). Bats observed at higher number of minutes include western small-footed myotis (*Myotis ciliolabrum*) and canyon bat (*Parastrellus hesperus*). Western small-footed myotis has high potential to roost on the Reservation within oak and riparian woodland. Commonly observed invertebrate species included painted lady (*Vanessa cardui*), Behr's metalmark (*Apodemia mormo virgulti*), funereal duskywing (*Erynnis funeralis*), checkered white (*Pontia protodice*), and Pacific sara orangetip (*Anthocharis sara sara*).

During surveys conducted within the Boulder Brush Corridor, a total of 207 wildlife species were observed, 27 of which are considered special status. Species observed were recorded during focused surveys, habitat assessments, vegetation mapping, and sensitive plant surveys. A cumulative list of wildlife species observed during these surveys is provided in Appendix F-2.

Commonly observed reptiles include western fence lizard and common side-blotched lizard.

Commonly observed birds included western meadowlark, California scrub-jay, red-tailed hawk, Anna's hummingbird, house finch, turkey vulture, wrentit, common raven, greater roadrunner, California towhee, northern mockingbird, ash-throated flycatcher, phainopepla, spotted towhee, bushtit, and Bewick's wren.

Commonly observed mammals included desert cottontail, brush rabbit, California ground squirrel, and coyote.

Acoustical bat surveys were conducted in 2011 for the Jewell Valley Wind Project previously proposed by a different applicant. The surveys resulted in the detection of 13 bat species in the vicinity of the broadband acoustic detectors, which were located along the eastern edge of the Boulder Brush Corridor. It is assumed that all bat species recorded during the surveys would use suitable habitat in the Boulder Brush Corridor for foraging. One special-status bat species, western small-footed myotis, has a potential to roost within the Boulder Brush Corridor.

Commonly observed invertebrate species included painted lady, Behr's metalmark, funereal duskywing, checkered white, and Pacific sara orangetip.

4.5 Candidate, Proposed, or Listed Species under the ESA

This report defines "special-status species" as those that are candidate, proposed, or listed species under the federal ESA and species federally protected under the Bald and Golden Eagle Protection Act. Federally listed species known to occur within the Campo, Cameron Corners, Live Oak Springs, and Tierra Del Sol USGS quadrangles and surrounding quadrangles (described as "Project Vicinity") (USFWS 2018a; CNPS 2018; CDFW 2018a; SDNHM 2018) are summarized in Table 4.

Table 4
Federally Listed Plant and Wildlife Species Known from the Project Vicinity

Common Name Scientific Name	Federal Status	Habitat	Potential to Occur
Plants			
San Bernardino blue grass *Poa atropurpurea*	FE	Meadows and seeps, elevation ranging from 4,460 to 8,055 feet	**Not expected to occur.** The site is outside of the species' known elevation range, and there is no suitable vegetation present.
Amphibians			
Arroyo toad *Anaxyrus californicus*	FE	Semiarid areas near washes, sandy riverbanks, riparian areas, palm oasis, Joshua tree, mixed chaparral, and sagebrush; stream channels for breeding (typically third order); adjacent stream terraces and uplands for foraging and wintering	**Not expected to occur.** There are no suitable perennial washes or stream channels for breeding present. The closest known arroyo toad occurrences are located approximately 5.5 miles west of the study area in the Cottonwood Creek area (USFWS 2018a), a different watershed. There are no records of arroyo toad east of this location (USFWS 2018a; CDFW 2018a). Surveys conducted for the AECOM BSA were negative (AECOM 2012).
Birds			
California condor *Gymnogyps californianus*	FE	Forages on open terrain, foothill grassland, and oak savannah; nests in cavities on steep rocks or burned hallows of old-growth conifers and giant sequoia trees	**Very Low potential to forage and not expected to nest.** There is potential foraging habitat; however, no suitable nesting vegetation present and the only USFWS record to date of a condor in the Project Vicinity is of a subadult condor that came within 4.8 miles of the Project Site in 2007. However, the mean height above ground of the flight path of the condor was approximately 1,400 feet, well above the height of the proposed turbine blades. Other records are at least 15 miles away from the site from 2017 (other years are further from the site) (USGS 2018a, 2019). Livestock grazing and concentrations of big game animals, two primary sources of food for condors, do not occur on the Reservation, including the Project Site. The Reservation is fenced, which limits movement of livestock and big game onto the Reservation.

Table 4
Federally Listed Plant and Wildlife Species Known from the Project Vicinity

Common Name Scientific Name	Federal Status	Habitat	Potential to Occur
Southwestern willow flycatcher *Empidonax traillii extimus*	FE	Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration	**Not expected to occur.** Does not occur in vicinity (CDFW 2018a), and focused protocol surveys conducted in 2010 for this species were negative. The closest known CNDDB occurrence is 27.8 miles northwest of the Project Site (CDFW 2018a). There is marginal riparian habitat for this species, which prefers habitat along perennial streams and rivers.
Least Bell's vireo *Vireo bellii pusillus*	FE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season	**Low potential to occur.** Focused protocol surveys conducted in 2010 for this species were negative. The closest known CNDDB occurrence is 6 miles west of the Project Site (CDFW 2018a). There is marginal riparian habitat for this species, which prefers habitat along perennial streams and rivers.
Mammals			
Peninsular bighorn sheep *Ovis canadensis nelsoni pop. 2 DPS*	FE	Dry, rocky, low-elevation desert slopes, canyons, and washes; females near water during lambing season	**Not expected to occur.** The Reservation is located in the inner-montane zone of San Diego County, west of the desert slopes occupied by this species and approximately 6 miles (9.6 kilometers) from the western edge of the species' known range (CDFW 2018e). The closest CNDDB occurrence is 3.6 miles northeast of the Project Site within the Jacumba and In-Ko-Pah Mountains in more suitable habitat (CDFW 2018a). The Reservation lacks the dry, rocky desert habitat preferred by this species.
Invertebrates			
Quino checkerspot butterfly *Euphydryas editha quino*	FE	Annual forblands, grassland, open coastal scrub, and chaparral; often soils with cryptogamic crusts and fine-textured clay; host plants include *Plantago erecta*, *Antirrhinum coulterianum*, and *Plantago patagonica* (the Project Site is located in the Campo Core Occurrence Complex (USFWS 2009))	**Known to occur.** Twenty-seven Quino checkerspot butterfly observations were documented during 2010 USFWS protocol surveys. Approximately 3,803.1 acres (1,539.1 hectares) of suitable habitat was recorded. Observations were concentrated in the southern portion of the AECOM BSA (AECOM 2012). In 2018, updated surveys were conducted for the study area. No occurrences of Quino checkerspot butterfly were recorded during the focused surveys.
Laguna Mountains skipper *Pyrgus ruralis lagunae*	FE	Restricted to montane meadows of Laguna Mountains and Mount Palomar	**Not expected to occur.** This species' range is restricted to the Laguna Mountains and Mount Palomar. The closest recorded occurrence is approximately 10 miles northwest of the study area (CDFW 2018a; USFWS 2018a).

4.5.1 Plant Species

No focused special-status plant surveys were conducted within the Reservation in 2018 as a result of the following analysis. No sensitive plant species were detected within the Reservation during the 2010–2011 rare plant surveys conducted by AECOM (2012) and no federally listed plants were observed during the 2018 surveys within the Boulder Brush Corridor. Only one federally listed plant, San Bernardino blue grass, is known from the Project Area. San Bernardino blue grass is federally endangered plant that typically blooms May to July (or sometimes April to August) and occurs within mesic meadows and seeps (CNPS 2018). No critical habitat for San Bernardino blue grass occurs in the Project Area, and the nearest CNDDB record for this species is approximately 10 miles north of the Project Area with all other occurrences farther north. Because the Project Area is outside of the known range for the species and because there is no suitable habitat for this species within the study area, this species is not expected to occur. Given that no federally listed special-status plant species are expected to occur in the Project Area, special-status plant species are not discussed further in this report.

4.5.2 Wildlife Species

Federally listed wildlife species previously documented in the Project Vicinity[6] are summarized in Table 4. Based on USFWS critical habitat and occurrence data (USFWS 2018a) and CNDDB occurrence data (CDFW 2018a, 2018b, 2018c), seven federally listed wildlife species were observed or found to have some potential to occur within the Project Area and vicinity based on habitat or records from a nine-quadrangle search: arroyo toad, California condor (*Gymnogyps californianus*), southwestern willow flycatcher, least Bell's vireo, Peninsular bighorn sheep, Quino checkerspot butterfly, and Laguna Mountains skipper (Table 4). However, only one of the seven species, Quino checkerspot butterfly, is known to occur in the Project Area.

*4.5.2.1 Quino Checkerspot Butterfly (*Euphydryas editha quino*), FE*

Quino checkerspot butterfly was listed as endangered on January 16, 1997 (62 FR 2313–2322). A recovery plan was published for the species on September 17, 2003 (USFWS 2003). Critical habitat was first designated on April 15, 2008 (67 FR 18356–18395), and was later revised on June 17, 2009 (74 FR 28776–28862). In accordance with ESA Section 4(b)(2); EO 13175, Consultation and Coordination with Indian Tribal Governments; and Secretarial Order 3206, USFWS has excluded the Reservation from critical habitat designation for Quino checkerspot butterfly. Critical habitat designated for Quino checkerspot butterfly borders the Reservation to the west and south (Figure 9, USFWS Critical Habitat).

[6] "Project Vicinity" refers to the Campo, Cameron Corners, Live Oak Springs, and Tierra Del Sol USGS quadrangles and surrounding quadrangles.

This species is found only in western Riverside County, southern San Diego County, and northern Baja California, Mexico (USFWS 2003). This species is found on sparsely vegetated hilltops, on ridgelines, and occasionally on rocky outcrops in open chaparral and coastal sage scrub habitat (typically at less than 3,000 feet amsl). This species requires host plants within these vegetation communities for feeding and reproduction. The primary larval host plant is dotseed (or dwarf) plantain (*Plantago erecta*); however, several other species have been documented as important larval host plants, including desert plantain, sometimes called woolly plantain (*Plantago patagonica*); thread-leaved bird's beak (*Cordylanthus rigidus*); white snapdragon (*Antirrhinum coulterianum*); owl's clover (*Castilleja exserta*); and Chinese houses (*Collinsia* spp.) (USFWS 2003).

4.5.2.2 Habitat and Occurrence in the 2005 through 2009 Survey Areas – Campo Landfill Project

As referenced in AECOM (2012), between 2005 and 2009, Pacific Southwest Biological Services biologists conducted USFWS protocol surveys for Quino checkerspot butterfly in the southeastern portion of the Reservation for the then-proposed, but no longer under consideration, Campo Regional Landfill Project (BIA 2010). Protocol surveys were conducted within an approximate 394-acre (159-hectare) area of open vegetation characteristic of Quino checkerspot butterfly habitat (BIA 2010). There were 23 Quino checkerspot butterfly detections recorded between March and April during these surveys (14 detections in 2005, 1 detection in 2006, and 8 detections in 2009) (PSBS 2005, 2009). No Quino checkerspot butterfly detections were made during protocol surveys in 2007 and 2008 (PSBS 2007, 2008). Potential Quino checkerspot butterfly host plants recorded during this previous survey effort included owl's clover, thread-leaved bird's beak, and Chinese houses (BIA 2010).

4.5.2.3 Habitat and Occurrence in the AECOM BSA and Vicinity

In 2010, USFWS protocol surveys were conducted for Quino checkerspot butterfly in the southeastern portion of the AECOM BSA (AECOM 2012). There were 27 Quino checkerspot butterfly observations recorded within the Reservation (Figure 10, 2010 Quino Checkerspot Butterfly Survey Results). Nineteen observations were made within in the southern portion of the AECOM BSA, and eight observations were documented from outside the AECOM BSA but within the Reservation (Figure 10).

Three potential Quino checkerspot butterfly larval host plant species were observed within the AECOM BSA during the 2010 focused surveys: Chinese houses, white snapdragon, and thread-leaved bird's beak (Figure 10). Observations of Quino checkerspot butterfly and locations of larval host plants made previously for the Campo Landfill Project and those made during 2010 surveys suggest that the southern portion of the Reservation supports a higher density of Quino checkerspot butterfly as compared to northern portions of the site (i.e., north of SR-94).

4.5.2.4 Habitat and Occurrence in the 2018 Survey Area

No Quino checkerspot butterfly or their host plants were observed during the 2018 focused surveys within the Project Site. Approximately 1,216 acres were considered potential suitable habitat within the Project Site (Figure 4).

4.5.2.5 Habitat and Occurrence in the 2019 Off-Reservation Survey Area

A total of five Quino checkerspot butterfly individuals were observed during the 2019 focused surveys by Erin Bergman on April 10, 2019 (Figure 8 series) (Attachment C-3). The Quino checkerspot butterfly individuals were observed in an area with open decomposed granite soils, hilltops, ridges, numerous granitic rock outcrops, and various nectar sources. No host plants were observed anywhere within the immediate survey area. Quino checkerspot butterfly individuals spent much of the observation time nectaring on Clearwater cryptantha (*Cryptantha intermedia* var. *intermedia*) and pointed cryptantha (*Cryptantha muricata* var. *jonesii*) for short periods of time (a few seconds), landing on bare ground (a few seconds) and performing hilltopping behaviors the majority of the time. These Quino checkerspot butterfly individuals were only observed on this one day during this one survey week. No other Quino checkerspot butterfly individuals were observed during the protocol surveys.

4.5.2.6 Quino Checkerspot Butterfly Occupied Habitat

Quino checkerspot butterfly populations vary yearly based on a variety of factors, including rainfall, temperature, timing of rain events, and host plant growth patterns, among others. Low rainfall and other factors can cause larva to extend diapause and delay emergence. Lack of adult Quino checkerspot butterfly observations in one year may not be considered adequate evidence that a site is unoccupied. Therefore, potentially occupied habitat was modeled based on Quino checkerspot butterfly records, host plants observed in 2010 and 2019, and topographic features (i.e., hilltops and ridgelines). The habitat model is created from the following parameters based on general industry guidance from USFWS for other projects:

- 200-meter buffer around Quino checkerspot butterfly locations
- 200-meter buffer around “significant” plant populations (i.e., >20 individuals)
- Hilltops
- Ridgelines (centerline with 100-foot (31.2-meter) buffer)

Plant population buffers, hilltops, and ridgelines were added to the primary Quino checkerspot butterfly detection polygon or each other as they would connect. If the link was broken by distance or unsuitable habitat, then the potentially occupied patch would end.

The 2010, 2018, and 2019 Quino checkerspot butterfly exclusion areas were removed from the model, because those areas were determined to be unsuitable for this species. This model resulted in approximately 674.1 acres of potentially occupied habitat mapped within the Campo Corridor and approximately 121.8 acres mapped within the Boulder Brush Corridor. Figure 11, Quino Checkerspot Butterfly Modeled Habitat, shows the model and estimated occupied habitat.

4.6 Bald and Golden Eagles

Bald and golden eagles are federally protected under the BGEPA.

4.6.1 Bald Eagle

Within mainland Southern California, bald eagles primarily winter at larger bodies of water in the lowlands and mountains (Garrett and Dunn 1981). It is fairly common as a local winter migrant at a few favored inland waters in Southern California. The greatest numbers occur at Big Bear Lake, Cachuma Lake, Lake Mathews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River (Zeiner et al. 1990). In San Diego County, bald eagles are observed at Lake Henshaw and occasionally at other lakes and reservoirs during the winter (Unitt 2004). Bald eagles have recently begun nesting in San Diego County, and have been recorded nesting at the Ramona Grasslands Preserve each year since 2013 (AECOM 2017; eBird 2018).

Migratory patterns of bald eagles are complex and reflect a variety of circumstances, including age of the individual, location of the breeding site, severity of climate, and food availability (Buehler 2000). Eagles from northern populations migrate south between August and January, with subadults leaving the breeding grounds earlier than adults (Buehler 2000). The migratory movements of salmon affect the movements of both adults and subadults in the Pacific Northwest, where many bald eagles move north in late summer to feed during the salmon run on the Chilkat River in Alaska. Adults from Alaska move south in fall, arriving in November and December. Adults in the southern part of the species' range are generally not migratory, but remain near the nest sites year-round (Buehler 2000). In inland areas of central and Southern California, wintering bald eagles from northern latitudes generally arrive in October or November and remain until March or April (Lehman 1994; Roberson 2002; Unitt 2004; Linthicum et al. 2007).

No bald eagles have been observed during the ongoing eagle point count surveys conducted from October 2017 to present (or during any other surveys). The Project site lacks lakes, ponds, and perennial rivers that support fish, their typical prey. Bald eagles typically nest and roost around water sources.

4.6.2 Golden Eagle

In California, golden eagles breed January through August, with peak breeding activity occurring February through July. Breeding typically begins in January with courtship and nest building, and egg laying typically occurs in February and March (Brown 1976; CPUC and BLM 2011; WRI 2010). Golden eagles typically lay one to three eggs, which they incubate for 43 to 45 days (Beebe 1974). The hatching and then feeding of nestlings takes place March through June. After their young fledge, the adult eagles may continue to feed the young birds for several months (CPUC and BLM 2011; WRI 2010). In the prey-rich oak woodland and savanna habitats of the California Coast Ranges, established golden eagle breeding pairs typically nest in most years (Hunt et al. 1999; Hunt and Hunt 2006); however, the long breeding cycle may contribute to some pairs breeding only every other year, even when food is abundant (CPUC and BLM 2011; WRI 2010). In other situations, where overall ecosystem productivity is lower or more variable from year to year, pairs need to range farther in search of food and may not nest every year because of the energetic demands of securing dispersed prey (Kochert et al. 2002).

Lagomorphs (rabbits and hares) and ground squirrels are of primary importance in the diet of most golden eagles, including in San Diego County, but their diet may include a wide variety of other mammals, reptiles, and birds, and frequently includes carrion, especially during winter (Johnsgard 1990; Kochert et al. 2002; Olendorff 1976).

There are no suitable large trees with a developed shrub layer or cliffs present for nesting; therefore, this species is not expected to nest on site. Unitt (2004) states that "The golden eagle is absent from some surprisingly large yet little disturbed areas of San Diego County, such as Cuyamaca Mountains and the Campo Plateau between Lake Morena and Jacumba." The historical breeding distribution map and general occurrence maps in Unitt (2004) also present a pocket of unoccupied habitat near the Project site.

4.6.2.1 Results of 2017–2019 Surveys

Weekly focused eagle surveys in support of eventual USFWS and CDFW coordination regarding the need for an eagle take permit have been conducted on site in 2017 through 2019 (see Section 3.3.6, Golden Eagle Aerial and Ground Nest Searches). Nine golden eagles were observed flying over the study area during the 2017 through 2019 surveys (Figure 12, Results of Eagle Count Surveys). During the 30-minute point-count surveys, only one juvenile golden eagle was detected on April 11, 2019, for 2 minutes. Single juvenile golden eagles were also detected during the all-day eagle surveys on October 6 and October 8, 2018. Additionally, eight golden eagles were detected between November 2017 and October 2018 on seven occasions for a total of 13 minutes (Table 5). In total, as of September 2019, eagles were observed on site for approximately 15 of more than 131,600 minutes during the 2017–2019 all-day eagle surveys and avian 30-minute point-count surveys.

Table 5
Golden Eagle Detection Data

Survey Type	Date	Number/Age	Minutes of Detection	Distance from Observer (Meters)	Flight Height Range (Meters)
Fall Migration All-Day	11/21/2017	1 adult	1	270	67–152
Fall Migration All-Day	11/21/2017	1 adult	1	900	101–171
Fall Migration All-Day	5/16/2018	1 adult	1	1,300	110–198
Fall Migration All-Day	10/6/2018	1 adult	3	3,000	762–914
Fall Migration All-Day	10/6/2018	1 juvenile	3	150	0–30
Fall Migration All-Day	10/8/2018	1 juvenile	3	—	305–677
Fall Migration All-Day	10/16/2018	2 adults	1	1,600	244–853
30-Minute Point Count	4/11/2019	1 juvenile	2	—	121–213

Table 6 shows the level of survey effort applied for 30-minute point-count surveys and fall migration eagle surveys.

Table 6
Point Count and Eagle Survey Effort

Survey	Survey Date Range	Total Sites Visited	Survey Length	Total Survey Minutes	Total Survey Hours
30-Minute Point Count	09/08/2017–09/26//2019	1,510	30 minutes	45,300[1]	755.00
Eagle Survey	10/02–12/01/2017 and 10/02–11/28/2018	206	Varies	86,316	1,438.60

Note:
[1] Includes 82 visits to site A, which overlaps with the Campo Wind Project.

4.6.2.2 USGS Eagle Data

Additionally, USGS has been capturing eagles and affixing telemetry transmitters to them that collect data at least every either 15-minute, 30-second, or 6-second intervals, depending on the equipment and golden eagle behavior, and has been collecting hundreds of thousands data points since 2014 (Tracey et al. 2016, 2017, 2018). As of February 23, 2016, USGS has 15 eagles with active transmitters (Tracey et al. 2016) and from February 2016 to February 2017 there were 18 eagles with active transmitters (Tracey et al. 2017). This is the most comprehensive dataset available and it includes real-time and continual data on each individual. The Figure 13 series (USGS Golden Eagle (Birds F004–M011)) depicts the data for each individual that occurred within the 10-mile On-Reservation portion of the Project Site over this period; the data for each are summarized below by individual. Tabular data for each data point captured within the 10-mile

buffer are provided in Appendix G. The Figure 13 series also depicts the data for each individual that occurred within the 10-mile Off-Reservation portion of the Project Site over this period; the data for each are summarized below by individual.

This detailed data, combined with the extensive surveys and past surveys on site and in the vicinity, results in a comprehensive dataset from which to develop conclusions. Although golden eagles have been documented within the 10-mile area and the data shows golden eagles traveling in a straight line instead of their actual flight path, including a few brief incursions over the Project Site, these are very minor when compared to their overall use areas and geographic range. Therefore, line paths created from the telemetry data are considered to be substantial analysis for the Project Site. As shown in the figures, Table 7, and the discussion below, the Project Site appears to be at the very fringe of their individual territories or use areas, and likely mostly represent brief exploratory searches. The Figure 13 series shows this information.

Table 7
Biotelemetry Data for Golden Eagles within 10 Miles of Project Site

Eagle ID	Date Captured	Capture Location	Primary Use Areas (Tracey et al. 2016, 2017)	Activity on/near Project Site (10-Mile Buffer)
F004	12/27/2014	Marron Valley	Biotelemetry data show this individual traveling from southeast San Diego County north through the Peninsular Ranges into the San Jacinto and San Bernardino Mountains. There is limited flight activity west to the San Gabriel Mountains and back east.	The data show a flight path through the northern portion of the Project Site on April 10 and 11, 2015, and through the southern portion of the Project Site on October 22, 2015 (Figure 13a). Within the 10-mile buffer, the data show a couple of points northwest of the Project Site in January 2016 (Figure 13b).
F006	2/2/2015	Santa Ysabel	Biotelemetry data show this individual traveling from Baja California north into Otay, Ramona, and Anza Borrego, and through Palm Desert and Cathedral City.	Within the 10-mile buffer, the data show points west and southwest from May 2015 and a few points north of the Project site in June 2015 (Figure 13c).
F007	2/23/2015	Long Potrero	Biotelemetry data show this individual concentrated in two areas: east of Tecate, Mexico, and around Barrett Lake. Flight paths also show travel to the surrounding areas as far north as Julian and farther south of Tecate, Mexico.	Within the 10-mile buffer, the data show a flight pattern from December 23, 2015. There are several points within the southwest portion of the Reservation from November 2015. There are points from March, April, November, and December 2015 west and southwest of the Project Site and along the western side of the buffer (Figure 13d). Data from 2016 show flight paths through the western portion of the Reservation on April 2, 2016; July 15, 2016; August 10, 12, and 13, 2016; September 22 and 30, 2016; October 15, 2016; and November 8, 2016. There are also numerous point data within the western half of the buffer in 2016 (Figure 13e). In 2017, data show

Table 7
Biotelemetry Data for Golden Eagles within 10 Miles of Project Site

Eagle ID	Date Captured	Capture Location	Primary Use Areas (Tracey et al. 2016, 2017)	Activity on/near Project Site (10-Mile Buffer)
				points from January and February within the southwest portion of the buffer (Figure 13f).
F008	3/14/2015	Pamo Valley	Biotelemetry data show this individual primarily concentrated around the Ramona and Santa Ysabel areas and east of Cuyamaca Reservoir in the Cleveland National Forest.	Within the 10-mile buffer, the data show points from May, June, and July 2015 west of the Project Site (Figure 13g).
F013	2/11/2016	Gregory Mountain	Biotelemetry data show this individual traveling around the Gomez Trail and Agua Tibia Creek areas on the Pauma and Pala Reservations.	Within the 10-mile buffer, the data show a north–south flight path through the middle of the Project Area, and there are several points from November 2016 along the western side of the buffer (Figure 13h).
F014	2/12/2016	Fremont Canyon	Biotelemetry data show this individual traveling throughout Southern California including Baja California, the San Joaquin Valley and from California to Wyoming and back.	The data show a flight path through the central portion of the Project Site on March 8, 2016. The transmitter recorded the eagle flying through Project Area between 11:41 a.m. and 11:56 a.m. and the individual continued flying in a southwest direction. There are also several points from March 2016 along the eastern side of the buffer (Figure 13i).
F016	3/5/2016	Barrett Lake	Biotelemetry data shows this individual concentrated around Barrett Lake and flight paths in the Cleveland National Forest area as well as into Mexico.	Within the 10-mile buffer, the data show points from March, April, and June–November 2016 west of the Project Site in Mexico (Figure 13j). There are a couple of points from January 2017 west of the Project Area (Figure 13k).
M002	1/8/2015	Marron Valley	Biotelemetry data show this individual primarily concentrated around the San Ysidro Mountains and in the mountains south of the Tijuana area.	Within the 10-miile buffer, the data show just two points from February 2015 along the very western edge of the buffer (Figure 13l).
M005	12/1/2015	Barrett Lake	Biotelemetry data show this individual concentrated in the hills just south of Barrett Lake with some flight paths north toward Pothole Canyon and northwest toward the San Diego Country Estates.	Within the 10-mile buffer, the data show a flight path from October 1, 2015 through the very southern portion of the Project Site and into Mexico. There are also points from March, April, June, August, and September 2015 along the western portion of the buffer (Figure 13m). Data from 2016 show points along the western portion of the buffer from February, April, July, and September–November (Figure 13n). Within the 10-miile buffer, the data show just three points from February 2017 along the very western edge of the buffer (Figure 13o).

Table 7
Biotelemetry Data for Golden Eagles within 10 Miles of Project Site

Eagle ID	Date Captured	Capture Location	Primary Use Areas (Tracey et al. 2016, 2017)	Activity on/near Project Site (10-Mile Buffer)
M007	12/9/2015	Long Valley	Biotelemetry data show this individual concentrated around the La Jolla Reservation with flights south toward Campo and into Ensenada, Mexico.	Within the 10-mile buffer, the data show points from December 2015 along the western half of the buffer (Figure 13p). In 2016, there are flight paths through the Project Area on January 14, 2016; January 17, 2016; May 13, 2016; May 23, 2016; June 19 and 29, 2016; July 28, 2016; August 1 and 24, 2016; September 9 and 11, 2016; and October 2, 2016. There are also point data within the buffer throughout most of the 2016 (Figure 13q).
M010	12/17/2015	Proctor Valley	Biotelemetry data show this individual concentrated east and south of Tijuana, Mexico with flight paths east of Tecate, Mexico, and the Jamul Mountains.	Within the 10-mile buffer, the data show a flight path from February 17, 2016; there are points from February and March 2016 south of the Project site and into Mexico (Figures 13r).
M011	12/21/2015	Barrett Lake	Biotelemetry data show this individual concentrated the Presa El Carrizo Lake southwest of Tecate, Mexico, with additional concentrated flights around the Otay Lakes, Barrett Lake.	There are no points from 2015 within the 10-mile buffer, but show points west of the buffer (Figure 13s). The 2016 data shows a flight path on January 25, 2016, in the western and southern portion of the Reservation; there are also points from January–March 2016 in the Reservation and western portion of the buffer and from July 2016 north of the Project Area (Figure 13t).

4.7 Jurisdictional Wetlands and Non-Wetland Waters

A formal jurisdictional delineation of waters and wetlands was conducted in 2017 and 2018 for the Project Site (Figure 8 series).

The jurisdictional resources in the Project Area consist of Campo Creek, Miller Creek, and tributaries to Campo Creek, Tule Creek, and the Tijuana River. Small ephemeral channels collecting runoff and surface flow from the hillslopes and roads that drain toward Campo Creek characterize the majority of the resources in Project Area. There is an unnamed drainage with a wide floodplain bisecting the Project Area in a north–south direction. This floodplain has a low-flow channel where it receives surface flow that drains into Campo Creek, but the majority of the floodplain appears to be supported by subsurface flow, indicated by the patches of riparian herbs, shrubs, and trees within portions of the floodplain; the channel is considered an intermittent non-wetland water of the United States. There are sections of the floodplain dominated by upland species, such as big sagebrush scrub, tall tumblemustard, and cheatgrass. There are a few drainages in the northeast that appear to drain east and connect to Tule Creek, and there are a few drainages

in the northwest that are part of Miller Creek. None of the ephemeral drainages within the Project Site supported hydrophytic vegetation; therefore, no data station samples were conducted. These features are considered ephemeral non-wetland waters of the United States. Some features appear to be completely isolated from Campo Creek or Tule Creek as they completely abate into uplands. There are eight disconnected features that are within 100 feet of Tule Creek or Campo Creek (or a tributary to these creeks), but that are considered waters of the United States based on the Clean Water Rule's definition of "adjacent waters." Any isolated features beyond 100 feet of Tule or Campo Creek (or a tributary to these creeks) are not considered waters of the United States.

Campo Creek receives surface and subsurface flows from the surrounding hills and mountains. Campo Creek flows west through Campo Valley and into Mexico where it connects to Tecate Creek. Tecate Creek continues flowing west and northwest, eventually entering the United States near Marron Valley where it flows into the Tijuana River. The Tijuana River outlets into the Pacific Ocean at Imperial Beach. Therefore, these waters in the Project Area are considered subject to regulation by the ACOE.

Tule Creek receives surface and subsurface flows from headwaters originating in the Laguna Mountains northwest of the Project Area. It continues draining in a downward gradient in an east and southeast orientation into Tule Lake, located approximately 4.5 miles southeast of the Project Area. Water then flows into Tule Canyon, which eventually outlets into Carrizo Creek where it drains north/northeast. Carrizo Creek turns into Carrizo Wash and connects to San Felipe Wash and eventually into the Salton Sea to form a significant nexus to a traditional navigable water. Therefore, these waters in the Project Area are considered subject to regulation by the ACOE.

Miller Creek receives surface flow from the surround hills and mountains. Miller Creek drains east and south until it connects with Campo Creek just east of the Project Site.

The Tijuana River flows through Mexico and along the U.S./Mexico border until it drains into the Pacific Ocean south of San Diego. The tributaries in the southwest corner of the Project site appear to flow through a series of tributaries in Mexico until reaching the Tijuana River.

The Project Site supports non-wetland stream features, wetland habitat associated with the unnamed channel and floodplain, as well as some basins and seeps/springs that are all considered jurisdictional waters of the United States (Figure 8 series). One seep/spring supports an emergent wetland that is otherwise in a completely upland area in the northeast corner of the Project Site (Data Station (DS) 1a–b). Another seep/spring supports a small freshwater marsh adjacent to a dirt road near Live Oak Trail (DS 2a–b, DS 3). Emergent wetland and southern willow scrub, and valley Sacaton grassland occur within the unnamed channel/floodplain and meet the definition of a three-parameter wetland (DS 5a–b, DS 6a–b, DS 7a–b, and DS 8a–d). Data stations in the Off-Reservation area are primarily associated with non-wetland waters (DS 9–12f). Table 8 includes

the jurisdictional aquatic resources within the Project Site and Table 9 includes the results of the data station samples within the Project Area. Appendix H includes the data station forms and OHWM datasheets representing the non-wetland waters mapped in the Project Area. These features are shown on the Figure 8 series.

Table 8
ACOE Jurisdictional Resources on the Project Site

Vegetation Community	Jurisdiction	Acres
Emergent wetland Freshwater marsh Valley sacaton grassland	Wetland waters of the United States	3.69
Southern willow scrub	Wetland waters of the United States	0.71
Unvegetated channel – ephemeral	Waters of the United States	4.89
Unvegetated channel – intermittent	Waters of the United States	0.01
	Total Jurisdictional Resources	**9.30**

Table 9
Data Station Results – Study Area

Sample Point	Hydrophytic Vegetation	Hydric Soils	Hydrology	Jurisdiction
DS 1a	Yes	Yes	Yes	ACOE wetland waters of the United States
DS 1b	Yes	Yes	No	ACOE non-wetland waters of the United States
DS 2a	Yes	No	No	ACOE non-wetland waters of the United States
DS 2b	Yes	No	No	ACOE non-wetland waters of the United States
DS 3	Yes	Yes	Yes	ACOE wetland waters of the United States
DS 4	No	No	Yes	ACOE non-wetland waters of the United States
DS 5a	Yes	Yes	Yes	ACOE wetland waters of the United States
DS 5b	No	No	Yes	ACOE non-wetland waters of the United States
DS 6a	No	No	Yes	ACOE non-wetland waters of the United States
DS 6b	No	Yes	Yes	ACOE non-wetland waters of the United States
DS 7a	Yes	Yes	Yes	ACOE wetland waters of the United States
DS 7b	Yes	No	No	ACOE non-wetland waters of the United States
DS 8a	Yes	Yes	Yes	ACOE wetland waters of the United States
DS 8b	Yes	Yes	Yes	ACOE wetland waters of the United States
DS 8c	Yes	Yes	Yes	ACOE wetland waters of the United States
DS 8d	No	Yes	Yes	ACOE non-wetland waters of the United States
DS 9	No	No	Yes	ACOE non-wetland waters of the United States

Table 9
Data Station Results – Study Area

Sample Point	Hydrophytic Vegetation	Hydric Soils	Hydrology	Jurisdiction
DS 10a	Yes	No	Yes	ACOE non-wetland waters of the United States
DS 10b	No	No	Yes	ACOE non-wetland waters of the United States
DS 10c	No	No	No	N/A
DS 11	No	Yes	Yes	N/A
DS 12a	Yes	No	No	N/A
DS 12b	No	No	No	N/A
DS 12c	Yes	No	Yes	ACOE non-wetland waters of the United States
DS 12d	Yes	No	Yes	N/A
DS 12e	No	No	Yes	N/A
DS 12f	No	No	No	N/A

DS = Data Station; N/A = not applicable.

4.8 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the immigration and emigration of animals. Wildlife corridors contribute to population viability by allowing the exchange of genes between populations, which helps maintain genetic diversity; by providing access to adjacent habitat areas, representing additional territory for foraging and mating; by allowing for a greater carrying capacity; and by providing routes for colonization of habitat lands following local population extinctions or habitat recovery from ecological catastrophes (e.g., fires). Habitat linkages are patches of native habitat that function to join two larger patches of habitat. They serve as connections between habitat patches and help reduce the adverse effects of habitat fragmentation. The linkage represents a potential route for gene flow and long-term dispersal. Habitat linkages may serve as both habitat and avenues of gene flow for small animals such as passerine birds, small mammals, reptiles, and amphibians. Habitat linkages may be represented by continuous patches of habitat or by nearby habitat "islands" that function as "stepping stones" for dispersal.

Previous studies identified the undeveloped portions of the study area as suitable for wildlife movement and related local dispersal (e.g., juvenile animals from natal areas) (AECOM 2012). The BSA previously identified by AECOM in 2010 (AECOM BSA) may function as a portion of the home ranges (e.g., foraging for food or water, defending territories, searching for mates, breeding areas, or cover) for large-ranging species. For example, cougar (*Puma concolor*) ranges are approximately 22,981 acres (9,300 hectares) for 12 adult females and 89,699 acres (36,300 hectare) for 2 adult males in Southern California. Mule deer (*Odocoileus hemionus*) ranges are approximately 121 to 2,812 acres (49 to 1,138 hectares) (Dickson et al. 2004; Kie et al. 2002),

depending on the habitats available. Smaller species, such as butterflies, amphibians, reptiles, birds, and small mammals, have smaller home ranges; therefore, individuals of these species present in the study area may spend most of their lives within the study area. The dispersal of these species occurs over multiple generations (Penrod et al. 2006).

At the regional scale, large wildlife species and birds use the Project Area for dispersal (e.g., individuals extending range distributions) and seasonal migration. In the Project Area, upland habitat may provide vegetative cover to shelter wildlife to support movement for wildlife species (Penrod et al. 2006). The Project Area is part of a linkage that connects habitats between the Cleveland National Forest to the north and habitats in Baja California to the south, and along the U.S./Mexico international border (CBI 2003; CBI et al. 2015). The La Posta Linkage planning area borders the Project Area on the west; however, the linkage excludes the Project Area in the analysis because of access and land use planning constraints (CBI 2003). However, several of the focal species identified in the La Posta Linkage and habitat supporting these species were detected in the Project Site, including Quino checkerspot butterfly, golden eagle, black-tailed jackrabbit (*Lepus californicus*), and Blainville's horned lizard (*Phrynosoma blainvillii*); thus, the Project Site contributes to a linkage that sustains wildlife movement. However, major transportation corridors (i.e., I-8 and SR-94) represent significant barriers to wildlife movement and sources of mortality for large wildlife species (CBI 2003). Smaller surface streets can be significant barriers to smaller, less-mobile species, but are less of an impediment to the movement of large wildlife species (CBI 2003).

The Project Area and immediate vicinity are located within the Pacific Flyway, a major migration route for birds that travel north–south between North and South America. Small bird (passerine) migration occurs mostly at night. In Southern California, the Pacific Flyway spans a broad front, although migrating birds are not uniformly distributed across the landscape (Bloom 1985). Small birds avoid areas that are more turbulent over mountains; therefore, they mostly follow the coast or desert to reach their wintering grounds farther south (e.g., Mexico to South America). Smaller birds that do migrate through the mountains will generally seek out forested areas that provide cover during daylight hours.

Conversely, migrating raptors and other soaring birds tend to follow mountain ridges and use updrafts created by the topography. Most raptorial species (other than turkey vultures and Swainson's hawks (*Buteo swainsoni*)) migrating to and from Mexico migrate across a broad and diffuse front and are not known to concentrate movements anywhere. Many birds migrating from their winter range in western mainland Mexico to their breeding range in Northern California, the Pacific Northwest, or Alaska use San Diego County as a corridor for crossing from the desert to the coastal slope (Unitt 2007, as cited in AECOM 2012). However, this migration happens along the east side of San Diego County's mountains and is most concentrated in the canyons and valleys that lead from southeast to northwest (Unitt 2007, as cited in AECOM 2012). Therefore, the Project Area is not located within this northward migration route.

In addition to the Pacific Flyway, shorter, irregular movements of resident birds during post-breeding dispersal or in response to changes in food sources commonly occur in the region. Avian species and groups documented from the study area and immediate vicinity that are known to make these types of movements include the wrentit, some woodpeckers, jays, nuthatches, and finches (Garrett and Dunn 1981).

Based on the avian data collected for the Project and the site's location, habitat, and topography, large concentrations of migrating birds do not regularly pass through the Project Area. Additionally, radar shows migrating species travel at much higher altitudes than the proposed wind turbines will reach. Previous studies within the Project vicinity, including the Tule Wind Project, concluded that large concentrations of migrants do not appear to regularly pass through the region (Tetra Tech 2008, 2009). However, migration is not a uniform and consistent phenomenon, and it is expected that while generally low, it will vary due to vagaries of weather or other unforeseeable factors (DiGaudio et al. 2008; Kerlinger and Moore 1989; Manville 2005; NREL 2006).

4.9 Other Avian Data Collected

This section describes the additional data collected during the avian point-count surveys and bat surveys.

4.9.1 Bird Data Analysis

Data collected during avian point-count surveys were analyzed in order to establish baseline conditions; understand species richness, composition, use patterns, and exposure to wind turbines; and provide a basis for estimating avian risk of collision with wind turbines as a result of construction and operation of the Project.

Between 2017 and 2019 three types of avian surveys were conducted for the Project, including raptor nest searches, all-day eagle point counts (2 years of fall/winter), and 30-minute point-count surveys. In order to provide results which are comparable to other local wind projects (AECOM 2012; Tetra Tech 2008, 2009), only analysis from the 30-minute point-count surveys were included in this analysis. Avian point-count surveys were conducted on a weekly basis[7] between September 8, 2017, and February 2018 and from July 13, 2018, to September 26, 2019. Surveys were performed across 20 point-count locations[8] distributed across the Project Area (Figure 7). Each point-count location incorporated a survey area of 800 meters (2, 625 feet) around the point location.

[7] With the exception of the first survey, surveys were conducted on a weekly basis. The first survey was performed on September 8, 2017, with the following survey approximately 4 weeks later on October 9, 2017.

[8] Note that seven additional point-count stations were studied on the Boulder Brush Facilities component related to a potential wind facility on that site. That data is not included here or included in the analysis because it has little bearing on the gen-tie analysis on that site. The data are similar to what was collected for these 20 sites, however, and would not have skewed the results of this analysis.

Avian species observed during surveys were analyzed by species and as a taxonomically related group (Table 10). Avian groups were generally organized by taxonomy in order to reflect groups with similarities in bird behavior, general habitat requirements, and typical life history patterns. In addition, these groupings were consistent with other local wind projects, mentioned above, in order to produce comparable results.

A description of the measurements examined, along with calculation methods, provided in this report is provided in Table 11. As described in Table 11, species richness is described by the Number of Species present or by Species Mean Use (i.e., the average number of species observed per survey point count location). Species richness describes the diversity of avian species present on site. Composition of an avian community is the percent of the population composed by a given avian group, which describes the diversity and relative abundance of different avian groups on site. Individual Mean Use describes the average level of individual bird activity occurring during point-count surveys. The Shannon Diversity Index (SDI)[9] is a measure of the diversity, or distribution, of observations (i.e., individual species) among categories (i.e., point-count locations). Observations distributed evenly among categories would result in relatively high SDI values, suggesting high diversity. Conversely, if the majority of observations are found in very few categories, SDI values would be relatively low, suggesting low diversity.

Last, an Exposure Index was calculated for each individual species. This index provides a relative measure of how often birds are observed flying at turbine blade heights proposed for the wind turbines (i.e., the rotor swept zone) and provides a measure for the relative risk that the Project may pose to avian species observed. The rotor swept zone considered for this analysis assumes a total turbine height (highest point of the blades) of 179 meters (587 feet), 135-meter (443-foot) blade diameter, and 44-meter (144-foot) ground clearance (lowest point of the blades). However, it should be noted that an Exposure Index alone does not provide a complete measure for a species' level of risk of collision by wind turbines. Many factors affect a species risk of collision including, but not limited to, bird density, age, proximity to nests, residency status, season, weather, flight behaviors, interaction with other birds, prey availability, topography, wind speed, and project design (e.g., turbine height, rotor speed) (USFWS 2013). Therefore, the indices presented below should be considered one measurement of avian risk for exposure to wind turbines.

[9] Also referred to as the Shannon-Wiener diversity index or Shannon-Weaver index (Shannon and Weaver 1949; Zar 1984).

Table 10
Taxonomically Related Avian Groups for Species Observed

Avian Group	Order	Family Name	
		Scientific Name	*Common Name*
Crows and Allies	Passeriformes	Corvidae	Crows and Jays
Doves and Pigeons	Columbiformes	Columbidae	Doves and Pigeons
Gamebirds	Galliformes	Odontophoridae	New World Quail
Nighthawks and Nightjars	Caprimulgiformes	Caprimulgidae	Goatsuckers
Perching Birds[1]	Cuculiformes	Cuculidae	Cuckoos, Roadrunners, and Anis
	Passeriformes[1]	Aegithalidae	Long-Tailed Tits and Bushtits
		Alaudidae	Larks
		Cardinalidae	Cardinals and Allies
		Fringillidae	Fringilline and Cardueline Finches and Allies
		Hirundinidae	Swallows
		Icteridae	Blackbirds
		Laniidae	Shrikes
		Mimidae	Mockingbirds and Thrashers
		Paridae	Chickadees and Titmice
		Parulidae	Wood-Warblers
		Passerellidae	New World Sparrows
		Passeridae	Old World Sparrows
		Polioptilidae	Gnatcatchers
		Ptiliogonatidae	Silky-Flycatchers
		Regulidae	Kinglets
		Sylviidae	Sylviid Warblers
		Troglodytidae	Wrens
		Turdidae	Thrushes
		Tyrannidae	Tyrant Flycatchers
		Vireonidae	Vireos
Raptors	Accipitriformes	Accipitridae	Hawks, Kites, Eagles, and Allies
	Cathartiformes	Cathartidae	New World Vultures
	Falconiformes	Falconidae	Caracaras and Falcons
Swifts and Hummingbirds	Apodiformes	Apodidae	Swifts
		Trochilidae	Hummingbirds
Waterfowl[2]	Charadriiformes	Laridae	Gulls, Terns, and Skimmers
	Pelecaniformes	Pelecanidae	Pelicans
Woodpeckers	Piciformes	Picidae	Woodpeckers and Allies

1 Excludes Corvids and Allies. Includes Cuckoos and Allies.
2 Waterfowl observed, but observations were considered negligible occurrences and subsequently not included in the analysis.

Table 11
Measurements, Descriptions, and Calculation Methods

Measurement	Description	Calculation Methods
Number of Species	Number of different species present	Tally of the number of species observed.
Composition of Avian Community (%)	Percent of the population composed by a given species	Tally of the number of individuals observed for a given species divided by the total number of individuals observed across all surveys.
Species Mean Use[1]	Average number of **species** observed per survey per point count location	**By Point Location:** Calculated by (1) tallying the number of species observed at a given point location on a given survey day for all point locations and surveys, (2) summing the total number of species observed at a given point location across all surveys, and (3) dividing the total number of species by the total number of surveys performed at that point location. **By Avian Group:** For a given avian group, calculated by (1) tallying the number of species observed at a given point location on a given survey day for all point locations and surveys, (2) summing the total number of species observed across all point locations and surveys, and (3) dividing by the total number of surveys performed across all locations. **By Month:** For a given month, calculated by (1) tallying the number of species observed at a given point location on a given survey day for all point locations and surveys, (2) summing the total number of species observed across all point locations and surveys, and (3) dividing by the total number of surveys performed in a given month.
Individual Mean Use[2]	Average number of **individuals** observed per survey per point count location	**By Point Location:** Calculated by (1) tallying the number of individuals of a given species observed at a given point location on a given survey day for all point locations and surveys, (2) summing the total number of individuals observed at a given point location across all surveys, and (3) dividing the total number of species by the total number of surveys performed at that point location. **By Species (or Avian Group):** For a given species (or avian group), calculated by (1) tallying the number of individuals observed at a given point location on a given survey day for all point locations and surveys, (2) summing the total number of individuals observed across all point locations and surveys, and (3) dividing by the total number of surveys performed across all locations. **By Month:** For a given month, calculated by (1) tallying the number of individuals observed at a given point location on a given survey day for all point locations and surveys, (2) summing the total number of individuals observed across all point locations and surveys, and (3) dividing by the total number of surveys performed in a given month.

Table 11
Measurements, Descriptions, and Calculation Methods

Measurement	Description	Calculation Methods
Shannon Diversity Index (H)	Measure of species diversity in a community	$H' = -\sum_{i=1}^{k} p_i \log p_i$ where *k* = the number of species p_i = proportion of individuals found in species *i*, = n_i/N where n_i is the number of species of individuals in species *i* and *N* is the total number of individuals in the community
Exposure Index	Provides a relative measure of how often birds are observed flying at heights proposed for the wind turbines and relates to the relative risk of collision with turbines	EI = A * P_f * P_t where *A* = individual mean use (average number of individuals observed per survey per point count location; see calculations above) P_f = proportion of species detections in flight. Calculated by dividing the number of individuals observed in flight by the total number of individuals observed for the species across all surveys. P_t = proportion of time spent by a species flying within the rotor swept zone. Calculated by dividing the number of individuals observed in flight within the RSH by the total number of individuals observed in flight for the species across all surveys.

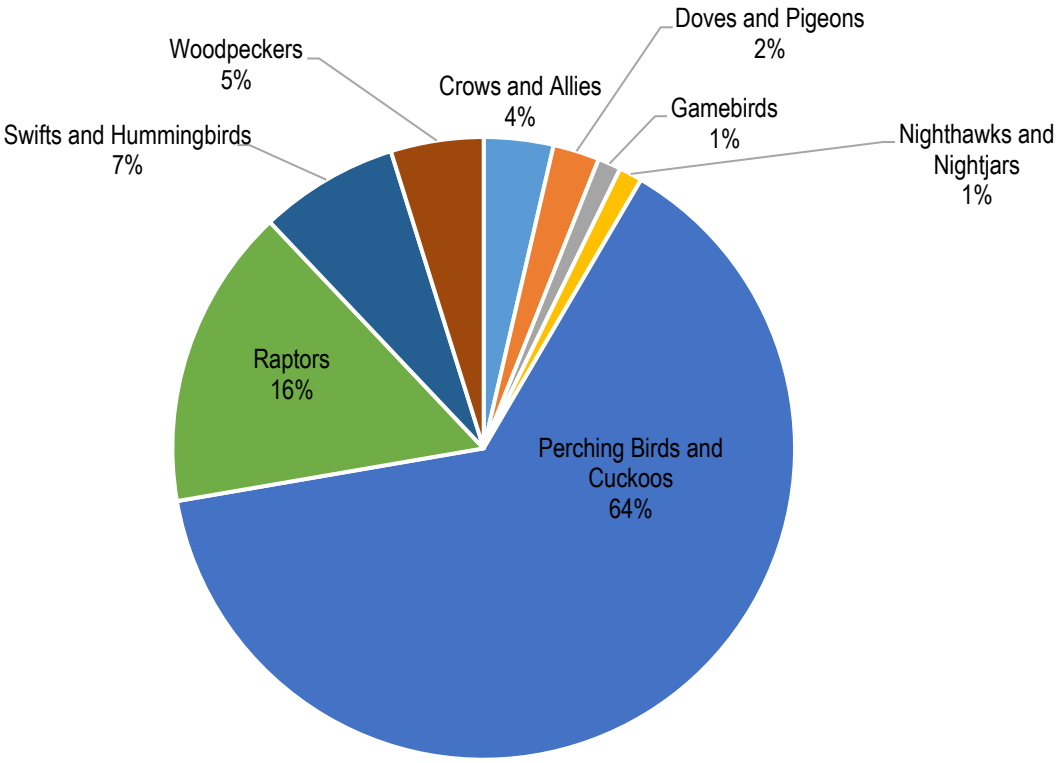
Notes:
1 In Shu'luuk Wind Project described as "Mean Species Richness," the average number of species observed per survey (AECOM 2012).
2 In Shu'luuk Wind Project described as "Mean Use," the average number of observations per survey (AECOM 2012).

4.9.2 Bird Results

Between September 8, 2017, and February 9, 2018, and July 13, 2018, and September 26, 2019, a total of 1,290 surveys were performed over 221 days across 20 point-count locations distributed throughout the Project Site (Figure 7), resulting in a total of 645 survey hours. As shown in Exhibit 1 and Figure 7, surveys for point-count locations in the northeastern portion of the Project Site (i.e., AA, AB, AC, and AD) were initiated in August 2018 and as a result were visited fewer times than the other point-count locations.

Overall, a total of 85 identifiable species were observed. Of these 85 species, 2 waterfowl (brown pelican (*Pelecanus occidentalis*) and ring-billed gull (*Larus delawarensis*)) were considered negligible observations and removed from the analysis. Therefore, a total of 83 species across 8 avian groups were analyzed. As shown in Exhibit 1, the majority of species observed included species within the perching birds (53 species, 64%) and raptor (13 species, 16%) groups. The remaining species observations were composed of swifts and hummingbirds (6 species, 7%), woodpeckers (4 species, 5%), crows and allies (3 species, 4%), doves and pigeons (2 species, 2%), gamebirds (1 species, 1%), and nighthawks and nightjars (1 species, 1%).

Exhibit 1. Number of Species by Avian Group



Similarly, as shown in Table 12, the majority of individual birds observed included crows and allies (3,398 individuals, 42%), perching birds (3,316 individuals, 41%) and raptors (949 individuals, 12%). The average number of species (Species Mean Use) and individuals (Individual Mean Use) observed per survey was highest for perching birds (1.50 species, 2.57 individuals) and crows and allies (1.04 species, 2.63 individuals) and raptors (0.48 species, 0.74 individuals). Although the majority of individuals observed across all surveys belonged to the perching birds group, only 33% (1,098 individuals) of the birds visually detected displayed any flight behaviors. Of those that did display flight behaviors the majority (97%, 1,069 individuals) were only documented as occurring below the rotor swept zone.

The majority of visually detected individuals in the following avian groups were observed in flight: crows and allies (2,460 individuals, 72%), doves and pigeons (86 individuals, 91%), nighthawks and nightjars (8 individuals, 67%), raptors (930 individuals, 98%), and swifts and hummingbirds (74 individuals, 90%). Of those in flight, raptors (650 individuals, 70%) occurred most often in the rotor swept zone, followed by crows and allies (1,193 individuals, 48%), swifts and hummingbirds (29 individuals, 39%), and doves and pigeons (16 individuals, 19%).

As shown in Table 13, the majority of raptors observed included red-tailed hawk (453 individuals, 6% of total, 48% of raptors) and turkey vulture (421 individuals, 5% of total, 44% of raptors).

Common ravens composed the majority of crows and allies observations (2,587 individuals, 32% of total, 76% of crows and allies). Doves and pigeon observations were composed of two species, of which mourning dove (52 individuals, 1% of total, 55% of doves and pigeons) was observed slightly more than rock pigeon (42 individuals, 1% of total, 45% of doves and pigeons). Swifts and hummingbird observations were mostly composed of two species, of which Anna's hummingbird (32 individuals, <1% of total, 39% of swifts and hummingbirds) was observed slightly more than white-throated swift (30 individuals, <1% of total, 37% of swifts and hummingbirds). In addition, a total of 16 special-status bird species were observed, of which turkey vulture was observed with the most frequency (Table 13). Only 1 golden eagle was detected.

Table 14 provides a summary of the Exposure Index. As shown, the species with the greatest risk for collisions with turbines, based on field observations alone, includes common ravens (EI = 0.92), followed by red-tailed hawks (EI = 0.27) and turkey vultures (EI = 0.21). Additional species that had an EI ≥ 0.01 included rock pigeon, house finch, phainopepla, Cooper's hawk, Vaux's swift, and white-throated swift.

Table 12
Summary of Species Richness and Diversity Measurements by Avian Group

Avian Group	Number of Species	Total Number of Individuals Observed	% of Total Number of Individuals Observed	Species Mean Use	Individual Mean Use	Number (%) of Visual Detections in Flight	Number (%) of Visual Detections in Flight within the RSH	Number (%) of Visual Detections in Flight above (only) the RSH	Number (%) of Visual Detections in Flight below (only) the RSH
Crows and Allies	3	3,398	42%	1.04	2.63	2,460 (72%)	1,193 (48%)	27 (1%)	1,240 (50%)
Doves and Pigeons	2	94	1%	0.03	0.07	86 (91%)	16 (19%)	7 (8%)	63 (73%)
Gamebirds	1	59	1%	0.02	0.05	0	0	0	0
Nighthawks and Nightjars	1	12	0%	0.01	0.01	8 (67%)	0	0	8 (100%)
Perching Birds	53	3,316	41%	1.50	2.57	1,098 (33%)	29 (3%)	0	1,069 (97%)
Raptors	13	949	12%	0.48	0.74	930 (98%)	650 (70%)	34 (4%)	246 (26%)
Swifts and Hummingbirds	6	82	1%	0.04	0.06	74 (90%)	29 (39%)	0	45 (61%)
Woodpeckers	4	89	1%	0.06	0.07	19 (21%)	0	0	19 (100%)
Total	**83**	**7,999**	**100%**	**3.18**	**6.20**	**4675**	**1917**	**68**	**2998**

Table 13
Summary of Observations by Avian Group, Order, Family, and Species

Avian Group	Order	Family	Common Name[1]	Scientific Name	Special-Status (Federal/State/ EC MSCP)[2]	Number of Individuals[3]	% of Total Individuals	% of Avian Group
Crows and Allies	Passeriformes	Corvidae	American crow	*Corvus brachyrhynchos*	—	28	0%	1%
			California scrub-jay	*Aphelocoma californica*	—	783	10%	23%
			common raven	*Corvus corax*	—	2587	32%	76%
Doves and Pigeons	Columbiformes	Columbidae	mourning dove	*Zenaida macroura*	—	52	1%	55%
			rock pigeon (rock dove)	*Columba livia*	—	42	1%	45%
Gamebirds	Galliformes	Odontophoridae	California quail	*Callipepla californica*	—	59	1%	100%
Nighthawks and Nightjars	Caprimulgiformes	Caprimulgidae	lesser nighthawk (M-B)	*Chordeiles acutipennis*	—	12	0%	100%

Table 13
Summary of Observations by Avian Group, Order, Family, and Species

Avian Group	Order	Family	Common Name[1]	Scientific Name	Special-Status (Federal/State/ EC MSCP)[2]	Number of Individuals[3]	% of Total Individuals	% of Avian Group
Perching Birds	Cuculiformes	Cuculidae	greater roadrunner	*Geococcyx californianus*	—	3	0%	0%
	Passeriformes	Aegithalidae	bushtit	*Psaltriparus minimus*	—	237	3%	7%
		Alaudidae	horned lark	*Eremophila alpestris*	—	2	0%	0%
		Cardinalidae	black-headed grosbeak (M-B)	*Pheucticus melanocephalus*	—	23	0%	1%
			lazuli bunting (M-B)	*Passerina amoena*	—	60	1%	2%
		Fringillidae	Cassin's finch (M)	*Haemorhous cassinii*	—	1	0%	0%
			house finch	*Haemorhous mexicanus*	—	329	4%	10%
			Lawrence's goldfinch (M-B)	*Spinus lawrencei*	BCC/None	138	2%	4%
			lesser goldfinch	*Spinus psaltria*	—	298	4%	9%
			pine siskin (M)	*Spinus pinus*	—	5	0%	0%
		Hirundinidae	cliff swallow (M-B)	*Petrochelidon pyrrhonota*	—	4	0%	0%
			northern rough-winged swallow (M-B)	*Stelgidopteryx serripennis*	—	1	0%	0%
			tree swallow (M-B)	*Tachycineta bicolor*	—	2	0%	0%
			violet-green swallow (M-B)	*Tachycineta thalassina*	—	2	0%	0%
		Icteridae	Brewer's blackbird	*Euphagus cyanocephalus*	—	1	0%	0%
			brown-headed cowbird	*Molothrus ater*	—	2	0%	0%
			Bullock's oriole (M-B)	*Icterus bullockii*	—	1	0%	0%
			hooded oriole (M-B)	*Icterus cucullatus*	—	2	0%	0%
			tricolored blackbird	*Agelaius tricolor*	BCC/SSC, ST	50	1%	2%
		Laniidae	loggerhead shrike	*Lanius ludovicianus*	BCC/SSC	2	0%	0%
		Mimidae	California thrasher	*Toxostoma redivivum*	—	211	3%	6%

Table 13
Summary of Observations by Avian Group, Order, Family, and Species

Avian Group	Order	Family	Common Name[1]	Scientific Name	Special-Status (Federal/State/ EC MSCP)[2]	Number of Individuals[3]	% of Total Individuals	% of Avian Group
			northern mockingbird	*Mimus polyglottos*	—	42	1%	1%
		Paridae	oak titmouse	*Baeolophus inornatus*	BCC/None	22	0%	1%
		Parulidae	black-throated gray warbler (M-B)	*Setophaga nigrescens*	—	2	0%	0%
			Townsend's warbler (M)	*Setophaga townsendi*	—	2	0%	0%
			yellow-rumped warbler (M)	*Setophaga coronata*	—	6	0%	0%
		Passerellidae	Bell's sparrow	*Artemisiospiza belli*	—	38	0%	1%
			black-chinned sparrow (M-B)	*Spizella atrogularis*	—	31	0%	1%
			black-throated sparrow	*Amphispiza bilineata*	—	20	0%	1%
			California towhee	*Melozone crissalis*	—	428	5%	13%
			dark-eyed junco	*Junco hyemalis*	—	171	2%	5%
			fox sparrow (M-B)	*Passerella iliaca*	—	2	0%	0%
			lark sparrow	*Chondestes grammacus*	—	11	0%	0%
			song sparrow	*Melospiza melodia*	—	12	0%	0%
			spotted towhee	*Pipilo maculatus*	—	388	5%	12%
			white-crowned sparrow (M)	*Zonotrichia leucophrys*	—	238	3%	7%
		Passeridae	house sparrow	*Passer domesticus*	—	1	0%	0%
		Polioptilidae	black-tailed gnatcatcher	*Polioptila melanura*	None/WL	2	0%	0%
			blue-gray gnatcatcher (M-B)	*Polioptila caerulea*	—	38	0%	1%
		Ptiliogonatidae	phainopepla (M-B)	*Phainopepla nitens*	—	53	1%	2%
		Regulidae	ruby-crowned kinglet (M)	*Regulus calendula*	—	3	0%	0%

Table 13
Summary of Observations by Avian Group, Order, Family, and Species

Avian Group	Order	Family	Common Name[1]	Scientific Name	Special-Status (Federal/State/ EC MSCP)[2]	Number of Individuals[3]	% of Total Individuals	% of Avian Group
		Sylviidae	wrentit	*Chamaea fasciata*	—	194	2%	6%
		Troglodytidae	Bewick's wren	*Thryomanes bewickii*	—	138	2%	4%
			canyon wren	*Catherpes mexicanus*	—	6	0%	0%
			house wren	*Troglodytes aedon*	—	2	0%	0%
			rock wren	*Salpinctes obsoletus*	—	11	0%	0%
		Turdidae	western bluebird	*Sialia mexicana*	—	49	1%	1%
		Tyrannidae	ash-throated flycatcher (M-B)	*Myiarchus cinerascens*	—	16	0%	0%
			Cassin's kingbird	*Tyrannus vociferans*	—	5	0%	0%
			Pacific-slope flycatcher (M-B)	*Empidonax difficilis*	—	1	0%	0%
			Say's phoebe	*Sayornis saya*	—	3	0%	0%
			western kingbird (M-B)	*Tyrannus verticalis*	—	4	0%	0%
		Vireonidae	warbling vireo (M-B)	*Vireo gilvus*	—	3	0%	0%
Raptors	Accipitriformes	Accipitridae	Cooper's hawk (M-B)	*Accipiter cooperii*	None/WL	30	0%	3%
			ferruginous hawk (M)	*Buteo regalis*	BCC/WL	3	0%	0%
			golden eagle	*Aquila chrysaetos*	BCC/FP, WL	1	0%	0%
			northern harrier	*Circus hudsonius*	None/SSC	2	0%	0%
			red-shouldered hawk	*Buteo lineatus*	—	7	0%	1%
			red-tailed hawk	*Buteo jamaicensis*	—	453	6%	48%
			sharp-shinned hawk (M)	*Accipiter striatus*	None/WL	5	0%	1%
			Swainson's hawk (M)	*Buteo swainsoni*	BCC/ST	1	0%	0%
			zone-tailed hawk (M)	*Buteo albonotatus*	—	1	0%	0%
	Cathartiformes	Cathartidae	turkey vulture	*Cathartes aura*	None/None/EC MSCP	421	5%	44%
	Falconiformes	Falconidae	American kestrel	*Falco sparverius*	—	18	0%	2%
			merlin (M)	*Falco columbarius*	None/WL	4	0%	0%
			prairie falcon	*Falco mexicanus*	BCC/WL	3	0%	0%

Table 13
Summary of Observations by Avian Group, Order, Family, and Species

Avian Group	Order	Family	Common Name[1]	Scientific Name	Special-Status (Federal/State/ EC MSCP)[2]	Number of Individuals[3]	% of Total Individuals	% of Avian Group
Swifts and Hummingbirds	Apodiformes	Apodidae	Vaux's swift (M)	*Chaetura vauxi*	None/SSC	7	0%	9%
			white-throated swift	*Aeronautes saxatalis*	—	30	0%	37%
		Trochilidae	Allen's hummingbird (M)	*Selasphorus sasin*	—	2	0%	2%
			Allen's/rufous hummingbird (M)	*Selasphorus sp.*	—	1	0%	1%
			Anna's hummingbird	*Calypte anna*	—	32	0%	39%
			Costa's hummingbird (M-B)	*Calypte costae*	BCC/None	10	0%	12%
Woodpeckers	Piciformes	Picidae	acorn woodpecker	*Melanerpes formicivorus*	—	17	0%	19%
			ladder-backed woodpecker	*Dryobates scalaris*	—	2	0%	2%
			northern flicker	*Colaptes auratus*	—	64	1%	72%
			Nuttall's woodpecker	*Dryobates nuttallii*	—	6	0%	7%

Notes:

1 Based on typical bird behavior for the project region: M = Migratory (non-breeder), M-B = Migratory (breeder). If not noted, species is considered a resident.

2 Status Abbreviations**:**
BCC: U.S. Fish and Wildlife Service Bird of Conservation Concern
SSC: California Species of Special Concern
FP: California Fully Protected Species
WL: California Watch List Species
ST: State Threatened
EC MSCP: Draft East County Multiple Species Conservation Program Covered Species

3 Total number of individuals observed (7,999) does not include 150 individuals not identified to species, 3 individual brown pelicans, and 2 individual ring-billed gull observations considered noise in the data.

Table 14
Summary of Exposure Indices by Avian Group and Species

Special Status[1]	Common Name	Scientific Name	Number of Individuals			Number of Visual Detections in Flight (F)	Proportion of Detections in Flight (F/Total)(Pf)	Number of Flight Detections in the RSZ (R)	Proportion of Detections in RSZ (R/F)(Pt)	Individual Mean Use (A)	Exposure Index (A*Pf*Pt)
			Total[2]	*Audible Only*	*Visual*						
					Crows and Allies						
	American crow	*Corvus brachyrhynchos*	28	2	26	26	0.93	1	0.04	0.022	0.00
	California scrub-jay	*Aphelocoma californica*	783	446	337	274	0.35	0	0.00	0.607	0.00
	common raven	*Corvus corax*	2587	398	2189	2160	0.83	1192	0.55	2.005	0.92
					Doves and Pigeons						
	mourning dove	*Zenaida macroura*	52	8	44	44	0.85	4	0.09	0.040	0.00
	rock pigeon (rock dove)	*Columba livia*	42	0	42	42	1.00	12	0.29	0.033	0.01
					Gamebirds						
	California quail	*Callipepla californica*	59	47	12	0	0.00	0	0.00	0.046	0.00
					Nighthawks and Nightjars						
	lesser nighthawk	*Chordeiles acutipennis*	12	0	12	8	0.67	0	0.00	0.009	0.00
					Perching Birds						
	ash-throated flycatcher	*Myiarchus cinerascens*	16	2	14	13	0.81	0	0.00	0.012	0.00
	Bell's sparrow	*Artemisiospiza belli*	38	20	18	6	0.16	0	0.00	0.029	0.00
	Bewick's wren	*Thryomanes bewickii*	138	115	23	17	0.12	0	0.00	0.107	0.00
	black-chinned sparrow	*Spizella atrogularis*	31	22	9	9	0.29	0	0.00	0.024	0.00
	black-headed grosbeak	*Pheucticus melanocephalus*	23	8	15	4	0.17	0	0.00	0.018	0.00
✓	black-tailed gnatcatcher	*Polioptila melanura*	2	0	2	2	1.00	0	0.00	0.002	0.00
	black-throated gray warbler	*Setophaga nigrescens*	2	0	2	2	1.00	0	0.00	0.002	0.00
	black-throated sparrow	*Amphispiza bilineata*	20	20	0	0	0.00	0	0.00	0.016	0.00
	blue-gray gnatcatcher	*Polioptila caerulea*	38	17	21	19	0.50	0	0.00	0.029	0.00
	Brewer's blackbird	*Euphagus cyanocephalus*	1	0	1	1	1.00	0	0.00	0.001	0.00
	brown-headed cowbird	*Molothrus ater*	2	0	2	2	1.00	0	0.00	0.002	0.00
	Bullock's oriole	*Icterus bullockii*	1	0	1	1	1.00	0	0.00	0.001	0.00
	bushtit	*Psaltriparus minimus*	237	48	189	146	0.62	0	0.00	0.184	0.00
	California thrasher	*Toxostoma redivivum*	211	188	23	13	0.06	0	0.00	0.164	0.00
	California towhee	*Melozone crissalis*	428	354	74	60	0.14	0	0.00	0.332	0.00
	canyon wren	*Catherpes mexicanus*	6	4	2	2	0.33	0	0.00	0.005	0.00
	Cassin's finch	*Haemorhous cassinii*	1	0	1	1	1.00	0	0.00	0.001	0.00
	Cassin's kingbird	*Tyrannus vociferans*	5	3	2	1	0.20	0	0.00	0.004	0.00
	cliff swallow	*Petrochelidon pyrrhonota*	4	0	4	4	1.00	4	1.00	0.003	0.00
	dark-eyed junco	*Junco hyemalis*	171	77	94	88	0.51	0	0.00	0.133	0.00
	fox sparrow	*Passerella iliaca*	2	0	2	2	1.00	0	0.00	0.002	0.00
	greater roadrunner	*Geococcyx californianus*	3	0	3	1	0.33	0	0.00	0.002	0.00
	hooded oriole	*Icterus cucullatus*	2	0	2	2	1.00	0	0.00	0.002	0.00
	horned lark	*Eremophila alpestris*	2	0	2	2	1.00	0	0.00	0.002	0.00
	house finch	*Haemorhous mexicanus*	329	174	155	147	0.45	9	0.06	0.255	0.01
	house sparrow	*Passer domesticus*	1	0	1	0	0.00	0	0.00	0.001	0.00
	house wren	*Troglodytes aedon*	2	1	1	1	0.50	0	0.00	0.002	0.00
	lark sparrow	*Chondestes grammacus*	11	10	1	0	0.00	0	0.00	0.009	0.00
✓	Lawrence's goldfinch	*Spinus lawrencei*	138	54	84	82	0.59	0	0.00	0.107	0.00
	lazuli bunting	*Passerina amoena*	60	36	24	14	0.23	0	0.00	0.047	0.00
	lesser goldfinch	*Spinus psaltria*	298	95	203	198	0.66	3	0.02	0.231	0.00
✓	loggerhead shrike	*Lanius ludovicianus*	2	1	1	1	0.50	0	0.00	0.002	0.00

Table 14
Summary of Exposure Indices by Avian Group and Species

Special Status[1]	Common Name	Scientific Name	Number of Individuals			Number of Visual Detections in Flight (F)	Proportion of Detections in Flight (F/Total)(Pf)	Number of Flight Detections in the RSZ (R)	Proportion of Detections in RSZ (R/F)(Pt)	Individual Mean Use (A)	Exposure Index (A*Pf*Pt)
			Total[2]	*Audible Only*	*Visual*						
	northern mockingbird	*Mimus polyglottos*	42	40	2	1	0.02	0	0.00	0.033	0.00
	northern rough-winged swallow	*Stelgidopteryx serripennis*	1	0	1	1	1.00	0	0.00	0.001	0.00
✓	oak titmouse	*Baeolophus inornatus*	22	15	7	7	0.32	0	0.00	0.017	0.00
	Pacific-slope flycatcher	*Empidonax difficilis*	1	1	0	0	0.00	0	0.00	0.001	0.00
	phainopepla	*Phainopepla nitens*	53	16	37	31	0.58	8	0.26	0.041	0.01
	pine siskin	*Spinus pinus*	5	0	5	5	1.00	5	1.00	0.004	0.00
	rock wren	*Salpinctes obsoletus*	11	5	6	3	0.27	0	0.00	0.009	0.00
	ruby-crowned kinglet	*Regulus calendula*	3	0	3	3	1.00	0	0.00	0.002	0.00
	Say's phoebe	*Sayornis saya*	3	0	3	2	0.67	0	0.00	0.002	0.00
	song sparrow	*Melospiza melodia*	12	8	4	2	0.17	0	0.00	0.009	0.00
	spotted towhee	*Pipilo maculatus*	388	349	39	26	0.07	0	0.00	0.301	0.00
	Townsend's warbler	*Setophaga townsendi*	2	0	2	2	1.00	0	0.00	0.002	0.00
	tree swallow	*Tachycineta bicolor*	2	0	2	2	1.00	0	0.00	0.002	0.00
✓	tricolored blackbird	*Agelaius tricolor*	50	0	50	50	1.00	0	0.00	0.039	0.00
	violet-green swallow	*Tachycineta thalassina*	2	0	2	2	1.00	0	0.00	0.002	0.00
	warbling vireo	*Vireo gilvus*	3	2	1	1	0.33	0	0.00	0.002	0.00
	western bluebird	*Sialia mexicana*	49	6	43	24	0.49	0	0.00	0.038	0.00
	western kingbird	*Tyrannus verticalis*	4	0	4	4	1.00	0	0.00	0.003	0.00
	white-crowned sparrow	*Zonotrichia leucophrys*	238	150	88	80	0.34	0	0.00	0.184	0.00
	wrentit	*Chamaea fasciata*	194	185	9	6	0.03	0	0.00	0.150	0.00
	yellow-rumped warbler	*Setophaga coronata*	6	1	5	5	0.83	0	0.00	0.005	0.00
Raptors											
	American kestrel	*Falco sparverius*	18	0	18	18	1.00	5	0.28	0.014	0.00
✓	Cooper's hawk	*Accipiter cooperii*	30	1	29	29	0.97	15	0.52	0.023	0.01
✓	ferruginous hawk	*Buteo regalis*	3	0	3	3	1.00	3	1.00	0.002	0.00
✓	golden eagle	*Aquila chrysaetos*	1	0	1	1	1.00	1	1.00	0.001	0.00
✓	merlin	*Falco columbarius*	4	0	4	4	1.00	0	0.00	0.003	0.00
✓	northern harrier	*Circus hudsonius*	2	0	2	2	1.00	2	1.00	0.002	0.00
✓	prairie falcon	*Falco mexicanus*	3	0	3	3	1.00	1	0.33	0.002	0.00
	red-shouldered hawk	*Buteo lineatus*	7	4	3	3	0.43	2	0.67	0.005	0.00
	red-tailed hawk	*Buteo jamaicensis*	453	8	445	440	0.97	344	0.78	0.351	0.27
✓	sharp-shinned hawk	*Accipiter striatus*	5	0	5	5	1.00	3	0.60	0.004	0.00
✓	Swainson's hawk	*Buteo swainsoni*	1	0	1	1	1.00	1	1.00	0.001	0.00
✓	turkey vulture	*Cathartes aura*	421	0	421	420	1.00	272	0.65	0.326	0.21
	zone-tailed hawk	*Buteo albonotatus*	1	0	1	1	1.00	1	1.00	0.001	0.00
Swifts and Hummingbirds											
	Allen's hummingbird	*Selasphorus sasin*	2	0	2	2	1.00	0	0.00	0.002	0.00
	Allen's/rufous hummingbird	*Selasphorus sp.*	1	0	1	1	1.00	0	0.00	0.001	0.00
	Anna's hummingbird	*Calypte anna*	32	5	27	26	0.81	0	0.00	0.025	0.00
✓	Costa's hummingbird	*Calypte costae*	10	2	8	8	0.80	0	0.00	0.008	0.00
✓	Vaux's swift	*Chaetura vauxi*	7	0	7	7	1.00	7	1.00	0.005	0.01
	white-throated swift	*Aeronautes saxatalis*	30	0	30	30	1.00	22	0.73	0.023	0.02

Table 14
Summary of Exposure Indices by Avian Group and Species

Special Status[1]	Common Name	Scientific Name	Number of Individuals			Number of Visual Detections in Flight (F)	Proportion of Detections in Flight (F/Total)(Pf)	Number of Flight Detections in the RSZ (R)	Proportion of Detections in RSZ (R/F)(Pt)	Individual Mean Use (A)	Exposure Index (A*Pf*Pt)
			Total[2]	*Audible Only*	*Visual*						
Woodpeckers											
	acorn woodpecker	*Melanerpes formicivorus*	17	16	1	1	0.06	0	0.00	0.013	0.00
	ladder-backed woodpecker	*Dryobates scalaris*	2	1	1	1	0.50	0	0.00	0.002	0.00
	northern flicker	*Colaptes auratus*	64	48	16	14	0.22	0	0.00	0.050	0.00
	Nuttall's woodpecker	*Dryobates nuttallii*	6	3	3	3	0.50	0	0.00	0.005	0.00

Notes: RSZ = rotor-swept zone.

1 ✓ Indicates that a species is designated as special status by a federal, state, or local entity. Special-status designations for each species are detailed in Table 4.

2 Total number of individuals observed (7,999) does not include 150 individuals not identified to species, 3 individual brown pelicans, and 2 individual ring-billed gull observations considered noise in the data.

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4.9.2.1 Results by Point Location

As shown in Table 15 and Exhibit 2, the number of species observed across all point locations was generally similar across the Project Site, with slightly fewer species observed in AA, AB, AD, and AC, likely due to a lower number of surveys occurring at those locations. As shown in Table 15, Exhibit 2, and Exhibit 3, the following point-count locations exhibited the greatest number of species detections, individual mean use, and/or species mean use values: I, P, W, R, S, U, AA, and Z. All but sites AA and Z are located in the central to southern portions of the Project Site. Sites AA and Z are located in the northwestern portion of the Project Site, and although fewer surveys were conducted at site AA, the Individual Mean Use and Species Mean Use was comparatively high. Although sites AB, AC, and AD also had a lower number of surveys, compared to other sites, these locations recorded a lower number of total individuals observed but with similar number of species and similar individual mean use and similar species mean use as with other sites. As shown on Figure 1, taken together these sites are distributed across the Project Area, including in the northeastern portion of the Project Site, which may suggest that the highest levels of species diversity and use is not clustered in a few particular sites, but rather spread across the entire Project Area.

As shown in Exhibit 4, generally the Shannon Diversity Index was similar across most sites, with slightly more diversity documented in the southern sites (sites H, L, K, and N). However, the northern sites (U, Z, S, and AA) were also very similar to the southern sites. Raw data and calculations for the Shannon Diversity Index are provided in Appendix I.

Table 15
Summary of Species Richness and Diversity by Point Location

Point Count Location	Number of Surveys	Number of Individuals[1]	Species Richness			Shannon Diversity Index
			Number of Species	*Species Mean Use*	*Individual Mean Use*	
All Locations	**1,290**	**7,999**	**83**	**3.18**	**6.20**	**2.78**
AA	52	328	34	3.35	6.31	2.68
AB	52	299	30	2.83	5.75	2.37
AC	51	252	25	2.96	4.94	2.35
AD	51	280	34	2.73	5.49	2.40
H	68	303	28	2.75	4.46	2.87
I	67	586	31	4.18	8.75	2.52
K	67	351	32	2.82	5.24	2.78
L	67	394	35	3.13	5.88	2.86
M	67	331	31	2.34	4.94	2.22
N	67	393	34	3.43	5.87	2.77
O	68	384	33	3.04	5.65	2.59
P	68	512	36	3.56	7.53	2.26
R	69	591	36	3.75	8.57	2.10

Table 15
Summary of Species Richness and Diversity by Point Location

Point Count Location	Number of Surveys	Number of Individuals[1]	Species Richness			Shannon Diversity Index
			Number of Species	*Species Mean Use*	*Individual Mean Use*	
S	68	526	36	3.82	7.74	2.69
U	68	455	39	3.65	6.69	2.73
V	68	339	33	2.85	4.99	2.53
W	68	564	37	3.18	8.29	2.09
X	68	346	35	2.46	5.09	2.39
Y	68	344	27	3.01	5.06	2.52
Z	68	421	33	3.62	6.19	2.71

[1] Total number of individuals observed (7,999) does not include 150 individuals not identified to species, 3 individual brown pelicans, and 2 individual ring-billed gull observations considered noise in the data.

Exhibit 2. Number of Individuals and Species by Location

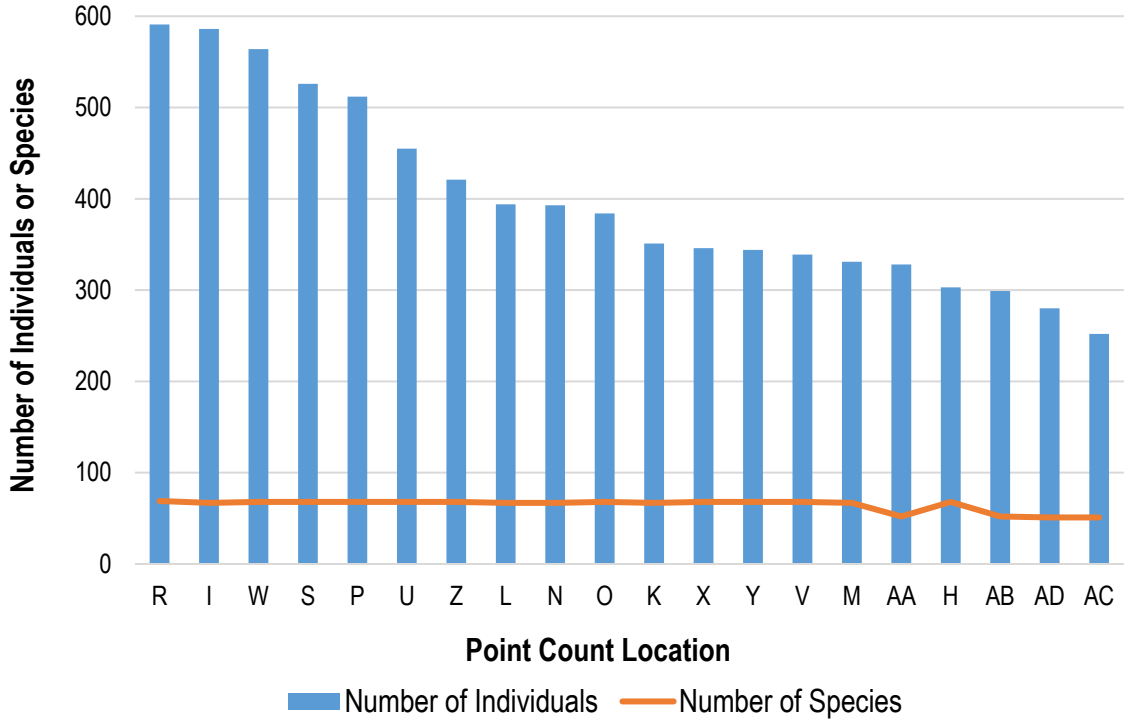


Exhibit 3. Individual and Mean Use Values by Location

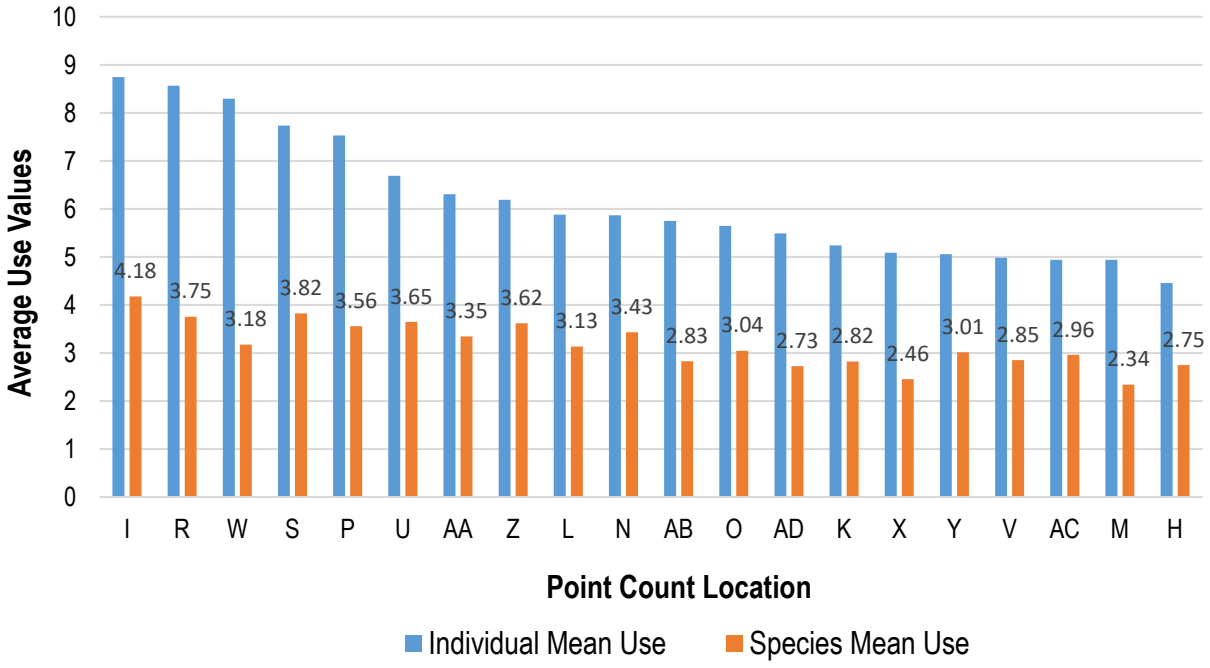
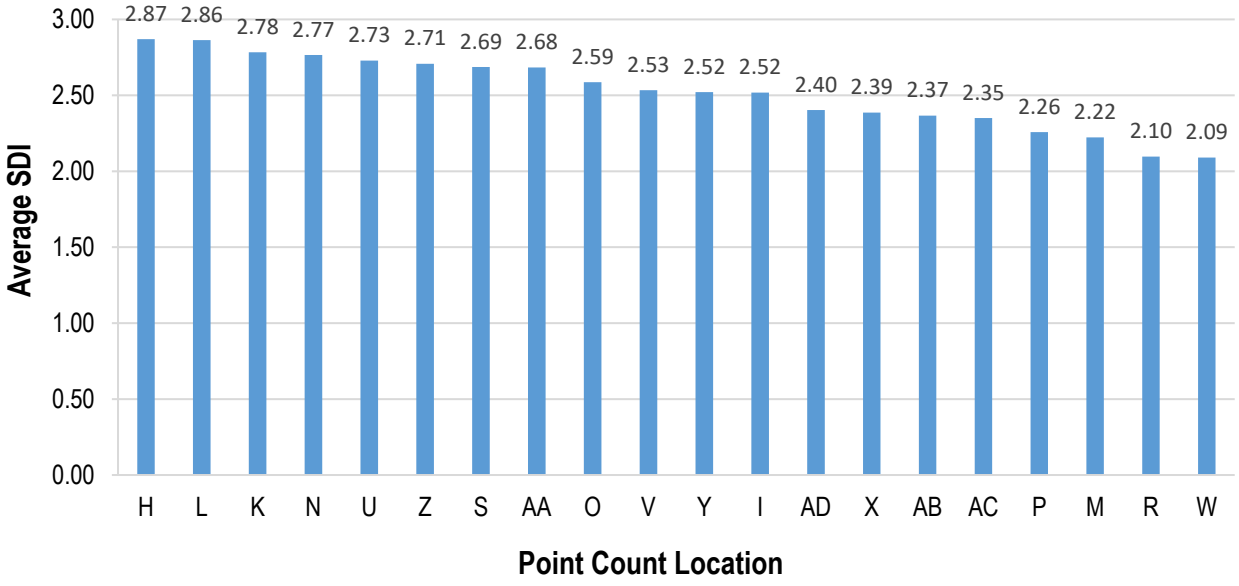


Exhibit 4. Average Shannon Diversity Index (SDI) by Location



4.9.2.2 Summary by Month

Table 16 provides a summary of avian diversity metrics by month. Overall, collectively the greatest number of species occurred in July (42 species), followed April and May (38 and 37 species, respectively) and October and November (39 and 38 species, respectively). Although the greatest number was observed in July, the April–May and October–November months generally follow the timing for spring and fall migrations through the region.

As shown in Table 16 and Exhibit 5, individual mean use (i.e., average number of individuals observed per survey) was greatest in April–May (6.89 to 7.63 individuals) and September–November (7.36 to 6.47 individuals), again reflecting greater numbers of individuals passing through during the typical spring and fall migration periods. The lowest individual mean use values occurred in July (4.95 individuals), which is typically a nesting month when birds are typically brooding eggs and in the middle of nesting/young rearing activities, resulting in fewer detections. Conversely, species mean use (i.e., average number of species observed per survey) was greatest in December (5.76 species) and January (4.83 species), suggesting that although these are moderate periods of individual bird activity they are periods of higher species diversity.

As shown in Table 17 and Exhibit 6, individual mean use was greatest for crows and allies, perching birds, and raptors—all of which also compose the greatest number of individuals observed across the site (Table 12). The greatest fluctuations in individual mean use is observed with perching birds with the greatest peaks (i.e., average number of individuals per survey) observed in spring (May), which coincides with spring migration, in which perching birds and cuckoos constitute a fair number of the migrants observed. As shown in Table 12, of 53 perching birds, 24 (45%) are migrants. Although crows and allies are composed of all resident species, there is a moderate amount of fluctuation in individual mean use across the year, with the greatest individual mean use observed in March and September (Exhibit 6).

Table 16
Summary of Species and Individual Use Measurements by Month

Month	Number of Surveys	Number of Species Observed	Species Mean Use	Individual Mean Use	No. of Individuals Observed				
					Total	*Resident*	*Migrant (Breeder)*	*Special-Status*	*Raptor*
January	116	24	4.83	5.66	656	602	23	38	81
February	68	22	3.09	5.75	391	390	0	21	52
March	85	27	3.15	6.52	554	549	1	18	53
April	87	38	2.29	6.89	599	574	23	73	52
May	89	37	2.41	7.63	679	610	66	42	61
June	80	33	2.42	5.79	463	412	50	50	71
July	144	42	3.43	4.95	713	631	81	141	161
August	94	34	2.76	5.30	498	479	18	73	78
September	81	29	2.79	7.36	596	556	39	85	106
October	138	39	3.54	6.58	908	763	43	46	65
November	164	38	4.32	6.47	1,061	918	53	73	98
December	144	25	5.76	6.12	881	801	38	41	71
Total	**1,290**	**83**	**3.18**	**6.20**	**7,999**	**7,285**	**435**	**701**	**949**

Exhibit 5. Monthly Variation of Species and Individual Mean Use

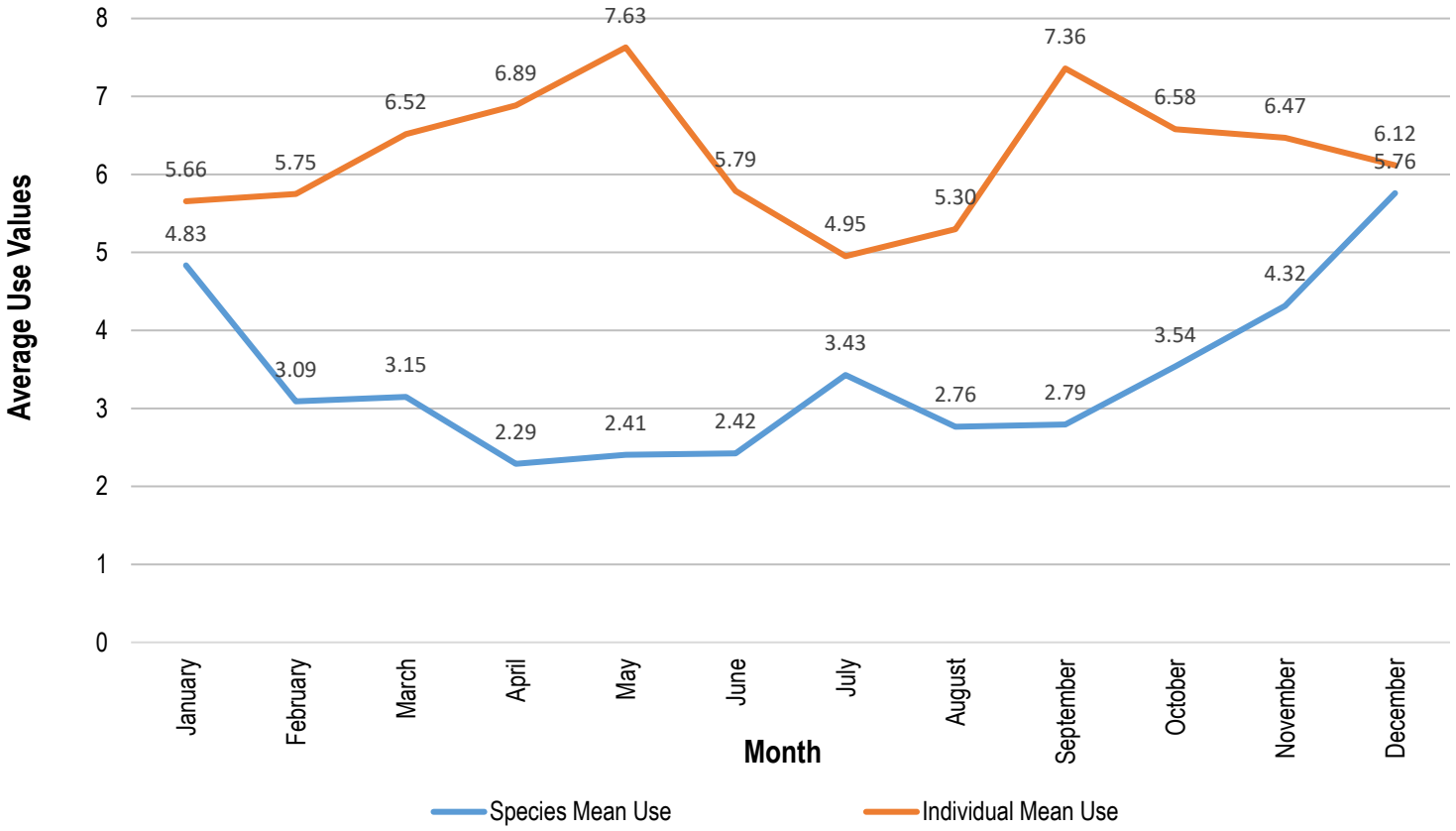
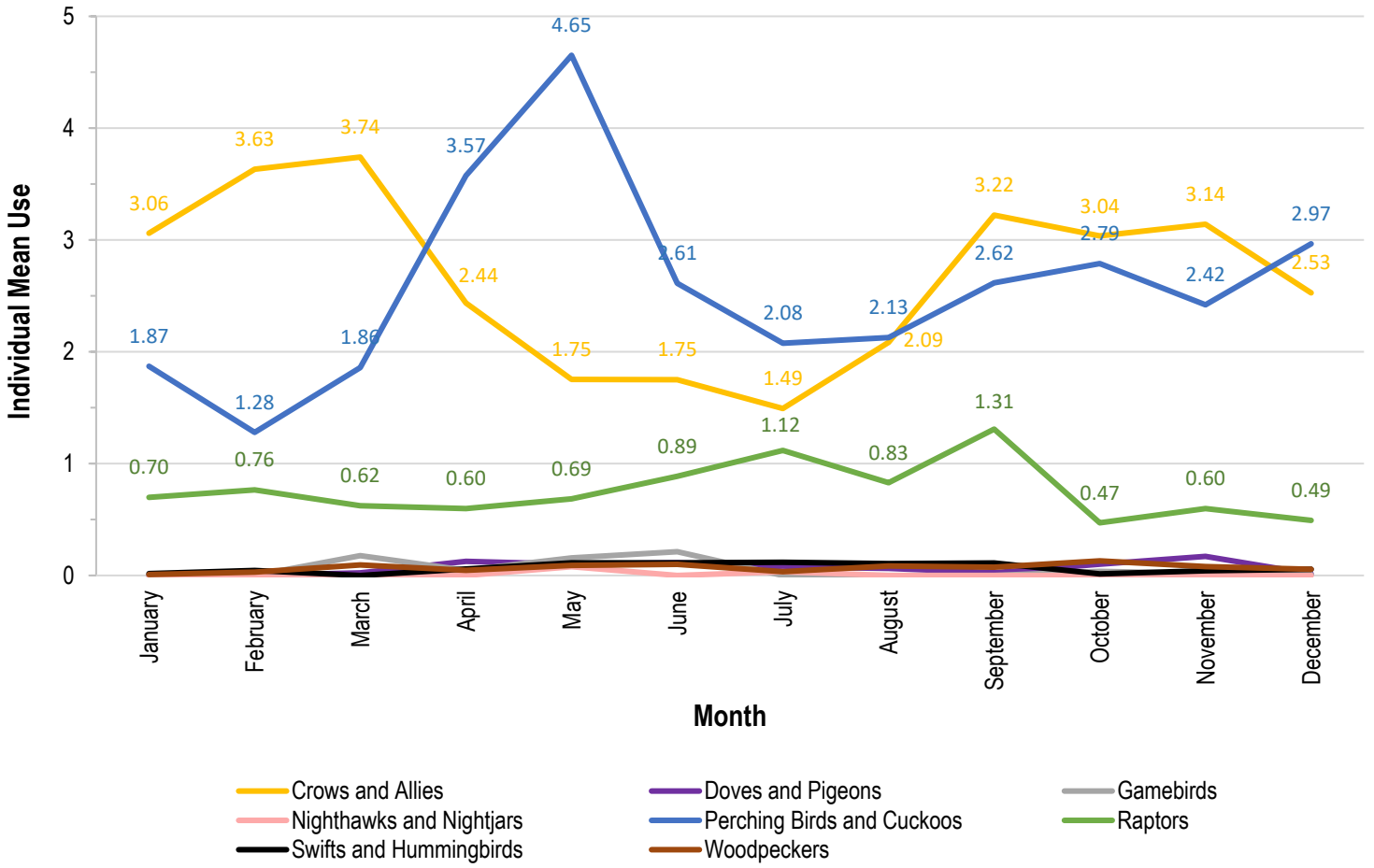


Table 17
Summary of Individual Mean Use Values by Avian Group and Month

Month	Individual Mean Use							
	Crows and Allies	*Doves and Pigeons*	*Gamebirds*	*Nighthawks and Nightjars*	*Perching Birds*	*Raptors*	*Swifts and Hummingbirds*	*Woodpeckers*
January	3.06	0.00	0.00	0.00	1.87	0.70	0.02	0.01
February	3.63	0.00	0.00	0.00	1.28	0.76	0.04	0.03
March	3.74	0.02	0.18	0.00	1.86	0.62	0.00	0.09
April	2.44	0.13	0.05	0.00	3.57	0.60	0.06	0.05
May	1.75	0.10	0.16	0.08	4.65	0.69	0.11	0.09
June	1.75	0.11	0.21	0.00	2.61	0.89	0.11	0.10
July	1.49	0.08	0.00	0.03	2.08	1.12	0.12	0.03
August	2.09	0.06	0.00	0.00	2.13	0.83	0.11	0.09
September	3.22	0.02	0.00	0.00	2.62	1.31	0.11	0.07
October	3.04	0.10	0.04	0.00	2.79	0.47	0.01	0.13
November	3.14	0.17	0.02	0.00	2.42	0.60	0.04	0.08
December	2.53	0.01	0.01	0.00	2.97	0.49	0.06	0.06

Exhibit 6. Individual Mean Use Values by Avian Group and Month



4.9.2.3 Comparisons with other Proximate Wind Projects

Weekly avian point-count surveys (30 minutes) were previously conducted at 18 point-count locations for 1 year between April 15, 2010, and April 15, 2011, within the boundaries of the project site for the previously proposed Shu'luuk Wind Project (AECOM 2012). Point-count locations established in 2010 and 2011 were similar to those surveyed in 2017–2019, which allows for on-site comparisons between 2010–2011 and 2017–2019. In addition, the Tule Wind Project is located approximately 3 miles north of the Project Site (Tetra Tech 2008, 2009), which allows for a comparison of off-site avian use patterns.

As shown in Table 18, although more surveys were performed in 2017–2019 (1,290 surveys) than in 2010–2011 (950 surveys), efforts between 2017 and 2019 resulted in fewer species observations (7,999 individuals, 83 species, across 10 taxonomic orders) than observed in 2010–2011 (12,605 individuals, 109 species across 16 taxonomic orders). However, both survey efforts show that the most frequently observed avian groups included perching birds (i.e., songbirds, excluding corvids), crows and allies, and raptors, together composing approximately 96% and 91% composition of the avian community on the Project Site and the Shu'luuk Wind project site, respectively. Similarly, these three avian groups and swifts and hummingbirds were the most frequently observed species on the Tule Wind project site (Table 18). Individual Mean Use between 2005–2006 and 2007–2008 for the Tule Wind Project fluctuated greatly for these same avian groups (i.e., perching birds, crows and allies, and raptors), with higher values than those observed at the Project Site.

Table 18
Comparison of Avian Group Measurements with Other Project Survey Efforts

Avian Group	Project				Shu'luuk Wind Project 2010/2011[1]				Tule Wind Project 2005/2006[1]		Tule Wind Project 2007/2008[1]	
	Number of Species	*Number of Observations*	*Mean Use*	*Composition of Avian Community (%)*	*Number of Species*	*Number of Observations*	*Mean Use*	*Composition of Avian Community %*	*Mean Use*	*Composition of Avian Community (%)*	*Mean Use*	*Composition of Avian Community (%)*
Perching Birds	53	3,316	2.57	41%	73	7,708	8.12	61%	6.54	56%	3.87	41%
Crows and Allies	3	3,398	2.63	42%	3	2,817	2.96	22%	3.31	28%	2.8	30%
Raptors	13	949	0.74	12%	13	974	1.03	8%	0.58	5%	0.98	10%
Swifts and Hummingbirds	6	82	0.06	1%	6	436	0.30	3%	0.34	3%	1.02	11%
Gamebirds	1	59	0.05	1%	2	284	0.30	2%	0.76	6%	0.17	2%
Woodpeckers	4	89	0.07	1%	4	206	0.22	2%	0.05	0%	0.27	3%
Doves and Pigeons	2	94	0.07	1%	2	121	0.13	1%	0.09	1%	0.18	2%
Nighthawks and Nightjars	1	12	0.01	0%	1	5	0.01	0%	—	—	—	—
Total	**83**	**7,999**	—	**100%**	**104**	**12,551**	—	**100%**	—	**100%**	—	**99%**

[1] See AECOM 2012.

4.9.3 Bat Data Analysis and Results

Section 3.3.7.1, 2010–2011 Bat Surveys, discusses the methods used by AECOM for the Shu'luuk Wind Project to analyze potential effects on bats. As noted, AECOM analyzed data collected from six temporary Meteorological (Met) towers (12 microphones total) between May 2010 and May 2011. Section 3.3.7.2, 2011–2012 Bat Surveys, discusses the methods used to collect data by Dudek to supplement the AECOM analysis. The AECOM data was supplemented by the Dudek data collection between September 2011 and September 2012 at two additional Met towers located just east of the Project Area within the Jewell Valley Project,[10] but still in areas that were representative of the Project Site in terms of geography, elevation, topography, and vegetation communities. Also, the analysis includes data from a third Met tower sampled during the same period that were originally excluded from the analysis due to apparent file noise leading to gaps in data collection. However, the data do support the general species composition analysis so they are included here. Finally, this section includes additional information from the Tule Wind Project (Dudek 2011). These studies are more than adequate to support analysis for a non-federal species group for a NEPA analysis. It should be noted that the level of bat study effort in California and elsewhere is highly variable and many project proponents perform studies that last less than a year. In this case, the Project has nearly 2 consecutive years of data from the vicinity to identify the likely suite of species that occur in the area. This suite is likely to remain consistent over a broader term so should be considered valid for analysis purposes.

The AECOM (2012) studies found 13 to 15 bat species to occur within the AECOM BSA, which is similar to the Campo Corridor. They found no maternity roosts or habitat (e.g., caves or mines) to support large roost sites within their study area or in close proximity, but did locate five confirmed roost locations and five additional potential roost sites. These were primarily associated with SR-94, Live Oak Springs Road, and buildings, but were also found in tree snags and boulder crevices.

Acoustical bat surveys were conducted in 2011 for the previous Jewell Valley Wind Project site, part of which overlaps the Boulder Brush Corridor. The surveys resulted in the detection of 14 bat species within the vicinity of the broadband acoustic detectors, which were located on a Met tower at the eastern edge of the Boulder Brush Corridor and two additional Met towers situated to the south (Jewell Valley studies). It is assumed that all bat species recorded during the surveys would utilize similar suitable habitat within the Campo Corridor and Boulder Brush Corridor for foraging.

[10] Overall, three Met towers were studied for the Jewell Valley surveys. These included one tower situated within the Boulder Brush Corridor, and two additional towers to the south, but east of the Campo Corridor (see Figure 5). All three were relied upon for the analysis, but the data from one of the towers had a subset with errors so the data from that tower were relied upon for confirming anecdotal information only. Effectively, two towers contributed to the actual data analysis.

In comparison, studies performed for the Tule Wind Project (Dudek 2011) analyzed bats by grouped known frequency ranges as opposed to individual species and found an estimated 17.7 bat passes per detector night – this was lower than eastern U.S. wind facilities, but higher than Minnesota and Wyoming wind facilities. The Tule Wind Project studies extrapolated reported bat fatality rates from other wind facilities (range between 0 and 40 bat fatalities per megawatt per year) and predicted 2.5 bat fatalities per megawatt per year for the Tule Wind Project. Additionally, the Tule Wind Project studies included review of seven horizontal mine shafts and three vertical mine shafts in the vicinity of the Tule Wind Project and found that only one horizontal mine shaft had potential to support bat activity.

To evaluate the levels of activity for bats that could occur in the Campo Corridor, a comparison of total index of activity (IA), or the magnitude of each species' contribution to spatial use, was prepared (Table 19) and compared to long-term acoustic studies within Nevada (O'Farrell, pers. comm. 2018). Within the Campo Corridor, there are potential attractive foraging features (e.g., dense riparian habitat, open water). While there are rock outcroppings within and surrounding the Campo Corridor and Boulder Brush Corridor, these features are not large enough to support large roosting populations of bats. Compared to the comparative Project locations with those attractant features (O'Farrell, pers. comm. 2018), the bats likely to occur within the Campo Corridor demonstrated IA values lower than those obtained at locations with higher value attractant features. For example, the IA values at the Virgin River sample area had an IA of 46,583 (O'Farrell 2006a) and the Las Vegas Wash sample area had IA values ranging from 28,594 to 168,428 (O'Farrell 2006b). The Table Mountain sample area was a mid-elevation site on a large mountain plateau with ridgelines and lacked attractant features; the IA values ranged from 75 to 345 (O'Farrell 2007). Table 19 provides the bat species observed within the vicinity of the Anabat equipment and their IA. Each of these species is expected to use the Project Site for foraging, while one special-status bat species, western small-footed myotis, has a potential to roost within the Project Site. Compared to areas that have attractant features, the IA for the Campo Corridor is very low (215–855) and is consistent with other areas that have limited habitat attractants for bats.

The Ocotillo Wind and Tule Wind projects, both located within the cumulative study area for the Project Site, have also conducted bat surveys. The Tule Wind surveys recorded 22 bat species, while the Ocotillo Wind surveys recorded 5 species (Gruver et al. 2011; Ocotillo Express LLC 2012). The IA for these sets of surveys was not included in any reports prepared for those projects so could not be compared. However, these surveys show the variety of predicted species richness which are dependent on the resources present on site. Tule Wind is in a broad area that included more habitat diversity than the Ocotillo Wind, Shu'luuk Wind, and Jewell Valley Wind Projects. The data that were independently gathered and analyzed for both Shu'luuk and Jewell Valley show similarities in the species richness, location of activity (Table 20), and general monthly patterns of use (Table 21).

Table 19
Acoustic Activity Indices for All Bats Detected in the Vicinity of the Campo Corridor

Common Name (*Scientific Name*)	Index of Activity					
	High Microphone			*Low Microphone*		
	N[1]	*SE*[2]	*SW*[3]	*N*[1]	*SE*[2]	*SW*[3]
Special-Status Bats						
Pallid bat (*Antrozous pallidus*)	—	—		6	20	—
Townsend's big-eared bat (*Corynorhinus townsendii*)	—	—		20	43	4
Western mastiff bat (*Eumops perotis californicus*)	9	22	9	5	9	2
Hoary bat (*Lasiurus cinereus*)	9	14	7	4	5	2
Western yellow bat (*Lasiurus xanthinus*)	—	2	2	2	13	—
Western small-footed myotis (*Myotis ciliolabrum*)	—	—		218	1108	2
Fringed myotis (*Myotis thysanodes*)	—	—		—	6	1
Yuma myotis (*Myotis yumanensis*)	1	—		18	46	2
Pocketed free-tailed bat (*Nyctinomops femorosaccus*)	98	1	34	37	6	13
Big free-tailed bat (*Nyctinomops macrotis*)	1	35	1	—	—	1
Non-Special-Status Bats						
Big brown bat (*Eptesicus fuscus*)	6	2	1	44	19	—
California myotis (*Myotis californicus*)	—	—		19	—	—
Canyon bat (*Parastrellus hesperus*)	27	2	2	460	226	4
Brazilian free-tailed bat (*Tadarida brasiliensis*)	64	18	30	22	44	25
Total	**215**	**75**	**83**	**873**	**1,544**	**55**

Table 20
Comparative Overall Bat Activity (Jewell Valley vs. Shu'luuk)

Microphone Height	Number of Species Identified	Number of Calls	Number of Detector Nights	Raw Mean Use	Composition of Bat Calls (%)
Jewell Valley Data					
High	9	8,074	521	15.50	16.21
Low	14	41,727	525	79.48	83.79
Total	**14**	49,801	1,046	94.98	100
Shu'luuk Data					
High	12	3,867	1,844	2.09	38.72
Low	13	6,121	1,916	3.20	61.28
Total	**13**	**9,988**	**3,760**	**2.66**	**100.00**

Note: Includes data from three Met towers for Jewell Valley Wind Project and six Met towers for Shu'luuk Wind Project.

Table 21
Comparative Bat Species Richness by Month (Jewell Valley vs. Shu'luuk)

Month	Average Number of Species Identified	Number of Species Identified
	High Microphone	*Low Microphone*
Jewell Valley Data		
January 2012	3	6
February 2012	4	8
March 2012	4	8
April 2012	4	10
May 2012	6	10
June 2012	5	9
July 2012	6	9
August 2012	8	12
September 2011	7	11
October 2011	8	9
November 2011	5	9
December 2011	2	6
Shu'luuk Data		
January 2011	5	5
February 2011	4	3
March 2011	4	6
April 2011	4	7
May 2011	8	11
June 2010	7	11
July 2010	8	12
August 2010	6	13
September 2010	7	12
October 2010	6	12
November 2010	4	5
December 2010	3	2

Note: Includes data from three Met towers for Jewell Valley Wind Project and six Met towers for Shu'luuk Wind Project.

5 PROJECT IMPACTS

5.1 Definition of Impacts

This section addresses direct and indirect impacts to biological resources that would result from implementation of the Project. A number of mitigation measures are included as part of the Project to avoid, minimize, and/or mitigate potential impacts to less than significant levels; these measures are summarized in Chapter 6, Avoidance, Minimization, and Mitigation Measures. Additionally, standard BMPs are described in Table 1 in Section 1.4, Standard Best Management Practices.

Direct Impacts. Direct effects are defined as those "which are caused by the action and occur at the same time and place" (40 CFR 1508.8(a)). Permanent direct impacts associated with the Project include impacts from the loss of habitat within the limits of grading for the wind turbines, access roads, and associated Project components (i.e., Project collector substation, O&M building, parking, meteorological towers). They may also include continuing operational impacts such as avian and bat collisions with wind turbines, noise, vehicle traffic, hydrologic changes, and runoff. The Boulder Brush Facilities would have temporary direct impacts associated with construction and include short-term effects of noise, dust, erosion, and traffic. They also would include the temporary widening of roads, temporary batching plant, temporary staging area needed for equipment and material transportation, and fuel modification zones associated with the batching plant and laydown yard.

Direct impacts were quantified by overlaying the Project data layers on GIS-located biological resources.

It should be noted that the Project would include up to 60 turbines; however, a total of 76 turbine sites have been evaluated as part of this analysis, of which only 60 could be constructed under the Campo Lease. As such, the direct impacts analyzed in this report are a conservative overestimation of the actual impacts that would occur because the impact footprint that would be executed as part of the Project would be associated with the smaller 60-turbine configuration, as opposed to the 76-turbine configuration as analyzed in the EIS. However, since the final turbine locations will be selected based on final engineering and avoidance of certain sensitive resources, the entire area of potential effect is assumed impacted for the purpose of this analysis under NEPA.

Indirect Impacts. Indirect impacts are defined as those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8(b)). Indirect impacts to biological resources may occur outside the direct limits of grading (temporary indirect impact) or from the long-term operation of the Project (permanent indirect impact). Indirect impacts may affect areas within the defined Project Site but outside the limits of grading, including non-impacted areas and areas outside the development footprint, such as downstream effects.

Temporary indirect impacts as a result of construction may include: dust and noise, which could temporarily disrupt habitat and species' vitality; changes in hydrology; disruption of wildlife activity resulting from increased human activity; short-term habitat fragmentation; invasive species; construction-related chemical pollutants; and alteration of natural fire regime. However, all Project grading would be subject to restrictions and requirements that address erosion and runoff, including the federal Clean Water Act and the National Pollution Discharge Elimination System program, preparation of a stormwater pollution prevention plan (SWPPP) and all applicable construction stormwater BMPs and post-construction source control BMPs. These programs are expected to minimize Project impacts with respect to erosion/runoff, altered hydrology, and potential impacts from chemical pollutants.

Permanent indirect impacts to adjacent lands may include intrusions by humans and domestic pets, noise from human activity and the wind turbines, nighttime lighting, invasion by exotic plant and wildlife species, effects of toxic chemicals (fertilizers, pesticides, herbicides, and other hazardous materials associated with the O&M building and equipment), litter, habitat fragmentation, and hydrologic changes from irrigation, if applicable.

Cumulative Impacts. Cumulative impacts refer to the combined environmental effects of the Project and other past, present, and probable future projects. In some cases, the impact from a single project may not be significant, but when combined with other projects, the cumulative impact may be significant.

5.2 Effects on Vegetation Communities and Land Covers

5.2.1 Direct

Direct impacts would occur on vegetation communities and land covers as a result of the Project. Table 22a quantifies the impacts on the vegetation communities and land covers associated with the Project. The Figure 14 series, Impacts to Biological Resources, shows these impacts. Table 22b quantifies the impacts on the vegetation communities and land covers associated with Alternative 2 (Reduced Intensity – Approximately 202 MW).

Table 22a
Impacts on Vegetation Communities and Land Cover Types – Project

General Vegetation Community/ Land Cover Category	Vegetation Type (Holland/Oberbauer Code)	Campo Wind Facilities	Boulder Brush Facilities		Total (Acres)
		Permanent Impacts (Acres)	*Temporary Impacts (Acres)*	*Permanent Impacts (Acres)*	
Bog and Marsh (50000)	Emergent wetland	0.32	0.20[a]	0	0.52
	Freshwater marsh	0	0	0	0
Bog and Marsh (50000) Subtotal		*0.32*	*0.20*	*0*	*0.52*
Disturbed and Developed Areas (10000)	Developed	3.56	0.01	0.09	3.66
	Disturbed habitat	45.24	2.44	5.53	53.21
	Eucalyptus woodland	0	0.02	0	0.02
Disturbed and Developed Areas (10000) Subtotal		*48.80*	*2.46*	*5.62*	*56.88*
Grasslands, Vernal Pools, Meadows, and other Herb Communities (40000)	Wildflower field	0	3.11	0.60	3.71
	Non-native grassland	21.23	0	0	21.23
	Non-native grassland broadleaf-dominated	0.20	0	0	0.20
	Valley sacaton grassland	0.22	0	0	0.22
Grasslands, Vernal Pools, Meadows, and other Herb Communities (40000) Subtotal		*21.65*	*3.11*	*0.60*	*25.36*
Riparian and Bottomland Habitat (60000)	Mulefat scrub	0.05	0	0	0.05
	Southern coast live oak riparian forest	0.85	0	0	0.85
	Southern willow scrub	0.18	0	0	0.18
	Southern arroyo willow riparian forest	0	0.20	0.15	0.35
Riparian and Bottomland Habitat (60000) Subtotal		*1.08*	*0.20*	*0.15*	*1.43*

Table 22a
Impacts on Vegetation Communities and Land Cover Types – Project

General Vegetation Community/ Land Cover Category	Vegetation Type (Holland/Oberbauer Code)	Campo Wind Facilities	Boulder Brush Facilities		Total (Acres)
		Permanent Impacts (Acres)	*Temporary Impacts (Acres)*	*Permanent Impacts (Acres)*	
Scrub and Chaparral (30000)	Big sagebrush scrub	30.42	6.44	2.72	39.58
	Disturbed big sagebrush scrub	0	0	0	0
	Granitic chamise chaparral	458.44	2.47	1.08	461.99
	Granitic northern mixed chaparral	92.97	23.90	9.64	126.51
	Montane buckwheat scrub	47.19	11.30	5.71	64.20
	Red shank chaparral	39.51	11.49	6.92	57.92
	Semi-desert chaparral	0	20.73	10.39	31.12
	Scrub oak chaparral	15.48	0	0	15.48
	Upper Sonoran subshrub scrub	10.59	0	0	10.59
	Scrub and Chaparral (30000) Subtotal	*694.59*	*76.33*	*36.47*	*807.39*
Woodland (70000)	Coast live oak woodland	18.79	4.54	0.90	24.23
	Open coast live oak woodland	1.41	0.10	0.04	1.55
	Dense coast live oak woodland	1.35	0	0	1.35
	Woodland (70000) Subtotal	*22.55*	*4.64*	*0.94*	*28.13*
Unvegetated stream channel	Unvegetated stream channel	1.25	0.30 [a]	0.13	1.68
	Unvegetated Stream Channel Subtotal	*1.25*	*0.30 [a]*	*0.13*	*1.68*
	Total	**789.25**	**87.25**	**43.91**	**920.40**

[a] Impacts to approximately 0.20 acres of emergent wetland and 0.12 acres of unvegetated channel are from a construction-related, temporarily cleared road that will be revegetated and/or recontoured once construction is complete. This temporary impact is a result of a 12-foot-wide construction access road which crosses Tule Creek. This road will be utilized only during construction to drive a pull truck across it to string cables, and will not be a permanent access road. Vegetation in this area will be trimmed or disked and no gravel or pavement will be placed within the creek. Following Boulder Brush Facilities construction, the area will be recontoured and replanted to restore Tule Creek to pre-Project conditions.

Table 22b
Impacts on Vegetation Communities and Land Cover Types – Alternative 2

General Vegetation Community/Land Cover Category	Vegetation Type (Holland/Oberbauer Code)	Campo Wind Facilities	Boulder Brush Facilities		Total (Acres)
		Permanent Impacts (Acres)	*Temporary Impacts (Acres)*	*Permanent Impacts (Acres)*	
Bog and Marsh (50000)	Emergent wetland	0.35	0.21[a]	0	0.56
	Freshwater marsh	0.01	0	0	0.01
Bog and Marsh (50000) Subtotal		*0.36*	*0.21*	*0*	*0.57*
Disturbed and Developed Areas (10000)	Developed	3.22	0	0.01	3.23
	Disturbed habitat	38.30	1.70	9.45	49.45
Disturbed and Developed Areas (10000) Subtotal		*41.52*	*1.70*	*9.46*	*52.68*
Grasslands, Vernal Pools, Meadows, and other Herb Communities (40000)	Wildflower field	0	5.62	0.49	6.11
	Non-native grassland	21.07	0	0	21.07
	Non-native grassland broadleaf-dominated	2.97	0	0	2.97
	Valley sacaton grassland	0.22	0	0	0.22
Grasslands, Vernal Pools, Meadows, and other Herb Communities (40000) Subtotal		*24.26*	*5.62*	*0.49*	*30.37*
Riparian and Bottomland Habitat (60000)	Mulefat scrub	0.05	0	0	0.05
	Southern willow scrub	0.18	0	0	0.18
	Southern arroyo willow riparian forest	0	0.06	0.05	0.11
Riparian and Bottomland Habitat (60000) Subtotal		*0.23*	*0.06*	*0.05*	*0.34*

Table 22b
Impacts on Vegetation Communities and Land Cover Types – Alternative 2

General Vegetation Community/Land Cover Category	Vegetation Type (Holland/Oberbauer Code)	Campo Wind Facilities	Boulder Brush Facilities		Total (Acres)
		Permanent Impacts (Acres)	*Temporary Impacts (Acres)*	*Permanent Impacts (Acres)*	
Scrub and Chaparral (30000)	Big sagebrush scrub	32.66	10.01	2.39	45.46
	Disturbed big sagebrush scrub	0	0	0	0
	Granitic chamise chaparral	393.54	2.51	1.03	397.08
	Granitic northern mixed chaparral	48.21	41.24	21.56	111.01
	Montane buckwheat scrub	37.33	14.12	6.61	58.06
	Red shank chaparral	35.26	19.48	13.00	67.74
	Semi-desert chaparral	0	19.95	12.45	32.40
	Scrub oak chaparral	18.57	0	0	18.57
	Upper Sonoran subshrub scrub	8.76	0	0	8.76
Scrub and Chaparral (30000) Subtotal		*574.33*	*107.29*	*57.05*	*738.67*
Woodland (70000)	Coast live oak woodland	17.84	11.39	1.78	31.01
Woodland (70000) Subtotal		*17.84*	*11.39*	*1.78*	*31.01*
Unvegetated Stream Channel	Unvegetated stream channel	1.29	0.27 [a]	0.12	1.68
Unvegetated Stream Channel Subtotal		*1.29*	*0.27* [a]	*0.12*	*1.68*
Total		**659.82**	**126.54**	**68.94**	**855.30**

5.2.2 Indirect

Temporary

Temporary (construction-related) indirect impacts from construction activities to vegetation communities outside of the limits of grading could include impacts related to or resulting from the generation of fugitive dust; temporary changes in hydrology resulting from construction, including sedimentation and erosion; and the introduction of chemical pollutants (including herbicides). The standard BMPs described in Table 1 address many of these potential impacts, such as keeping equipment free of leaks, using trash abatement to reduce attraction of predators, minimizing wildfires from construction-related activities, avoiding working in heavy rains, and establishing speed limits and watering to reduce dust from equipment and vehicles.

Excessive dust during grading on surrounding vegetation can decrease the vigor and productivity of vegetation through effects on light, penetration, photosynthesis, respiration, transpiration, increased penetration of phytotoxic gaseous pollutants, and increased incidence of pests and diseases. Excessive dust is only anticipated during construction as a result of construction equipment and vehicles.

Construction activities could result in hydrologic and water-quality-related impacts adjacent to and downstream of the construction area. Hydrologic alterations include changes in flow rates and patterns in streams, which may adversely affect adjacent and downstream vegetation communities. Water-quality impacts could include chemical-compound pollution (e.g., fuel, oil, lubricants, paints, release agents, and other construction materials), erosion, increased turbidity, and excessive sedimentation. Erosion and chemical pollution can also decrease the number of plant pollinators, increase the occurrence of non-native plants, and cause damage to and destruction of native plants.

No herbicides are proposed to be used during construction. Additionally, construction activities would follow established BMPs (Table 1) and be subject to restrictions and requirements that address erosion and runoff, including the CWA and the National Pollution Discharge Elimination System program. Preparation and implementation of a Project-specific SWPPP and compliance with the CWA are expected to minimize temporary construction-related impacts with respect to erosion/runoff and altered hydrology, and potential impacts from chemical pollutants, such that impacts would not be significant.

Permanent

Permanent (operation-related) indirect impacts could result from the proximity of the Project to vegetation communities after construction, including impacts related to O&M. O&M activities would be limited to the permanent footprint of the Project. However, indirect impacts to vegetation

communities could occur from generation of fugitive dust from vehicles (similar to the temporary impacts), habitat fragmentation, chemical pollutants if used for operation-related activities, introduction or spread of invasive species, and alteration of the natural fire regime. The standard BMPs described in Table 1 will minimize many of these potential impacts, such as speed limits to reduce dust from vehicles, material storage, and handling to avoid spills, and trash abatement to reduce attraction of predators.

Habitat fragmentation and isolation of plant populations can lead to extinction of local populations as a result of reduction in total habitat area, which reduces effective population sizes, and insularization of local populations, which affects dispersal rates (Wilcove et al. 1986; Wilcox and Murphy 1985). Although these effects are more readily observable in wildlife, there are potential ecological effects, such as changes in pollinator populations, which can result in altered plant community composition and thus adversely affect vegetation communities. The permanent impact footprint is relatively small and primarily associated with the turbine pads, which are spread out within the Campo Corridor. Each turbine would be mounted on a concrete pedestal (approximately 20 feet in diameter) supported by a permanent concrete foundation (approximately 70–80 feet in diameter and 7–10 feet below grade; exact dimensions would depend on specific turbine site needs). Therefore, the Project is not expected to increase habitat fragmentation or isolation of plant populations.

Removal of vegetation can increase runoff from roads and other paved surfaces, resulting in increased erosion and transport of sediment into vegetation communities. If unchecked during construction these can lead to long-term adverse effects such as altered erosion, increased surface flows, and underground seepage which can favor the establishment of non-native plants. Changed hydrologic conditions can also alter seed bank characteristics and modify habitat for ground-dwelling fauna that may disperse seed. During O&M, herbicides may be used to prevent vegetation from reestablishing around structures. Any chemical herbicides shall be used strictly in accordance with U.S. Environmental Protection Agency labelling and applied by certified applicators as required. Any herbicide applications would be contained within the Project footprint, thereby minimizing indirect impacts.

Invasive plant species that thrive in edge habitats are a well-documented problem in Southern California. Exotic plant species may alter habitats and displace native species over time, leading to extirpation of native plant species and unique vegetation communities, and loss of suitable habitat for special-status wildlife species. The introduction of non-native, invasive animal species could negatively affect native species that may be pollinators of or seed dispersal agents for plants within vegetation communities.

Increased human activity after construction could result in the potential for trampling of vegetation outside of the limits of grading, as well as soil compaction, and could affect the viability of plant

communities. Trampling can alter the ecosystem, creating gaps in vegetation and allowing exotic, non-native plant species to become established, leading to soil erosion. Trampling may also affect the rate of rainfall interception and evapotranspiration, soil moisture, water penetration pathways, surface flows, and erosion. Increased human activity increases the risk for damage to adjacent vegetation communities.

The Project proposes to alter natural landscapes, impact native vegetation communities, and could potentially disrupt naturally occurring fires. Shorter-than-natural fire return intervals can preclude recovery of the native vegetation between fires, weaken the ecological system, allow for invasion of exotic species, and in some cases result in permanent transition of the vegetation to non-native communities, such as annual grassland and weedy communities (Keeley 1987; Malanson and O'Leary 1982; O'Leary et al. 1992). If the natural fire regime is suppressed, longer-than-natural fire return intervals can result in excessive buildup of fuel loads so that when fires do occur, they are catastrophic. Unnaturally long fire intervals can also result in senescence of plant communities, such as chaparral, that rely on shorter intervals for rejuvenation. The Project has the potential to increase fire regime as a result of increased human activity and ignition sources at the Project Site. Two 10,000-gallon water tanks each would be installed at the O&M building and collector substation within the Campo Corridor, and three 30,000-gallon water tanks dedicated for firefighting purposes would be installed near the high-voltage substation within the Boulder Brush Corridor. This on-site fire prevention infrastructure would provide immediate resources for firefighting.

5.2.3 Effects Determination

Direct Impacts to Vegetation Communities. Direct impacts to vegetation communities that coincide with jurisdictional waters of the United States are considered a potential adverse effect because they are federally regulated resources (**Impact BIO-1**). These impacts are quantified and addressed in Section 5.3, Effects on Jurisdictional Aquatic Resources. There are no other vegetation communities that would be regulated by NEPA. These impacts would not be adverse through implementation of recommended **Mitigation Measure (MM) BIO-2** (Jurisdictional Waters and Wetlands Compensation). This measure requires that all temporary impacts to federally regulated jurisdictional aquatic resources be restored in place to pre-activity functions and permanent impacts be permitted through the ACOE. Permanent impacts will be mitigated through an approved mitigation bank and/or in-lieu fee program or in an off-site open space preserve in order to achieve no net loss of jurisdictional aquatic resources.

Indirect Effects. Temporary indirect impacts from fugitive dust, altered hydrology, and increased erosion could adversely affect adjacent vegetation communities (**Impact BIO-2**). Permanent indirect impacts from invasive plant species on adjacent vegetation communities and land covers

(e.g., unvegetated channel) and increased fire regime would result in a potential adverse effect (**Impact BIO-3**). These impacts would not be adverse through implementation of recommended **MM-BIO-1** (General Avoidance and Minimization Measures), which would help reduce temporary and permanent indirect impacts through biological monitoring, environmental training to reduce impacts to resources outside of the limits of disturbance, implementation of a SWPPP to reduce impacts to jurisdictional aquatic resources outside of the limits of disturbance and avoid planting any invasive species, implementation of a fugitive dust control plan, implementation of erosion and runoff control plan, weed management, and implementation of a Fire Protection Plan for the Campo Wind Facilities prepared to the satisfaction of the Campo Reservation Fire Protection District (CRFPD).

Chapter 6 provides measures designed to avoid, minimize, and mitigate adverse impacts on vegetation communities that are regulated by ACOE under the CWA. Section 5.5, Effects on Special-Status Wildlife Species, discusses impacts on habitat supporting species protected under the ESA.

Off-Reservation impacts associated with the Boulder Brush Facilities on state and County resources will be analyzed in the County EIR currently in preparation.

5.2.4 Alternative 2: Reduced Intensity – Approximately 202 MW

Direct Impacts on Vegetation Communities. Alternative 2 would result in direct impacts on vegetation communities that coincide with jurisdictional waters of the United States. These impacts are considered a potential adverse effect because they are on federally regulated resources. These impacts are quantified and addressed in Section 5.3. There are no other vegetation communities that would be regulated by NEPA. These effects would not be adverse through implementation of recommended **MM-BIO-2** (Jurisdictional Waters and Wetlands Compensation). This measure requires that all temporary impacts to federally regulated jurisdictional aquatic resources be restored in place to pre-activity functions and permanent impacts be permitted through the ACOE. Permanent impacts will be mitigated through an approved mitigation bank and/or in-lieu fee program or in an off-site open space preserve in order to achieve no net loss of jurisdictional aquatic resources.

Indirect Effects. The temporary and permanent indirect effects are similar to those described for the Project but would be reduced through the elimination of the turbines in the southwest portion of the Reservation. These impacts would not be adverse through implementation of recommended **MM-BIO-1** (General Avoidance and Minimization Measures).

5.3 Effects on Jurisdictional Aquatic Resources

5.3.1 Direct

The Project would result in potential direct impacts on jurisdictional resources. Table 23a quantifies the potential impacts on these resources associated with the Project and Figure 14 series shows the locations and extent of these potential impacts. Table 23b quantifies the potential impacts on these resources associated with Alternative 2.

Table 23a
Impacts on Waters of the United States – Project

Feature Type	Type of Habitat (Oberbauer et al. 2008)	Type of Habitat (Cowardin et al. 1979)	Campo Wind Facilities	Boulder Brush Facilities		Total: Acres (Linear Feet)
			Permanent Impacts: Acres (Linear Feet)	*Temporary Impacts: Acres (Linear Feet)*	*Permanent Impacts: Acres (Linear Feet)*	
Non-wetland waters	Waters of the U.S./ unvegetated channel – ephemeral	Riverine; unconsolidated Bottom, sand, ephemerally flooded, fresh	1.13 ac[1] (8,839 ft)	0.21 ac (2,277 ft)	0.11 ac (1,612 ft)	1.45 ac (12,728 ft)
Non-wetland waters	Waters of the U.S./ unvegetated channel – intermittent	Riverine; unconsolidated bottom, sand, intermittently flooded, fresh	0	0.09 ac (141 ft)	0.01 ac (24 ft)	0.10 ac (166 ft)
Wetland	Emergent wetland Freshwater marsh Valley sacaton grassland	Riparian; emergent, lentic, riparian	0.54 ac	0	0	0.54 ac
Wetland	Southern willow scrub	Riparian; scrub-shrub, lentic, riparian	0.13 ac	0	0	0.13 ac
Total potential impacts on jurisdictional waters			**1.81 ac (8,839 ft)**	**0.30 ac (2,418 ft)**	**0.13 ac (1,636 ft)**	**2.23 ac (12,894 ft)**

Notes: ac = acres; ft = linear feet.

[1] There are several isolated channels that are not regulated by ACOE; these are categorized as unvegetated stream channel in Sections 4.2 and 5.2, but their acreages are not included in Sections 4.7 or 5.3 because they are not considered waters of the United States.

Table 23b
Impacts on Waters of the United States – Alternative 2 – Approximately 202 MW

Feature Type	Type of Habitat (Oberbauer et al. 2008)	Type of Habitat (Cowardin et al. 1979)	Campo Wind Facilities	Boulder Brush Facilities		Total: Acres (Linear Feet)
			Permanent Impacts: Acres (Linear Feet)	*Temporary Impacts: Acres (Linear Feet)*	*Permanent Impacts: Acres (Linear Feet)*	
Non-wetland waters	Waters of the U.S./ unvegetated channel – ephemeral	Riverine; unconsolidated Bottom, sand, ephemerally flooded, fresh	1.21 ac (7,574 ft)	0.21 ac (3,967 ft)	0.11 ac (1,908 ft)	1.53 ac (13,449 ft)
Non-wetland waters	Waters of the U.S./ unvegetated channel – intermittent	Riverine; unconsolidated bottom, sand, intermittently flooded, fresh	<0.01 (203 lf)	0.06 ac (305 ft)	0.01 ac (24 ft)	0.07 ac (329 ft)
Wetland	Emergent wetland Freshwater marsh Valley sacaton grassland	Riparian; emergent, lentic, riparian	0.55 ac	0	0	0.55 ac
Wetland	Southern willow scrub	Riparian; scrub-shrub, lentic, riparian	0.13 ac	0	0	0.13 ac
Total potential impacts on jurisdictional waters			**1.90 ac (7,777 ft)**	**0.27 ac (4,272 ft)**	**0.12 ac (1,932 ft)**	**2.29 ac (13,981 ft)**

To the extent feasible, Project features have been sited to avoid potential jurisdictional waters of the United States. Remaining permanent impacts resulting from new access road (unpaved) construction are unavoidable. Construction of permanent, unpaved roads across ephemeral drainage features will be at grade to allow for water to continue flowing downstream unimpeded. Therefore, they would not adversely affect the overall functions (e.g., volume, velocity, and historical direction of surface water) or values (e.g., aesthetics, flood control, and water quality) of these features.

Off-Reservation impacts associated with the Boulder Brush Facilities on state and County resources will be analyzed in the Draft EIR.

5.3.2 Indirect

Temporary

Temporary (construction-related) indirect impacts from grading and other construction activities to jurisdictional resources outside of the limits of grading are similar to those described for vegetation in Section 5.2.2. Potential temporary indirect impacts include generation of fugitive dust; changes in hydrology resulting from construction, including sedimentation and erosion; and the introduction of chemical pollutants (including herbicides). The standard BMPs described in Table 1 minimize some of these potential impacts, such as keeping equipment free of leaks, avoiding working in heavy rains, and establishing speed limits to reduce dust from equipment and vehicles.

Permanent

Permanent (operation-related) indirect impacts could result from the proximity of the Project to jurisdictional resources after construction are similar to those described for vegetation in Section 5.2.2. Potential permanent indirect impacts include generation of fugitive dust from vehicles (similar to the temporary impacts) and chemical pollutants if used for operation-related activities. The standard BMPs described in Table 1 minimize some of these potential impacts, such as speed limits to reduce dust from vehicles and trash abatement to reduce attraction of predators.

5.3.3 Effects Determination

Direct Impacts. Permanent impacts to approximately 2.22 acres of federally regulated wetland and non-wetland waters of the United States would be a potential adverse effect (see **Impact BIO-1**). These impacts will not be adverse through implementation of recommended **MM-BIO-2** (Jurisdictional Waters and Wetlands-Specific Avoidance, Minimization, and Mitigation Measures). This measure requires that all temporary impacts to federally regulated jurisdictional aquatic resources be restored in place to pre-activity functions and permanent impacts be permitted through the ACOE. Permanent impacts would be mitigated through an approved mitigation bank and/or in-lieu fee program or in an off-site open space preserve in order to achieve a no net loss of jurisdictional aquatic resources.

Indirect Effects. Temporary indirect impacts from fugitive dust, altered hydrology, and increased erosion could adversely affect adjacent jurisdictional resources (**Impact BIO-4**). Permanent indirect impacts from would be minimized through the standard BMPs described in Table 1 and would result in no adverse effect. These impacts would not be adverse through implementation of recommended **MM-BIO-1** (General Avoidance and Minimization Measures), which helps reduce temporary and permanent indirect impacts through biological monitoring, environmental training to reduce impacts to resources outside of the limits of disturbance, implementation of a SWPPP to

reduce impacts to jurisdictional aquatic resources outside of the limits of disturbance and avoid planting any invasive species, implementation of a fugitive dust control plan, implementation of erosion and runoff control plan, weed management, and implementation of a Fire Protection Plan for the Campo Wind Facilities prepared to the satisfaction of CRFPD.

It is anticipated that the Project would qualify for authorizations under CWA Section 404 Nationwide Permit (NWP) program (33 CFR 330). The specific statutory authority for the NWPs (and other CWA Section 404 General Permits) is CWA Section 404(e). CWA Section 404(e) authorizes ACOE (after notice and opportunity for public hearing) to issue NWPs that cause only minimal adverse environmental effects the aquatic environment. Additionally, the final Regional Conditions developed by the ACOE Los Angeles District are to ensure that NWP authorizations would result in no more than minimal individual and cumulative impacts to aquatic resources within its designated area of responsibility and regulatory jurisdiction. It is anticipated that regulated activities in jurisdictional waters of the United States associated with the Project could be authorized through compliance with NWP 51, Land-Based Renewable Energy Generation facilities and/or NWP 12, Utility Line Activities. NWP 51 and/or NWP 12 would specify permit conditions applicable to the Project.

The Project has been designed to avoid and minimize impacts on jurisdictional aquatic resources to the greatest extent practicable, and standard BMPs (see Table 1) would be implemented. Chapter 6 provides measures designed to avoid, minimize, and mitigate impacts on potential jurisdictional waters of the United States.

5.3.4 Alternative 2: Reduced Intensity – Approximately 202 MW

Direct Impacts. Permanent impacts to 2.29 acres of federally regulated wetland and non-wetland waters of the United States would be a potential adverse effect. These impacts would not be adverse through implementation of recommended **MM-BIO-2** (Jurisdictional Waters and Wetlands-Specific Avoidance, Minimization, and Mitigation Measures). This measure requires that all temporary impacts to federally regulated jurisdictional aquatic resources be restored in place to pre-activity functions and permanent impacts be permitted through the ACOE. Permanent impacts would be mitigated through an approved mitigation bank and/or in-lieu fee program or in an off-site open space preserve in order to achieve a no net loss of jurisdictional aquatic resources.

Indirect Effects. Temporary and permanent indirect impacts are similar to those described for the Project, but would be reduced through the elimination of the turbines in the southwest portion of the Reservation. Permanent indirect impacts from would be minimized through the standard BMPs described in Table 1 and would result in no adverse effect. These impacts would not be adverse through implementation of recommended **MM-BIO-1** (General Avoidance and Minimization Measures).

5.4 Effects on Special-Status Plant Species

5.4.1 Direct

There are no federally listed plants within the Project Site or limits of grading; therefore, no permanent or temporary direct impacts on federally listed plants would occur.

Off-Reservation impacts associated with the Boulder Brush Facilities on state and County resources will be analyzed in the Draft EIR currently in preparation.

5.4.2 Indirect

There are no federally listed plants within the Project Site or limits of grading; therefore, no permanent or temporary indirect impacts on federally listed plants would occur.

5.4.3 Effects Determination

No impacts would occur on federally listed plants; therefore, no On- or Off-Reservation permanent or temporary indirect impacts on federally listed plants would occur.

5.4.4 Alternative 2: Reduced Intensity – Approximately 202 MW

No impacts would occur on federally listed plants; therefore, no On- or Off-Reservation permanent or temporary indirect impacts on federally listed plants would occur.

5.5 Effects on Special-Status Wildlife Species

5.5.1 Direct

5.5.1.1 Quino Checkerspot Butterfly

Quino checkerspot butterfly is the only known federally listed species to occur in the Project Site. Quino checkerspot butterfly was observed during the 2010 focused surveys within portions of the Project Site as well as elsewhere in the Project Area (see Section 4.5.2, Wildlife Species) (Figure 10). No Quino checkerspot butterflies were observed during the focused 2018 surveys; however, that does not override the results of the previous survey efforts. Dudek modeled habitat as discussed below, in order to estimate potentially occupied areas on site (see Section 4.5.2) and overlaid the model with the Project footprint to estimate impacts. There would be impacts to 242.13 acres of potentially occupied Quino checkerspot butterfly habitat (Figure 15, Impacts to Potentially Suitable Quino Checkerspot Surveyed Areas).

Exclusion Areas

Prior to performing the focused surveys in 2018 and 2019, Dudek biologists conducted host plant mapping as well as a habitat assessment within the Action Area as defined in the Biological Assessment in order to identify suitable habitat and exclude unsuitable habitat. Exclusion areas that were not surveyed were determined based on the USFWS survey protocol (2014), and consisted of developed areas and densely vegetated chaparral with tall shrubs forming closed canopies. Prior surveys were conducted within the Reservation for the Shu'luuk Wind Project by AECOM in 2012 and utilized a similar method when excluding areas for surveys.

As defined by the 2014 USFWS protocol, Exclusion Areas include the following:

- Orchards, developed areas, or small in-fill parcels (plots smaller than an acre completely surrounded by urban development) largely dominated by non-native vegetation;
- Active/in-use agricultural fields without natural or remnant inclusions of native vegetation or that are completely without any fallowed or unplowed areas;
- Closed-canopy woody vegetation including forests, riparian areas, shrub-lands, and chaparral. "Closed-canopy woody vegetation" describes shrubs or trees growing closely together in which the upper portions of the vegetation converge (are touching) to the point that the open space between two or more plants is not significantly different than the open space within a single plant. Closed canopy shrub-land and chaparral are defined as vegetation so thick that it is inaccessible to humans except by destruction of woody vegetation (branches).

The AECOM (2012) exclusion areas as compared to the Dudek (2018) exclusion areas have few differences. Table 24 depicts the various acreages for permutations of excluded versus surveyed habitat between the two survey efforts. Within overlapping survey boundaries, these differences can be attributed to time between surveys and growth of plants and possibly individual observer bias. In no instances did the Dudek exclusion areas overlap with known Quino checkerspot butterfly locations; however, some of the AECOM and Dudek exclusion areas came close to known Quino checkerspot butterfly.

Table 24
Exclusion Area Differences between the AECOM 2010 and Dudek 2018 Survey Efforts

Permutation	Acres
Areas surveyed by Dudek but not addressed by AECOM	258.94
Areas surveyed by Dudek, but excluded by AECOM	54.27

Table 24
Exclusion Area Differences between the AECOM 2010 and Dudek 2018 Survey Efforts

Permutation	Acres
Areas surveyed by AECOM, but excluded by Dudek	258.03
Areas surveyed by both	358.48
Areas excluded by both	61.49

Modeled Habitat

Potentially occupied habitat was modeled based on Quino checkerspot butterfly occurrence data and host plants observed in 2010 and supplemented by the Dudek studies. The 2018 surveys did not detect any host plants within the Quino checkerspot butterfly survey area (defined as the non-excluded areas that were surveyed during the 2018 and 2019 survey years). Quino checkerspot butterfly populations vary annually based on a variety of factors, including rainfall, temperature, timing of rain events, and host plant growth patterns, among others. Low rainfall and other factors can cause larva to extend diapause and delay emergence. Lack of adult Quino checkerspot butterfly observations in one year may not equate to absence at a particular site in another year.

The model was presented to USFWS on July 2, 2019. Based on the feedback received from the USFWS on July 2, 2019, Dudek included all components that occurred within 1 kilometer (0.6 miles) of any Quino checkerspot butterfly observation where suitable habitat occurred (Figure 7) within the analysis. In order to generate this figure, a 1-kilometer buffer was applied to all known (California Natural Diversity Database or USFWS) data points from the Project Vicinity (i.e. the area surrounding the Project Area that might support Quino checkerspot butterfly—in this case, a minimum of 1 kilometer from the Project Area), as shown on Figure 6. Quino checkerspot butterfly suitable habitat was then identified where it overlapped the buffer. The acreage of these resulting areas was then calculated. Areas that were excluded from surveys were those that were determined to be unsuitable for Quino checkerspot butterfly by both AECOM and Dudek. Areas that were excluded by one entity but not the other were included in the model as potentially suitable habitat. This model resulted in 332.62 acres of suitable, potentially occupied habitat within the Project Area. It should be noted that this suitable habitat calculation is based on recent discussions with USFWS.

Quino Checkerspot Butterfly Impact Assessment Summary

Based on the revised modeling and consultation with USFWS, the following impacts were determined. Mutual or exclusive exclusion areas were assumed to not be suitable for Quino checkerspot butterfly presence for the purposes of this analysis. Areas that were determined by one entity (Dudek or AECOM) to be excluded, but not by the other, were included in the model.

Quino checkerspot butterflies tend to fly relatively close to the ground and in open habitats and they could be susceptible to collisions with construction equipment during construction activities or vehicles associated with O&M activities. Therefore, direct impacts to Quino checkerspot butterfly were assumed when the impacts will occur within 200 meters (approximately 650 feet) of known Quino checkerspot butterfly locations and within 200 meters of host plant populations. Based on the analysis, 22 turbines, various road segments, gen-tie line segments, and the temporary batch plant and staging areas would cause direct effects to Quino checkerspot butterfly and impact approximately 242.13 acres of Quino checkerspot butterfly habitat.

5.5.1.2 Golden Eagle

Golden eagle use in the Project Site and surrounding area is described in Section 4.6.2, Golden Eagle. The infrequent sightings during the eagle point surveys and USGS biotelemetry data suggests that the Project Site and surrounding area receives little use by eagles and is not the core territory of any eagles.

Furthermore, a study conducted by WEST (2010) analyzed turbine collision risk to eagles. This study included a comparison of the Tule Wind Project to other wind projects throughout the United States, including two wind projects in California that had golden eagle observations. The study concluded that there was a low risk of turbine collision for eagles. However, it is recognized that this study was not based on data specific to the Project Site. The study also states that risk could be higher if birds in the vicinity are spending more time foraging in or around turbines. No specific studies, mapping, monitoring, or telemetry data had been collected to understand golden eagle use areas or behavioral patterns in or around the Tule Wind Site.

However, the telemetry data provided in this report shows that there were very few golden eagle incursions over the Project Site when compared to their overall use areas and the larger geographic area in which the Project Site is situated. Additionally, the areas surrounding the Project Site are rural and undeveloped, allowing golden eagles to forage in those locations and thus, spend less time at the Project Site foraging. Therefore, given the information and data demonstrating that eagles have low risk of turbine collision and that they spend minimal time at the Project Site, elevation information for telemetry data is not needed.

Table 25 shows the relevant variables and estimated golden eagle mortality risk per year (USFWS 2018b).

Table 25
Years 1 and 2 (30-Minute Surveys) – Turbine Model Specs and CI 80 Results for Various Turbine Models

Existing/Proposed/ Hypothetical	Turbine Model	Number of Turbines	Rotor Diameter (Meters)	Blade Ground Clearance (Meters)	Blade Tip Height (Meters)	CI 80 (Estimated GOEA Mortality/Year)
Proposed	N/A	60	141	44	179	0.12
Alternative	N/A	48	141	44	179	0.096

Notes: GOEA = golden eagle; N/A = not applicable.
Golden eagle mortality risk per year is estimated at the 80% confidence interval using the USFWS Risk Estimator R Package (USFWS 2018b).

5.5.1.3 Avian Species

There are potential direct impacts to nesting birds protected under the MBTA due to vegetation removal, as well as avian collisions with wind turbines and meteorological towers, and electrocution from overhead transmission lines.

Overall, the majority of avian species and individuals observed across the Project Site includes crows and allies, perching birds, and raptors. Similarly, avian point-count studies in 2010–2011 also found these three avian groups (i.e., perching birds, crows and allies, and raptors) to have the highest individual use values (Table 18). Although perching birds were the most numerous avian group observed, the majority of these individuals were detected flying under the rotor swept zone. Raptors and crows and allies occurred in the rotor swept zone with the most frequency. Red-tailed hawks, turkey vultures, and common ravens were the most numerous species of these groups. These results suggest that, due to their relative abundance and occurrence within the rotor swept zone, these three species have the greatest risk of collision with Project turbines (see Exposure Index, Table 14). It should be noted that although these three species found to be of greatest risk of collisions, many species were observed on site and collision is possible with any of the species traversing the Project Site. However, based on numbers and flight behavior, collision would be most likely with the most numerous species that typically fly within the rotor swept zone.

Spring and fall migration periods also showed high numbers of individual bird occurring throughout the site. As a result, there is a possibility of a greater number of collisions with turbines during these periods and post-construction monitoring should consider more survey efforts to identify casualties during these periods. In addition, the data show that avian use and species richness was generally distributed throughout the Project Site and higher use values were not shown to be particular to any cluster or isolated group of proposed turbine locations. Therefore, post-construction monitoring should distribute survey efforts across the Project Site without particular focus on any individual groups of turbines (see Section 5.5.3, Effects Determination).

5.5.1.4 Bats

Risk to bats associated with the Project primarily stems from direct impacts to roost sites, electrocution, barotrauma, and collision. In this case, no maternity roost sites are known from the area or nearby. The Shu'luuk Wind Project found limited non-maternal roost locations potentially supporting one or few animals only. The Tule Wind Project found only one horizontal mine shaft that had potential to support roosting bats; located 1 mile from Project turbines. Because of the type of infrastructure and wiring protections, electrocution is also of limited risk. Additionally, because of the slower speeds associated with Project turbines, barotrauma is also of limited to no risk. The National Renewable Energy Laboratory (NREL 2018) conducted one of the few studies to attempt to analyze actual risk related to the barotrauma hypothesis. They used computational simulations and analytics to determine actual risk. Using realistic assumptions regarding activity (e.g., 15 m/s as the highest wind speed that bats would be expected to fly) and survival pressures (i.e., existing data regarding rats as a surrogate), and comparing three different distances from the blade, they concluded that (1) the pressure drop on the suction side of the blade was a factor of four less than the lethality threshold for rats, (2) the low-pressure region over the blade is highly localized, and (3) the minimum pressure in the tip vortex is a factor of three less than the lethality threshold for rats. While the actual relationship between rat thresholds and bat thresholds are not known, they seem to be an equivalent surrogate and the conclusion was that it seemed unlikely that barotrauma is a significant contributor to turbine-related bat deaths.

Regarding the potential relative risk of collision for bats, a number of factors are important to consider. The abundance of bats within and adjacent to the biological study area is low when compared to other habitat types and regions. The Searchlight Nevada project (O'Farrell 2010) used paired high and low acoustic monitoring units similar to the acoustical bat surveys for performed for the Jewell Valley project; the majority of species, excluding the migratory tree bats and high-flying molossids, were found to fly less than 30 meters in height and those that did occur within the higher spaces represented only a small fraction of total activity. The Shu'luuk data and Jewell Valley data sets showed most of the bat activity occurred around the lower microphone, or 15 feet off the ground and far under the rotor swept area. Thus, most species of bats are at minimal risk of adverse encounters with wind turbines. The overall magnitude of bat usage within the Campo Corridor is significantly less than any locations studied that contain attractant features (see Section 4.4, Wildlife Diversity). This suggests that the risk for bat collisions with Project wind turbines is low when taking into account the overall low abundance of bats in the area and lower abundance of high-flying bats (see Table 19). The acoustical bat results indicate that the activity at the higher microphone (which captures bats that tend to fly higher) was lower when compared to the lower microphone.

CEC (2013) notes that bats can be more attracted to areas with strong lights because of the increased insect prey availability and hypothesized that some observed mortalities may have been generated by the presence of strong lights in the vicinity of roost sites and turbines. CEC also notes that there is no evidence that aviation lighting associated with nacelles contribute to bat mortality (Kunz et al. 2007, as cited in CEC 2013). No turbines will be located closer than 0.25 miles from an On-Reservation receptor, so the possibility of resident-induced lighting attractants are reduced.

Direct impacts to bats could result in mortality or injury due to collisions at wind turbines. However, potential effects of the Project on the meta-community of bats in the region, including those species known to be susceptible to collision with turbine blades, would be negligible.

5.5.2 Indirect

Temporary

Temporary (construction-related) indirect impacts from grading and other construction activities to species' habitat outside of the limits of grading are similar to those described for vegetation in Section 5.2.2. Potential temporary indirect impacts include generation of fugitive dust; changes in hydrology resulting from construction, including sedimentation and erosion; and the introduction of chemical pollutants (including pesticides or herbicides). Additionally, construction-related noise can have a variety of indirect impacts on wildlife species, including increased stress, weakened immune systems, altered foraging behavior, displacement due to startle, degraded communication with conspecifics (e.g., masking), damaged hearing from extremely loud noises, and increased vulnerability to predators (Lovich and Ennen 2011; Brattstrom and Bondello 1983, as cited in Lovich and Ennen 2011). Construction-related noise and vibration could occur from equipment used during site preparation and grading, including vegetation clearing, and construction of the Project. Construction noise and vibration levels would vary from hour-to-hour and day-to-day, depending on the equipment in use, the operations being performed, and the distance between the source and receptor. Construction would occur during the day, and no construction is anticipated to take place at night. Increased noise and vibration can affect breeding behaviors in birds, mammals, reptiles, amphibians, and other species that use vocal methods for communication. Increased vibration can collapse small mammal, reptile, or amphibian burrows if they are located close to the construction equipment.

Construction activities increase the number of humans within the area, which can deter wildlife from using an area. Additionally, trash from construction-related activities can attract predators to an area, increasing the chance of predation on wildlife species.

The standard BMPs described in Table 1 minimize some of these potential impacts, such as keeping equipment free of leaks; avoiding working in heavy rains; establishing speed limits to reduce dust from equipment and vehicles; using trash abatement to reduce attraction of predators; limiting work to daytime hours; and not using nighttime lighting.

Permanent

Permanent (operation-related) indirect impacts could result from the proximity of the Project to species' habitat after construction and are similar to those described for vegetation in Section 5.2.2. Potential permanent indirect impacts include generation of fugitive dust from O&M vehicles (similar to the temporary impacts), chemical pollutants if used for operation-related activities, light pollution, introduction of non-native species, habitat fragmentation, and increased fire regime. Dust can affect invertebrates as well as preventing nectaring on vegetation that is covered in dust; chemical pollutants can result in mortality of invertebrates, reptiles, and amphibians through direct contact; habitat fragmentation can prevent wildlife from foraging, expanding their ranges, moving between breeding, nesting, and foraging habitats, and overall reduce genetic diversity; and increased fire can reduce habitat or result in habitat type conversion that become unsuitable for wildlife as well as result in direct mortality of individual species. Operations-related lighting is limited to (1) restricted exterior lighting installed on turbines for Federal Aviation Administration aviation warning lights and (2) permanent motion-sensitive, directional security lights installed to provide adequate illumination around the collector substation. All lighting would be shielded and directed downward to minimize the potential for glare or spillover onto adjacent properties.

Campo Wind Facilities implementation and operation would create stationary noise sources on the Reservation. These sources would include the wind turbines, O&M facility, Project collector substation, gen-tie line, and maintenance and inspection activities. Campo Wind Facilities would employ approximately 10 to 12 full-time employees, generating up to 24 daily two-way trips, 7 days per week. While these activities would increase noise levels immediately adjacent to the access road during vehicle pass-bys, these events would not result in a substantial increase in ambient noise. The O&M facility could result in noise impacts during the summer months when rooftop air-cooled condenser units are used. At peak use, the maximum estimated noise levels produced are less than 48 A-weighted decibels equivalent continuous sound level (dBA L_{eq}) at approximately 200 feet from the building. The collector substation, which would feature a single 35 kV/230 kV transformer (for purposes of this analysis, a continuous source of noise emission as compared to other ancillary systems and equipment at this site that may only produce noise intermittently). At a source-to-receptor distance of at least 300 feet from this transformer, the expected sound pressure level would be less than 48 dBA L_{eq}. The On-Reservation gen-tie line associated with the Boulder Brush Facilities may produce corona during normal operation, but even under foul weather

conditions that would moisten or wet the conductor surfaces, the resulting noise would only be audible at very close distances and therefore would not result in an adverse effect.

Based on the noise contour modeling in Appendix G to the EIR (*Acoustical Analysis Report for the Campo Wind Project with Boulder Brush Facilities*), the operational noise levels at 60 dBA range from 300 feet to 1,800 feet from the turbine locations, depending on the average wind speed.

The standard BMPs described in Table 1 minimize some of these potential impacts, such as speed limits to reduce dust from vehicles and trash abatement to reduce attraction of predators.

Quino Checkerspot Butterfly

Indirect effects are those that may result from the Project at a later time with reasonable certainty. Project O&M may result in temporary and long-term indirect effects to Quino checkerspot butterfly. Long-term indirect effects to Quino checkerspot butterfly individuals or suitable habitat within the Project Area could result from the proximity of the Project to vegetation communities after construction, including impacts related to O&M. O&M activities would occur within the limits of grading; indirect impacts to vegetation communities could occur from generation of fugitive dust from vehicles, habitat fragmentation, accidental additional clearing of adjacent habitat, chemical pollutants if used for operation-related activities, non-native invasive species, and alteration of the natural fire regime.

An additional approximately 90.49 acres of potentially occupied Quino checkerspot butterfly habitat (i.e., habitat that is within 1 kilometer of known Quino checkerspot butterfly locations but is not within 200 meters of host plants or Quino checkerspot butterfly observations) is present at the Project Site. These areas are not expected to incur direct Quino checkerspot butterfly impacts because they do not otherwise include necessary host plant or nectar plant concentrations, but might incur indirect impacts if appropriate management practices are not maintained.

5.5.3 Effects Determination

Direct Impacts. This section provides effects determinations for the direct and indirect impacts described above. There are direct impacts to approximately 242.13 acres of potentially occupied Quino checkerspot butterfly habitat, which is a potentially adverse effect (**Impact BIO-5**). Butterfly collisions with construction equipment and/or vehicles associated with O&M activities may occur and such collisions would be an adverse effect (**Impact BIO-6**). Implementation of recommended **MM-BIO-3** (Quino Checkerspot Butterfly-Specific Avoidance, Minimization, and Mitigation Measures) would reduce adverse effects to this species through adhering to the terms and conditions provided by the USFWS during the ESA Section 7 consultation process. These terms may include off-site mitigation for permanent impacts to potentially occupied Quino checkerspot butterfly habitat, installation of construction flagging around potentially occupied areas.

As discussed in Sections 4.6.2 and 5.1, golden eagle use on site and the surrounding area is infrequent, these areas are not core territory of any eagles, and the chance for collisions is low; therefore, no adverse effects on golden eagle would occur. For the reasons outlined in Section 5.5.1.2, Golden Eagle, the probability of take is so low that the need for an Eagle Take Permit is not anticipated at this time. The Project will have a Bird and Bat Conservation Strategy (BBCS), as described in **MM-BIO-4(c)**, that will outline and include fatality monitoring for a spectrum of bird and bat species. Therefore, an appropriate mechanism is in place for monitoring for take of eagle in the unlikely event that such take were to occur, to ensure that the Developer would undertake appropriate consultation with USFWS.

No bald eagles have been observed during the ongoing eagle point count surveys conducted from October 2017 to present (or during any other surveys). The Project Site lacks lakes, ponds, and perennial rivers that support fish, their typical prey. Bald eagles also typically nest and roost around water sources, which are not on or near the Project site. The species is not expected to occur on site as more than a rare flyover.

Potential direct impacts to birds (e.g., active nests) protected under the MBTA as a result of vegetation clearing is a potential adverse effect (**Impact BIO-7**). This impact would not be adverse with implementation of recommended **MM-BIO-4** (Avian-Specific Avoidance, Minimization, and Mitigation Measures), which recommends vegetation clearance outside of the nesting bird season (generally February 15 through August 15); if avoidance is not feasible, then a nesting bird survey would be done, and buffers provided around active nests until nesting is completed.

Avian collisions with turbines or towers and/or electrocution with overhead lines is a potential adverse effect (**Impact BIO-8**). This impact would not be adverse with implementation of recommended **MM-BIO-4**, which requires preparation of a BBCS to monitor the Project Site for dead or injured bird and bat species; removal of dead carcasses to reduce attraction of carrion-consuming birds of prey; and implementation of recommendations by the Avian Power Line Interaction Committee (APLIC) to protect raptors and other birds from electrocution (APLIC 2006, 2012). Although potential direct impacts to bats would not be considered adverse under NEPA and thus would not require mitigation, implementation of **MM-BIO-4** would further reduce potential impacts associated with bat collisions.

Indirect Effects. Temporary indirect impacts from construction-related noise and increased human activity can adversely affect nesting birds protected under the MBTA, and erosion and altered hydrology can adversely affect habitat for species such as Quino checkerspot butterfly (**Impact BIO-9**). These impacts would not be adverse through implementation of recommended **MM-BIO-1** and **MM-BIO-4**, which would help reduce temporary indirect impacts through biological monitoring, environmental training to reduce impacts to resources outside of the limits

of disturbance, implementation of a SWPPP to reduce impacts to habitat and waterways outside of the limits of disturbance, implementation of a fugitive dust control plan, implementation of erosion and runoff control plan, weed management, and vegetation clearing avoidance during the nesting season (or nesting bird clearance surveys).

Habitat fragmentation is not an adverse effect of the Project because the individual wind turbine pads are small. Each turbine would be mounted on a concrete pedestal (approximately 20 feet in diameter) supported by a permanent concrete foundation (approximately 70–80 feet in diameter and 7–10 feet deep). The roads and the gen-tie line would not be fenced; therefore, most wildlife would be able to continue moving freely through these areas (see Section 5.6, Effects on Wildlife Corridors and Habitat Connectivity). Smaller surface roads can present a barrier to smaller, less mobile species; however, access roads are anticipated to be used for access to the Campo Wind Facilities only and would not function as surface roads for residential areas. Further, O&M of the Project would include a small staff (approximately 10–12 staff members would be employed on site at any one time throughout the life of the Project), which would not result in a large increase of traffic on the roads. The roads would also be composed of native soils with decomposed granite and gravel. Additionally, access within the Reservation would be limited to residents and personnel with permission only, and access roads would be controlled. Controlled access might include gates or other measures to limit access to personnel. Further, the areas beyond the turbine pads would be allowed to naturally revegetate and would be available for wildlife use. Therefore, the roads would not increase off-road vehicle use on the Project Site. Increased fire regime as a result of fire suppression could result in potential adverse effects (**Impact BIO-10**). Implementation of recommended **MM-BIO-1** would reduce potential impacts from fire because it requires implementation of a Fire Protection Plan for the Campo Wind Facilities prepared to the satisfaction of CRFPD.

5.5.4 Alternative 2: Reduced Intensity – Approximately 202 MW

Direct Impacts. Alternative 2 would result in direct impacts to approximately 191.58 acres of potentially occupied Quino checkerspot butterfly habitat is a potentially adverse effect. There is a low potential for butterfly collisions with construction equipment and/or vehicles associated with O&M activities. Those collisions would be an adverse effect, but that effect would be less compared to the Project as a result of the reduced area. Implementation of recommended **MM-BIO-3** (Quino Checkerspot Butterfly-Specific Avoidance, Minimization, and Mitigation Measures) would reduce adverse effects to this species through adhering to the terms and conditions provided by the USFWS during the Section 7 consultation process.

As discussed above, golden eagle use on site is infrequent, and the chance for collisions is low; therefore, no adverse effects on golden eagle would occur. Likewise, as discussed further above,

no bald eagles have been observed during the ongoing eagle point count surveys conducted from October 2017 to present (or during any other surveys).

Direct impacts to birds (e.g., active nests) protected under the MBTA as a result of vegetation clearing is a potential adverse effect. This impact would not be adverse with implementation of recommended **MM-BIO-4** (Avian-Specific Avoidance, Minimization, and Mitigation Measures).

Avian and bat collisions with turbines or towers and/or electrocution with overhead lines is a potential adverse effect, although it is reduced compared to the Project with the elimination of 12 turbines. This impact would not be adverse with implementation of recommended **MM-BIO-4**.

Indirect Effects. Temporary and permanent indirect impacts are similar to those described for the Project, but are expected to be lower because of the elimination of turbines in the southwest portion of the Reservation. These impacts would not be adverse through implementation of recommended **MM-BIO-1** and **MM-BIO-4.**

5.6 Effects on Wildlife Corridors and Habitat Connectivity

Terrestrial Wildlife Movement

Studies have shown mixed results when evaluating the long-term effects of wind facilities on terrestrial wildlife. Studies are species-specific and conclude that there is a need for more research assessing impacts to wind development. Lopucki et al. (2017) studied the effects of functioning wind projects on four terrestrial animals: European roe deer (*Capreolus capreolus*), European hare (*Lepus europaeus*), red fox (*Vulpes vulpes*), and the common pheasant (*Phasianus colchicus*). The study concluded that: herbivorous mammals (roe deer and European hare) avoided wind farm interiors and proximity to turbines; common pheasants showed a positive reaction to wind turbine proximity; red fox had a neutral response to wind turbines; and there was no relation between fox track density and turbine proximity (Lopucki et al. 2017). In accordance with other published studies (Helldin et al. 2012; Lovich and Ennen 2013; Lopucki and Mroz 2016; Walter et al. 2006; Winder et al. 2014a, 2014b), Lopucki et al. (2017) hypothesized that the studied wildlife would not avoid areas in close proximity to turbines and would utilize all areas of functional wind farms with a frequency similar to the control area. The results of wildlife tracking study by Lopucki et al. (2017) concluded that there was use of the wind farm area, even in close proximity to wind turbines, by the studied wildlife. Although the studies showed mixed results for reactions of studied wildlife to wind farms where the roe deer and rabbit spent less time near the turbines, pheasants spent more time near the turbines, and the fox showed no difference when compared to control sites. They determined that more data from different study sites with different predatory pressures is also needed to fully understand the effects of wind power on terrestrial wildlife (Lopucki et al. 2017).

The Wyoming Game and Fish Commission (2010) concluded that there is need for research to identify and assess the impacts of wind development. According to the Walter et al. (2006) study, elk (*Cervus canadensis*) were displaced from wind development activities during construction, but following the completion of construction, less displacement was noted. The network of roads constructed for wind projects could displace elk depending on the amount of human activity. Increased human activity can displace elk and result in increased movements (Rumble et al. 2005). However, dirt roads may also facilitate movement of coyote, gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), mule deer, and other species (PSBS 2003; Lovallo and Anderson 1996). Dirt roads have also been shown to provide potentially important landscape linkages for smaller wildlife to pass through unsuitable habitat to more suitable habitat (Brock and Kelt 2004). For example, California ground squirrels may use trails and drainage systems to disperse from colonies (Wiggett and Boag 1989). San Diego pocket mice (*Chaetodipus fallax*) and cactus mice (*Peromyscus eremicus*) will use low-use dirt trails but avoid low-use paved roads of similar width and rural two-lane highways (Brehme et al. 2013). Brock and Kelt (2004) found that the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*) used dirt roads extensively to move great distances through otherwise inhospitable habitat to find more suitable habitat. Species-specific studies show mixed results and conclude that there is need for more research to assess the impacts of wind development.

In Arizona, a study evaluated the potential of pronghorn (*Antilocapra americana*) response to wind energy development (American Wind Wildlife Institute 2017). Of the 24 pronghorn monitored, 21 of the pronghorn used the wind facility, and the remaining 3 were collared south of the study area and did not interact with the facility. The research determined that high crossing rates were associated with open grassland in the winter, but in the summer, pronghorn were more likely to use the pinyon and juniper wooded areas. Finally, pronghorn tended to use the areas within the wind facility more often in the winter months (November through February) than the summer months (April through October). There was no diurnal pattern (552 crossings took place during daylight hours compared to 520 at night).

The Find/Rein-project, a research project run by the Norwegian University of Life Sciences (NMBU) supported by the Norwegian Institute for Nature Research and the Norwegian Water Resources and Energy Directorate, began in 2005 and investigated the effects of human activity, wind power developments and power lines on both semi-domestic and wild reindeer. This research project had study periods of 5 to 7 years, spanning from years before construction of wind power developments and power lines, during construction, to years after construction. While further studies are ongoing, thus far results have shown that it is the amount and type of human activity largely during the construction period and not the permanent installations of infrastructure themselves that disturb movement of reindeer (UiO and NMBU 2014). While there are no reindeer in the Project

Area, it is a large and highly migratory terrestrial mammal; therefore, references to this study are intended to support an assumption that Project operations would not preclude movement for the number of more tolerant terrestrial mammal species that do frequent the Project Area.

Supporting this assessment, there is observational and anecdotal information that supports the conclusion that animals continue to move through operational wind facilities. Dudek is currently working on an existing wind facility repowering project located in Merced County on the Pacheco State Park that includes consistent use by coyote, bobcat, mule deer, and Tule elk (*Cervus elaphus nannodes*). The Tule elk were reintroduced to the larger area and eventually invaded this area of their own volition, thus indicating that these species are not unduly bothered by the turbines, infrastructure, and road networks associated with this wind facility. Further, the Developer has a number of existing operational wind facilities in Kern County and observations made at those facilities indicate frequent use by coyote, bobcat, deer and, while less frequent, even elk, pronghorn, and American black bear (*Ursus americanus*) have been observed moving through the area during facility operations.

Based on the results of these studies, implementation of the Project is not expected to impact wildlife movement, habitat connectivity, or wildlife corridors.

As discussed in the Final EIR/EIS for the Tule Wind Project, which is a recently constructed Wind Energy Project in the vicinity of the Project that was included in the East County (ECO) Substation, Tule Wind, Energia Sierra Juarez Gen-Tie Projects EIR/EIS (2011), the Final EIR/EIS concluded:

> There is literature that describes wind project areas as creating a behavioral avoidance area, thereby establishing a barrier in the aerial habitat used by birds and bats (Drewitt and Langston 2006). Typical avian usage of the site relative to the turbine heights suggests a majority of the bird usage on the site is below the direct rotor swept area of the turbines. Avoidance of aerial habitat by bird and bat species would be a species-specific behavior response to the Tule Wind Project, for which sufficient data is not available to evaluate. Avoidance of turbine rotor swept areas by bird or bat species using the aerial habitat at the height of the rotor swept area has the potential to result in movement effects for these specific species; however, such avoidance behavior would reduce the potential effects of collision to those species as assessed. Overall based on the information available and based on a significance criteria that specifically relates to effects on "linkages or wildlife movement corridors," the Tule Wind Project would not have an adverse impact on linkages or wildlife movement corridors. Under CEQA, this impact would be less than significant.

Ground-based wildlife movement through the Project Area is relatively unconstrained. Wildlife species are expected to move through the Project Area, and implementation of the Project is not expected to impede wildlife movement. Typical wildlife species expected to move through the Project Area include mule deer, cougar, bobcat, coyote, small mammals, reptiles, and birds. Although these species may temporarily avoid areas of the Project Site during construction, long-term adverse effects are not anticipated due to animal habituation to the buildings and structures. Studies conducted at Foote Creek Rim in Wyoming have not demonstrated any long-term displacement effects on pronghorn antelope, and use of the area has not declined since the construction of the wind energy project (BLM 2005). The relatively wide placement of the turbines and low anticipated level of human operation is not expected to preclude movement for non-avian migrating species.

Avian Movement

As described in Section 4.8, Wildlife Corridors and Habitat Linkages, the Project Area occurs within the Pacific Flyway, but as stated, small birds mostly fly along the coast or the desert side of the mountains, which occurs off-site of the Project Area. Additionally, previous studies within the Project Vicinity, including for the Tule Wind Project, concluded that large concentrations of migrants do not appear to regularly pass through the region (Tetra Tech 2008, 2009). However, migration is not a uniform and consistent phenomenon, and it is expected that while generally low, it will vary due to vagaries of weather or other unforeseeable factors (DiGaudio et al. 2008; Kerlinger and Moore 1989; Manville 2005; NREL 2006). As such, the Project Area is a lower use migration area as compared to other areas near the Project Area. This conclusion is supported by the nearly 2-year weekly point-count surveys conducted in the Project Area and is consistent with the Shu'luuk EIS analysis.

5.6.1 Direct

The Project would directly impact approximately 920.40 acres of vegetation communities that currently serve as habitat for wildlife movement. Implementation of the Project is not expected to result in permanent direct impacts to habitat connectivity and wildlife corridors. The Project Site is large, with varied habitats, and may support wildlife corridors. Although the Project would involve placement of structures and wind turbines within the landscape, the site is unfenced and the features are not considered barriers that would interfere with the movement of wildlife through the surrounding undeveloped landscapes. Therefore, the Project would not constrain wildlife movement. There is existing human activity throughout portions of the Reservation, as allowed by the Tribe, and additional human activity from O&M activities is also not expected to impact wildlife movement throughout the Project Site. Land within the Boulder Brush Boundary is subject to regular off-road vehicle use; however, the Project would not increase off-road vehicle use on the Project Site.

Likewise, the presence of turbines would not preclude the use of the Pacific Flyway for avian species, nor would it artificially constrain avian species to a modified or "unnatural" movement corridor.

5.6.2 Indirect

Temporary

Temporary (construction-related) indirect impacts would result from noise and ground vibrations through the use of mechanized equipment and increased traffic. Noise would most likely only be a disturbance to those species that are active during the day, since noise levels are less at night because construction activities would not take place at night (see Table 1). Most wildlife species, such as cougars and bobcats, that would use the area as a habitat corridor or as part of their territory are nocturnal, very mobile, and generally have relatively large home ranges and therefore would not be impacted by Project construction while foraging and moving at night. Noise from Project construction is not anticipated to hamper breeding and nesting activities of any species likely to use the area as a wildlife corridor.

No construction is anticipated to take place at night, and therefore no nighttime lighting would interfere with wildlife movement (see Table 1).

Permanent

Permanent (operation-related) indirect impacts associated with permanent lighting would consist of the O&M facility, Federal Aviation Administration lighting on selected turbines, and parking areas. These areas would include security lighting designed to minimize light pollution and preserve dark skies, while enhancing safety, security, and functionality. Some localized security-related lighting may be required during construction and/or operation. Noise associated with O&M activities is not anticipated to hamper breeding or use of the surrounding area as a wildlife corridor. Wildlife species are expected to acclimate to the new facilities and equipment.

5.6.3 Effects Determination

Direct Impacts. Project wind turbines within the Campo Corridor are limited to a small footprint; the roads are private and unpaved and are not expected to increase vehicle use on site. The turbines are widely dispersed, ranging from approximately 600 feet to approximately 1,700 feet away from each other. The Boulder Brush Facilities include transmission line poles that have a small footprint; the roads are private and are not expected to increase vehicle use on site; and the high-voltage substation and switchyard area is limited to a footprint that still allows movement in the surrounding areas. Therefore, the Project allows for nearly unimpeded movement by both terrestrial and avian species.

As described in Section 4.8, a number of studies have determined that terrestrial wildlife are not adversely affected by wind power development (Agha et al. 2015; American Wind Wildlife Institute 2017; Lopucki et al. 2017; Walter et al. 2006; Wyoming Game and Fish Commission 2010). Therefore, construction and operation of the Project is not expected to have an adverse effect on wildlife movement, habitat connectivity, or wildlife corridors.

Indirect Effects. Temporary indirect impacts associated with noise are not expected to result in an adverse effect to wildlife corridors and habitat connectivity. Permanent indirect impacts associated with Project lighting is not expected to result in adverse effects to wildlife corridors. Therefore, the potential noise and lighting impacts as a result of the Project would result in no adverse effect.

5.6.4 Alternative 2: Reduced Intensity – Approximately 202 MW

Direct Impacts. Project wind turbines within the Campo Corridor are limited to a small footprint; the roads are private and unpaved and are not expected to increase vehicle use on site. The turbines are widely dispersed ranging from 600 feet to 1,700 feet away from each other. The Boulder Brush Facilities include transmission line poles that have a small footprint; the roads are private and are not expected to increase vehicle use on site; and the high-voltage substation and switchyard area is limited to a footprint that still allows movement in the surrounding areas. Therefore, the Project would allow for nearly unimpeded movement by both terrestrial and avian species.

As described in Section 4.8, a number of studies have determined that terrestrial wildlife are not adversely affected by wind power development (Agha et al. 2015; American Wind Wildlife Institute 2017; Lopucki et al. 2017; Walter et al. 2006; Wyoming Game and Fish Commission 2010). Therefore, construction and operation of the Project is not expected to have an adverse effect on wildlife movement, habitat connectivity, or wildlife corridors.

Indirect Effects. Temporary indirect impacts associated with noise are not expected to result in an adverse effect to wildlife corridors and habitat connectivity. Permanent indirect impacts associated with Project lighting is not expected to result in adverse effects to wildlife corridors. Therefore, the potential noise and lighting impacts as a result of the Project would result in no adverse effect.

5.7 Cumulative Effects

The Council on Environmental Quality regulations define cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions” (40 CFR 1508.7). The purpose of cumulative effects

analysis is to ensure that the federal responsible official considers the full range of consequences of the proposed action and alternatives, including the no action alternative.

Geographic Extent

The geographic extent for the analysis of cumulative impacts associated with biological resources includes the vicinity of all past, present, and reasonably foreseeable actions, within recognized ecological boundaries based on ecoregions. To define the appropriate geographic extent, a GIS-based analysis of eastern San Diego County and western Imperial County was performed. This included a review of available GIS data for watersheds, ecoregion data, and bioregion data. Map review and analysis included the San Diego Plant Atlas ecoregion maps and data (SDNHM 2018), Calflora maps and data (Calflora 2018), U.S. Environmental Protection Agency watershed maps (EPA 2018a), U.S. Environmental Protection Agency ecoregion maps (EPA 2018b), and Jepson Bioregion maps (Jepson Flora Project 2018).

Based on the above analysis, the Peninsular Ranges of the California Floristic Province, as defined in the Jepson Flora Project, were determined to be an appropriate boundary for analysis of cumulative effects on biological resources (Figure 16, Biological Cumulative Study Area Vegetation).

The Peninsular Ranges eco-geographic extent was chosen because the geographic system developed by the Jepson Flora Project "combines features of natural landscapes and biota to delimit the units, as opposed to using the often arbitrary and unnatural boundaries of counties for that purpose. The Jepson geographic system most importantly reflects broad patterns of natural vegetation (and, at a finer scale, more specific plant assemblages), geology, topography, and climate" (Jepson Flora Project 2018). In addition, habitat within the Peninsular Ranges comprises a variety of ecoregions supporting habitat for wildlife. The southern mountain ecoregion, south desert slopes, central mountains, and portions of the southern foothills are all represented within the Peninsular Ranges (SDNHM 2018).

The Peninsular Ranges of the Jepson Flora Project exclude the southern desert lowlands (SDNHM 2018). Based on an analysis of both flora and fauna, southern desert lowland flora was determined to be dissimilar to the southern mountain region, south desert slopes, and central mountains and southern foothills (SDNHM 2018).

The biological cumulative analysis study area is explained in the "Existing Cumulative Conditions" section that follows. The cumulative projects analyzed for biological resources are a subset of those projects summarized in Table 24.

Existing Conditions within the Cumulative Impacts Analysis Area

Southeastern San Diego County is considered a transition zone between biogeographic regions. The California Floristic Province occurs in the biological cumulative analysis study area, which encompasses a majority of California west of the extreme dry regions. Within the California Floristic Province, the Peninsular Ranges subregion (i.e., an area of similar climatic and plant community associations) stretches from southern Los Angeles County along the valley, foothills, and mountains south to Baja California, Mexico.

In the western and central portion of the analysis area in and around the McCain Valley, the mountain and foothill areas are characterized by a mosaic of chaparral and scrub communities that grade into oak woodlands and grasslands in the valleys. Many of the valleys are also characterized by grazing uses and rural residential development. This analysis area primarily includes transmission projects, large-scale renewable energy development, and residential and communications development in eastern San Diego County. The assemblage of plant and wildlife species, including special-status species, in the western and central portion of the analysis area is largely the same as that identified for the Project.

Cumulative Effects Assessment Methodology

The cumulative effects analysis conducted for biological resources is based on the list method and considers relevant projects from Table 26. Figure 16 shows the extent of the cumulative study area. Projects from the past, projects that are reasonably foreseeable, projects already approved, and projects pending are included. Of the cumulative projects listed in Table 26, the following projects would potentially affect biological resources within the cumulative study area: Torrey Wind Project, Energia Sierra Juarez Wind Project, Energia Sierra Juarez Transmission Project, Tule Wind Project, ECO Substation, Rugged Solar, Golden Acorn Casino and Travel Center, Freedom Ranch, Boulevard Fire Station, Rough Acres Foundation Campground Facility, Jacumba Solar, Boulevard Solar, Boulevard Energy Storage, JVR Solar, and VZW-1-8 Boulevard.

The locations of these projects can be found on Figure 16. Reasonably foreseeable projects located east of the cumulative impacts analysis area are not included because they would affect more arid vegetation communities (southern desert lowlands; SDNHM 2018) than those present on site; therefore, the Project would not cumulatively contribute to impacts in natural vegetation communities of the arid regions (southern desert lowlands) or impact species that are associated with these arid (southern desert lowlands) habitat types.

Reasonably foreseeable projects located in the western, central, and southeastern portion of the cumulative impacts analysis area (within San Diego County), within the cumulative study area, as

described above, have the potential to affect similar vegetation communities as the Project and therefore could contribute to cumulative impacts in natural vegetation communities in this region, or to impacts to species that are associated with these habitat types.

The cumulative impact analysis for wildlife movement and local and regional planning is similarly limited to the cumulative study area. Since the analysis area is largely undeveloped, wildlife movement through and around the reasonably foreseeable project areas would still be possible. Despite the development of the reasonably foreseeable projects, the area would remain predominantly rural with significant undeveloped areas and wildlife movement opportunity. Local and regional planning efforts are defined by the jurisdiction of the lead agency, which in the case of the Project is the Bureau of Indian Affairs and the County of San Diego for Boulder Brush Facilities.

Table 26
Cumulative – Reasonably Foreseeable, Approved, and Pending Projects

Project	Type	Status	Distance from Project	Project-Related Impacts
Energia Sierra Juarez Wind Project I: Development of 400 MW of wind generation. Phase I (just north of the town of La Rumorosa in Mexico) is proposed to generate approximately 100 MW of energy with 45 to 52 turbines. Point of interconnection proposed with the ECO Substation.	PF-W	C	Approx. 15 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, and Hazards and Hazardous Materials (Fire)
Tule Wind Farm: 12,239 acres of public lands, 186 MW, with 67 wind turbines. The project would deliver power through the project substation via a 138 kV transmission line to run south to an interconnection with the proposed San Diego Gas & Electric Rebuilt Boulevard Substation.	PF-W	Phase 1 = C Phase 2 = A	Approx. 0.25 miles	Air Quality, Biological Resources, Cultural Resources, Public Services, and Hazards and Hazardous Materials (Fire)
Energia Sierra Juarez U.S. Transmission, MUP: 230 kV double-circuit power lines leading to San Diego Gas & Electric ECO Substation near the Mexican border.	PF	C	Approx. 13 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, and Hazards and Hazardous Materials (Fire)
ECO Substation: ECO Substation, Rebuilt Boulevard Substation, and 13.3-mile 138 kV line between Rebuilt Boulevard Substation and ECO Substation.	PF	C	Approx. 13 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, Hydrology/Water Quality, Noise, and Hazards and Hazardous Materials (Fire)
Rugged Solar: Major Use Permit Modification MUP-12-007W1, MUP-12-007TE; MUP for the construction and operation of a 74 MW solar energy system on an approximately 765-acre site.	PF-S	UC	Approx. 5 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, Hydrology/ Water Quality, Noise, Public Services, and Hazards and Hazardous Materials (Fire)

Table 26
Cumulative – Reasonably Foreseeable, Approved, and Pending Projects

Project	Type	Status	Distance from Project	Project-Related Impacts
Golden Acorn Casino and Travel Center: State Clearinghouse No. 2007071097: 33-acre expansion consisting of 150-room hotel, 900-space parking garage, surface parking, RV park, casino expansion, bowling alley, arcade, offices, retail, restaurants/food service, wind turbines, and water and wastewater improvements in three phases.	F	C	Approx. 4 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, Noise, Public Services, Utilities, and Hazards and Hazardous Materials (Fire)
Freedom Ranch: MUP 74-011W2; Expand existing facilities from 50 beds to 125 beds in four phases. (Alcohol/Drug Treatment and Recovery Facility)	R	A	Approx. 12 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, Noise, Public Services, Utilities, and Hazards and Hazardous Materials (Fire)
Boulevard Fire Station: Project would replace existing fire station along Highway 94. The fire station would be 8,496 square feet including an apparatus bay, and would have a total footprint of disturbance of approximately 30,000 square feet of the 17.5-acre parcel. The site would include water tank facilities that would be filled infrequently as well as roadway improvements along its northern boundary and roadway access improvements to Manzanita Dulce. (Fire Station)	PF	C	Approx. 4 miles	Aesthetics and Air Quality
Rough Acres Foundation Campground Facility: MUP-12-021; MUP for a campground/conference center. (Wellness Center and Campground Facility)	O	UR	Approx. 2 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, Noise, Public Services, Utilities, and Hazards and Hazardous Materials (Fire)
Jacumba Community Services District Capacity Increase: Project would involve creation of new well at existing monitoring well site (Park Well) to increase capacity of JCSD water supply.	O	A	Approx. 11 miles	Hydrology Water Quality
Jacumba Solar: MUP-14-041; MUP for the construction and operation of a 20 MW solar energy system on an approximately 304-acre site.	PF-S	C	Approx. 13 miles	Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Public Services, Transportation/Traffic, Utilities and Service Systems

Table 26
Cumulative – Reasonably Foreseeable, Approved, and Pending Projects

Project	Type	Status	Distance from Project	Project-Related Impacts
Boulevard Solar: Major Use Permit Modification: MUP-12-010W1 MUP-12-010TE; MUP for the construction and operation of a 60 MW solar energy system on an approximately 420-acre site.	PF-S	UR	Approx. 9 miles	TBD pending completion of environmental analysis
Boulevard Energy Storage: PDS 2017-ZAP-17-006; Minor Use Permit for the construction and operation of a 100 MW energy storage facility on a 2-acre footprint.	PF	UR	Approx. 6 miles	TBD pending completion of environmental analysis
JVR Solar: MPA-17-016; Proposed construction and operation of a 100 MW solar energy system on an approximately 571-acre site.	PF-S	UR	Approx. 10 miles	TBD pending completion of environmental analysis
Cameron Solar: MUP-18-004; MUP for the construction and operation of a 1.7 MW solar energy system consisting of approximately 19 acres on a 164.7-acre parcel.	PF-S	UR	Approx. 13 miles	TBD pending completion of environmental analysis
Torrey Wind: Construction and operation of a 126 MW wind energy generation facility consisting of 30 wind turbines. The Torrey Wind Project is proposed within the Boulder Brush Boundary. The proposed 3.5-mile-long Off-Reservation gen-tie line, a component of the Boulder Brush Facilities, would transect the proposed Torrey Wind Project.	PF-W	UR	Adjacent to Project Site	TBD pending completion of environmental analysis
Meteorological Testing Facilities: NOE filed for the construction and operation of meteorological testing facilities to collect wind and climate data to determine site viability for the Torrey Wind project.	PF	UC	On Project Site	TBD pending completion of environmental analysis
Level 3 Communications LLC: Minor Use Permit PDS2001-3400-99-031; For the construction and operation of a Fiber-optic In-Line Application Facility consisting of two equipment shelters measuring 414 square feet and 286 square feet, a second facility consisting of six new shelters comprising 2,520 square feet, a 255-square-foot generator shelter, the relocation of an existing 255-square-foot generator hut, and a 8-foot, ’6-inch sound wall.	PF	C	Approx. 3.25 miles	Negative Declaration
Site Master Inc.: MUP PDS2014-MUP-14-005; MUP for the construction and operation of a 35-foot-tall faux elevated water tank with two mounted microwave dishes.	PF	C	Approx. 3.25 miles	Notice of Exemption

Table 26
Cumulative – Reasonably Foreseeable, Approved, and Pending Projects

Project	Type	Status	Distance from Project	Project-Related Impacts
Pacific Telephone: MUP PDS2011-3300-76-061; MUP for the construction and operation of a 64-square-foot equipment shelter.	PF	C	Approx. 4.25 miles	Special Use Permit
White Star Communications Site: MUP PDS2011-3300-88-064; MUP for the construction and operation of a radio communications facility for SAFE (San Diego Authority for Freeway Emergency) consisting of a tower max height of 70 feet, a mounted microwave dish, and a 200-square-foot equipment shelter with an antenna max height 40 feet.	PF	C	Approx. 4.75 miles	Negative Declaration
Pactel White Star: MUP PDS2003-3300-90-018; MUP for the construction and operation of a 100-foot lattice tower with 10-foot whip antenna on top and two buildings measuring 288 square feet and 567 square feet, a 270-square-foot building, 8 panel antennas, a 6-foot dish antenna, a 159.5-square-foot emergency standby generator surrounded by a 7-foot, 6-inch CMU block wall with roof and acoustic panel, 15 panel antennas, and a 230-square-foot equipment shelter	PF	C	Approx. 4.75 miles	Negative Declaration
SD0716 Manzanita – FWLL Modification & T-Mobile L700: Site Plan PDS2016-STP-16-022, PDS2014-STP-14-009, PDS2016-STP-16-020; Site Plan for the construction and operation of eight panel antennas, four new remote radio units (total 5), four radio frequency filters, four tower-mounted amplifiers, two surge suppressors mounted to an existing 35-foot wooden pole, two new equipment cabinets (total four), and one GPS antenna (total two).	PF	C	Approx. 2.5 miles	Notice of Exemption
VZW I-8 Boulevard: Site Plan PDS2014-STP-14-011; Site Plan for the construction and operation of 12 antennas mounted to a new 35 foot faux water tank, an associated equipment shelter, and an emergency generator.	PF	A	Approx. 2.25 miles	Biological Resources, Hazards & Hazardous Materials

PF = Public facilities and Utilities; S = Solar; W = Wind; T = Transmission; F = Federal; R = Residential; O = Other; MUP = Major Use Permit; A = Approved; UC = under construction; UR = under review; C = Completed; kV = kilovolt; MW = megawatt; ECO = East County; TM = Tentative Map.

5.7.1 Candidate, Proposed, or Listed Species under the ESA

Special-Status Wildlife Species

Direct

In order for a cumulative impact to special-status wildlife species to occur, the cumulative projects would have to result in the loss of the same special-status wildlife species or their habitat as the Project such that those species become more limited in their distribution, population size, or available suitable habitat within the analysis area. The Project would impact approximately 242.13 acres of potentially occupied Quino checkerspot butterfly habitat. As with this Project, projects within the cumulative impact study area that have impacts to Quino checkerspot butterfly habitat would be required to mitigate for these impacts through habitat mitigation and other measures specified during the Section 7 or Section 10 of the Endangered Species Act process. Therefore, the cumulative impacts would not be adverse with implementation of measures in the Section 7 or Section 10 process.

Indirect

Given the nature, location, and timing of the reasonably foreseeable projects, the potential for cumulatively significant indirect construction-related impacts to special-status wildlife species is low. Reasonably foreseeable projects within the biological cumulative analysis study area involve a variety of project types. Projects within a few miles of the Project are generally not anticipated to be constructed simultaneously (see discussion above).

However, construction of some listed cumulative projects in close proximity to the Project may overlap, in which case noise, human presence, and erosion and altered hydrology could cause wildlife behavior modifications and avoidance of the area during construction activities. These disruptions could result in changes in habitat usage and potentially affect species fitness and productivity. The potential mortality resulting from increased vehicle use in the Project Area and construction area hazards (e.g., trenches) across the Project Site and listed cumulative project site areas could lead to decreased population numbers and reduced productivity. The Project and other reasonably foreseeable projects are located in a rural area and adjacent properties provide undeveloped areas for golden eagle to forage and available habitat for Quino checkerspot butterfly host plants. Permanent indirect impacts to wildlife habitat from increased fire regime could result in an adverse effect.

However, with implementation of the mitigation measures for the Project, along with the minimization and mitigation measures for the cumulative projects, these impacts would be reduced to no adverse effect. Additionally, there is suitable habitat available for wildlife species, including federally protected species, on portions of the Project Site and throughout the biological cumulative analysis study area.

5.7.2 Riparian Habitat or Sensitive Natural Community

Direct

Impacts to approximately 2.22 acres of vegetation communities associated with jurisdictional resources are proposed, resulting in potential adverse effects because they are federally regulated resources. There are no federally sensitive vegetation communities on the Project Site. The total acreage of vegetation communities analyzed in the biological cumulative analysis study area is approximately 499,048 acres. The Project impacts (approximately 2.22 acres) and cumulative project impacts (approximately 5.80 acres) are less than 1% of the total cumulative study area (Table 27); therefore, the potential cumulative project impacts would not result in an adverse effect. Additionally, with implementation of the recommended mitigation measures for the Project, along with the minimization and mitigation measures for the cumulative projects, these impacts would be further reduced.

Table 27
Cumulative Vegetation Impacts

Project Name	Potential Jurisdictional Resources	Impact Acreage
ECO Substation	Southern willow scrub/mulefat scrub	0.30
Energia Sierra Juarez U.S. Transmission	Southern cottonwood willow riparian forest	0.01
Jacumba Solar	Unvegetated channel	0.21
Rough Acres Foundation	Unvegetated channel	0.86
Rugged Solar	Alkali meadow (including disturbed)	0.10
	Tamarisk scrub	3.10
Rugged Solar – Off Site	Southern willow scrub (disturbed)	0.10
Torrey Wind	Southern arroyo willow riparian forest	0.11
	Unvegetated channel	0.41
Tule Wind Farm	Southern willow scrub	0.10
	Unvegetated channel	0.60
	Total	**5.80**

Indirect

In order for a cumulative impact to sensitive or riparian natural communities to occur, the cumulative projects would have to result in the loss of the same indirect impacts to vegetation communities as the Project. Potential adverse effects could occur from fugitive dust, altered hydrology, and increased erosion as part of the Project. The cumulative projects listed in Table 26

that would result in impacts to potentially jurisdictional vegetation communities likely would have the same indirect impacts.

Construction of some cumulative projects may partially overlap or would be completed prior to commencement of Project construction activities, and impacts would be less severe than if they were constructed simultaneously. If all of the reasonably foreseeable cumulative projects in close proximity to the Project were to be constructed simultaneously, substantial dust generation, erosion, and sedimentation could degrade nearby jurisdictional resources. The cumulative indirect Project impacts could result in an adverse effect. However, with implementation of the mitigation measures for the Project, along with the minimization and mitigation measures for the cumulative projects, these impacts would be not be adverse.

6 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Purpose: To identify and recommend mitigation that would avoid or minimize the potential adverse impacts of the Project.

MM-BIO-1 General Avoidance and Minimization Measures.

(a) Project Biologist(s). A Project biologist(s) approved by the U.S. Fish and Wildlife Service (USFWS) and the Campo Band of Diegueño Mission Indians (Tribe) shall be designated by the Developer. The Campo Environmental Protection Agency is recommended to oversee the duties of the Project biologist for all work conducted on the Reservation. The Developer shall submit the names, documented experience, any relevant permit numbers, and resumes for the Project biologist(s) to USFWS and the Tribe for approval prior to initiation of construction. The Project biologist(s) shall be responsible for the following:

- Providing training to all construction workers (may take the form of any documentable training platform).
- Reviewing and/or designating the construction area in the field with the construction contractor in accordance with the final grading plan prior to clearing, grubbing, or grading.
- Conducting a field review of the staking to be set by the professional surveyor, designating the limits of construction activity prior to clearing, grubbing, or grading.
- Flushing wildlife species (i.e., reptiles, mammals, avian, or other mobile species) from occupied habitat areas immediately prior to (i.e., within 2 hours) brush-clearing and earthmoving activities. This does not include disturbance of nesting birds (see MM-BIO-4) or "flushing" of federally listed species (e.g., Quino checkerspot butterfly (see MM-BIO-3)).
- Regularly monitoring construction activities to verify that construction is proceeding in compliance with all permit requirements specific to biological resources.
- Overseeing the construction site so that cover and/or escape routes for wildlife from excavated areas are provided on a daily basis. All steep trenches, holes, and excavations during construction shall be covered at night with backfill, plywood, metal plates, or other means, and the edges

covered with soils and plastic sheeting such that small wildlife cannot access them, and/or excavations shall provide an earthen ramp or boards to allow for a wildlife escape route at the ends and every 30 feet.

- Maintaining communication with the appropriate personnel (construction Project manager, resident engineer) so that issues relating to biological resources are appropriately and lawfully managed.
- Verifying that grading plans include a stormwater pollution prevention plan.
- Reporting any noncompliance issues to the Bureau of Indian Affairs, the resident engineer, and the Tribe.

(b) Environmental Training Program. A worker environmental awareness program shall be developed and implemented prior to the start of construction. The Project biologist(s) shall use this program to conduct environmental training for construction personnel. All construction site personnel shall be required to attend the environmental training in conjunction with hazard and safety training prior to working on site.

(c) SWPPP. The stormwater pollution prevention plan (SWPPP) or equivalent shall include, at a minimum, the best management practices listed below. The combined implementation of these requirements shall protect adjacent habitats and special-status species during construction to the maximum extent practicable. At a minimum, the following measures and/or restrictions shall be incorporated into the SWPPP and noted on construction plans, where appropriate, to avoid impacts to special-status species, special-status vegetation communities, and/or jurisdictional waters during construction. The measures described in the SWPPP would be subject to enforcement by the Campo Environmental Protection Agency on the Reservation, and the County of San Diego for the Boulder Brush Facilities.

The Project biologist(s) shall verify the implementation of the following design requirements:

- No planting or seeding of invasive plant species (per the most recent version of the California Invasive Plant Council's California Invasive Plant Inventory for the Project region) shall be permitted.
- Construction activity shall not be permitted in jurisdictional waters of the United States except as authorized by applicable law and permit(s),

including permits and authorizations approved by the U.S. Army Corps of Engineers.

- Silt settling basins installed during the construction process shall be located away from areas of ponded or flowing water to prevent discolored, silt-bearing water from reaching areas of ponded or flowing water during normal flow regimes.
- Temporary structures, staging, and storage areas for construction equipment and/or materials shall not be located in jurisdictional waters, including wetlands and riparian areas.
- Any equipment or vehicles driven and/or operated within jurisdictional waters of the United States shall be checked and maintained by the operator daily to prevent leaks of oil or other petroleum products that could be deleterious to aquatic life if introduced to the watercourse.
- No stationary equipment, such as motors, pumps, generators, and welders, or fuel storage tanks shall be located within 200 feet of jurisdictional waters of the United States.
- No debris, bark, slash sawdust, rubbish, cement, concrete, oil, or petroleum products shall be stored where it may be washed by rainfall or runoff into jurisdictional waters of the United States.
- When construction operations are completed, any excess materials or debris shall be removed from the work area.
- No equipment maintenance shall be performed within 200 feet of jurisdictional waters of the United States where petroleum products or other pollutants from the equipment may enter these areas.
- Fully covered trash receptacles that are animal-proof and weather-proof shall be installed and used by the construction contractor(s) to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Littering shall be prohibited and trash shall be removed from construction areas daily. All food-related trash and garbage shall be removed from the construction sites on a daily basis.

(d) Fugitive Dust Control Plan. The Developer shall develop a fugitive dust control plan in compliance with San Diego County Air Pollution Control Regulations to reduce particulate matter less than 10 microns (PM_{10}) and fine particulate matter less than 2.5 microns ($PM_{2.5}$) emissions during

construction and decommissioning. The fugitive dust control plan shall include names, addresses, and phone numbers of persons responsible for the preparation, submission, and implementation of the plan; description and location of operation(s); and a list of all fugitive dust emissions sources included in the operation.

The following dust control measures shall be implemented:

- All on-site unpaved roads shall be effectively stabilized using soil stabilizers that can be determined to be as efficient, or more efficient, for fugitive dust control than California Air Resources Board-approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation. Application of the soil stabilizer shall be undertaken strictly to the manufacturer's directions for application and cognizant of the weather forecast to avoid application immediately before a rain event.
- All material excavated or graded shall be sufficiently watered to prevent excessive dust. Watering shall occur as needed with complete coverage of disturbed areas.
- All haul trucks hauling soil, sand, and other loose materials shall be covered (e.g., with tarps or other enclosures that would reduce fugitive dust emissions).
- Soil loads shall be kept below 18 inches of the freeboard of the truck.
- Drop heights shall be minimized when loaders dump soil into trucks.
- Traffic speeds on unpaved roads shall be limited to 15 miles per hour.
- New disturbance in previously undisturbed areas shall be minimized to the extent feasible.

(e) Revegetation. Disturbed areas that are not required to be clear for operations and maintenance activities (i.e., temporarily disturbed areas) shall be revegetated or stabilized using soil binders within 90 days of construction completion. If soil binders are used they shall be as efficient, or more efficient, for fugitive dust control than California Air Resources Board-approved soil stabilizers. Soil would be revegetated with native plant species found within adjacent habitats. Locally available seed will be used, and seed from species that are unavailable for collection would not be incorporated into the final seed palette. Revegetation of temporarily

disturbed areas shall provide a minimum of 40% cover of plant species native to adjacent habitats within a 2-year time frame. If 40% cover of native species is not achieved within 2 years, adaptive management measures (e.g. supplemental seeding, erosion control, pest control) will be pursued until 40% cover of native species is achieved.

Prior to decommissioning of Campo Wind Facilities, a decommissioning plan would be prepared and implemented. The decommissioning plan shall include revegetation of the previously disturbed areas. Soil would be revegetated with native plant species found within adjacent habitats. Locally available seed would be used, and seed from species that are unavailable for collection would not be incorporated into the final seed palette. Revegetation of disturbed areas shall provide a minimum of 40% cover of plant species native to adjacent habitats within 2 years of construction completion. If 40% cover of native species is not achieved within 2 years, adaptive management measures will be pursued until 40% cover of native species is achieved.

(f) Erosion and Runoff Control. During construction, material stockpiles shall be placed such that they cause minimal interference with on-site drainage patterns. This will protect jurisdictional resources from being inundated with sediment-laden runoff. Design of drainage facilities shall incorporate long-term control of pollutants and stormwater flow to minimize pollution and hydrologic changes.

(g) Weed Management. A weed management plan shall be developed and approved by the Tribe prior to commencement of construction activities on the Reservation. The plan shall include the following:

- Weed inventory and risk assessment
- Identification of problem areas and necessary preventive measures
- Annual surveys within the restoration areas to document weed patches for 2 years post construction
- Success standards, such as no more than a 10% increase in weed species in restoration areas
- Adaptive management measures
- Reporting

All herbicide application shall be in compliance with applicable laws and regulations under the prescription of a Pest Control Adviser and implemented by a licensed applicator.

(h) Fire Protection. To minimize the potential exposure of the Project to fire hazards, a Boulder Brush Fire Protection Plan (FPP) shall be prepared and an FPP for the Campo Wind Facilities shall be prepared to the satisfaction of CRFPD. The FPPs shall be implemented in conjunction with development of the Project.

MM-BIO-2 **Jurisdictional Waters and Wetlands Compensation.** Temporary and permanent impacts to jurisdictional waters and wetlands shall be mitigated per the Project's federal Clean Water Act permit conditions. Temporary impacts shall be restored in place to pre-activity functions; permanent impacts shall be mitigated through a U.S. Army Corps of Engineers-approved mitigation bank and/or in-lieu fee program. Either of these mitigation options would result in no net loss of jurisdictional aquatic resources. A functional assessment, such as the California Rapid Assessment Method, of the jurisdictional areas proposed to be impacted and preserved at the mitigation site shall be conducted. The purpose of the functional assessment is to evaluate the existing functions and services within the jurisdictional drainages and ensure that the functions and values of the jurisdictional areas lost are replaced at the mitigation site. The precise mitigation ratio shall depend on the functions and values of the mitigation site and any restoration activities that may be conducted to further increase the functions and values of the mitigation site. Refer to MM-BIO-1 for success criteria for revegetation areas.

MM-BIO-3 **Implementation of USFWS-Issued Terms and Conditions.** All terms and conditions developed as part of the Section 7 consultation process with the U.S. Fish and Wildlife Service (USFWS) and provided in the Project's Biological Opinion shall be implemented. Terms and conditions shall apply to any ESA-listed species that may be impacted by the Project. Ratios for habitat-based mitigation (if any) shall be determined during the Section 7 consultation process. The mitigation shall focus on habitat preservation and creation for long-term conservation of metapopulation dynamics. Per coordination with USFWS, seasonal avoidance of mapped suitable Quino checkerspot butterfly habitat during Project construction would not be required. Terms and conditions outlined in the Project's Biological Opinion shall take precedence over the measure outlined herein. The measure described below would be subject to enforcement by the Campo Environmental Protection Agency on the Reservation, and by the County of San Diego for the

Boulder Brush Facilities. The Project's Biological Opinion will be issued to the BIA and the BIA will be responsible for implementing the terms and conditions of the Biological Opinion.

(a) Construction Flagging and Signage. Construction flagging and/or signage will be installed when construction of the Project occurs immediately adjacent to mapped occupied Quino checkerspot butterfly habitat (i.e., within a 200-meter radius around host plant concentrations or Quino checkerspot butterfly detections that are located within 1 kilometer of a mapped Quino checkerspot butterfly location) to prevent unnecessary intrusion into occupied Quino checkerspot butterfly habitat. Signage shall be installed where construction activity high-use areas border suitable Quino checkerspot butterfly habitat to prevent intrusion into sensitive habitat and remind personnel of restrictions regarding activities within these areas.

MM-BIO-4 Avian-Specific Avoidance, Minimization, and Mitigation Measures.

(a) Vegetation Clearing Seasonal Avoidance/Nest Clearance Surveys. Vegetation clearing would take place outside of the general avian breeding season (February 15 through August 15) when practicable. If not practicable to conduct vegetation clearing outside the general avian breeding season, it is recommended that a Project biologist with a minimum of 3 years' experience conducting migratory bird surveys conduct a nest-clearance survey within 500 feet (152 meters) of a vegetation clearance area no more than 5 days prior to vegetation clearing. Vegetation clearing crews shall coordinate with the Project biologist prior to the start of construction to verify that the area has been adequately surveyed. If no active nests are discovered, vegetation clearing may proceed. If an active nest is discovered, the nest and an avoidance buffer (at least 300 feet (91 meters) for passerines and at least 500 feet (152 meters) for raptors) shall be flagged or otherwise marked for avoidance. The Project biologist shall monitor any active nest discovered on at least a weekly basis to track the status of each nest. Vegetation clearing shall not take place within the avoidance buffer until nesting is complete (i.e., nestlings have fledged or nest has failed), as determined by the Project biologist. If clearing in a given area ceases for five or more consecutive days during the nesting season, repeat nest clearance surveys will be conducted to verify that new nesting locations have not been established.

(b) Construction Seasonal Avoidance/Pre-Construction Surveys. Construction (non-vegetation-clearing activities; see MM-BIO-3(a) for vegetation clearing restrictions) that cannot occur outside the general avian breeding season (February 15 through August 15) shall proceed under the following recommended protocols. If nest clearance surveys (see MM-BIO-3(a)) have not been conducted within 5 days of the start of construction, the Project biologist shall conduct a pre-construction nest survey within 500 feet (152 meters) of the construction area no more than 5 days prior to the start of construction in a given area of the construction footprint. Construction crews shall coordinate with the Project biologist prior to the start of construction to verify that the area has been adequately surveyed. If no active nests are discovered, construction may proceed. If an active nest is discovered, the nest and an avoidance buffer (at least 300 feet (91 meters) for passerines and at least 500 feet (152 meters) for raptors) shall be flagged or otherwise marked prior to the start of construction. The Project biologist shall coordinate with construction crews to determine the types of construction activities that may take place within the avoidance buffer. The following shall be taken into consideration when determining whether a construction activity may take place within the avoidance buffer: (1) location of nest; (2) status of nesting; (3) species-specific sensitivity to potential disturbances associated with an activity; (4) type, duration, and timing of construction activity; (5) existing level of disturbances; and (6) influence of other environmental factors on potential disturbances. The Project biologist shall be responsible for monitoring any active nests discovered on at least a weekly basis to track the status of each nest. Should the Project biologist determine that construction activities may disturb the nesting activity, then construction activities shall cease within the avoidance buffer until nesting is complete. If construction in a given area ceases for 5 or more consecutive days during the nesting season, repeat pre-construction surveys shall be required to verify that new nesting locations have not been established.

(c) Bird and Bat Conservation Strategy. The Developer shall prepare a Bird and Bat Conservation Strategy (BBCS). The BBCS shall be prepared by a qualified biologist and shall include methods and results of avian and bat surveys conducted in 2017, 2018, and 2019 at the Project Site; a risk assessment associated with potential collisions/barotrauma with Project turbines and meteorological towers and electrocution associated with

overhead transmission lines; recommended avoidance, minimization, and mitigation measures to address this risk; methods and protocols associated with post-construction monitoring; and adaptive management actions that can be taken based on monitoring results. The BBCS shall be submitted to USFWS for review. The BBCS may include the following:

- **Implementation of a Post-Construction Monitoring Program.** A Post-Construction Monitoring Program shall provide a means of methodically recording and collecting information on dead or injured birds and bats within the Project Site by professional biologists. This monitoring program will include standardized survey methods, observer trials, and carcass removal trials to assist in determining accurate collision estimates for the Project. These rates will allow for comparison to other projects and assist in determining what, if any, adaptive management activities should be implemented. This monitoring program will occur for a minimum of 2 years and be initiated after completion of Project construction.
- **Implementation of a Worker Response Reporting System (WRRS).** The WRRS shall provide a means of recording and collecting information on incidental discoveries of dead or injured birds and bats within the Project Site by site personnel. The WRRS shall be used by site personnel who discover bird and bat carcasses during construction and routine maintenance activities. Site personnel shall be provided a set of standardized instructions to follow in response to wildlife incidents in the Project area.
- **Notification and Implementation Activities.** In accordance with the WRRS, during construction, site personnel shall notify the Project biologist to collect the following data on the incidentally detected avian and bat wildlife: species, date, time, location (e.g., nearest Project structure), and how the animal died, if known. Results shall be reported to the Tribe and the Developer on a quarterly basis unless federally listed species are involved. During operations, a procedure shall be developed for site personnel to collect the same data, take photographs, and notify the Project's environmental manager, who shall then notify the Tribe and the Developer unless listed species are involved, in which case USFWS shall be notified within 48 hours. In the event of an injury to federally protected species, the USFWS shall be contacted

immediately for instruction on how to handle the situation. Workers shall be trained on the WRRS during Worker Environmental Awareness Program training. The WRRS shall be used for the life of the Project. To accommodate these requirements, a Project biologist shall be on retainer throughout the construction period, and one shall be available during the life of the Project to assist in avian and bat identifications, data collection, determination of cause of death or injury, and implementing the WRRS.

(d) Removal of Carcasses. All large animal carcasses (e.g., any domestic livestock, feral animal, or big game) incidentally found within the Project Site during operation and maintenance activities shall be removed from the site to prevent attraction of carrion-consuming birds of prey.

(e) APLIC Standards. The Project shall implement 2006 and 2012 recommendations by the Avian Power Line Interaction Committee (APLIC) to protect raptors and other birds from electrocution. When properly designed and implemented, these measures can be sufficient to protect even the largest birds that may perch or roost on transmission lines or towers from electrocution. Specifically, these measures will include design specifications regarding proper pole and crossmember dimensions, phasing, and insulator design and dimensions to preclude wire-to-wire contact with a goal of providing appropriate separation between energized conductors and energized hardware and ground wire. In addition, bird diverters or other means to make lines more visible to birds will be installed where appropriate to help avoid collisions.

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