

Appendix J

Final Bird Impact Avoidance and Minimization Plan

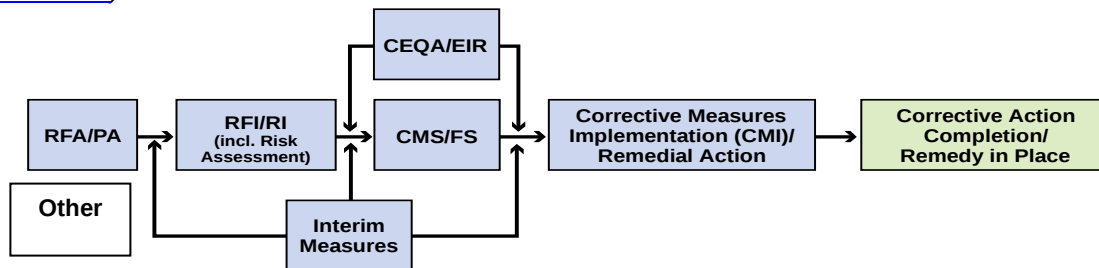


Topock Project Executive Abstract

Document Title: <i>Final Bird Impact Avoidance and Minimization Plan, Topock Groundwater Remediation Project</i> Submitting Agency: DTSC, RWQCB Final Document? ☒ Yes ☐ No	Date of Document: April 30, 2014 Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) – PG&E
Priority Status: ☐ HIGH ☐ MED ☒ LOW Is this time critical? ☐ Yes ☒ No	Action Required: ☒ Information Only ☐ Review & Comment Return to: _____ By Date: _____ ☐ Other / Explain:
Type of Document: ☐ Draft ☒ Report ☐ Letter ☐ Memo ☐ Other / Explain:	Is this a Regulatory Requirement? ☒ Yes ☐ No If no, why is the document needed?
What does this information pertain to? ☐ Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA) ☐ RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment) ☐ Corrective Measures Study (CMS)/Feasibility Study (FS) ☐ Corrective Measures Implementation (CMI)/Remedial Action ☒ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR) ☐ Interim Measures ☐ Other / Explain:	Other Justification/s: ☐ Permit ☐ Other / Explain:
What is the consequence of NOT doing this item? What is the consequence of DOING this item? This plan is required by EIR mitigation measure BIO-2a. If this work was not performed, it would constitute a non-compliance with the EIR mitigation measure.	Brief Summary of attached document: The Bird Impact Avoidance and Minimization Plan (BIAMP) describes how impacts to special-status bird species, including those protected under the Federal and California Endangered Species Acts and Migratory Bird Treaty Act will be avoided and minimized during implementation of the Topock Groundwater Remediation Project. Written by: PG&E
Recommendations: This report is for your information only.	
How is this information related to the Final Remedy or Regulatory Requirements: This plan will be used in remedy design and implementation, in compliance with EIR Mitigation Measure BIO-2a.	
Other requirements of this information? None.	

Related Reports and Documents:

Click any boxes in the Regulatory Road Map (below) to be linked to the Documents Library on the DTSC Topock Web Site (www.dtsc-topock.com).



Legend

RFA/PA – RCRA Facility Assessment/Preliminary Assessment

RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)

CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study

CEQA/EIR – California Environmental Quality Act/Environmental Impact Report

Version 9



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April 30, 2014

Mr. Aaron Yue
Project Manager
California Department of Toxic Substances Control
5796 Corporate Avenue
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Subject: *Final Bird Impact Avoidance and Minimization Plan, Topock Groundwater Remediation Project*

Dear Mr. Yue:

Enclosed is the *Final Bird Impact Avoidance and Minimization Plan, Topock Compressor Station Groundwater Remediation Project*. This plan describes how impacts to special-status bird species, including those protected under the Federal and California Endangered Species Acts and Migratory Bird Treaty Act will be avoided and minimized during implementation of the Topock Groundwater Remediation Project.

The draft plan was submitted in July 2013 and revised to final after CDFW, DTSC and DOI reviews.

Please contact me at (805) 234-2257 or Virginia Strohl at (559) 263-7417 if you have any questions about this.

Sincerely,

A handwritten signature in blue ink that reads "Yvonne Meeks".

Yvonne Meeks
Topock Project Manager

Enclosure

Final Bird Impact Avoidance and Minimization Plan, Topock Groundwater Remediation Project

cc: Karen Baker/DTSC
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Final

Bird Impact Avoidance and Minimization Plan Topock Groundwater Remediation Project

Prepared for
Pacific Gas and Electric Company

April 2014

CH2MHILL®

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Acronyms and Abbreviations

ACS	Avian Conservation Strategy (Draft)
AGFC	Arizona Game and Fish Commission
AGFD	Arizona Game and Fish Department
AMM	Avoidance and Minimization Measure
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
ARAR's	Applicable or Relevant and Appropriate Requirements
BLM	United States Bureau of Land Management
BOR	United States Bureau of Reclamation
BNSF	Burlington Northern-Santa Fe
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CFGF	California Fish and Game Code
CNDDDB	California Natural Diversity Database
Compressor Station	PG&E Topock Compressor Station
Cr(VI)	hexavalent chromium
DOI	United States Department of the Interior
DTSC	Department of Toxic Substances Control
FCR	field contact representative
EIR	Final Environmental Impact Report
ESA	Federal Endangered Species Act
gpm	Gallons per minute
HNWR	Havas National Wildlife Refuge
IRZ	In-situ Reactive Zone
I-40	Interstate 40
LCR MSCP	Lower Colorado River Multi-Species Conservation Plan
MBTA	Migratory Bird Treaty Act
PBA	Programmatic Biological Assessment
PG&E	Pacific Gas and Electric Company
Plan	Bird Impact Avoidance and Minimization Plan
RCRA	Resource Conservation and Recovery Act

RWQCB	Regional Water Quality Control Board
SSC	California Species of Special Concern
USFWS	United States Fish and Wildlife Service
WSCA	Wildlife of Special Concern in Arizona

Introduction

Pacific Gas and Electric Company (PG&E) has prepared this Bird Impact Avoidance and Minimization Plan (Plan) to describe how impacts to special-status bird species, including those protected under the Migratory Bird Treaty Act (MBTA), the California Fish and Game Code (CFGF), and Arizona Game and Fish Commission (AGFC), will be avoided and minimized during implementation of the Topock Groundwater Remediation Project.

This plan is required pursuant to the *Final Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project* (EIR; DTSC 2011); specifically, EIR Mitigation Measure BIO-2a, which addresses Disturbance of Special-Status Birds and Loss of Habitat¹.

BIO-2a: Disturbance of Special-Status Birds and Loss of Habitat. To the extent feasible, the project implementation plans shall be designed to minimize removal of habitat for special-status birds. During the design process and before ground disturbing activities (except within the East Ravine as described in the Revised Addendum and unless otherwise required as noted below), a qualified biologist shall coordinate with PG&E to ensure that the footprints of project elements and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on habitat and nesting habitat for other special-status species, to the extent feasible. DTSC will ensure compliance with all preconstruction and construction phase avoidance measures identified during this process and included in any design plans. Vegetation removal and other activities shall be timed to avoid the nesting season for special-status bird species that may be present. The nesting cycle for most birds in this region spans March 15 through September 30.

Preconstruction Measures: Preconstruction breeding season surveys shall be conducted during the general nesting period, which encompasses the period from March 15 through September 30, if the final design of the project (including East Ravine investigation Sites I, K and L) could result in disturbance or loss of active nests of special-status bird species. If vegetation removal or other disturbance related to project implementation is required during the nesting season, focused surveys for active nests of special-status birds shall be conducted before such activities begin. A qualified biologist shall conduct preconstruction surveys to identify active nests that could be affected. The appropriate area to be surveyed and the timing of the survey may vary depending on the activity and species that could be affected. For the Yuma clapper rail, the preconstruction surveys shall specifically identify habitat within 300 feet of construction areas, in accordance with substantive policies of USFWS including those set out in USFWS protocols.

Construction Measures: Before the initiation of project elements that could result in disturbance of active nests or nesting pairs of other special-status birds, a qualified biologist shall be consulted to identify appropriate measures to minimize adverse impacts during the construction phase of the project. If deemed appropriate for the final project design because of the potential for impacts, minimization measures will include focusing construction activities that must be conducted during the nesting season to less sensitive periods in the nesting cycle, implementing buffers around active nests of special-status birds to the extent practical and feasible to limit visual and noise disturbance, conducting worker awareness training, and conducting biological monitoring (including noise monitoring to determine if construction noise at the edge of suitable nesting habitat is elevated above 60 dBA Leq or ambient levels). An avoidance and minimization plan for special status bird species, as defined in Table 4.3-3 and those species protected under the federal Migratory Bird Treaty Act, including the Yuma clapper rail, shall be developed and implemented in consultation with USFWS, and agreed upon by DTSC. Avoidance and impact minimization measures, such as prohibiting construction near or in sensitive bird habitat, limiting construction during breeding seasons, and requiring an on-site biological monitor, shall be included in the design plan and implemented to the extent necessary to avoid significant impacts on sensitive bird species.

This Plan addresses project activities and their potential impacts to bird species and includes Avoidance and Minimization Measures (AMMs) that will be implemented to ensure that project impacts to special-status bird

¹Decommissioning will be addressed in a separate plan per EIR Mitigation Measure BIO-2C

species are not significant. The AMM's proposed for southwestern willow flycatcher and Yuma clapper rail, the two federally listed bird species with potential to be affected by the Topock Groundwater Remediation Project, are consistent with measures addressed in the *Programmatic Biological Assessment [PBA] for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions (CH2M HILL 2007)*.

1.1 Background

In December 1951, the PG&E Topock Compressor Station (compressor station) began operations to compress natural gas supplied from the southwestern United States for transport through pipelines to PG&E's service territory in central and northern California.

From 1951 to 1985 chromium-based products were added to cooling water to inhibit corrosion, minimize scale, and control biological growth. PG&E replaced the chromium-based cooling water treatment products with phosphate-based products in 1985, at which time PG&E discontinued operation of the wastewater treatment system. Currently, four Class II double-lined ponds are in use and operated under the jurisdiction of the Colorado River Basin Regional Water Quality Control Board (RWQCB).

In 1996, PG&E entered into a Corrective Action Consent Agreement with Department of Toxic Substances Control (DTSC) to govern the investigation and remediation of the compressor station site under California state law. DTSC is the California state lead agency charged with directing investigative activities in the action area in accordance with the Resource Conservation and Recovery Act (RCRA). In July 2005, PG&E and the United States Department of the Interior ("DOI") on behalf of the U.S. Fish and Wildlife Service ("USFWS"), the Bureau of Land Management ("BLM"), and the Bureau of Reclamation ("BOR"), entered into a Consent Agreement that outlined the process by which PG&E would comply with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements during the investigation and remediation of the action area, which includes the implementation of a final remedy.

The final remedy will be implemented to address groundwater contamination in the project area, and the EIR includes several mitigation measures that are required to be implemented during the design, construction, and operation phases of the project to protect sensitive biological resources. Project activities have the potential to impact special-status bird species; therefore, the EIR includes Mitigation Measure BIO-2a to ensure the protection of these birds and requires the preparation of this Plan.

1.2 Location

The compressor station is located near the California and Arizona border in eastern San Bernardino County, approximately 12 miles southeast of the city of Needles, California (Figure 1). The town of Topock, Arizona is located approximately one-half mile to the east. Access to the compressor station is from the Park Moabi Road exit off of Interstate 40. At Moabi Regional Park, the roadway connects to National Trails Highway, which extends eastward and then southward for approximately one mile along the Colorado River to the Topock Compressor Station.

1.3 Project Description

Groundwater near the compressor station has been contaminated by chemicals associated with historical releases in areas known as Bat Cave Wash and East Ravine. The main contaminant of concern in groundwater is Cr(VI), which was used in the past as an additive to the cooling water at the compressor station, and is harmful to human health and ecological receptors in the environment. Other chemicals present in the groundwater include Cr(T), molybdenum, selenium, and nitrates. Although currently not being used as a drinking water source, the affected groundwater has the potential to come into contact with drinking water wells and the Colorado River. Cleanup of the contaminated groundwater plume is being designed to protect all identified potential receptors and maintain groundwater as a resource.

The proposed project involves flushing the contaminated groundwater plume through an in-situ reactive zone (IRZ) of extraction and injections wells and installing extraction wells near the Colorado River to hydraulically control the plume, accelerate cleanup of the groundwater within the floodplain, and flush the groundwater with

elevated Cr(VI) through the IRZ. The proposed project consists of five main elements: (1) an IRZ zone along a portion of National Trails Highway, (2) an Inner Recirculation Loop (IRL) that consists of extraction wells near the Colorado River that would pump contaminated groundwater that would be amended with organic carbon before reinjection in the western end of the plume, (3) a TCS Recirculation Loop that includes extraction wells in the eastern end of the East Ravine, eastern side of the TCS, and injection wells northwest of the TCS, and (4) freshwater supply system to convey water from a supply well in Arizona to assist with flushing the chromium plume.

The project description is divided into sequential phases of project implementation: construction, operations and maintenance, long-term monitoring, and decommissioning. It is estimated that the duration of these four project phases is 3 years, 29 years (up to 110 years), 10 years, and 2 years, respectively.

Specific project activities with potential to impact special-status birds are described in Section 4 of this Plan, and potential impacts to special-status birds from these activities are discussed in Section 5.

Plan Goals

The goals of this Plan are to:

- Identify measures to ensure the avoidance or minimization of impacts to protected bird species during project construction. In general and pursuant to EIR Mitigation Measure BIO-2a, measures will include to the extent necessary (as determined by a qualified biologist and in consultation with the appropriate regulatory agencies):
 - prohibiting construction near or in special-status bird habitat,
 - limiting construction during breeding seasons,
 - requiring an on-site biological monitor during field activities,
 - implementing buffers around active nests to the extent practical and feasible to limit noise and visual disturbances, and
 - conducting worker awareness training and noise monitoring where 60 dBA L_{eq} or ambient levels may be exceeded during construction at the edge of nesting habitats.
- Facilitate project design avoidance of suitable special-status bird habitat, to the extent feasible, via mapping of such habitats.
- Ensure compliance with the regulations described in section 2.1 of this Plan.

2.1 Regulatory Framework

The project is required to comply with the following federal and State (Arizona and California) regulations that protect bird species as identified in the table of Applicable or Relevant and Appropriate Requirements (“ARARs”) in the DOI Record of Decision for the groundwater remedy.

2.1.1 Federal Regulations and Standards

2.1.1.1 Federal Endangered Species Act

The Federal Endangered Species Act (ESA) is implemented by the United States Fish and Wildlife Service (USFWS). Section 9 of the ESA prohibits the “take” of federally listed as threatened or endangered species, unless permitted. “Take” is defined to include any harm or harassment, including significant habitat modification or degradation that could potentially kill or injure wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. The project is subject to consultation pursuant to ESA Section 7 that addresses federally listed species with potential to occur in the project area and their habitat. This document includes measures proposed for federally listed species in the *PBA (CH2M HILL 2007)*.

2.1.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) is implemented by the USFWS and prohibits the “take” of migratory birds, including causing failure of a nest, unless permitted.

2.1.2 State Regulations and Standards

2.1.2.1 California Endangered Species Act

The California Endangered Species Act (CESA) is implemented by the California Department of Fish and Wildlife (CDFW) and prohibits any activities that would jeopardize or take a species listed as threatened or endangered within the State, unless permitted.

2.1.2.2 California Fully Protected Wildlife Species Provisions

This provision is implemented by CDFW and prohibits the take and permitting of take of fully protected species.

2.1.2.3 California Species of Special Concern

This provision is applicable to bird, mammal, amphibian, and reptile species designated by CDFW as California Species of Special Concern (SSC). While this designation does not include additional regulatory protections, SSC species are typically considered by projects that are subject to the California Environmental Quality Act and were addressed in the EIR for the Topock Remediation Project.

2.1.2.4 Protection of Bird Nests and Raptors (California Fish and Game Code §3500 and 3503.5)

Implemented by CDFW, Section 3503 of the California Fish and Game Code (CFGF) states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise proved by the CFGF or any regulation made pursuant to the CFGF. Section 3503.5 specifically states that except as otherwise authorized by the CFGF or related regulations, it is unlawful to take, possess or destroy any raptors (i.e., birds of prey in the orders Falconiformes or Strigiformes that includes eagles, hawks, falcons, owls, and others), including the nests or eggs of such birds.

2.1.2.5 Migratory Bird Provision (California Fish and Game Code §3513)

This provision is implemented by CDFW and prohibits any take or possession of birds that are designated by the MBTA as migratory nongame birds except as allowed by federal rules and regulations promulgated pursuant to the MBTA (see above for MBTA description).

2.1.2.6 Taking Birds; Possession of Raptors (Arizona Game and Fish §17-236)

This provision is implemented by Arizona Game and Fish Department and makes it unlawful to take or injure any bird or harass any bird upon its nest, or remove the nests or eggs of any bird, except as could occur in normal horticultural and agricultural practices and except as authorized by the commission. This regulation is the equivalent, in terms of project applicability, to the CFGF §3503.5.

2.1.2.7 Wildlife of Special Concern in Arizona (Arizona Game and Fish §17)

Under authorities implicit in Arizona Revised Statute 17, the Arizona Game and Fish Department maintains a list of wildlife of greatest concern. The list focuses on the degree to which habitats or populations are threatened and the probability of extirpation of a taxon from Arizona. There are four categories for species on the WSCA list: extinct, endangered, threatened, and candidate.

2.2 Avian Conservation Strategy

In April 2013, PG&E released the *Draft Avian Conservation Strategy: Guideline for Bird Protection and Mitigation* (ICFI, 2013) (ACS) to provide a comprehensive avian conservation strategy thereby avoiding and minimizing adverse effects on nesting migratory birds within PG&E's service area in compliance with applicable federal and state regulations. The ACS recommended buffers were used in this report to avoid and minimize impacts to protected bird species. Any buffer identified in the PBA for a state or federally listed threatened or endangered species was incorporated into this report instead of the ACS buffer.

Protected Bird Species

This section describes the bird species with regulatory protection that are anticipated or known to occur in the project area. Measures to avoid or minimize impacts to these species are provided in Section 6.

Sections 3.1 and 3.2 discuss bird species that are protected by the MBTA and CFGC, respectively. Section 3.3 provides an account of special-status birds with additional regulatory protections that could occur in the project area.

The EIR (*Volume II, Section 4.3*) describes the locations of suitable habitat for special-status bird species in the project area. In order to facilitate project design avoidance of special-status bird habitat, a qualified biologist conducted a literature review that included the EIR, mapping developed for southwestern willow flycatcher presence/absence surveys (GANDA, 2009), mapping developed for Yuma Clapper Rail and California Black Rail Yuma clapper rail surveys (Konecny Biological Services, 2012), and mapping of Vegetation Communities from plant surveys (CH2M HILL 2012). A map that cross references these sources to depict special-status bird species habitat within the project area is included in this Plan as Figure 2.

Many common bird species protected by MBTA may nest in almost any area where nesting structures occur, including widespread upland habitats (e.g., creosote bush scrub) and man-made facilities (e.g., compressor station buildings). Section 6 describes a combined approach to avoid or minimize impacts to sensitive habitats and active nests, to the extent feasible, to ensure that impacts to special-status bird species are less than significant.

3.1 Migratory Bird Treaty Act Protected Bird Species

The number of bird species protected by the MBTA is extensive and listed at 50 CFR §10.13. A list of MBTA protected species that are anticipated to occur within the project area is included in Appendix A. Section 6.1 provides the general avoidance and mitigation measures applicable to MBTA protected birds.

3.2 CFGC §3503 and §3503.5 Protected Bird species

CFGC §3503 protects the nest and eggs of any bird. Raptors and raptor nests protected by CFGC §3503.5 that are anticipated to occur within the project area include American kestrel (*Falco sparverius*), Northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), and great horned owl (*Bubo virginianus*). The general avoidance and mitigation measures in Section 6.1 also address mitigation for potential impacts to bird species protected by the CFGC.

3.3 Species Accounts

This section provides the regulatory status, habitat requirements, nesting information, and occurrence potential for eight special-status bird species that could occur in the project area as determined by the EIR. New information from recent protocol surveys, new surveys of the expanded APE, and research conducted in the preparation of this Plan are also provided, as is a species account for the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), previously determined unlikely to occur in the project area but was documented in the area during bird surveys in 2012 (GANDA, 2012).

Mapping of suitable habitat in the project area is included in Figure 2. No critical habitat for listed bird species occurs in the project area. With the exception of western yellow-billed cuckoo, special-status species determined by the EIR as unlikely to occur in the project area, and that have not been detected in the project area, are not discussed in this Plan.

3.3.1 Southwestern willow flycatcher (*Empidonax traillii extimus*)

This species is federally and California State listed as Endangered, and is considered endangered on the list of Wildlife of Special Concern in Arizona. It is associated with dense riparian habitats along streams, rivers, and other wetlands.

Historically the southwestern willow flycatcher nested in native vegetation including willows, seepwillow, boxelder, buttonbush, and cottonwood. Following modern changes to riparian communities, this subspecies still nests in native vegetation, but also uses thickets dominated by non-native tamarisk and Russian olive, or in mixed native non-native stands.

It builds nests and lays eggs in late May and early June with a clutch size of 2 to 5 eggs. The nest is a small open cup, most often 6.5 to 23 feet above ground in a fork or on a horizontal branch of a medium-sized bush or small tree with dense vegetation above and around the nest. Young fledge in early to mid-July, and second clutches only occur if the first clutch failed.

The project area contains suitable nesting (primarily in tamarisk thickets) and foraging habitat for this species along the Colorado River floodplain and Topock Marsh area in Arizona. This species has been documented in riparian areas around the site, primarily at Topock Marsh, and has been detected near Park Moabi Lagoon (GANDA 2009). However, several protocol surveys were conducted since 2004 in the project area and none have detected nests or breeding behaviors. A protocol survey conducted in 2012 identified two transient individuals and no nesting pairs. If an active nest is detected during future surveys, an avoidance zone will be implemented around the nest. The PBA states that all construction activity within 200 feet of active nesting areas will be prohibited until the nesting pair/young have vacated the nests. To the extent feasible, future project activities should be avoided within the sensitive areas such as potential SWFL habitat, wetlands, 100-year floodplain, and a 60-foot buffer from the Colorado River.

Sections 6.1 and 6.2.1 provide the avoidance and minimization measures for southwestern willow flycatcher.

3.3.2 Arizona Bell's vireo (*Vireo bellii arizonae*)

This species is California State listed as Endangered and associated with early to mid-successional riparian habitat that includes a structurally diverse canopy.

It is a summer resident that generally breeds between late March and late September. The nest is usually placed less than 5 feet above the ground. A typical vireo nest is a basket attached to twigs and made of various fibers such as split large grasses, and mixed with strips of soft inner bark, fine grasses, willow fluff, plant down, spider nests, and cattle hair. Three or four eggs usually are laid and incubation lasts about 14 days. Egg laying typically begins in early April, two broods generally are raised each season, and nesting occurs through the summer. Although normally timid, shy, and retiring, both parents are aggressive defenders of eggs and young.

Individuals were detected in Arizona near Needles and the Topock Marsh during project related surveys conducted in 2008 and 2012; therefore, this species is known to forage in the project area (GANDA, 2012). However it is unlikely to nest in the project area due to a general lack of suitable nesting habitat.

Section 6.2.1 provides the avoidance and minimization measures for Arizona Bell's vireo. The ACS recommends a standard activity-free buffer distance of 500 feet from active nests of this species.

3.3.3 Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)

This species is a federal candidate for listing, a California State Endangered species, and is considered threatened on the list of Wildlife of Special Concern in Arizona. It is associated with large blocks of riparian woodland composed of cottonwood and willow.

The onset of breeding is apparently correlated with an abundant local food supply or periods of greatest rainfall. Cuckoos may not breed if local food supply is inadequate on breeding grounds following spring migration. The breeding cycle is extremely rapid and requires only 17 days from egg-laying to fledging of young. Nesting activities take place between late June and late July, but may begin as early as late May and continue into September. Nest building typically takes 2-4 days. One brood of two to three young is raised per season. Cuckoos will occasionally double-brood in western populations if abundant food resources exist. Incubation begins with initiation of the first egg laying, known as asynchronous hatching, resulting in eggs and nestlings at different developmental stages in the same nest. Asynchronous hatching permits survival of the oldest nestlings in the event of a food shortage. The incubation period for yellow-billed cuckoos is 10 to 12 days. The young are fed large food items for the 5-8

day nestling period. Most young cuckoos leave the nest on day 6. After fledging, the young are dependent on the adults for at least 2 weeks.

This species has been documented within Topock Marsh (GANDA 2009) and one individual was detected during a previous survey conducted in 2012 in the project area on the Arizona side of the Colorado River (GANDA 2012). However, this species is not anticipated to nest in the project area due to lack of suitable habitat.

Section 6.2.1 provides the avoidance and minimization measures for western yellow-billed cuckoo. The Fish and Wildlife Service recommends a standard buffer distance of 300 feet for the western yellow-billed cuckoo.

3.3.4 California black rail (*Laterallus jamaicensis coturniculus*)

This marsh bird is California State listed as Threatened, is a California Fully Protected species, and is considered Wildlife of Special Concern in Arizona. California black rail is associated with fresh or brackish water wetlands that include cattail and bulrush stands.

The California black rail form pairs as early as late February. The nest is a well-defined bowl, with a canopy of dead or living vegetation woven over the top and a ramp of dead vegetation leading to an entrance on the side of the nest. Nests are primarily made of southern cattail or spikerush, and are elevated above the mud substrate in clumps of vegetation.

California black rail lays eggs between early March and early July. Average clutch size ranges from 3 to 8 eggs. The incubation period for nests ranges from 17 to 20 days. Chicks hatch one at a time and are born semi-precocial; they require brooding by one parent for the first few days after hatching.

The project area contains suitable foraging and nesting habitat for this species on the Arizona side in the Topock Marsh and marginal habitat in small patches along the Colorado River and mouth of the East Ravine. California black rail was not detected during 2012 protocol surveys (GANDA, 2012). However, during marsh bird surveys performed by HNWR over four years ago a California black rail was detected within the marsh (Linda Miller personal communication, April 30, 2014). The East Ravine and other small patches of cattail and bulrush habitats along the Colorado River are likely subject to too much disturbance from river associated recreation activities and water level fluctuations for this species. This species is not anticipated to nest in the project area due to lack of suitable habitat.

Avoidance and minimization measures for this species are provided in Section 6.2.1. The ACS recommends a standard activity-free buffer distance of 500 feet from active nests of California black rail.

3.3.5 Yuma clapper rail (*Rallus longirostris yumanensis*)

This marsh bird is federally listed as Endangered, California State listed as Threatened, is a California Fully Protected species, and is considered endangered on the list of Wildlife of Special Concern in Arizona.

The Yuma clapper rail is a marsh bird found in dense cattail or cattail-bulrush marshes along the lower Colorado River in Mexico north to the lower Muddy River and Virgin River in Utah above those rivers' confluence with Lake Mead.

Yuma clapper rails are generally found in freshwater and alkali marshes dominated by stands of emergent vegetation interspersed with areas of open water and drier, upland benches. This subspecies prefers mature marsh stands along margins of shallow ponds with stable water levels. Nest sites selected by this subspecies are near upland areas in shallow sites dominated by mature vegetation, often in the base of a shrub. Yuma clapper rails move into different cover types in winter, showing a preference for denser cover than in summer.

This rail usually lays 7 to 11 eggs in a cup nest of grasses or sedges. The first brood appears in March, although pairs may nest again after failure of a previous nest. Chicks begin to forage independently on small prey soon after hatching, and begin to feed farther from adults as fledging age approaches (Meanley 1985). Young can fly in about 9 to 10 weeks.

This species is known to occur in the Topock Marsh, and it was detected during 2012 protocol surveys in the project area in the Topock Marsh on the Arizona side northwest of County Highway 10. These protocol surveys

were also conducted at the East Ravine and in other areas of potentially suitable foraging or nesting habitats in the project area, but no rails were detected in these areas.

Sections 6.1 and 6.2.2 provide the avoidance and minimization measures for Yuma clapper rail, as provided in Section 5.3.1.8 of the PBA. The PBA states that all construction activity within 300 feet of active nesting areas will be prohibited until the nesting pair/young have vacated the nests.

3.3.6 Western least bittern (*Ixobrychus exilis hesperis*)

This marsh bird is a California Species of Special Concern and is considered a candidate species on the list of Wildlife of Special Concern in Arizona. It occurs in the same habitats as the aforementioned rail species (cattail and bulrush stands).

In Arizona, resident least bitterns likely begin breeding before migratory populations, with males initiating their cooing calls in March and April. They are a locally common breeder from April through September.

Throughout their entire range, nests are typically built among dense stands of emergent or woody vegetation. Nests are well concealed, and are usually located adjacent to open water. Nests have been found scattered throughout suitable habitat or concentrated in loose groupings. Typical clutches are 4-5 eggs and the time from laying the first egg to the hatching of the first egg ranges from 19 to 21 days. Young can forage on their own within 1-2 weeks. The young normally leave the nest permanently by 13-15 days but linger nearby for 1-2 weeks. Approximate age at first flight is 29 days. The least bittern will re-nest and double brood.

Western least bittern is known to occur at Topock Marsh (Reclamation 2004). The protocol survey for both rail species included a protocol survey for Western least bittern, and the species was not detected in the project area in any areas of suitable or potentially suitable habitat during surveys in 2012. Therefore, it is unlikely that this species occurs and is not expected to nest in the project area.

Section 6.2.1 provides the avoidance and minimization measures for western least bittern. The ACS recommends a standard activity-free buffer distance of 100 feet from active nests of this species.

3.3.7 Crissal thrasher (*Toxostoma crissale*)

This species is a California Species of Special Concern, associated with riparian woodlands, and primarily found in dense stands of honey mesquite.

Crissal thrasher nests are generally well hidden in the interior of dense shrubs, and consist of coarse twigs lined with finer material. Clutch size is usually 2-3 eggs, the incubation period is 14 days, and young fledge 11 to 16 days after hatching (Cody 1999).

This species has been documented along the Colorado River on the Arizona side near Needles and within the Havasu National Wildlife Refuge (GANDA 2008). Marginally suitable habitat occurs in the project area within tamarisk thickets and honey mesquite bosque. Avoidance and minimization measures for this species are provided in Section 6.2.1. The ACS recommends a standard activity-free buffer distance of 75 feet from active thrasher nests.

3.3.8 Sonoran yellow warbler (*Dendroica petechia sonorana*)

This species is a California Species of Special Concern, associated with riparian woodlands composed of cottonwood and willow.

The Sonoran yellow warbler breeds in the willow and cottonwood habitats that line the lower Colorado River. Yellow warblers begin arriving on their breeding grounds in April. Nest building activity has been observed in mid-April, and the egg laying likely begins in late April, with nestlings and fledglings by early May. Nests are typically found in the forks of cottonwoods, willows, or tamarisk from 10 to 20 feet (3-6 m) high. Yellow warblers will attempt several nests throughout the season but typically produce only one brood with a clutch size of 4 eggs. Adults have been observed feeding a fledgling into August.

The species is known to occur in the Topock Marsh, and the project area contains suitable nesting and foraging habitat.

Section 6.2.1 provides avoidance and minimization measures for Sonoran yellow warbler. The ACS recommends a standard activity-free buffer distance of 75 feet from active nests.

3.3.9 Yellow-breasted chat (*Icteria virens*)

This species is a California Species of Special Concern associated with riparian woodlands at the edges of open water. The species is associated with cottonwood, willow, tamarisk, and stands of arrow weed.

The nesting season begins in mid-May and lasts through early August. Nests are usually placed near the ground in dense thickets and shrubs that provide concealment. The nest is a bulky cup composed of grasses, leaves, strips of bark, or stems of weeds and is lined with finer grasses, wiry plant stems, pine needles, and sometimes roots and hair (Oberholser 1974). Three to four eggs are incubated for 10 to 12 days, and the young typically fledge the after 7 to 10 days.

Yellow-breasted chat is known to occur near Needles and at Topock Marsh (CNDDDB 2008). The project area contains suitable foraging and nesting habitat for this species along the Colorado River floodplain and Topock Marsh. Avoidance and minimization measures for yellow breasted chat are provided in Section 6.2.1. The ACS recommends a standard activity-free buffer distance of 75 feet from active nests.

TABLE 3-1

Special-Status Species Potentially Occurring in the Project Area

Species	Status ^a	Habitat	Potential for Occurrence ^b	Nesting Season
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	Fed: E CDFW: E AGFC: E LCR MSCP	Dense riparian habitats along streams, rivers, and other wetlands, and breeds in stands of dense cottonwood, willow, and tamarisk thickets.	Known to occur in the project area as transient (non-nesting) based on recent years' protocol surveys. The project area provides some suitable habitat. This species has been documented in riparian areas around the site, primarily at Topock Marsh, and has been detected near Park Moabi Lagoon (GANDA 2009: Figure 5, page 7).	May 1 to September 1
Arizona Bell's vireo <i>Vireo bellii arizonae</i>	CDFW: E LCR MSCP	Associated with willow thickets with mulefat.	Known to occur as transient; documented in Arizona near Needles and the Topock Marsh (CNDDDB 2008; GANDA 2008:5-1, GANDA 2012), but project area provides little suitable nesting habitat.	May 1 to September 30
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	CDFW: E AGFC: T Fed: C LCR MSCP	Riparian forest nester in flood bottoms of larger river systems. Requires multistory habitat for foraging.	Known to occur as transient; however project area provides no suitable nesting and little foraging habitat. Documented within the Topock Marsh (CNDDDB, 2008; GANDA 2009:6).	April 15 to September 30
California black rail <i>Laterallus jamaicensis coturniculus</i>	CDFW: FP, T AGFC: E LCR MSCP	Habitat includes shallow freshwater and brackish marshes dominated by bulrush species.	Could occur; potentially suitable habitat within the Topock Marsh, but no CNDDDB records near area; documented at delta of Colorado River.	February 1 to August 1
Yuma clapper rail <i>Rallus longirostris yumanensis</i>	Fed: E CDFW: T, FP AGFC: T LCR MSCP	Only along the Lower Colorado River (from Topock Marsh southward) and around the Salton Sea. It occupies heavily vegetated freshwater.	Known to occur in the Topock Marsh within the Arizona side of the project area based on 2012 protocol surveys. However, the project area within/adjacent to the river provides little suitable habitat on the California side. This species has been documented in the Topock Marsh and the Topock Gorge (CNDDDB 2008; GANDA 2009:6).	March 15 to July 31
Western least bittern <i>Ixobrychus exilis hesperis</i>	CDFW: SSC LCR MSCP	Freshwater marshes with dense vegetation.	Could occur; known to occur at Topock Marsh (Reclamation 2004). Along the Lower Colorado River all documented occurrences were in Arizona.	May 1 to August 31
Crissal thrasher <i>Toxostoma crissale</i>	CDFW: SSC	Nests within desert riparian and wash habitats.	Could occur; documented along the Colorado River on Arizona side near Needles and within the Havasu National Wildlife Refuge (HNWR) (CNDDDB, 2008; GANDA 2008: B-1), but project area provides little suitable nesting habitat.	February 1 to July 31
Sonoran yellow warbler <i>Dendroica petechia sonorana</i>	CDFW: SSC LCR MSCP	Historically nesting in riparian forests associated with open water but along the LCR; tamarisk is a habitat component.	Could occur; documented along the Colorado River near Needles (CNDDDB 2008), but project area provides little suitable nesting habitat.	May 1 to June 30

TABLE 3-1

Special-Status Species Potentially Occurring in the Project Area

Species	Status ^a	Habitat	Potential for Occurrence ^b	Nesting Season
Yellow-breasted chat <i>Icteria virens</i>	CDFW: SSC	Riparian areas with dense woody vegetation bordering open areas.	Could occur; known to occur near Needles and at Topock Marsh (CNDDDB 2008).	March 15 to September 30

^a Legal Status Definitions:U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories

E = Endangered

C = Candidate proposed for listing

California Department of Fish and Wildlife (CDFW) State Listing Categories

E = Endangered

T = Threatened

FP = Fully Protected (no take permitted)

SSC = California Species of Special Concern

Arizona Game and Fish Commission (AGFC) Listing Categories

E = Endangered

T = Threatened

C = Candidate

Other Status Categories

LCR MHCP = Lower Colorado River Multi-species Habitat Conservation Program covered species (included for informational purposes)

Sources: EIR; CNDDDB, 2008; GANDA, 2008 and 2009; Reclamation, 2004, USFWS 1999

^b Potential for Occurrence Definitions:

Could occur: Suitable habitat is available in the project area; however, there are few or no other indicators that the species might be present.

Known to occur: Species or evidence of its presence was observed in the project area during protocol or reconnaissance-level surveys or was reported by others.

Project Activities

This section summarizes the activities as described in EIR Section 3.5 that have potential to impact special-status bird species. Biologists participated in a 60 percent design field meeting with the project design team on April 23 and 24, 2012, to assist in ensuring that the project design includes avoidance of sensitive habitats, as feasible, and that the majority of project features have been located away from identified special-status bird habitats.

Construction of the proposed project would occur during an estimated 4 years: 3 years for constructing the remediation facilities at the onset of the proposed project and 1 year for decommissioning of the existing IM-3 Facility after final remedy is considered operating properly and successfully. The length of time required for construction is dependent on a number of factors, including the number of wells, pipelines, and other infrastructure, the geologic conditions encountered during well installation, the time required for regulatory and landowner approvals, and the availability of construction labor and materials at the time of construction.

Construction will be primarily limited to daylight hours to minimize the need for lighting and to conserve energy to the extent practical and/or feasible; however, some nighttime construction efforts may be required. For example, nighttime construction activity could be required for the continuous drilling of large-diameter wells. Lighting associated with construction and decommissioning activities will be limited to active construction equipment in operation during nighttime operations and will consist of downward facing fixtures fitted with cutoff shields to reduce light diffusion. Staging areas will be located to the extent feasible in areas that are already developed or disturbed, such as within the fenced and developed areas at the compressor station. However, staging could also be located elsewhere within the project area.

Construction practices will be designed to limit dust, noise, and nighttime light generation where feasible.

Heavy equipment may include trucks and excavators or backhoes to lay the pipeline network, and cranes to place control sheds and reductant storage tanks. Trucks may be necessary for making deliveries and hauling waste from the site.

The project consists of the following primary features: remediation facilities, freshwater flushing, monitoring wells, water conveyance, utilities, and roadways, each of which has the potential to impact protected birds.

4.1 Remediation Facilities

Remediation facilities will consist of extraction wells, injection wells, IRZ wells, and reductant storage facilities.

4.1.1 Extraction, Injection, and IRZ wells

Remediation and monitoring wells could be installed either using conventional truck-mounted drilling equipment or all-terrain capable equipment. Up to 126 wells will be installed, not including any replacement wells that may be necessary during the operation and maintenance phase. The sonic drilling method could be used for smaller-diameter extraction and injection wells. Wells that are located within the bedrock area may involve diamond coring or air rotary drilling methods in conjunction with sonic or rotary methods for setting surface casing. For wells greater than 4 inches in diameter, mud rotary drilling methods may be used. Sonic drilling methods will be used for construction of 4-inch-diameter or smaller diameter wells to the depths necessary to reach bedrock at much of the project area. Tanks, bins, or tanker trucks may be used to contain excess water and drill cuttings at the drill site and at designated staging areas. Typical well vaults would be 6 feet long by 8 feet long by 8 feet deep, and will house wells between 4 and 12 inches in diameter.

Based on the activities that have occurred to date in the project area during installation of similar wells, the length of time required to construct the injection and extraction wells range from 1 day to 5 weeks per well, depending on the diameter and depth of the well.

To support the drilling rig, a support truck, a forklift, and one or more pickup trucks may be used to transport personnel, equipment, and materials from staging areas to the drill site. The forklift will also be used to transport

cuttings and excess core generated from drilling the soil borings to lined, steel roll-off soil bins that will be temporarily staged. Up to four 20,000 gallon tanks and four to six roll-off bins might be required for large-diameter deep wells. The area surrounding each borehole that may be disturbed, including temporary equipment lay down areas, during drilling is estimated to be up to one-half acre.

4.1.2 Reductant Storage Facilities

The maximum footprint of the reductant storage and associated facilities will be 35,000 square feet, which may consist of facilities at multiple locations.

4.2 Freshwater Flushing

Freshwater flushing involves the use of injection wells, discussed above, to introduce clean water to the aquifer. Freshwater injection would involve piping water in from an off-site source and will be pumped either from new or existing Arizona wells, from new wells in California north of the compressor station, or from a new surface water intake at or near the Colorado River. Freshwater will be transported by pipeline to injection wells located north, west, and/or south of the plume. Any water pipelines that may be needed to deliver water from freshwater wells will be built primarily underground and within existing utility corridors or roadways. The source of freshwater may change during the operation and maintenance period of the remedy; not all freshwater supply structures (wells, intakes, pipelines) will need to be constructed at the outset of the remedy, but could be constructed as needed during the operation and maintenance period. To accommodate the flow volume that is required for remediation, new pipelines will likely need to be constructed connecting the water supply with the injection wells.

If a well is determined the most appropriate method for obtaining freshwater for flushing, wells will be drilled in the typical method for drilling wells as described above. Should a river intake approach be used, the intake will consist typically of belowground perforated or solid pipes (or rectangular channels) extending into the river. The intake pipes lead to pumps that push the water to the desired location. Reinforced concrete is often used to support the pipes. Because the intake pipes are usually installed below the water table, dewatering is necessary to allow for safe construction. Dewatering can be accomplished by pumping or installing sheet piles or cofferdams.

An alternative approach is to install pumps below the river surface with riser pipes extending to a concrete and steel platform. The pump motors, air compressors, monitoring and control equipment, equipment hoists, and an operator's structure will be installed on the platform. The platform will be supported by pylons or piers drilled into bedrock beneath the river bottom or mounted on the existing pipe bridge structure. The area of the platform will be from 2,000 to 10,000 square feet, and could be accessed by boat or by vehicles.

As described above, pipelines that deliver the freshwater could be installed above or belowground depending on the required service life, security and access needs, ground disturbance considerations, and type of pipeline. The diameter of pipelines is estimated to vary between 1 inch and 2 feet. Air release valves will typically be constructed inside underground concrete vaults surrounded by protective bollards.

4.3 Monitoring Wells

Approximately 100 monitoring wells currently exist near the compressor station, and a maximum of 19 new monitoring wells are anticipated as part of the proposed project. Monitoring wells could be replaced throughout the operation and monitoring phase, as necessary. Monitoring wells are typically between 4 and 8 inches in diameter and are completed at the ground surface with a concrete pad (typically 4 square feet) and include a manhole-type cover to the well. Where a ground surface completion is not feasible, monitoring wells may be installed with aboveground completion with steel protective casing. Monitoring wells will be situated in areas that provide relevant data on groundwater hydraulics and chemistry.

4.4 Water Conveyance, Utilities, and Roadways

The proposed project will require pipelines to transfer freshwater, treated water, and reductant-amended water throughout the treatment area. It will also require other utility connections such as electrical power, signal communications, small solar panels, diesel fuel, and natural gas. Where underground pipelines or utilities are

determined most appropriate, trenches will be excavated to depths of 3 to 4 feet (or more), buried, and covered to match the surrounding area, whether it is soil or pavement.

Depending on required service life, security and access, landowner requirements, agency requirements, type of pipeline, and environmental constraints (such as the subsurface geologic features or cultural resources), pipelines could be installed aboveground or belowground. The diameter of pipelines may vary from 1 to 14 inches, depending on the specific utility and required flow rate. Trenching will vary according to the size of pipeline and electrical conduit needed, as follows: 1.5-foot-wide trench for 1- to 4-inch piping, 3-foot-wide trench for 6- to 12-inch piping, and 5-foot-wide trench for 12- to 14-inch piping. An estimated 120,000 linear feet of pipeline may be required to serve the proposed project. Electric utility transformers and access vaults (which may include the use of protective bollards) will be placed at selected points along the pipeline corridor.

Electric conduit and cable will be installed to supply communication and power to pumps and instrumentation and will typically be installed underground in the same location as piping. Wherever feasible, trenches will be dug to place utility connections underground, which will reduce wear from weather and vandalism. As with pipelines, approximately 70,000 linear feet of electrical and signal communications is expected to be required for project implementation. Small solar panels may be installed to provide supplemental power, or as a primary power source for a lower power demand, such as for instrumentation and communication systems.

A road network for accessing the existing network of monitoring wells runs throughout the project area. This road network will be used where feasible for construction and operation of the proposed project; however, additional roads will be required. Approximately 1,000 linear feet of new roads could be needed throughout the project area, for both construction and long-term operation and maintenance of the proposed project. An access road will be required to provide service to each well. At some wells, a vehicle turnaround will be required. For wells where a turnaround is needed, the final disturbed area at each wellhead could be as large as 3,000 square feet. For wells located along an access road where no turnaround is needed, the area used for the well activities would be approximately 1,000 square feet. Access roads will be graded to create a smooth surface and proper drainage and will be routed with topographical and built structures and will consider sensitive natural resources. The roads will be maintained throughout the operation and maintenance period of the proposed project. Depending on their location, condition, frequency of use, and purpose, roads may be paved with asphalt, covered in gravel, or left unpaved. Following determination that the remedial or monitoring structure is no longer needed, the road will be closed and restored to pre-project conditions.

Depending on the location of extraction, treatment, and injection facilities, additional access routes could be constructed, or existing roads improved to support the level of activities proposed. The length of new or improved roads is estimated to be up to 6,000 linear feet and will be designed to minimize grading and disturbance of sensitive resources and existing structures and to maximize the use of existing roads. Typical road design and construction involves topographic surveying, grading, installing surface drainage systems (culverts, gutters, and riprap for slope protection), and constructing retaining walls.

4.5 Nonspecific Activities

Nonspecific activities support the project but are not considered a primary project feature. For example, habitat restoration activities may include preparing impacted areas for planting of native vegetation and maintaining planted vegetation until success criteria are met, which could be up to 5 years.

Potential Impacts

This section describes the potential impacts of project features and activities described in Section 4. The mechanism of project related impact to birds can be broadly grouped into the following four categories: 1) nesting and foraging habitat degradation or loss, 2) direct nest disturbances, including visual and auditory disturbances, that could result in nest failure, abandonment, or decreased viability of eggs or young, 3) direct injury or mortality resulting from entrapment in equipment and materials, and 4) increased predation of protected birds, especially from feral animals or mesopredators.

5.1 Habitat Loss and Degradation

Habitat loss is one of the most substantial and direct threats to avian species. Permanent loss of habitat is often associated with development such as residential, industrial or agricultural land use conversions. In addition, human uses and development often alter ecosystem function. Losing natural habitat across a landscape further leads to fragmentation and alterations in spatial patterns that influence how avian species utilize the remaining habitat (CalPIF 2009).

Habitat degradation can also affect the foraging and nesting habitats of avian species. For example, the introduction of invasive species to an area can diminish the abundance of native plants, leading to fewer foraging opportunities for seed-dependent species or loss of nesting sites.

5.2 Impacts on Nests or Nesting Territories

The project area supports suitable nesting habitat for birds protected by the MBTA and several special-status birds, and these species could be affected during construction, operation and maintenance, and decommissioning. Nesting can occur in vegetation and/or in burrows on or near the project site. In the project vicinity, the avian nesting season for most bird species is from March 15 through September 30. Active nests may be directly impacted (i.e., destroyed or disturbed) by project construction activities resulting in nest abandonment and failure. Nesting territories, the areas surrounding nests which the parents utilize to support successful nesting (e.g., foraging and hunting for feeding of young, vegetation buffers that provide protection from predators), may be directly impacted by project activities (e.g., vegetation removal and habitat degradation), resulting in nest failure or reduced viability of young.

Visual or auditory disturbances related to construction, operation, maintenance, and decommissioning can affect special-status bird species during the breeding seasons. For example, birds that are startled by the sound or visible presence of project equipment may abandon nests, resulting in the reduced viability of eggs and young. Visual disturbances that may impact birds include those resulting from night-time lighting.

5.3 Entrapment from Equipment and Materials

Equipment and materials on site may entrap special-status birds leading to injury or mortality. Open-top vertical pipes are known to trap birds, especially cavity nesters or birds escaping from predators or seeking shade. Once birds enter pipes, they cannot grip the slick surface or spread their wings to fly out, and suffer death from dehydration, starvation, and exposure. Birds have also become trapped in large water storage tanks with small openings around the top.

To ensure that equipment and materials, especially vertical pipes, do not result in significant impacts to protected birds, the AMMs described in section 6 will be implemented.

5.4 Attracting Predators

Habitat that becomes fragmented from human development often results in an increase in feral animals and mesopredators (carnivores of small or intermediate body size). In addition, an increase in trash often functions as food subsidies for these species, which leads to an increase in predator viability. Land uses can dramatically

influence the sustainability of desert bird populations by increasing the populations of brown-headed cowbirds, domestic cats, jays, skunks, raccoons, ravens, crows, and other predators (CalPIF 2009).

5.5 Effect Categories

Table 5-1 qualifies overall impacts related to the project activities presented in Section 4 and is derived from information presented in *Draft Avian Conservation Strategy: Guidelines for Bird Protection and Mitigation* (ACS; ICFI 2013). Section 6 discusses how these impacts will be avoided or minimized, and Tables 6-1 and 6-2 provide recommended activity buffers based on the identified effect categories.

As discussed in the ACS, effect scores for each impact mechanism were aggregated to assign an overall effect score for each PG&E activity. The overall effect score (Low, Medium, and High) is an aggregation of the effect category scores assigned for each of four impact mechanisms (occupied nest location or nesting substrate, personnel and equipment activity, activity duration, and noise level). Effects categorized as low or short were assigned a value of 1; effects categorized as medium were assigned a value of 2; and effects categorized as high or long were assigned a value of 3. These four effect category values were added to assign the overall effect score. Cumulative values between 4 and 6 were assigned an overall effect category of low; values between 7 and 9 were assigned a category of medium; and values between 10 and 12 were assigned a category of high. It is important to note that the effect categories (low, medium, and high) are relative to each other at any given distance from an activity and that effect category assignments will not change when such activities occur at varying distance from a nest. A detailed discussion of the impact mechanisms is provided in Section 3.3 of the ACS.

Effects of PG&E activities decrease with distance, which is taken into account by the assignment of activity-free buffers in Chapter 6 below. The overall effect categories were used to assign activity free buffer requirements discussed in Chapter 6.

TABLE 5-1
Potential Activity Effects¹

Activity	Overall Effect Category ^a	Occupied nest location or nesting substrate	Personnel and equipment activity	Activity duration	Noise level
Remediation Facilities					
Installation of Extraction, Injection, and IRZ Wells	Medium	Medium	High	Short	High
Construction of Reductant Storage Facilities	High	Medium	High	Long	High
Freshwater Flushing					
Installation of Water Supply Wells	High	Medium	High	Medium	High
Construction of Water Pumping Platform	High	Medium	High	Medium	High
Monitoring Wells					
Installation of Monitoring Wells	Medium	Medium	High	Short	High
Water Conveyance, Utilities, and Roadways					
Pipeline Construction	High	Medium	High	Long	High
Installation of Electrical Conduit and Cable	Medium	Medium	Medium	Short	Medium
Road Construction	High	Medium	High	Long	High
Operation and Maintenance					

TABLE 5-1
Potential Activity Effects¹

Periodic well maintenance	Medium	Medium	Medium	Short	High
Equipment maintenance and inspections	Medium	Medium	Medium	Short	High
Periodic replacement of wells and other structures	High	Medium	High	Short	High

¹ Based on ICFI 2013, in part

^a The effect categories (Medium and High) for each activity are relative to each other at any distance that an activity occurs from a nest. Distance is taken into account with the implementation of activity-free buffers as presented in Chapter 6.

Avoidance and Minimization Measures

As described in Section 4, the majority of project features has been located away from special-status bird habitats and avoids special-status bird habitat areas to the extent feasible. Because complete avoidance of direct impacts to suitable habitat is not feasible, and the project may result in direct (e.g., project related disturbance) and indirect (e.g., increased predation) impacts to protected birds, this section includes measures that have been developed to ensure that direct and indirect impacts to protected birds during the construction, operation, maintenance, and decommissioning phases of the project are not significant. General avoidance and minimization measures that address all bird species are provided in Section 6.1, and additional measures specific to Yuma clapper rail, southwestern willow flycatcher, and the western yellow-billed cuckoo are provided in Section 6.2. The recommended activity buffers in Tables 6-1 and 6-2 are derived from information presented in the ACS, and draw on the effect categories presented in Table 5-1. These tables provide standard buffer distances for each species group or for individual species, followed by minimum buffer distances for medium and high overall effect category activities identified in Table 5-1.

6.1 General Avoidance and Minimization Measures

1. Prior to the initiation of any ground disturbing or noise generating project activities outside of the fenced areas of the Compressor Station between March 15 and September 30, a qualified biologist shall conduct a preconstruction survey in areas of potentially suitable habitat for nests and nesting bird behavior. The appropriate area to be surveyed and the timing of the survey may vary depending on the activity and species that could be affected.
2. The location of any active nest shall be flagged, mapped, and communicated to the project foreperson. For each identified active nest the biologist will record species, nest location, behavior, site conditions, estimated date of nest establishment, and estimated fledge date.
3. To avoid impacts to nesting MBTA protected and California Fish and Game Code §3503 and 3503.5 species, a buffer of up to 400 feet will be established around all identified active nests, as recommended in Table 6-1. Buffer distances will be dependent on feasibility and practicability, and a biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, and the sensitivity and habituation of the birds, and the dissimilarity of the proposed activity with background activity) to minimize impacts to nesting birds. As discussed in Section 7.2, the biologist will assess the activity effect, ambient activities, site conditions, and bird behavior to determine the efficacy of activity-free areas.
4. To avoid impacts to other special-status bird species, a buffer of up to 500 feet will be established around identified active nests as recommended in Table 6-2. In conformance with PBA General Requirement 3.4-25, riparian areas surrounding the proposed action site and subject to influence of operations and maintenance activities shall be surveyed for southwestern willow flycatcher according to the protocol established by the USFWS. Activities within Southwestern willow flycatcher habitat and the floodplain will be avoided during nesting season (March 15 – September 30). Species-specific AMMs in Section 6.2 include additional restrictions for southwestern willow flycatcher, Yuma clapper rail, and the western yellow-billed cuckoo.
5. Activity-free buffers should be designated around active nesting areas in conformance with PBA General Project Management Measure 3.4-25. Project activities within the activity-free area will be prohibited until the nesting pair and young have vacated the nests. The biologist will use maps, flagging, signage, and tailboard meetings as needed to ensure that project crews are aware of the location and intent of the activity-free area.
6. The biologist will monitor bird behavior in relation to project activities. With approval from DTSC and the Federal Agencies, the activity-free area may be reduced if specific factors or additional protection measures (e.g., visual screening) will ensure the protection of the nest.

TABLE 6-1

Recommended Activity-Free Buffers for MBTA and CFGC Protected Species Groups^a

Species Group	Representative Species	Standard Buffer (feet) ¹	Medium Impact Minimum Buffer (feet) ¹	High Impact Minimum Buffer (feet) ¹
Waterfowl	American wigeon, Bufflehead, Blue-winged teal, Canada goose, Canvasback, Cinnamon teal, Common goldeneye, Common merganser, Gadwall, Greater white-fronted goose, Green-winged teal, Lesser scaup, Mallard, Northern pintail, Northern shoveler, Redhead, Red-breasted merganser, Red-necked duck, Ring-necked duck, Ross' goose, Ruddy duck, Snow goose, American Coot, common moorhen	100	15	30
Rails and Green Heron	Virginia Rail, Sora, Green Heron	100	15	30
Quails and Relatives	Gambel's quail	100	15	30
Colonial Herons, Egrets, and Cormorants	American white pelican, Black-crowned Night-heron, Clark's grebe, Double-crested Cormorant, Eared grebe, Great blue heron, Great Egret, Green heron, Pied-billed grebe, Snowy egret, Western grebe, White faced ibis	400	25	50
Birds of Prey (Cavity-nesting)	American Kestrel, Barn Owl, Great horned owl, Western Screech-owl, Northern Pygmy-owl	200	25	50
Birds of Prey (Platform nesting)	Turkey Vulture, Red-tailed Hawk, Merlin, Prairie Falcon, Osprey, Sharp-shinned hawk, Cooper's Hawk, Northern harrier	300	50	100
Shorebirds 1	Black-necked Stilt, American Avocet, Common snipe, Dunlin, Greater yellowlegs, Least sandpiper, Lesser yellowlegs, Long-billed dowitcher, western sandpiper, Wilson's snipe	150	15	30
Shorebirds 2	Killdeer	75	15	30
Gulls and Terns	Caspian Tern, Forster's Tern, California Gull, Ring-billed gull	300	50	100
Kingfishers	Belted Kingfisher	100	25	50
Doves	Common ground dove, Inca dove, Mourning Dove	50	10	20
Roadrunners and Band-tailed Pigeon	Greater Roadrunner, Band-tailed Pigeon	100	25	50
Caprimulgidae	Lesser Nighthawk	75	20	30
Hummingbirds	Black-chinned Hummingbird, Anna's Hummingbird, Costa's Hummingbird	50	15	20
Woodpeckers	Downy Woodpecker, Gila woodpecker, Hairy Woodpecker, Northern Flicker, Red-breasted Sapsucker, Red-naped sapsucker, White-headed Woodpecker.	50	10	20

TABLE 6-1

Recommended Activity-Free Buffers for MBTA and CFGC Protected Species Groups^a

Passerines (cavity and crevice nesters)	Ash-throated Flycatcher, Tree Swallow, Mountain Chickadee, Oak Titmouse, Red-breasted Nuthatch, White-breasted Nuthatch, Pygmy Nuthatch, Brown Creeper, Rock Wren, Canyon Wren, Bewick's Wren, House Wren, Western Bluebird	50	10	15
Passerines and other bridge, culvert, and building nesters	Black Phoebe, Say's Phoebe	75	15	30
Colonial Swallows	Cliff Swallow	50	15	30
Passerines (ground nesters, open habitats)	Horned Lark, Lark Sparrow, Western Meadowlark	75	15	30
Passerines (understory and thicket nesters)	Abert's towhee, Gray Flycatcher, Dusky Flycatcher, Pacific-slope Flycatcher, Gray Vireo, Cassin's Vireo, Western Scrub-jay, Bushtit, Bewick's Wren, Blue-gray Gnatcatcher, Swainson's Thrush, Hermit Thrush, Wrentit, California Thrasher, Orange-crowned Warbler, Yellow-rumped Warbler, Black-throated Gray Warbler, MacGillivray's Warbler, Common Yellowthroat, Wilson's Warbler, Yellow-breasted Chat, Green-tailed Towhee, Spotted Towhee, California Towhee, Rufous-crowned Sparrow, Chipping Sparrow, Brewer's Sparrow, Black-chinned Sparrow, Sage Sparrow, Fox Sparrow, Song Sparrow, Dark-eyed Junco, Blue Grosbeak, Lazuli Bunting, Red-winged Blackbird, American Goldfinch	75	15	30
Passerines (scrub and tree nesters)	Gray Flycatcher, Dusky Flycatcher, Pacific-slope Flycatcher, Western Woodpewee, Cassin's Kingbird, Western Kingbird, Cassin's Vireo, Hutton's Vireo, Warbling Vireo, Steller's Jay, American Crow, Common Raven, Verdin, Bushtit, Blue-gray Gnatcatcher, Cactus Wren, American Robin, Northern Mockingbird, Le Conte's Thrasher, Phainopepla, Yellow-rumped Warbler, Black-throated Gray Warbler, Chipping Sparrow, Black-throated Sparrow, Western Tanager, Black-headed Grosbeak, Brewer's Blackbird, Great-tailed Grackle, Hooded Oriole, Bullock's Oriole, Scott's Oriole, Purple Finch, Cassin's Finch, House Finch, Pine Siskin, Lesser Goldfinch, Lawrence's Goldfinch, American Goldfinch	75	15	30
Passerines (tower nesters)	Western Kingbird, Common Raven	75	15	30
Passerines (marsh nesters)	Common Yellowthroat, Red-winged Blackbird, Great-tailed Grackle	75	15	30
Species not covered under MBTA ²	Rock Pigeon, Ring-necked Pheasant, Chukar, Eurasian Collared-dove, Spotted Dove, European Starling, House Sparrow, and other nonnative/domestic birds	N/A	N/A	N/A

TABLE 6-1

Recommended Activity-Free Buffers for MBTA and CFGC Protected Species Groups^a

^a Standard buffer distances are provided for each species group or for individual species, followed by minimum buffer distances for medium and high overall effect category activities (for use in cases where reduced buffers are deemed appropriate).

¹ ICFI 2013

TABLE 6-2
Recommended Activity-Free Buffers for Special-Status Species^a

	Standard Buffer (feet) ¹	Medium Impact Minimum Buffer (feet) ¹	High Impact Minimum Buffer (feet) ¹
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	CR	CR	CR
Arizona Bell's vireo <i>Vireo bellii arizonae</i>	500	CR	CR
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	150	CR	CR
California black rail <i>Laterallus jamaicensis coturniculus</i>	300	CR	CR
Yuma clapper rail <i>Rallus longirostris yumanensis</i>	300 ³	CR	CR
Western least bittern <i>Ixobrychus exilis hesperis</i>	100	15	30
Crissal thrasher <i>Toxostoma crissale</i>	75	15	30
Sonoran yellow warbler <i>Dendroica petechia sonorana</i>	75	15	30
Yellow-breasted chat <i>Icteria virens</i>	75	15	30

^a Standard buffer distances are provided for each species group or for individual species, followed by minimum buffer distances for medium and high overall effect category activities (for use in cases where reduced buffers are deemed appropriate).

CR – Consultation Required

¹ ICFI 2013

² ICFI 2012

³ USFWS 2008

7. All PG&E employees and the contractors involved with the project shall be required to attend a worker education program prior to working on-site and outside of fenced areas (e.g., the compressor station). This program shall include information about protected bird species (and where they may occur in the project area) and the AMMs described in this Plan to ensure impacts on special-status birds are not significant. New employees shall receive training prior to working onsite.
8. Project activity footprints and access routes shall be confined to pre-determined areas. No vehicle travel off of established roads or approved access routes shall be permitted.
9. Any vertical pipes or small cavities on equipment or materials that may trap birds shall be capped or otherwise covered when work activity is not occurring at site.
10. Trash and food items shall be contained in closed containers and removed daily to reduce attractiveness to opportunistic predators such as coyotes and feral animals.
11. Night-time project site lights outside of the compressor station shall be angled toward the ground and reduced in intensity to levels compatible with safety concerns, and limited in duration of usage.
12. Upon project completion, all unused material and equipment shall be removed from the site. This condition does not apply to fenced sites.

13. Intentional harassment, killing or collection of any wildlife (including birds) at construction sites and surrounding areas shall be prohibited. Wildlife shall not be handled except in the case of injury or mortality, as described in AMM 15.
14. PG&E shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with the AMMs during major ground disturbing (including vegetation removal) or loud noise generating (above ambient levels) project activities outside of the compressor station or fenced areas. The FCR must be onsite during all construction activities. The FCR shall have authority to halt activities that are in violation of the AMMs and/or pose a danger to protected bird species. The FCR will have a copy of the AMMs when work is being conducted on site. The FCR may be a project manager, PG&E representative, or a biologist.
15. Any dead or injured special status bird species found in the project area shall be reported to the PG&E project biologist, USFWS, CDFW, BLM and, as appropriate, AGFD. Upon locating an individual dead or injured special-status bird species, PG&E shall make initial notification to the BLM and USFWS within three working days of its finding. The notification must be made by telephone and writing to the Lake Havasu BLM Office (2610 Sweetwater Avenue, Lake Havasu City, Arizona 86406, 928-505-1200) and the US Fish and Wildlife Service, Ecological Services Field Office (2321 West Royal Palm Road, Suite 103, Phoenix, AZ 85021, 602-242-0210). The report will include the date and time of the finding or incident (if known), location of the carcass, a photograph, cause of death (if known), and other pertinent information. Animals injured through PG&E activities shall be transported to a qualified veterinarian for treatment at the expense of PG&E. If an injured animal recovers, the USFWS, CDFW, BLM and, as appropriate, AGFD, shall be contacted for final disposition of the animal.

6.2 Species-Specific Mitigation Measures

The following mitigation measures from the PBA pertain to specific special-status species:

6.2.1 Southwestern Willow Flycatcher

1. The intent of PG&E will be to minimize the net increase of disturbed habitat in the area of potential effect (APE).
2. Riparian areas surrounding the proposed action site and subject to influence of operations and maintenance activities shall be surveyed for southwestern willow flycatcher according to the protocol established by the USFWS. These surveys shall be completed every two years by a biologist permitted by the USFWS to carry out flycatcher surveys until the action has been completed and all facilities have been removed. The monitoring frequency reduced from annual surveys to biennial surveys in agreement with the USFWS and BLM in March 2010. Reports shall be provided to the biologists in the BLM Lake Havasu Field Office on a biennial basis.
3. Construction and development activities that use heavy equipment should occur between October 1 and March 15. The use of any heavy equipment in or near southwestern willow flycatcher habitat after March 15 will be required to be reassessed and additional conservation measures considered.
4. To the extent feasible, future project activities within the sensitive areas identified on Figure 2 (i.e., potential southwestern willow flycatcher habitat, wetlands, 100-year floodplain, and a 60-foot buffer from the Colorado River) should be avoided. Further, if greater than 8.8 acres of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and mitigation may be required. Habitat loss includes the removal of trees and perennial shrubs, but does not include the trimming of vegetation.

6.2.2 Western Yellow-billed Cuckoo

1. The intent of PG&E will be to avoid investigative or response actions in or near riparian habitat, if at all possible.
2. Riparian areas surrounding the designated work areas and subject to influence of operations and maintenance activities shall be surveyed by a USFWS permitted biologist for western yellow-billed cuckoo according to the protocol established by the USFWS. After the initial 2 years of surveys, ongoing surveys shall

be performed according to USFWS's recommendations until the action has been completed and all facilities have been removed. Reports shall be provided to the biologists in the BLM Lake Havasu Field Office and to the USFWS's Phoenix AESO each time they are performed.

3. Construction and development activities that use heavy equipment should be completed prior to May 15. The use of any heavy equipment in or near western yellow-billed cuckoo habitat after May 15 will be required to be reassessed and additional conservation measures may be considered. Preferably such activities would occur from September 30 to May 15.
4. To the extent feasible, future project activities within the sensitive areas identified on Figure 2 (i.e., potential yellow-billed cuckoo habitat, wetlands, 100-year floodplain, and a 60-foot buffer from the Colorado River), should be avoided. Further, if greater than 8.8 acres of floodplain habitat is lost or manipulated, specific project consultation with USFWS will be required and possible mitigation may be required. Habitat loss is defined as the removal of trees and perennial shrubs. The trimming of vegetation is not considered habitat loss.
5. A biologist should be assigned to field teams for remediation activities within western yellow-billed cuckoo habitat during the period of May 15 through September 30.

6.2.3 Yuma Clapper Rail

1. The intent of PG&E will be to avoid investigative or response actions in or near marshes or wetlands, if at all possible.
2. If future actions are proposed to occur within 300 feet of wetlands or marshes (specifically the eastern boundary of the APE on the Arizona floodplain), project specific review will occur to ensure compliance with the PBA and associated USFWS consultation.
3. Specific to the Arizona portion of the APE, all construction and development activities should be completed prior to March 15. Preferably, such activities would occur from October 1 to March 15.
4. Where feasible, actions should not be proposed within the tamarisk habitat under the Interstate 40 and BNSF railway bridges that occur on the HNWR unless otherwise agreed to by the USFWS.
5. No more than 8.8 acres of floodplain habitat can be impacted without triggering additional ESA consultation requirements.

Monitoring and Reporting

Post-construction monitoring will document any avian fatalities that might occur and will identify factors that might warrant additional avoidance and minimization measures or improvement or elimination of avoidance and minimization measures found to be ineffective. Implementation of the proposed monitoring will help USFWS, BLM, and PG&E to evaluate the effectiveness of the avoidance and minimization measures.

If a dead or injured listed state and federal species is found, PG&E will notify the BLM, USFWS, CDFW, and AGFD, as noted in General AMM 15.

Adaptive Management

8.1 Accounting for Policy Changes

With the possibility of future implementation of new policies it is understood that commitments made in this Plan may require adaptation relative to potential forthcoming guidance. PG&E will work collaboratively with BLM and USFWS to apply necessary policy changes to this Plan.

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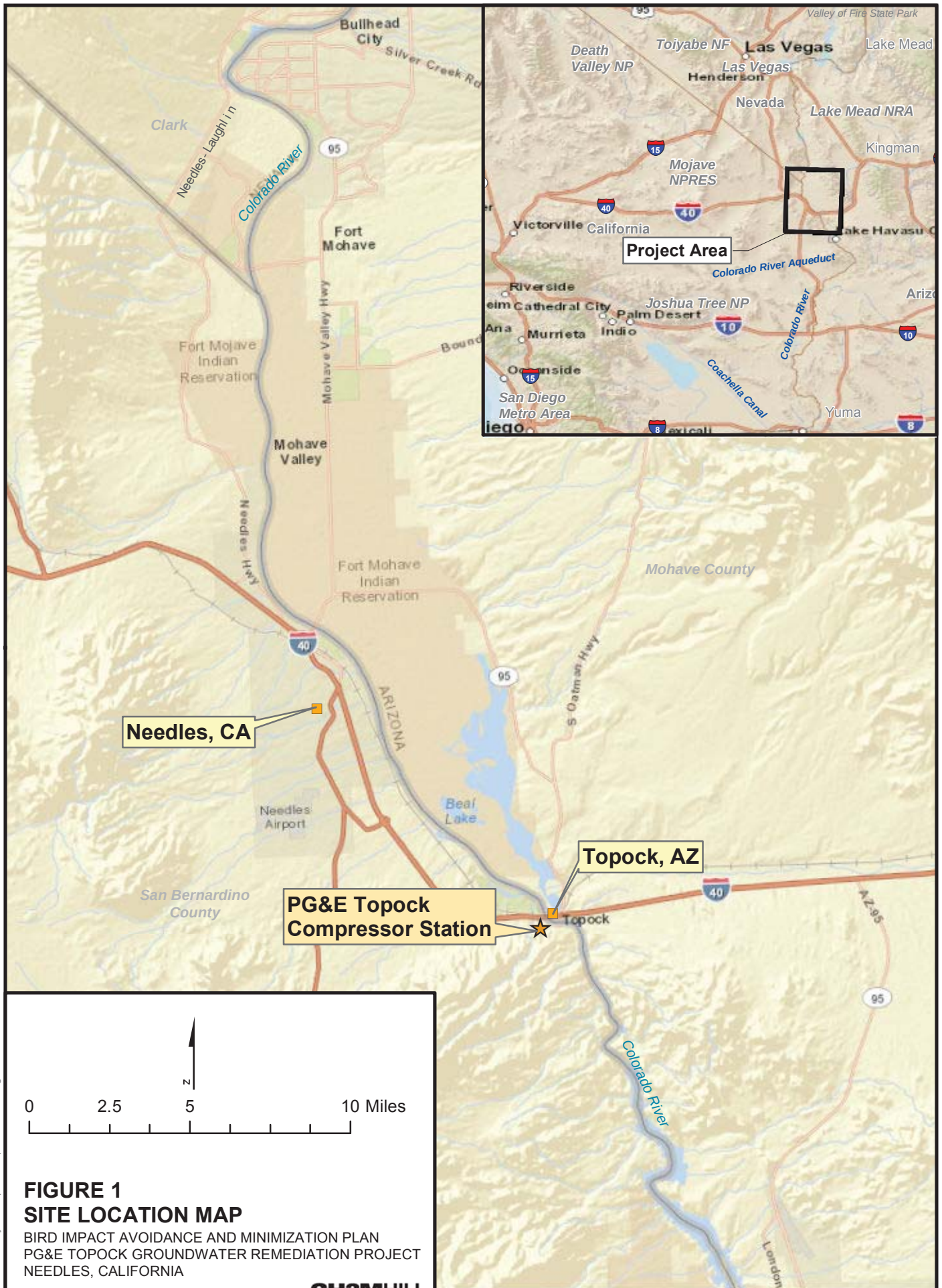
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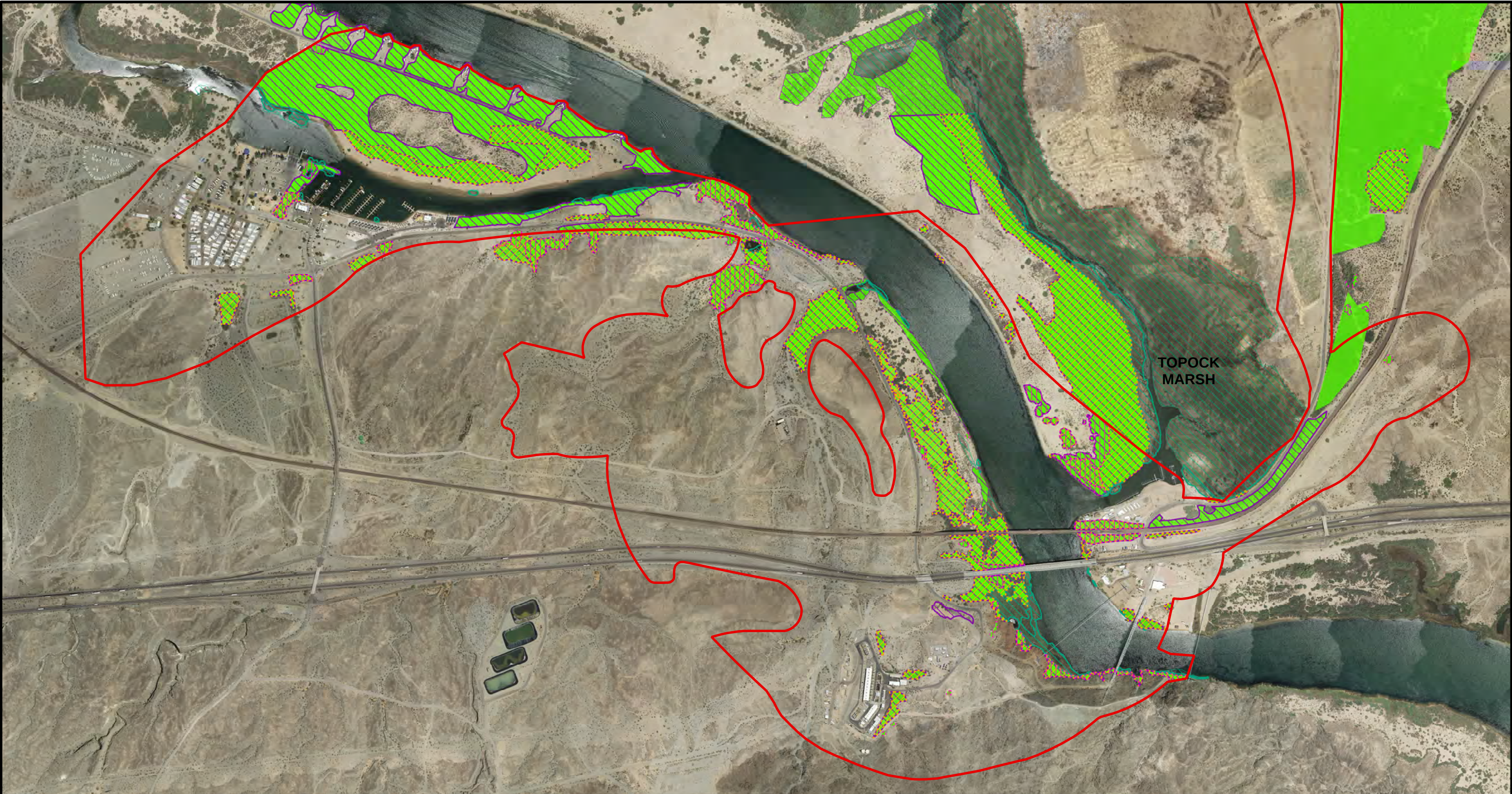
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LEGEND

 EIR Project Area

Habitat Areas

 Yuma clapper rail, Western least bittern, California black rail

 Western yellow-billed cuckoo (non-nesting), Yellow-breasted chat

 Southwestern willow flycatcher, Arizona Bell's vireo (non-nesting)

 Sonoran yellow warbler

 Crissal thrasher

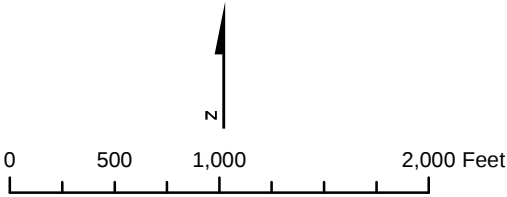


FIGURE 2
HABITATS OF SPECIAL-STATUS AVIAN SPECIES
APRIL 2014
PG&E Topock Groundwater Remediation Project
Needles, California

Appendix A
Migratory Bird Treaty Act Protected Bird Species

APPENDIX A

Migratory Bird Treaty Act Protected Species Anticipated To Occur Within The Project Area

Order (Group)	Species	Nesting Season
Anseriformes (waterfowl)	American wigeon	March 15 - September 30
	Bufflehead	
	Blue-winged teal	
	Canada goose	
	Canvasback	
	Cinnamon teal	
	Common goldeneye	
	Common merganser	
	Gadwall	
	Greater white-fronted goose	
	Green-winged teal	
	Lesser scaup	
	Mallard	
	Northern pintail	
	Northern shoveler	
	Redhead	
	Red-breasted merganser	
	Red-necked duck	
	Ring-necked duck	
	Ross' goose	
	Ruddy duck	
	Snow goose	
Apodiformes (swifts and hummingbirds)	Anna's hummingbird	March 15 - September 30
	Black-chinned hummingbird	
	Costa's hummingbird	
Caprimulgiformes (nightjars and allies)	Lesser nighthawk	March 15 - September 30
Charadriiformes (gulls, plovers and allies)	American avocet	March 15 - September 30
	Black-necked stilt	
	California gull	
	Caspian tern	
	Common snipe	
	Dunlin	
	Greater yellowlegs	
	Killdeer	
	Least sandpiper	
	Lesser yellowlegs	
	Long-billed dowitcher	
	Ring-billed gull	
	Western sandpiper	
	Wilson's snipe	
Columbiformes (doves and pigeons)	Common ground dove	March 15 - September 30

APPENDIX A

Migratory Bird Treaty Act Protected Species Anticipated To Occur Within The Project Area

Order (Group)	Species	Nesting Season
	Inca dove	
	Mourning dove	
Coraciiformes (kingfishers)	Belted kingfisher	March 15 - September 30
Cuculiformes (cuckoos and allies)	Greater roadrunner	March 15 - September 30
Falconiformes (falcons)	American kestrel	March 15 - September 30
	Merlin	
	Prairie falcon	
Accipitriformes (hawks, eagles and allies)	Cooper's hawk	March 15 - September 30
	Northern harrier	April 1 - August 15
	Osprey	April 1 - August 31
	Red-tailed hawk	April 1 - August 15
	Sharp-shinned hawk	April 1 - July 15
	Turkey vulture	May 1 - August 15
Galliformes (fowl)	Gambel's quail	March 15 - September 30
Gruiformes (cranes and allies)	American coot	March 15 - September 30
	Common gallinule	
	Common moorhen	
	Green heron	
	Sora	
	Virginia rail	
Passeriformes (perching birds)	Abert's towhee	March 15 - September 30
	American gold finch	
	American pipit	
	American robin	
	Ash-throated flycatcher	
	Bell's vireo	
	Bewick's wren	
	Black pheobe	
	Black-tailed gnatcatcher	
	Black-throated sparrow	
	Blue grosbeak	
	Blue-gray gnatcatcher	
	Brewer's blackbird	
	Brown-headed cowbird	
	Bushtit	
	Canyon wren	
	Chipping sparrow	
	Cliff swallow	
	Common raven	
	Common yellowthroat	
	Dark-eyed junco	

APPENDIX A

Migratory Bird Treaty Act Protected Species Anticipated To Occur Within The Project Area

Order (Group)	Species	Nesting Season
	Great-tailed grackle	
	House finch	
	House wren	
	Lazuli bunting	
	Lesser goldfinch	
	Lincoln's sparrow	
	Loggerhead shrike	
	Lucy's warbler	
	Marsh wren	
	Northern mockingbird	
	Northern rough-winged swallow	
	Orange-crowned warbler	
	Phainopepla	
	Purple finch	
	Red-winged blackbird	
	Rock wren	
	Rose breasted grosbeak	
	Ruby-crowned kinglet	
	Sage sparrow	
	Savannah sparrow	
	Say's pheobe	
	Song sparrow	
	Spotted towhee	
	Tree swallow	
	Verdin	
	Vermilion flycatcher	
	Warbling vireo	
	Western kingbird	
	Western meadowlark	
	White-crowned sparrow	
	Wilson's warbler	
	Yellow-headed blackbird	
	Yellow-rumped warbler	
Pelecaniformes (pelicans and allies)	American white pelican	March 15 - September 30
	Black-crowned night-heron	
	Double-crested cormorant	
	Great blue heron	
	Green heron	
	Great egret	
	Western grebe	
	White faced ibis	

APPENDIX A

Migratory Bird Treaty Act Protected Species Anticipated To Occur Within The Project Area

Order (Group)	Species	Nesting Season
	Snowy egret	
Piciformes (woodpeckers and allies)	Gila woodpecker	March 15 - September 30
	Ladder-backed woodpecker	
	Northern flicker	
	Red-naped sapsucker	
Podicipediformes (grebes)	Clark's grebe	March 15 - September 30
	Eared grebe	
	Pied-billed grebe	
	Western grebe	
Strigiformes (owls)	Great horned owl	March 15 - September 30