United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513

In Reply Refer To:

AESO/SE

02EAAZ00-2013-F-0168

02ENNM00-2013-F-0069
02EAAZ00-2013-I-0168
02EAAZ00-2012-CPA-0085
22410-2009-FA-0145

November 13, 2013

Memorandum

To: State Director, Bureau of Land Management, Santa Fe, New Mexico

From: Field Supervisor

Subject: Biological and Conference Opinion and Conference Report for the SunZia Southwest Transmission Line Project

Thank you for your June 3, 2013 memorandum, received in our office on June 5, 2013, requesting consultation pursuant to section 7 of the Endangered Species Act (16 U.S.C. §§ 1531-1544) (ESA), as amended, for the proposed SunZia Southwest Transmission Line Project. The proposed action is for the Bureau of Land Management (BLM) to issue a right-of-way grant to SunZia Transmission, LLC for the construction and operation of two 500 kV transmission lines from the proposed SunZia East Substation in Lincoln County, New Mexico, through Lincoln, Socorro, Sierra, Luna, Grant, and Hidalgo counties in New Mexico and Cochise, Greenlee, Graham, Pima, and Pinal counties in Arizona to the Pinal Central Substation in Pinal County (Figure 1) and to amend the BLM Socorro and Mimbres Resource Management Plans (RMPs) in New Mexico.

In your June 3, 2013 memorandum you requested formal consultation for Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*), Todsen's pennyroyal (*Hedeoma todsenii*), and Southwestern willow flycatcher (*Empidonax traillii extimus*) and its designated critical habitat. In addition, you requested our concurrence with your "may affect, is not likely to adversely affect" determinations for lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Mexican long-nosed bat (*Leptonycteris nivalis*), Mexican gray wolf (*Canis lupus baileyi*), jaguar (*Panthera onca*) and its proposed critical habitat, ocelot (*Leopardis pardalis*), Yuma clapper rail (*Rallus logirostris yumanensis*), piping plover (*Charadrius melodus*) and its designated critical habitat, and Rio Grande silvery minnow (*Hybognathus amarus*) and its designated critical habitat.

As stated in our July 3, 2013 memorandum, we concur with your determinations that the proposed action "may affect, is not likely to adversely affect" the Mexican gray wolf, jaguar and proposed critical habitat, ocelot, piping plover and designated critical habitat, and Rio Grande silvery minnow, and we provide our rationales in Appendix A. Also, as stated in our June 3, 2013 memorandum, we cannot concur with your determinations of "may affect, is not likely to adversely affect" for lesser long-nosed bat, Mexican long-nosed bat, Yuma clapper rail, and Rio Grande silvery minnow critical habitat, which are addressed in this biological opinion, as requested in your June 3, 2013 memorandum.

In your June 3, 2013 memorandum you also requested conference for the Northern aplomado falcon (*Falco femoralis septentrionalis*) non-essential population (NEP), which is provided as a conference report in Appendix B.

In your June 3, 2013 memorandum you requested technical guidance for candidate species Tucson shovel-nosed snake (*Chionactis occidentalis klauberi*) and Sprague's pipit (*Anthus spragueii*), which is provided in Appendix C.

On July 13, 2013 the FWS published the proposed listing as threatened and proposed designation of critical habitat for the northern Mexican gartersnake (*Thamnophis eques megalops*). On August 28, 2013 we received your August 21, 2013 memorandum with supplemental information and determinations that the proposed action "may affect, but is not likely to adversely affect" the proposed northern Mexican gartersnake and "may affect, but is not likely to adversely affect" its proposed critical habitat. We concur with your determinations and include our rationales in Appendix A.

Your August 28, 2013 memorandum included conclusions, to facilitate conference, that the project "may affect, and is likely to adversely affect" the Western yellow-billed cuckoo (*Coccyzus americanus*) and "may affect, and is likely to adversely affect" suitable habitat because Western yellow-billed cuckoo was anticipated to be proposed for listing by the FWS before the Record of Decision for the Project is signed and critical habitat is anticipated to be proposed shortly thereafter. Since the Western yellow-billed cuckoo was proposed as threatened on October 3, 2013, it will be analyzed in a conference opinion herein.

In summary, this document includes: 1) the FWS's biological opinion of the effects of the Project on lesser long-nosed bat, Mexican long-nosed bat, Southwestern willow flycatcher and its critical habitat, Yuma clapper rail, Rio Grande silvery minnow critical habitat, Kuenzler hedgehog cactus, and Todsen's pennyroyal; 2) the FWS's rationale for concurrence with BLM determinations of "may affect, is not likely to adversely affect;" 3) the FWS's conference report to address effects of the project on the Northern aplomado falcon NEP; 4) the FWS's technical guidance to address effects of the project on Tucson shovel-nosed snake, and Sprague's pipit; and 5) the FWS's conference opinion of effects of the project on Western yellow-billed cuckoo.

This biological and conference opinion and conference report is based on information provided in the May 2013 "Biological Assessment for the SunZia Southwest Transmission Project" (BA), the June 2013 "Final Environmental Impact Statement and Proposed Resource Management Plan Amendments for the SunZia Southwest Transmission Project" (FEIS/PRMPAs), email correspondence, telephone conversations, field investigations, and other sources of information.

Literature cited in this biological and conference opinion and conference report is not a complete bibliography of all literature available on the species of concern, transmission line construction and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

April 1, 2013	BLM transmitted Biological Assessment and requested formal consultation May 1, 2013 FWS responded that information in the BLM March 28, 2013 memorandum and in the BA was not sufficient to initiate formal consultation.
May 7, 2013	SunZia contractor, BLM, and FWS met to review BA information needs.
June 4, 2013	FWS received BLM memorandum dated June 3, 2013 transmitting revised biological assessment.
July 2, 2013	FWS responded to BLM June 3, 2013 memorandum initiating formal consultation and requesting clarification of action sought for New Mexico meadow jumping mouse following changed status. We also concurred with your determinations "may affect, is not likely to adversely affect" for Mexican gray wolf, jaguar and proposed critical habitat, ocelot, piping plover and designated critical habitat, and Rio Grande silvery minnow.
July 5, 2013	FWS received email from BLM clarifying that BLM was not seeking conference for New Mexico meadow jumping mouse.
July 10, 2013	FWS advised BLM by email of status change for Northern Mexican gartersnake following publication of proposed listing in *Federal Register*.
August 28, 2013	FWS received BLM August 21, 2013 memorandum with determinations for proposed narrow-headed gartersnake, proposed northern Mexican gartersnake, and supplemental information of effects on Western yellow-billed cuckoo to facilitate conference, if needed.
October 23, 2013	Draft biological and conference opinion and conference report provided to BLM for review.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The "Project Description" from the BA is included as Appendix D (App. D) and additional description of the proposed action, included at various locations in the BA, is included as Appendix E (App. E), which are included herein by reference. A summary is provided below for convenience.

Summary of the Proposed Action

The proposed action is for the BLM to issue a right-of-way grant to SunZia Transmission, LLC (Applicant) for the construction and operation of two 500 kV transmission lines from the proposed SunZia East Substation in New Mexico to the permitted Pinal Central Substation in Arizona (Figure 1) and to amend the BLM Socorro and Mimbres Resource Management Plans (RMPs) to change Visual Resource Management objectives and exclude certain areas from existing right-of-way avoidance areas to allow construction of the transmission lines. Where sensitive locations are identified, avoidance of impacts as described in Standard Mitigation Measures (App. D -Table 5) and Selective Mitigation Measures (App. D -Table 6), with additional detail provided by species below, would be a condition of the right-of-way grant. The terms Standard Mitigation Measures and Selective Mitigation Measures are used by BLM in the BA and FEIS/PRMPAs and are considered conservation measures herein for section 7 consultation purposes. Two 500 kV overhead transmission lines would be constructed; however the final configuration is not determined. For the purpose of analysis, one transmission line would be constructed and operated as a 500 kV single-circuit alternating current (AC) facility, with a second transmission line constructed and operated as a 500 kV single-circuit direct current (DC) facility. If both lines are constructed as AC, converter stations would not be constructed and three conductor bundles would be installed for AC rather than two for DC on each of the lines. Impacts from construction, operation, and maintenance are anticipated to be similar between a one AC and one DC configuration and two AC lines with the exception of construction and maintenance needed at the converter stations, which would be located within substations at the eastern and western ends of the line. Each transmission line would extend between the proposed SunZia East Substation and the Central Substation to be built by Salt River Project, previously approved by the Arizona Corporation Commission (ACC 2005), for a length of approximately 515 miles.

A "Construction, Operation, and Maintenance (COM) Plan" will be a component of the final "Plan of Development" (POD) developed by the applicant and submitted to BLM, and will contain the final, detailed engineering and siting of all Project features. For documents developed prior to site-specific engineering and completion of the COM Plan, including the Draft and Final EIS and the BA, impacts have been assessed along a reference centerline according to the typical conditions presented in the Project description. The reference centerline forms the basis for the analysis in this BA, and detailed siting of Project features (i.e., structures, substations, and access roads) would be determined and guided by the need to avoid impacts to sensitive, narrowly distributed resources such as rare plants or cultural resource sites. The study corridor width for biological resources is 8 miles FEIS, Table 3-1 (BLM 2013). However, preliminary engineering has been developed to support detailed estimates of ground disturbance and other impacts in two locations, where the proposed Project would cross designated critical habitat at the Rio Grande River and the San Pedro River.

The transmission line components include structures, foundations, conductors, insulators and associated hardware, overhead groundwire (OHGW), and fiber optic regeneration facilities. In addition, the AC transmission line portion of the project will include construction of substations including: Midpoint Substation located in Luna County, New Mexico, near the town of Deming; Lordsburg Substation located in Hidalgo County, New Mexico, near the existing Hidalgo Substation; and Willow-500 kV Substation located in Graham County, Arizona, near U.S. Route 191 and existing Tucson Electric Power (TEP) 345 kV transmission lines. The DC transmission line would not include interconnections with these intermediate substations, but would require AC/DC converter stations in the substation at each terminus.

Under typical conditions, the Project features (App. D - Table 1), with the exception of the access roads, would result in approximately 10.3 acres per mile of ground disturbance (7.9 acres per mile of temporary ground disturbance and 2.4 acres per mile of permanent ground disturbance). Access roads, as presented in App. D – Table 4, may result in 1.6 to 6.7 acres per mile of ground disturbance, depending on terrain and the presence of existing roads.

Similar structure types would be used for either the AC or DC transmission lines, except that each DC structure would contain only two sets of bundled conductors, versus three sets for an AC structure. The Project would be constructed within a 400-foot combined right-of-way, unless constraints caused by resources or terrain require a wider separation between lines, which would result in two separated 200 foot rights-of-way.

Project activities would include: preconstruction activities, including right-of-way and land acquisition, geotechnical investigations, and centerline survey; construction activities, including access roads, equipment staging and construction yards, structure pad and right-of-way preparation, foundation installation, structure assembly and erection, ground rod installation, stringing conductors and groundwire, construction of substations and AC/DC converter stations, waste removal, and reclamation; operation and maintenance (including vegetation management and herbicide use); and decommissioning.

Action Area

The action area includes all areas affected both directly and indirectly by the BLM action to issue a right-of-way grant to SunZia Transmission, LLC for the construction and operation of two 500 kV transmission lines, approximately 515 miles long, from the proposed SunZia East Substation in Lincoln County in eastern New Mexico to the permitted Pinal Central Substation in central Arizona (Figure1). More specifically, the action area includes the 8 mile wide corridor, defined in the FEIS, Table 3-1 (BLM 2013), centered on the reference centerline of the BLM preferred alternative.

The BLM preferred alternative for the proposed Project would begin at the proposed SunZia East Substation in northwestern Lincoln County, New Mexico and travel westward through Torrance and Socorro counties. The Project would cross the Rio Grande River north of Socorro, NM, turn south through the Rio Grande Valley in Socorro and Sierra counties, and cross the Luna County grasslands and turn to the west. Near Deming, the Project would proceed west through Luna, Grant and Hidalgo counties, crossing the Continental Divide. After entering Arizona and crossing the Peloncillo Mountains, the Project would continue west through Greenlee, Graham, and Cochise counties, and cross the San Pedro River approximately 11 miles north of Benson, Arizona. After traveling northwest along the western slope of the San Pedro River Valley in

Cochise, Pima, and Pinal counties, the Project would turn to the west near San Manuel, Arizona, then turn to the north near the existing Tortolita Substation near Interstate -10. The Project would turn west again near the northern end of the Picacho Mountains, reaching its terminus at the permitted Pinal Central Substation. See App. D – Figure 1 for an overview map of the BLM preferred alternative. Land ownership crossed by the proposed alignment include approximately 36 percent BLM, 43 percent New Mexico and Arizona State lands, and 21 percent private or other land owners (see App. D – Figure 2).

Term

The term of the BLM right-of-way grant to allow use of Federal land would be limited to 50 years although the potential project life is 75 years.

Conservation Measures

Conservation measures include those identified in Appendix D – Table 5 as Standard Mitigation Measures, which were developed as a part of the Project description in the Draft EIS and BLM Plan of development (POD). Standard Mitigation Measures would be applied Project-wide, wherever the applicable affected resource occurs. Standard Mitigation Measures typically include best Management Practices (BMPs) or address widely distributed resources. Appendix D – Table 6 identifies Selective Mitigation Measures, which are used to reduce or avoid site-specific impacts. Following in this section is additional detail, as presented in the BA, for implementation of Standard and Selective Mitigation Measures as conservation measures by species.

Prior to construction, the BLM would review and approve a final Plan of Development (POD), to be included in the stipulations of the right-of-way grant, which must be completed before a Notice to Proceed is issued by BLM. The POD will detail the methods and procedures that would be used in construction of the Project. In addition to a detailed Project description, the POD contains best management practices (BMP) and mitigation measures; specifies environmental compliance field activities; and includes a number of plans developed to achieve regulatory compliance and resources protection, such as: construction plan and program; flagging, fencing, and signage plan; transportation management plan; fire protection plan; blasting plan methodology; erosion, dust control, and air quality plan; hazardous materials management plan; emergency preparedness and response plan guidelines; environmental compliance management plan; biological resources protection plan; noxious weed management plan; historic properties identification and treatment plan; paleontological resources literature review and treatment plan; storm water pollution and prevention plan methodology; and right-of-way preparation, reclamation, and monitoring framework plan.

An Avian Protection Plan (APP) and an associated migratory bird conservation strategy would be developed as a condition of the BLM right-of-way grant and Notice to Proceed documents. The APP would specifically address the risk, for all bird species, of collision with transmission lines, and would provide for the application of bird diverters and other appropriate measures at identified locations, including Picacho Reservoir.

Conservation Measures – Lesser long-nosed bat (LNB)

Standard Mitigation Measure 28 (App. D, Table 5) is intended primarily to reduce impacts to nectar-feeding bats, including the lesser long-nosed bat, by salvaging potential food plants. The following conservation measures provide additional detail for how plant salvage would take place.

- LNB-1: All paniculate agaves (*Agave palmeri, A. parryi,* and *A. chrysantha*) and saguaros would be inventoried within the proposed right-of-way, and the potential to avoid or salvage each plant would be assessed.
- LNB-2: All suitable paniculate agaves that could not be avoided would be salvaged using methods approved by the BLM and USFWS, but larger agaves would be given preference for avoidance when feasible. Plants salvaged from areas of permanent disturbance would be used to reclaim areas of temporary disturbance, or replanted outside disturbed areas if necessary.
- LNB-3: Other species of agaves such as *A. schottii* that are not primary food plants for nectar-feeding bats would be salvaged and used for reclamation according to the reclamation plan in the POD.
- LNB-4: Saguaros less than 15 feet in height would be salvaged, unless prevented by site-specific conditions or poor plant health. Plants salvaged from areas of permanent disturbance would be used to reclaim areas of temporary disturbance, or replanted outside of disturbed areas if necessary. Larger saguaros would be avoided whenever feasible, but would be topped or removed if necessary.
- LNB-5: Agave and saguaro salvage would be augmented, as necessary, to achieve a goal of no net loss of mature flowering plants. Stocks from local sources or approved nursery-grown plants would be used.
- LNB-6: Salvaged plants would be monitored following reclamation for a period of 3 years, as described in the POD. Supplementary water would be provided, if monitoring indicates that rainfall is insufficient to achieve the goal of no net loss of forage plants. Plant survival through the monitoring period would be reported annually to the BLM and USFWS.

Conservation Measures – Mexican long-nosed bat

All of the available conservation measures would be implemented Project-wide to minimize impacts to the lesser long-nosed bat. These conservation measures are anticipated to be similarly effective in reducing impacts to Mexican long-nosed bats, if any are present.

- LNB-1: All paniculate agaves (*Agave palmeri, A. parryi,* and *A. chrysantha*) and saguaros would be inventoried within the proposed right-of-way, and the potential to avoid or salvage each plant would be assessed.
- LNB-2: All suitable paniculate agaves that could not be avoided would be salvaged using methods approved by the BLM and USFWS, but larger agaves would be given preference for avoidance when feasible. Plants salvaged from areas of permanent disturbance would be used to reclaim areas of temporary disturbance, or replanted outside disturbed areas if necessary.
- LNB-5: Agave and saguaro salvage would be augmented, as necessary, to achieve a goal of no net loss of mature flowering plants. Stocks from local sources or approved nursery-grown plants would be used.
- LNB-6: Salvaged plants would be monitored following construction for a period of 3 years, as described in the POD. Supplementary water would be provided, if monitoring

indicates that rainfall is insufficient to achieve the goal of no net loss of forage plants. Plant survival through the monitoring period would be reported annually to the BLM and USFWS.

Conservation Measures – Yuma clapper rail

- No species-specific mitigation measures are proposed for the Yuma clapper rail. Installation of bird diverters and other measures to reduce the risk of collision is a selective mitigation measure (App. D –Table 6, Measure 15), to be used in identified areas of high bird use or where conditions create an unusual risk of collision. Picacho Reservoir is a planned site to receive collision reduction measures that would benefit any migratory birds that may be present, including Yuma clapper rails.

Conservation Measures – Southwestern willow flycatcher

- Standard and selective mitigation measures would reduce direct impacts to riparian woodlands, through the minimization of ground disturbance and vegetation management. The following conservation measures provide additional detail on surveys, seasonal considerations, and design measures for the Southwestern willow flycatcher.WF-1: Preconstruction surveys for the Southwestern willow flycatcher would occur within the proposed right-of-way (including new or improved access roads) and a 0.5-mile buffer at the crossing location and adjacent floodplain of the Rio Grande, San Pedro River, and any other locations determined to merit surveys. Surveys would be conducted within all suitable habitat and according to a current, approved protocol.
- WF-2: Construction and maintenance in riparian woodlands would take place between September 15 and March 1, to avoid disturbance of Southwestern willow flycatchers.
- WF-3: Unguyed (self-supporting) structures would be used at the Rio Grande crossing, to reduce the width of the right-of-way and associated fragmentation of riparian woodland.
- WF-4: Helicopters would be used to assist in stringing conductors in Southwestern willow flycatcher designated critical habitat at the Rio Grande and San Pedro River crossings, to avoid the need to clear the right-of-way during construction.
- WF-5: Compensatory mitigation, including the acquisition and permanent protection of suitable nesting habitat, would be required to fully offset the loss of PCEs and disturbed ground within designated critical habitat in the appropriate MU, at a compensation ratio approved by the BLM and USFWS.

Conservation Measures – Rio Grande silvery minnow and critical habitat

Standard and selective mitigation measures would reduce direct impacts to the floodplain of the Rio Grande, through the minimization of ground disturbance and vegetation management. The following conservation measures provide for avoidance of effects to Rio Grande silvery minnow designated critical habitat:

- RGSM-1: No refueling of motor vehicles or small engines would take place within Rio Grande silvery minnow designated critical habitat. No fuels or hazardous chemicals would be stored in the levee-bounded floodplain of the Rio Grande.

- RGSM-2: Application of any herbicides within Rio Grande silvery minnow designated critical habitat would be in accordance with an approved vegetation management plan, and would be restricted to herbicides approved for application in riparian and aquatic areas. No herbicides were specifically identified in the Rio Grande Silvery Minnow Recovery Plan as recommended for use in Rio Grande silvery minnow habitat.
- RGSM-3: Textile mats, straw wattles, or other appropriate sediment control measures would be employed in the levee-bounded floodplain of the Rio Grande. Sediment control measures would be designed and maintained to reduce or prevent erosion in the event of overbank flooding. Sediment control would also be designed and implemented as stipulated in Floodplain Use or Clean Water Act Section 10/Section 404 permits.
- RGSM-4: All erosion control measures would be implemented such that, in the event of overbank flooding, return flow to the Rio Grande is not impeded in a way that might trap fish. Biological monitors during construction would ensure proper implementation of erosion control measures.
- RGSM-5: Compensatory mitigation, including the acquisition and permanent protection of suitable floodplain surrounding the Rio Grande, would be required to fully offset the loss of disturbed ground within designated critical habitat, at a compensation ratio approved by the BLM and USFWS.

Conservation Measures – Kuenzler Hedgehog Cactus

Standard and selective mitigation measures would reduce ground disturbance within potential Kuenzler hedgehog cactus habitat, and would prevent or control the spread of invasive plants. The following species-specific mitigation measures would assist in resolving the identity of any *E. fendleri* found within the Project area, and would reduce impacts to the listed variety if it is found:

- Prior to the final design, engineering, and commencement of construction, and during the flowering season for the Kuenzler hedgehog cactus, surveys would take place in suitable rocky habitat along links A10, A21, and E82. Surveys would cover the entire right-of-way within identified suitable habitat. Timing and extent of surveys would be coordinated with the BLM.
- Any *E. fendleri* found within the right-of-way would be provisionally identified, and identifying characters would be included in survey reports to the BLM and USFWS. If morphological characters representative of *E. fendleri kuenzleri* are observed, the BLM and USFWS would be notified promptly and identification would be verified by a species expert.
- If the Kuenzler hedgehog cactus is found to be present within the Project area, the survey would be expanded as needed to determine the extent of that population, and the design of the Project would be modified to avoid as many individual Kuenzler hedgehog cacti as is feasible.
- If the Kuenzler hedgehog cactus is found to be present within the Project area, the following protective measures would be implemented during construction:
    - Where possible, ground disturbance would be avoided within approximately 300 feet of Kuenzler hedgehog cacti.
    - Kuenzler hedgehog cacti within 75 feet of any ground-disturbing activities would be flagged and physically protected during construction activities.

- Biological monitors would be present to ensure that all avoidance and protective measures are implemented effectively.
- Any Kuenzler hedgehog cacti that could not feasibly be avoided would be salvaged and donated to an approved conservation facility.

Conservation Measures – Todsen's Pennyroyal

Standard and selective mitigation measures would reduce ground disturbance within potential Todsen's pennyroyal habitat. The following species-specific conservation measures provide additional detail on detection and avoidance of the species, if it is present in the Project area:

- Prior to the final design, engineering, and commencement of construction, any steep, north-facing slopes or other relatively cool, shaded areas in piñon-juniper woodlands on Chupadera Mesa or the foothills of the Gallinas Mountains would be surveyed for gypseous soils and the Todsen's pennyroyal. Surveys would cover the entire right-of-way within identified suitable habitat. Surveys would be conducted during the flowering season if possible, and would only take place during the growing season. Timing and extent of surveys would be coordinated with the BLM.
- The location and morphological characters of any plants provisionally identified as being Todsen's pennyroyals would be reported promptly to the BLM and USFWS. Identification would be verified by a species expert.
- If the Todsen's pennyroyal is found to be present within the Project area, the survey would be expanded as needed to determine the extent of that population, and the design of the Project would be modified to avoid as many individual Todsen's pennyroyals as is feasible.
- If the Todsen's pennyroyal is found to be present within the Project area, the following protective measures would be implemented during construction:
    - Where possible, ground disturbance would be avoided within approximately 300 feet of Todsen's pennyroyals.
    - Todsen's pennyroyal within 75 feet of any ground-disturbing activities would be flagged and physically protected during construction activities.
    - Biological monitors would be present to ensure that all avoidance and protective measures are implemented effectively.

Conservation Measures - Yellow-billed cuckoo

Standard and selective mitigation measures would reduce direct impacts to riparian woodlands, through the minimization of ground disturbance and vegetation management. The following conservation measures provide additional detail on seasonal considerations for the yellow-billed cuckoo.

- YC-1: Preconstruction surveys for the yellow-billed cuckoo would occur within the proposed right-of-way and a 0.5-mile buffer at the crossing location and adjacent floodplain of the Rio Grande, San Pedro River, Picacho Reservoir, and any other locations determined to merit surveys. Surveys would be conducted within all suitable habitats and according to a current, approved protocol.

- YC-2: Construction and maintenance in riparian woodlands would take place between September 15 and March 1, to avoid disturbance of nesting or fledging yellow-billed cuckoos.
- YC-3: Self-supporting lattice or tubular structures would be used at the Rio Grande crossing, to reduce the width of the right-of-way and associated fragmentation of riparian woodland.

STATUS OF THE SPECIES AND CRITICAL HABITAT

Lesser Long-nosed Bat

A. Species Description

The lesser long-nosed bat is a medium-sized, leaf-nosed bat. It has a long muzzle and a long tongue, and is capable of hover flight. These features are adaptations for feeding on nectar from the flowers of columnar cacti (e.g., saguaro [*Carnegiea gigantea*]; cardon [*Pachycereus pringlei*]; and organ pipe cactus (*Stenocereus thurberi*) and from paniculate agaves (e.g., Palmer's agave [*Agave palmeri*]) (Hoffmeister 1986). The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered in 1988 (USFWS 1988). No critical habitat has been designated for this species. A recovery plan was completed in 1995 (USFWS 1997). Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. Recovery actions include roost monitoring, protection of roosts and foraging resources, and reducing existing and new threats. The recovery plan states that the species will be considered for delisting when three major maternity roosts and two post-maternity roosts in the U.S., and three maternity roosts in Mexico have remained stable or increased in size for at least five years. A five-year review has been completed and recommends downlisting to threatened (USFWS 2007). On September 9, 2013 the FWS announced a 90-day finding on a petition downlist lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) from endangered to threatened under the ESA (78 FR 55046).

B. Distribution and Life History

The lesser long-nosed bat is migratory and found throughout its historical range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. It has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County) and Copper Mountains (Yuma County), southeast to the Peloncillo Mountains (Cochise County), and south to the international boundary.

Within the U.S., habitat types for the lesser long-nosed bat include Sonoran Desert scrub, semi-desert and plains grasslands, and oak and pine-oak woodlands. Farther south, the lesser long-nosed bat occurs at higher elevations. Maternity roosts, suitable day roosts, and concentrations of food plants are all critical resources for the lesser long-nosed bat. The factors that make roost sites useable have not all been identified, but maternity roosts tend to be very warm and poorly

ventilated (USFWS 1997). Such roosts reduce the energetic requirements of adult females while they are raising their young (Arends *et al.* 1995).

Roosts in Arizona are occupied from late April to September (Cockrum and Petryszyn 1991) and on occasion, as late as November (Sidner 2000); the lesser long-nosed bat has only rarely been recorded outside of this time period in Arizona (USFWS 1997, Hoffmeister 1986, Sidner and Houser 1990). In spring, adult females, most of which are pregnant, arrive in Arizona and gather into maternity colonies in southwestern Arizona. These roosts are typically at low elevations near concentrations of flowering columnar cacti. After the young are weaned these colonies mostly disband in July and August; some females and young move to higher elevations, primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Adult males typically occupy separate roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains and the Galiuro Mountains (T. Snow, pers. comm. Arizona Game and Fish Department, 1999) but also occur with adult females and young of the year at maternity sites (USFWS 1997). Throughout the night between foraging bouts, both sexes will rest in temporary night roosts (Hoffmeister 1986).

Lesser long-nosed bat appear to be opportunistic foragers and extremely efficient fliers. They are known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to foraging areas have been documented in Arizona at up to 25 miles and in Mexico at 25 miles and 36 miles (one way) (Ober *et al.* 2000, Dalton *et al.* 1994, Lowery *et al.* 2009). Lowery *et al.* 2009 and Steidl (personal communication, 2001) found that typical one-way foraging distance for bats in southeastern Arizona is roughly 6 to 18 miles. A substantial portion of the lesser long-nosed bat at the Pinacate Cave in northwestern Sonora (a maternity colony) fly 25-31 miles each night to foraging areas in OPCNM (USFWS 1997). Horner *et al.* (1990) found that lesser long-nosed bat commuted 30-36 miles round trip between an island maternity roost and the mainland in Sonora; the authors suggested these bats regularly flew at least 47 miles each night. Lesser long-nosed bat have been observed feeding at hummingbird feeders many miles from the closest known potential roost site (Lowery *et al.* 2009).

Lesser long-nosed bat, which often forage in flocks, consume nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. Nectar of these cacti and agaves is high energy food. Concentrations of some food resources appear to be distributed in patches on the landscape, and the nectar of each plant species used is only seasonally available. Cactus flowers and fruit are available during the spring and early summer; blooming agaves are available primarily from July through October. In Arizona, columnar cacti occur in lower elevation areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desert scrub areas, semi-desert grasslands and shrublands, and into the oak and pine-oak woodlands (Gentry 1982). Lesser long-nosed bat are important pollinators for agave and cacti, and are important seed dispersers for some cacti.

C. Status and Threats

Recent information indicates that lesser long-nosed bat populations appear to be increasing or stable at most Arizona roost sites identified in the recovery plan (AGFD 2005, Tibbitts 2005, Wolf and Dalton 2005, USFWS 2007). Lesser long-nosed bat populations additionally appear to be increasing or stable at other roost sites in Arizona and Mexico not included for monitoring in the recovery plan (Sidner 2005, AGFD 2009). Less is known about lesser long-nosed bat numbers and roosts in New Mexico. Though lesser long-nosed bat populations appear to be doing well, many threats to their stability and recovery still exist, including excess harvesting of agaves in Mexico; collection and destruction of cacti in the U.S.; conversion of habitat for agricultural and livestock uses, including the introduction of bufflegrass, a non-native, invasive grass species; wood-cutting; alternative energy development (wind and solar power); cross border violator (CBV) activities and required law enforcement activities; drought and climate change; fires; human disturbance at roost sites; and urban development.

Approximately 20 – 25 large lesser long-nosed bat roost sites, including maternity and late-summer roosts, have been documented in Arizona. Of these, 10 – 20 are monitored on an annual basis depending on available resources (USFWS 2007). Monitoring in Arizona in 2004 documented approximately 78,600 lesser long-nosed bat in late-summer roosts and approximately 34,600 in maternity roosts. More recently, in 2008, the numbers were 63,000 at late-summer roosts and 49,700 at maternity roosts (AGFD 2009). Ten to 20 lesser long-nosed bat roost sites in Mexico are also monitored annually. Over 100,000 lesser long-nosed bat are found at just one natural cave at the Pinacate Biosphere Reserve, Sonora, Mexico (Cockrum and Petryszyn 1991). The numbers above indicate that although a relatively large number of lesser long-nosed bat exist, the relative number of known large roosts is quite small.

The primary threat to lesser long-nosed bat is roost disturbance or loss. The colonial roosting behavior of this species, where high percentages of the population can congregate at a limited number of roost sites, increases the risk of significant declines or extinction due to impacts at roost sites. Some of the most significant threats known to lesser long-nosed bat roost sites are impacts resulting from use and occupancy of these roost sites by CBVs. Mines and caves, which provide roosts for lesser long-nosed bat, also provide shade, protection, and sometimes water, for border crossers. The types of impacts that result from illegal border activities include disturbance from human occupancy, lighting fires, direct mortality, accumulation of trash and other harmful materials, alteration of temperature and humidity, destruction of the roost itself, and the inability to carry out conservation and research activities. These effects can lead to harm, harassment, or, ultimately, roost abandonment (USFWS 2005). For example, the illegal activity, presumably by CBVs, at the Bluebird maternity roost site, caused bats to abandon the site in 2002, 2003, and 2005. Other reasons for disturbance or loss of bat roosts include the use of caves and mines for recreation; the deliberate destruction, defacing or damage of caves or mines; roost deterioration (including both buildings or mines); short or long-term impacts from fire; and mine closures for safety purposes. The presence of alternate roost sites may be critical when this type of disturbance occurs.

Fires in 2005 affected some lesser long-nosed bat foraging habitat, though the extent is unknown. For example, the Goldwater, Aux, and Sand Tank Fire Complexes on BMGR-East burned

through and around isolated patches of saguaros. Rogers (1985) documented that saguaros are not fire-adapted and suffer a high mortality rate as a result of fire. Therefore, fire can significantly affect forage resources for lesser long-nosed bat in the Sonoran desert. Monitoring of saguaro mortality rates should be done to assess the impacts on potential lesser long-nosed bat foraging habitat. Fire suppression activities associated with the 2005 fires could also have affected foraging habitat. For example, slurry drops may have left residue on saguaro flowers, which could have impacted lesser long-nosed bat feeding efficiency or resulted in minor contamination. In southeastern Arizona, several large wildfires in 2011 occurred in agave foraging habitat including the 222,954 acre Horseshoe II fire in the Chiricahua Mountains, the 68,078 acre Murphy fire in the Atascosa Mountains, and the 32,053 acre Monument fire in the Huachuca Mountains. The overall effect of these fires on lesser long-nosed bat foraging habitat is unknown.

Drought may affect lesser long-nosed bat foraging habitat, though the effects of drought on bats are not well understood. The drought in 2004 resulted in near complete flower failure in saguaros throughout the range of lesser long-nosed bat. During that time however, in lieu of saguaro flowers, lesser long-nosed bat foraged heavily on desert agave (*Agave deserti*) flowers, an agave species used less consistently by lesser long-nosed bat (Tibbitts 2006). Similarly, there was a failure of the agave bloom in southeastern Arizona in 2006, probably related to the ongoing drought. As a result, lesser long-nosed bat left some roosts earlier than normal and increased use of hummingbird feeders by lesser long-nosed bat was observed in the Tucson area. Climate change impacts to the lesser long-nosed bat in this portion of its range likely include loss of forage resources. Of particular concern is the prediction that saguaros, the primary lesser long-nosed bat forage resource in the Sonoran Desert, will decrease or even disappear within the current extent of the Sonoran Desert as climate change progresses (Weiss and Overpeck 2005). Monitoring bats and their forage during drought years is needed to better understand the effects of drought on this species.

The lesser long-nosed bat recovery plan (USFWS 1997) identifies the need to protect roost habitats and foraging areas and food plants, such as columnar cacti and agaves. The lesser long-nosed bat recovery plan provides specific discussion and guidance for management and information needs regarding bat roosts and forage resources (USFWS 1997). More information regarding the average size of foraging areas around roosts would be helpful to identify the minimum area around roosts that should be protected to maintain adequate forage resources.

We have produced numerous biological opinions on the lesser long-nosed bat since it was listed as endangered in 1988, some of which anticipated incidental take. Incidental take has been in the form or direct mortality and injury, harm, and harassment and has typically been only for a small number of individuals. Because incidental take of individual bats is difficult to detect, incidental take has often been quantified in terms of loss of forage resources, decreases in numbers of bats at roost sites, or increases in proposed action activities.

Examples of more recent biological opinions that anticipated incidental take for lesser long-nosed bat are summarized below. The 2008 biological opinion for implementation of the SBI*net* Tucson West Project, including the installation, operation, and maintenance of communication and sensor towers and other associated infrastructure, included incidental take in the form of 10 bats caused by collisions with towers and wind turbine blade-strike mortality for the life (presumed indefinite) of the proposed action. The 2007 biological opinion for the installation of one 600 kilowatt wind turbine and one 50KW mass megawatt wind machine on Fort Huachuca

included incidental take in the form of 10 bats caused by blade-strikes for the life (presumed indefinite) of the proposed action. The 2005 biological opinion for implementation of the Coronado National Forest Land and Resource Management Plan (U.S. Forest Service) included incidental take in the form of harm or harassment. The amount of take for individual bats was not quantified; instead take was to be considered exceeded if simultaneous August counts (at transitory roosts in Arizona, New Mexico, and Sonora) drop below 66,923 lesser long-nosed bat (the lowest number from 2001 – 2004 counts) for a period of two consecutive years as a result of the action. The 2004 biological opinion for the Bureau of Land Management Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management included incidental take in the form of harassment. The amount of incidental take was quantified in terms of loss of foraging resources, rather than loss of individual bats. The 2003 biological opinion for MCAS–Yuma Activities on the BMGR included incidental take in the form of direct mortality or injury (five bats every 10 years). Because take could not be monitored directly, it was to be considered exceeded if nocturnal low-level helicopter flights in certain areas on the BMGR increased significantly or if the numbers of bats in the Agua Dulce or Bluebird Mine roosts decreased significantly and MCAS-Yuma activities were an important cause of the decline. The 2002 biological opinion for Department of the Army Activities at and near Fort Huachuca (Fort), Arizona anticipated incidental take in the form of direct mortality or injury (six bats over the life of the project), harassment (20 bats per year), and harm (10 bats over the life of the project).

The lesser long-nosed bat recovery plan (USWS 1997), listing document (USFWS 1988), and the 5-year review summary and evaluation for the lesser long-nosed bat (USFWS 2007); all provide information on the status of the species, threats, and are incorporated by reference.

Mexican long-nosed bat (*Leptonycteris nivalis*)

Status

The Mexican long-nosed bat was listed as endangered under the ESA on September 30, 1988 (USFWS 1988). A Recovery Plan was completed in September 1994 (USFWS 1994), and notice of a pending 5-year review was given by the USFWS in February of 2009 (USFWS 2009a). There is no designated critical habitat for the species.

Distribution

The Mexican long-nosed bat is primarily a Mexican species, ranging as far south as central Guatemala, but occurs in the United States during the summer months in mountains of the Trans-Pecos area of Texas along the Rio Grande (Barbour and Davis 1969; Schmidly 1991), and in southern Hidalgo County, New Mexico. The first confirmed day-roost site in the United States was a maternity roost in Big Bend National Park (BBNP) (Easterla 1972). Mexican long-nosed bats were also captured in mist nets in southern Hidalgo County, leading to the discovery of two roost sites shared with lesser long-nosed bats (Bogan *et al*. 2006; Cryan 2007). Both sites are caves in the Animas and Big Hatchet mountains. There are additional netting records from the Chinati Mountains of Presidio County, Texas, and Guadalupe Canyon in the southern Peloncillo Mountains of New Mexico (Hoyt *et al*. 1994; Arita and Humphrey 1988).

A single Mexican long-nosed bat was captured in a mist n*et al*ong the Gila River near the Grant-Hidalgo county line in New Mexico, well outside the previously known range of the species (M.

Ramsey, personal communication). Juvenile Mexican long-nosed bats have been documented to make wide-ranging, apparently exploratory flights outside of their normal foraging range (England 2012). However, no additional information is available to indicate whether this record represents juvenile dispersal, a vagrant adult, or a roost site that may be previously unknown, intermittently used, or recently colonized. Known lesser long-nosed bat roosts are present in the Peloncillo Mountains, approximately 30 to 40 miles from this capture record.

Habitat and Life History

The Mexican long-nosed bat is a colonial, cave-roosting species. These bats appear to prefer montane habitats, mostly at or above the transition from lowland forests to pine-oak (Barbour and Davis 1969; Schmidly 1991). Mexican long-nosed bats broadly overlap with the range of the lesser long-nosed bat, but Mexican long-nosed bats prefer higher and cooler elevations (Arita 1991). They feed on nectar and pollen, generally using species of *Agave* as their primary food source while in the United States (Barbour and Davis 1969; Schmidly 1991). Palmer's century plant is the primary food source for the species in New Mexico, and Havard's century plant (*A. havardiana*) is the primary food source in Texas (England 2012).

Estimates of the numbers of bats at the BBNP cave site have varied from more than 13,000 to complete absence in some years. The roost sites in New Mexico have not been entered for censuses, although exit counts combining both species have exceeded 7,000 individuals. Lesser long-nosed bats appear to outnumber Mexican long-nosed bats in New Mexico roosts, based on mist-netting results, although behavioral differences may have influenced relative capture success for both species (Bogan *et al*. 2006).

The presence of this species in the United States at the northern edge of its range may reflect fluctuation of the core population in Mexico from year to year, or dispersal due to a lack of food resources within the core range (Schmidly 1991). While the bats typically roost at higher elevations, they may visit lower elevations while foraging, as evidenced by a netting record along the Rio Grande (Barbour and Davis 1969).

Threats to the Survival of the Mexican long-nosed bat

A primary threat to the species is disturbance or killing of bats in roosts (USFWS 1994b). Loss of food resources from conversion of land for agriculture or agave harvesting in Mexico could adversely affect the species (Moreno-Valdez *et al*. 2004).

Previous consultation history for the Mexican long-nosed bat includes the October 24, 2002 AESO/SE 2-21-98-F-399-R1, Reinitiation of Biological Opinion 2-21-98-F-399; Continuation of Livestock Grazing on the Coronado National Forest (Arizona) and consultation 22410-2008-F-0053 reinitiating consultation on several allotment on the Douglas Ranger District, Coronado National Forest.

Yuma clapper rail

The information provided below is a summary of relevant information on the Yuma clapper rail. Further information on the status of this species is summarized on our web page (www.fws.gov/southwest/es/arizona) under Document Library, Document by Species. If you do

not have access to the Internet or cannot otherwise access the information, please contact this office.

Listing History

The Yuma clapper rail (*Rallus longirostris yumanensis*) was listed as an endangered species on March 11, 1967 under endangered species legislation enacted in 1966 (Public Law 89-669). Critical habitat has not been designated for the Yuma clapper rail. The Yuma clapper rail Recovery Plan was issued in 1983 (U.S. Fish and Wildlife Service [USFWS] 1983) and is currently under revision (USFWS 2010)

Species Description

The Yuma clapper rail is a 14-16 inch (350-400 mm) long marsh bird with a long, down-curved beak. Both sexes are slate brown above, with light cinnamon underparts and barred flanks. The Yuma clapper rail is distinguished from other clapper rail subspecies using distributional data, plumage color, and wing configurations (Banks and Tomlinson 1974). The Yuma clapper rail is a secretive species and is not often seen in the wild. It does have a series of distinctive calls that are used to identify birds in the field. Frequency of calls or responsiveness to taped calls varies seasonally.

Life History

Habitat for the Yuma clapper rail is freshwater and brackish marshes with dense vegetation, dominated by cattails (*Typha spp.*) that include both mats of old material and more open stands. The most productive areas consist of uneven-aged stands of cattails interspersed with open water of variable depths (Conway *et al.* 1993). Other important factors in the suitability of habitat include the presence of vegetated edges between marshes and shrubby riparian vegetation (saltcedar or willow thickets) (Eddleman 1989), and the amount and rate of water level fluctuations within the habitat. Water flow in the open channels within the marsh is desirable (Tomlinson and Todd 1973). Yuma clapper rails will use quiet backwater ponds, flowing stream or riverside areas, irrigation canals and drainage ditches, reservoirs and small lakes or other small marshlands where cattail habitat is available. Natural and artificially constructed marshes can provide suitable habitat.

The breeding season for the Yuma clapper rail runs from February through early July (Eddleman 1989). Nests are constructed in marsh vegetation or low growing riparian plants at the edge of the water. Non-native (introduced) crayfish (*Procamberus clarki*) form the primary prey base for Yuma clapper rails today (Todd 1986). Prior to the introduction of crayfish, isopods, aquatic and terrestrial insects, clams, plant seeds, and small fish dominated the diet. Once believed to be highly migratory (with most birds thought to spend the winter in Mexico), telemetry data showed most rails do not migrate (Eddleman 1989). Very little is known about the dispersal of adult or juvenile birds, but evidence of populations expanding northward along the lower Colorado River, the Salton Sea, and central Arizona over the last 80 years indicates that Yuma clapper rails can effectively disperse to new habitats provided that habitat corridors exist between the old and new sites (Rosenberg *et al*. 1991).

Additional life history information is found in the revised Recovery Plan (USFWS 2010), Todd (1986), Eddleman (1989), and Rosenberg *et al*. (1991).

Status and Distribution

The Yuma clapper rail has two major population centers in the United States; the Salton Sea and surrounding wetlands in California, and the lower Colorado River marshes from the border with Mexico to Havasu National Wildlife Refuge. Smaller numbers of rails are found along the lower Gila River in Yuma County, the Phoenix metropolitan area (including portions of the Gila, Salt and Verde rivers) in Maricopa County, Roosevelt Lake in Gila County, Picacho Reservoir in Pinal County, and the Bill Williams River in La Paz County, Arizona (FWS annual survey data). Yuma clapper rails have also recently been documented from southern Nevada in Clark County (McKernan and Braden 2000) and the Virgin River in Washington County, Utah and Mohave County, Arizona (McKernan and Braden 2000). Appendix A contains the results of surveys from 2000-2010.

Annual survey data compiled by the Fish and Wildlife Service for the period 1990 through 2010 documented between 464 and 1076 rails observed (via calls or visual observation) at the survey sites. Surveys in 2009 documented 665 birds with 564 documented in 2010. These figures are of actual birds and are not extrapolated to provide a population estimate. The Yuma clapper rail population in Mexico was estimated to contain 6300 birds (Hinojosa-Huerta *et al*. 2000) mostly located at the Cienéga de Santa Clara, and the amount of movement between the major population centers is unknown.

Threats

Declines in actual numbers heard or seen on survey transects since the early 1990's have not been positively connected to any event on the lower Colorado River or Salton Sea; however, changes in habitat quality caused by overgrown marsh vegetation is suspected of influencing rail numbers in those areas. Habitat restoration through mowing or burning over-age cattail stands is under evaluation in several locations to determine future management needs. Conway *et al.* (2010) recently reported on the benefits of prescribed burns on the restoration of habitat quality in Yuma clapper rail habitats.

Recently developed information that may affect the life history of the Yuma clapper rail involves selenium levels in the crayfish, the primary prey species. Levels of selenium in crayfish from Yuma clapper rail habitats were high enough to cause concern for potential reproductive effects (Roberts 1996, King *et al*. 2000). No adverse effects from selenium have been observed; however, due to the clapper rails' secretive nature, nests are very difficult to find and young birds hard to observe. Additional monitoring is under consideration at this time.

Effects of Federal Actions on the Species

Federal actions that may have adverse effects to the Yuma clapper rail undergo section 7 consultation. These actions include issuance of Clean Water Act section 404 permits for dredging or filling in wetlands, and placement of seawalls or other shoreline modifications on all rivers and streams within the U.S. range of the species. The number of such actions varies between river systems.

Actions by Reclamation in managing the lower Colorado River have the greatest potential to impact large marsh habitats or disturb individual birds during dredging, bank stabilization, and other channel maintenance activities. Past Federal actions to construct dams, diversion structures, and other management actions have increased the amount and longevity of marsh habitats in

several locations on the lower Colorado River. These same actions eliminate the variable physical conditions that provide for marsh regeneration, and habitat quality is reduced over time. Measures are in place under the Lower Colorado River Multi-species Conservation Program (LCR MSCP) to provide conservation to address the effects of current management on remaining marshes. Effects to the Salton Sea Yuma clapper rail habitats from changes in water flow to the Sea that have a Federal nexus are being addressed under section 7.

Consultation History

The range of the Yuma clapper rail extends across several states and FWS office jurisdictions. The number of informal and formal consultations completed for this species is significant. Biological opinions on actions potentially affecting Yuma clapper rails in Arizona may be found at our website www.fws.gov/southwest/es/arizona in the Section 7 Biological Opinion page of the Document Library. Table 4 contains a list of formal consultations in Arizona where the Yuma clapper rail was included.

Southwestern willow flycatcher

Description

The Southwestern willow flycatcher is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches. The song is a sneezy "fitz-bew" or a "fit-a-bew", the call is a repeated "whit." It is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993). It is a Neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical breeding range of the Southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

Listing and critical habitat

The Southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995). Critical habitat was later designated on July 22, 1997 (USFWS 1997a). A correction notice was published in the Federal Register on August 20, 1997 to clarify the lateral extent of the designation (USFWS 1997b). On May 11, 2001, the Tenth Circuit Court of Appeals set aside designated critical habitat in those states under the its jurisdiction (New Mexico). The FWS decided to set aside critical habitat designated for the Southwestern willow flycatcher in all other states (California and Arizona) until it could re-assess the economic analysis. On October 19, 2005, the FWS re-designated critical habitat for the Southwestern willow flycatcher (USFWS 2005a). The lateral extent of critical habitat included areas within the 100-year floodplain.

On August 15, 2011, the FWS proposed a revision to the critical habitat designation, identifying stream segments in each of the 29 Management Units where there are recovery goals (USFWS 2011). On January 3, 2013, the FWS completed the flycatcher critical habitat revision by designating approximately 1,227 stream miles as critical habitat. These areas are designated as stream segments, with the lateral extent including the riparian areas and streams that occur within the 100-year floodplain or flood-prone areas encompassing a total area of approximately

208,973 acres. About 948 stream miles of proposed critical habitat were excluded from the final revised designation.

A final recovery plan for the Southwestern willow flycatcher was signed by the FWS Region 2 Director and released to the public in March, 2003 (USFWS 2002). The Plan describes the reasons for endangerment, current status of the Southwestern willow flycatcher, addresses important recovery actions, includes detailed issue papers on management issues, and provides recovery goals. Recovery is based on reaching numerical and habitat related goals for each specific Management Unit established throughout the subspecies range and establishing long-term conservation plans (USFWS 2002).

Habitat

The Southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to approximately 8,500 feet in Arizona and southwestern Colorado. Historical egg/nest collections and species' descriptions throughout its range describe the Southwestern willow flycatcher's widespread use of willow (*Salix* spp.) for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987). Currently, Southwestern willow flycatchers primarily use Geyer willow (*Salix geyeriana*), coyote willow (*Salix exigua*), Goodding's willow (*Salix gooddingii*), boxelder (*Acer negundo*), saltcedar (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolio*), and live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include: buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood (*Populus* spp.), white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.). Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the Southwestern willow flycatcher: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.* 1997).

The Southwestern willow flycatcher's habitat is dynamic and can change rapidly: nesting habitat can grow out of suitability; saltcedar habitat can develop from seeds to suitability in about four to five years; heavy runoff can remove/reduce habitat suitability in a day; or river channels, floodplain width, location, and vegetation density may change over time. The Southwestern willow flycatcher's use of habitat in different successional stages may also be dynamic. For example, over-mature or young habitat not suitable for nest placement can be occupied and used for foraging and shelter by migrating, breeding, dispersing, or non-territorial Southwestern willow flycatchers (McLeod *et al.* 2005, Cardinal and Paxton 2005). Southwestern willow flycatcher habitat can quickly change and vary in suitability, location, use, and occupancy over time (Finch and Stoleson 2000).

Tamarisk is an important component of the Southwestern willow flycatcher's nesting and foraging habitat in the central part of the Southwestern willow flycatcher's breeding range in Arizona, southern Nevada and Utah, and western New Mexico. In 2001 in Arizona, 323 of the 404 (80 percent) known Southwestern willow flycatcher nests (in 346 territories) were built in a tamarisk tree (Smith *et al.* 2002). Tamarisk had been believed by some to be a habitat type of lesser quality for the Southwestern willow flycatcher, however comparisons of reproductive performance (USFWS 2002), prey populations (Durst 2004) and physiological conditions (Owen and Sogge 2002) of Southwestern willow flycatchers breeding in native and exotic vegetation has revealed no difference (Sogge *et al.* 2005).

The introduced tamarisk leaf beetle was first detected affecting tamarisk within the range of the Southwestern willow flycatcher in 2008 along the Virgin River in St. George, Utah. Initially, this insect was not believed to be able to move into or survive within the southwestern United States in the breeding range of the Southwestern willow flycatcher. Along this Virgin River site in 2009, 13 of 15 Southwestern willow flycatcher nests failed following vegetation defoliation (Paxton *et al.* 2010 a, b). As of 2012, the beetle has been found in southern Nevada/Utah and northern Arizona/New Mexico within the Southwestern willow flycatcher's breeding range. It was believed to have been detected along the Colorado River below Hoover Dam in 2012. Because tamarisk is a component of about 50 percent of all known Southwestern willow flycatcher territories (Durst *et al.* 2008), continued spread of the beetle has the potential to significantly alter the distribution, abundance, and quality of Southwestern willow flycatcher nesting habitat and impact breeding attempts.

Rangewide distribution and abundance

There are currently 288 known Southwestern willow flycatcher breeding sites in California, Nevada, Arizona, Utah, New Mexico, and Colorado (all sites from 1993 to 2007 where a territorial Southwestern willow flycatcher has been detected) holding an estimated 1,299 territories (Durst *et al.* 2008). It is difficult to arrive at a grand total of Southwestern willow flycatcher territories since not all sites are surveyed annually. Numbers have increased since the bird was listed and some habitat remains unsurveyed; however, after nearly a decade of intense surveys, the existing numbers are just past the upper end of Unitt's (1987) estimate of 20 years ago (500-1000 pairs). About 50 percent of the 1,299 estimated territories (Table 1) throughout the subspecies range are located at four general locations (Cliff/Gila Valley – New Mexico, Roosevelt Lake and inflows - Arizona, lower San Pedro River/middle Gila River confluence – Arizona, Middle Rio Grande, New Mexico).

Arizona distribution and abundance

While numbers have significantly increased in Arizona (145 to 459 territories from 1996 to 2007) (English *et al.* 2006, Durst *et al.* 2008), overall distribution of Southwestern willow flycatchers throughout the state has not changed much. Currently, population stability in Arizona is believed to be largely dependent on the presence of two large populations (Roosevelt Lake and San Pedro/Gila River confluence). Therefore, the result of catastrophic events or losses of significant populations either in size or location could greatly change the status and survival of the bird. Conversely, expansion into new habitats or discovery of other populations would improve the known stability and status of the Southwestern willow flycatcher.

Critical habitat

Under the Act and its implementing regulations (50 CFR §424.12), the Service is required to identify the physical and biological features essential to the conservation of the Southwestern willow flycatcher in areas occupied at the time of listing, focusing on the features' primary constituent elements (PCEs). In general, the physical or biological features of critical habitat for nesting Southwestern willow flycatchers are found in the riparian areas within the 100-year floodplain or flood-prone area. Southwestern willow flycatcher habitat is ephemeral in its presence, and its distribution is dynamic in nature because riparian vegetation is prone to periodic disturbance (such as flooding) (USFWS 2002). The PBFs are described in detail in the proposed rule (76 FR 50546). These PBFs include, but are not limited to:

1. Space for individual and population growth and for normal behavior;
2. Food, water, air, light, minerals, or other nutritional or physiological requirements;
3. Cover or shelter;
4. Sites for breeding, reproduction, or rearing (or development) of offspring; and
5. Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

The primary constituent elements of designated critical habitat are based on riparian plant species, structure and quality of habitat and insects for prey.

1. Primary Constituent Element 1— *Riparian vegetation.* Riparian habitat along a dynamic river or lakeside, in a natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) that is comprised of trees and shrubs (that can include Gooddings willow, coyote willow, Geyer's willow, arroyo willow, red willow, yewleaf willow, pacific willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, stinging nettle, alder, velvet ash, poison hemlock, blackberry, seep willow, oak, rose, sycamore, false indigo, Pacific poison ivy, grape, Virginia creeper, Siberian elm, and walnut) and some combination of:

    (a) Dense riparian vegetation with thickets of trees and shrubs that can range in height from about 2 to 30 m (about 6 to 98 ft.). Lower-stature thickets (2 to 4 m or 6 to 13 ft. tall) are found at higher elevation riparian forests and tall-stature thickets are found at middle and lower-elevation riparian forests;
    (b) Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft.) above ground or dense foliage only at the shrub or tree level as a low, dense canopy;
    (c) Sites for nesting that contain a dense (about 50 percent to 100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground);
    (d) Dense patches of riparian forests that are interspersed with small openings of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense. Patch size may be as small as 0.1 ha (0.25 ac) or as large as 70 ha (175 ac).

2. Primary Constituent Element 2—*Insect prey populations.* A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, which can include: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies, moths, and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

A variety of river features such as broad floodplains, water, saturated soil, hydrologic regimes, elevated groundwater, fine sediments, etc. help develop and maintain these constituent elements and are also an important component to evaluate.

Past Consultations

Since listing in 1995, at least 226 Federal agency actions have undergone (or are currently under) formal section 7 consultation throughout the Southwestern willow flycatcher's range. This list of consultation can be found in the administrative record for this consultation. Since Southwestern willow flycatcher critical habitat was finalized in 2005, at least 33 formal opinions have been completed in Arizona (within and outside designated critical habitat). While many opinions were issued for the previous critical habitat designation, the stream reaches and constituent elements have changed.

For additional information on consultations relating to the Rio Grande portion of the action area see discussion of River Mile 111 Priority Site Project, flood control activities and water operations, Bosque del Apache National Wildlife Refuge (BDANWR) Water Management Plan, Sediment Plug Removal Project at the Refuge, San Acacia Levee Project under Rio Grande silvery minnow.

Activities continue to adversely affect the distribution and extent of all stages of Southwestern willow flycatcher habitat throughout its range (development, urbanization, grazing, recreation, native and non-native habitat removal, dam operations, river crossings, ground and surface water extraction, etc.). Introduced tamarisk eating leaf beetles were not anticipated to persist within the range of the Southwestern willow flycatcher. However, they were detected within the breeding habitat (and designated critical habitat) of the Southwestern willow flycatcher in 2008 along the Virgin River near the Town of St. George, Utah. In 2009, beetles were also known to have been detected defoliating habitat within the range of Southwestern willow flycatcher habitat in southern Nevada, and along the Colorado River in the Grand Canyon and near Shiprock in Arizona. Stochastic events also continue to change the distribution, quality, and extent of Southwestern willow flycatcher habitat.

Conservation measures associated with some consultations and Habitat Conservation Plans have helped to acquire lands specifically for Southwestern willow flycatchers on the San Pedro, Verde, and Gila rivers in AZ and the Kern River in CA. Additionally, along the lower Colorado River, the U.S. Bureau of Reclamation is currently attempting to establish riparian vegetation to expand and improve the distribution and abundance of nesting Southwestern willow flycatchers. A variety of Tribal Management Plans in CA, AZ, and NM have been established to guide conservation of the Southwestern willow flycatchers. Additionally, during the development of the critical habitat rule, management plans were developed for some private lands along the Owens River in CA and Gila River in NM. These are a portion of the conservation actions that have been established across the subspecies' range.

Rio Grande Silvery Minnow (*Hybognathus amarus*)

Status

The Rio Grande silvery minnow was listed as an endangered species under the ESA on July 20, 1994 (USFWS 1994). Critical habitat for the species was designated in 1999 (USFWS 1999) and modified in 2003 (USFWS 2003). A Recovery Plan as completed in 2010 (USFWS 2010).

Distribution

The sole remaining Rio Grande silvery minnow population of natural origin occurs in 174 miles of the Rio Grande in New Mexico, between the Cochiti Dam to the inflow of Elephant Butte Reservoir north of Truth or Consequences. The species originally occupied nearly 2,400 river miles in New Mexico and Texas, in the Rio Grande and the Pecos River (USFWS 2007). An NEP has been reintroduced into the Big Bend reach of the Rio Grande by the USFWS under Section 10(j) of the ESA (USFWS 2008e). This population has attempted reproduction (Roberson 2010).

Habitat and Life History

The Rio Grande silvery minnow lives in medium to large rivers, and normally uses habitats where flows are of low to moderate velocity over silty or sandy substrates, at depths less than 20 inches (8 inches in summer). Adult fish typically use eddies formed by debris, or occur in pools and occasionally backwaters, but do not survive in reservoirs with predatory exotic fish. Backwater habitat is essential nursery habitat, and provides an opportunity for planktonic eggs and larvae to settle out of the stream (Porter and Massong 2004). The Rio Grande silvery minnow is largely detritivorous and herbivorous, grazing on the biofilm of algae, diatoms, and other organic matter (Sublette *et al*. 1990), but readily takes invertebrate prey when flood scour or other factors reduce available algae and diatoms (Magaña 2007).

The Rio Grande silvery minnow spawns when water temperatures are between 68 and 75 degrees Fahrenheit. Spawning is usually associated with a high-flow event such as spring runoff, dam releases, or summer rainstorm events. The species produces non-adhesive, semi-buoyant eggs that mature as they drift down the river, suspended in the water column (USFWS 2007).

Threats to the Survival of the Rio Grande silvery minnow

Extirpation of the species from much of its historic range was driven by alteration or loss of habitat from diversions and damming of surface waters, drawdown of aquifers, water impoundments, river channelization, water quality degradation, and competition and predation by non-native species (*ibid*). Competition with the introduced, related Plains Minnow (*Hybognathus placitus*) appears to have led to the extirpation of the Rio Grande silvery minnow from the Pecos River (Sublette *et al*. 1990).

Within the existing natural range of the species, Porter and Massong (2004) describe three categories of threats. The planktonic nature of the fish's eggs makes the species susceptible to habitat fragmentation, where insufficient lengths of a stream reach results in eggs being deposited in unsuitable habitat such as reservoirs. Decreased fish density has been observed in stream reaches near Albuquerque, leading to an untested hypothesis that pollution from wastewater input or other sources may affect the fish. Loss of preferred silty backwater habitat may also be a cause of decline. Within the remaining range of the species, river stretches that lack backwater pools and with a non-native-dominated fish community lack Rio Grande silvery minnows (Torres 2007).

Critical Habitat

Critical habitat is designated for the Rio Grande silvery minnow on the Rio Grande River from Cochiti Dam to approximately River Mile 62.1 near the headwaters of Elephant Butte Reservoir (Figure 2). The lateral width extends to the levee in areas bounded by a levee and extends from bankfull outward 300 feet in areas not bounded by levees (USFWS 2003). The lateral width was included because:1) the biological integrity and natural dynamics of the river system are maintained within this area, 2) Conservation of the adjacent riparian zone helps provide essential nutrient recharge and protection from sediment and pollutants, which contributes to successful spawning and recruitment of Rio Grande silvery minnow, and 3) vegetated lateral zones are widely recognized as providing a variety of aquatic habitat functions and values (e.g., aquatic habitat for fish and other aquatic organisms, moderation of water temperature changes, and detritus for aquatic food webs) and help improve or maintain local water quality (USFWS 2010).

The primary constituent elements of the physical and biological features of critical habitat include (USFWS 2003b):

> 1. A hydrologic regime that provides sufficient flowing water with low to moderate currents capable of forming and maintaining a diversity of aquatic habitats such as, but not limited to, the following: backwaters (a body of water connected to the main channel, but with no appreciable flow), shallow side channels, pools (the portion of the river that is deep with relatively little velocity compared to the rest of the channel), eddies (a pool with water moving opposite to that in the river channel), and runs (flowing water in the river channel without obstructions) of varying depth and velocity. All of these are necessary for particular Rio Grande silvery minnow life history stages in appropriate seasons. The Rio Grande silvery minnow requires habitat with sufficient flows from early spring (March) to early summer (June) to trigger spawning, flows in the summer (June) and fall (October) that do not increase prolonged periods of low or no flow, and a relatively constant winter flow (November through February).
>
> 2. The presence of low velocity habitat (including eddies created by debris piles, pools, backwaters, or other refuge habitat) within unimpounded stretches of flowing water of sufficient length (i.e., river miles) to provide a variety of habitats with a wide range of depth and velocities.
>
> 3. Substrates of predominantly sand or silt.
>
> 4. Water of sufficient quality to maintain natural, daily and seasonally variable water temperatures in the approximate range of greater than 1º C (35º F) and less than 30º C (85º F), and to reduce degraded water quality conditions (decreased dissolved oxygen).

Previous Consultations

Ongoing and Past Projects in the Middle Rio Grande including those in the San Acacia Reach

Low Flow Conveyance Channel (LFCC)

Federal agencies have conducted numerous ESA section 7 consultations on flood control activities, water operations, LFCC and other projects in the Middle Rio Grande that inform the environmental baseline of the San Acacia Reach. In the 1990s and early 2000s, the FWS consulted with Reclamation on the diversion of water from the Rio Grande into the LFCC and vice versa, including studying the effects of channel gradient and sedimentation on water delivery (USBR 2001, 2003, 2012; USFWS 2003a). Experimental diversions into the LFCC resulted in the entrainment of Rio Grande silvery minnow eggs and subsequent detections of Rio Grande silvery minnows in the LFCC. Reclamation may perform some operations associated with the LFCC in conjunction with its supplemental water management program including pumping activities (USBR 2012). Reclamation also uses LFCC water in response to requests by the MRGCD or the Refuge to check up flows in the channel at existing check structures, thus increasing the head on the water so that diversions by the MRGCD and the Refuge from the LFCC are more easily made. Occasionally, Rio Grande silvery minnow eggs and adults may become entrained in the LFCC (USBR 2012), however, long-term occupancy by Rio Grande

silvery minnows in the LFCC is not anticipated as flow velocities (> 7 fps; USACE 2012a,b) would create unfavorable conditions.

River Mile 111 Priority Site Project

In March 2008, Reclamation submitted a BA to the FWS evaluating the effects of relocation of the Low Flow Conveyance Channel (LFCC) and the associated levee on Southwestern willow flycatcher and Rio Grande silvery minnow and their designated critical habitat. The project would allow the Rio Grande more freedom to move within its historical floodplain. Reclamation determined that the project "may affect, is not likely to adversely affect" the minnow and its designated habitat. The FWS concurred with this determination (Consultation 2420-2008-I-0067), provided the following conditions were met: 1) all construction of woody debris piles would occur under dry working conditions or during low flow conditions; 2) recent surveys of the LFCC downstream of the proposed construction area did not find any minnows; 3) the Lemitar radial gate structure would be closed during the construction operations; 4) cottonwood root wads would be placed on the bank near river mile (RM) 111 and would cascade into the river as it migrates west; and 5) the mitigation plan described in the BA would be fully implemented and the Conservation Measures described in the BA would also be fully implemented by Reclamation.

Flood Control Activities and Water Operations

In 2001 and 2003, the FWS issued jeopardy biological opinions resulting from programmatic section 7 consultations with Reclamation (USBR 2001, 2003; USFWS 2003a) and Corps (USBR 2003; USFWS 2003a), which addressed water operations and management on the Middle Rio Grande and the effects on the Rio Grande silvery minnow and Southwestern willow flycatchers (USFWS 2001, 2003a). Incidental take of listed species was authorized associated with the 2001 programmatic BO (USFWS 2001), as well as consultations that were tiered off of that BO. In the 2003 ESA consultation, a jeopardy Opinion was issued on March 17, 2003 (USFWS 2003a), and is the current programmatic Opinion on water operations for the Middle Rio Grande, and contains one RPA with multiple elements (USFWS 2003a). These elements set forth a flow regime in the Middle Rio Grande and describe habitat improvements necessary to alleviate jeopardy to both the Rio Grande silvery minnow and Southwestern willow flycatcher. In 2005, the FWS revised the incidental take statement (ITS) for the 2003 Opinion using a formula that incorporates October monitoring data, habitat conditions during Rio Grande silvery minnow spawn (spring runoff), and augmentation. Incidental take of Rio Grande silvery minnows is authorized with the 2005 BO revised ITS, and now fluctuates on an annual basis relative to the total number of Rio Grande silvery minnow found in October across the 20 population monitoring locations. Incidental take is authorized through consultations tiered off of the programmatic Opinion and on projects in the Middle Rio Grande.

Bosque del Apache National Wildlife Refuge (BDANWR) Water Management Plan

The Refuge completed an intra-Service section 7 consultation in May 2001, for the use of 8,691 acre feet of consumptive water use from the Rio Grande for the years 2001 through 2004, with 869 acre feet being used to aid in maintenance of habitat for the Rio Grande silvery minnow if: (1) data indicating that the addition of the water will foster survival of the Rio Grande silvery minnow or Southwestern willow flycatcher; (2) an equal or greater percentage of water by other water users in the MRGV is also contributed; and (3) legal permitting from the Office of the State Engineer is obtained prior to the emergency transfer request. The Refuge maintains a

consumptive water right of 12,417 acre feet and has initiated ESA consultation with the FWS for its future use. Consumptive use of water at the Refuge may also affect flow, duration, and during drying events as well as Rio Grande silvery minnow and Southwestern willow flycatcher habitat conditions in the San Acacia Reach.

Sediment Plug Removal Project at the Refuge

In August 2008, Reclamation submitted a BA to the FWS addressing potential impacts of removal of a sediment plug, which had formed within the Rio Grande at the Bosque del Apache National Wildlife Refuge (BDANWR) during spring runoff 2008, on Rio Grande silvery minnow and its designated critical habitat and on the Southwestern willow flycatcher. Reclamation's environmental commitments for the Sediment Plug Removal Project include: 1) construction of at least four embayment habitats (each approximately 30 to 50 feet in width and 50 to 70 feet in length) on the west side of the pilot channel to promote channel widening to be completed during Phase I(b); 2) collection of data for four years following excavation of the pilot channel to monitor channel degradation/aggradation and overbanking patterns, including: i) cross-section data of the river channel from the north boundary of the BDANWR to the San Marcial Railroad Bridge; ii) at least two inspections of the river channel by boat when overbanking begins during runoff; and iii) at least once during the four years, cross-section data of the river channel and floodplains that extend between endpoints for these rangelines; 3) data collected as above will be analyzed and compared to 2002 and 2005 cross-section data to assess changes to the riverbed thalweg and channel geometry, including width/depth ratio, and data and analysis will be provided to the FWS; and 4) in-depth analysis of alternatives to pilot channel construction within the aforementioned reach of river to be initiated within six months of completion of Phase I(b) of the project.

Drain Unit 7 Extension River Maintenance Priority Site Project

On June 13, 2008, Reclamation submitted a BA, along with a letter formally requesting consultation reinitiation, to the FWS for the proposed Drain Unit 7 (DU7) Extension River Maintenance Priority Site Project. The project will reinforce the bankline and protect the adjacent access road and drain by placing riprap along the bank within the active river channel. Reclamation determined that this action may affect, and is likely to adversely affect, the endangered minnow during construction; and may affect, and is not likely to adversely affect, designated minnow critical habitat. The FWS concluded that the proposed action is not likely to jeopardize the continued existence of the minnow and that there is likely to be short-term adverse effects on a very small portion of designated critical habitat at the construction site. Environmental commitments associated with the proposed DU7 Project include: implementing construction Best Management Practices (BMPs) and dust abatement during construction; revegetating the site; and performing construction outside minnow spawning periods (construction exclusion period of April 15 through July 1).

Vegetation and Sand Bar Removal Project Upstream of San Acacia Diversion Dam (SADD)

The Vegetation and Sand Bar Removal Project consisted of removing vegetation from approximately 11 acres of an in-channel sand bar in order to encourage mobilization of the sediment. Immediately upstream of the SADD, in the small reservoir pool, an 11-acre sand bar has developed, filling the channel with sand and narrowing the channel width. The presence of

this sand bar has reduced the pool volume upstream of the Dam to less than 35 percent of the intended design, and channel width above the SADD is about 25 percent of original. This reduced capacity and physical narrowing of the channel has caused significant negative impact to Dam operations and has increased risk to the SADD structure itself. Over time, vegetation has established on the sand bar and has further contributed to stabilization of the sand bar. The Middle Rio Grande Conservancy District planned to implement the Vegetation and Sand Bar Removal Project as part of its operation and maintenance responsibilities at the SADD, and Reclamation undertook ESA Section 7 consultation on its behalf because it owns the SADD.

San Acacia Levee Project

The Corps of Engineers submitted a request for formal consultation on May 8, 2012 for construction, operation, and maintenance of the Rio Grande Floodway, San Acacia to Bosque del Apache Unit (San Acacia Levee Project), addressed in Consultation 02ENNM00-2012-F-015, which addresses effects on Rio Grande silvery minnow and Southwestern willow flycatcher. The FWS anticipated incidental take of 436 Rio Grande silvery minnow in the form or harassment during installation of silt curtains or cofferdams.

Kuenzler Hedgehog Cactus

Status

The Kuenzler hedgehog cactus was listed as endangered under the ESA on November 28, 1979 (USFWS 1979). A Recovery Plan was completed in 1985 (USFWS 1985), and a 5-year review was completed in 2005 (USFWS 2005). The 5-year review recommended that the species be downlisted to threatened, although no rule to date has been proposed to do so. On September 9, 2013 the FWS announced a 90-day finding on a petition downlist lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) and Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*) from endangered to threatened under the ESA (78 FR 55046).

Distribution

When listed, the Kuenzler hedgehog cactus was only known from two locations in the eastern Sacramento Mountains of southern New Mexico, with an estimated population of 200 plants. Following listing, new locations for the species were discovered in the Guadalupe Mountains and to the north of the original known populations in the Sacramento Mountains between the towns of Carrizozo and Tinnie, New Mexico (*ibid*). A population of Kuenzler hedgehog cactus was discovered within the boundaries of a proposed realignment project for US Highway 54 north of Carrizozo, New Mexico, south of the proposed SunZia East Substation (USFWS 2003).

Habitat and Life History

The Kuenzler hedgehog cactus is found in juniper-dominated woodlands on soils of limestone origin (USFWS 1985). The species has been recorded over an elevation range of 5,200 to 6,900 feet, and the plants generally grow near the tops of gentle to moderate slopes, although often in the vicinity of steep slopes (May *et al*. 2008). Slopes with south and east aspect are most preferred, and north-facing slopes are almost entirely avoided.

Threats to the Survival of the Kuenzler Hedgehog Cactus

The Kuenzler hedgehog cactus was listed shortly after its description as a novel taxon, and the stated rarity of the plant drove illegal collecting pressures on the cactus. Some collection likely still occurs, but the eventual arrival of the plant into legal markets reduced some incentive for wild collections (USFWS 2005). Following its listing and increased survey effort, the area of the known range of the species has been greatly expanded and detected many populations largely inaccessible to collectors. This increase in known range has increased the number of plants known to be at risk from controlled burns and natural wildfires, which may cause some cactus mortality or deplete seed banks (USFWS 2005). May (2006) found little effect of wildfire on the species, but cautioned that the study population was not subject to a catastrophic fire such as would occur with either a very heavy fuel load or extreme weather conditions. A severe fire burned a population in 1992, resulting in high mortality and low recruitment following the fire (Sivinski 2004). Further threats include trampling due to grazing and habitat destruction by off-road vehicles and road or utility construction (USFWS 1985).

Previous Consultations

The FWS conducted a formal consultation on the Realignment and Reconstruction of U.S. 54, Carrizozo to Vaughn, New Mexico project and concluded the project was not likely to jeopardize the continued existence of the Kuenzler hedgehog cactus.

Todsen's Pennyroyal (*Hedeoma todsenii*)

Status

Todsen's pennyroyal was listed as endangered with designated critical habitat under the ESA on January 19, 1981 (USFWS 1981). Critical habitat was designated to include the entire area in the San Andres Mountains where the plant was known to occur at the time of the listing in 1981. The determination was based on the entire known range of the plant rather than on the presence of any PCEs, which were not described. The critical habitat designation did not include any unoccupied areas and was not revised after the discovery of the Sacramento Mountain sites or additional populations in the San Andres Mountains. A Recovery Plan for the species was completed in 1985 (USFWS 1985), and a revised Recovery Plan for the species was completed in 2001 (USFWS 2001).

Distribution

Todsen's pennyroyal is currently known only from a small metapopulation in the San Andres Mountains, and a complex of approximately 20 populations in the Sacramento Mountains in south-central New Mexico. However, the Recovery Plan suggests that other undiscovered populations may exist, and that potential habitat may be present on Chupadera Mesa (*ibid*).

Habitat and Life History

Todsen's pennyroyal is a resident of piñon-juniper habitat on steep (20 to 70 degrees), northerly slopes with a loose, gypseous-limestone substrate over an elevation range of 6,200 to 7,400 feet. Most reproduction is asexual through rhizomes, as seed viability appears to be very low. Todsen's pennyroyals are associated with gypseous soils of the Yeso formation, and may also occur on soils from the San Andres formation that often overlay the Yeso formation (*ibid*).

Threats to the Survival of the Todsen's Pennyroyal

Most populations of Todsen's pennyroyal are in relatively inaccessible areas, and receive some protection from this isolation. Livestock grazing may adversely affect populations by trampling of plants and causing soil erosion within plant habitat. Ground-disturbing activities associated with development of mineral extraction, oil and gas development, and linear developments including pipelines and transmission line corridors could adversely affect local populations. A small number of known populations (18) of the species, along with poor seed production and dispersal abilities, limit the recovery abilities of this species (*ibid*).

Previous Consultations

The FWS conducted an informal consultation with White Sands Missile Range on effects of range operations on the Todsen's pennyroyal.

Yellow-billed cuckoo (*Coccyzus americanus*)

Status

The Western United States DPS of the yellow-billed cuckoo was petitioned for ESA listing in 1998 (USFWS 2001). The cuckoo became a candidate for listing under the ESA in 2001, after a 12-month finding determined that listing was warranted but precluded by higher listing priorities (USFWS 2001a). The Western yellow-billed cuckoo was proposed as a threatened species on October 3, 2013 (USFWS 2013).

Distribution

The yellow-billed cuckoo is migratory and widespread in summer throughout North America. Morphologically, the yellow-billed cuckoos in the west throughout the continental United States and Mexico are generally larger, with significantly longer wings, longer tails, and longer and deeper bills (Franzreb and Laymon 1993). Yellow-billed cuckoos in the west arrive on the breeding grounds 4 to 8 weeks later than eastern yellow-billed cuckoos at similar latitude (Franzreb and Laymon 1993, Hughes 1999). Some information exists suggesting that the western population segment described in the scientific literature as the Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is distinguishable at the subspecific level; however, there is enough literature to conclude that recognition of the subspecies is not justified at this time (USFWS 2013). In New Mexico, the western DPS boundary coincides with the eastern boundary of the Rio Grande drainage, including the Sangre de Cristo Mountains and excluding the drainage of the Pecos River (USFWS 2001).

Yellow-billed cuckoos within the Western DPS were formerly widespread and locally common in California and Arizona, more narrowly distributed but locally common in New Mexico,

Oregon, and Washington, and uncommon along the western front of the Rocky Mountains north to British Columbia (*ibid*). The species no longer occurs in British Columbia, Washington, and much of the northern portion of its range. The largest remaining breeding areas are in southern and central California and Arizona, although the Rio Grande also supports a major population (USFWS 2009).

Habitat and Life History

Yellow-billed cuckoos forage primarily by gleaning insects from vegetation, but they may also capture flying insects (Hughes 1999). They specialize on relatively large invertebrate prey, including caterpillars (*Lepidoptera* sp.), katydids (*Tettigoniidae* sp.), cicadas (*Cicadidae* sp.), and grasshoppers (*Caelifera* sp.). Their breeding season may be timed to coincide with outbreaks of insect species, particularly tent caterpillars (Hughes 1999; USFWS 2001a) or cicadas (Johnson *et al*. 2007). In Arizona, fledging occurred at the peak emergence of cicadas (Rosenberg *et al*. 1982). Yellow-billed cuckoos also consume some wild berries, small lizards and treefrogs, and occasionally bird eggs and young as prey (Hughes 1999).

Western populations of yellow-billed cuckoos breed in dense riparian woodlands, primarily of cottonwood (*Populus fremontii*), willow (*Salix* spp.), and mesquite (*Prosopis* spp.), along riparian corridors in otherwise arid areas (Laymon and Halterman 1989; Hughes 1999). Dense undergrowth may be an important factor in selection of nest sites. Occupied habitat in Arizona may also contain box elder (*Acer negundo*), Arizona alder (*Alnus oblongifolia*), Arizona walnut (*Juglans major*), Arizona sycamore (*Platanus wrightii*), oak (*Quercus spp*.), netleaf hackberry (*Celtis reticulata*), velvet ash (*Fraxinus velutina*), Mexican elderberry (*Sambuccus mexicanus*), tamarisk (*Tamarix spp*.; also called salt cedar), and seepwillow (*Baccharis glutinosa*) (Corman and Magill 2000). Surveys conducted by the Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) reported 68 percent of the yellow-billed cuckoo observations were in lowland riparian woodlands, often containing a variable combination of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk (USFWS 2013). The Western yellow-billed cuckoos currently nest in riparian woodland of at least 50 acres within arid to semiarid landscapes (Hughes 1999). Throughout the Western yellow-billed cuckoo range, a large majority of nests are placed in willow trees, but alder (*Alnus spp*.), cottonwood, mesquite, walnut (*Juglans spp*.), box elder, sycamore, and tamarisk are also used (Jay 1911, Hanna 1937, Laymon 1980, Halterman and Laymon 1995, Corman and Magill 2000, Holmes et al. 2008).

Western yellow-billed cuckoos reach their breeding range later than most other migratory breeders, often in June (Rosenberg *et al*. 1982). They construct an unkempt stick nest on a horizontal limb in a tree or large shrub. Nest height ranges from 4 feet to (rarely) 100 feet, but most are typically below 30 feet (Hughes 1999). Although other species of cuckoos are often or always brood parasites of other birds, yellow-billed cuckoos do so only infrequently, possibly in response to high food resources that allow rapid egg production (Fleischer *et al*. 1985).

Nesting usually occurs between late June and late July, but can begin as early as late May and continue until late September (Hughes 1999). In a study on the lower Colorado River, three nests were estimated to have first fledged young during August 25-28 had they not failed. If these nests had successfully fledged young, the birds may still have been present at their respective breeding sites at least until September 15-18 (previously discussed in McNeil et al. 2012).

Threats to the Survival of the Yellow-billed cuckoo

The population of yellow-billed cuckoos in the western United States has declined over the past century, and their range has also contracted. The species may be extirpated from British Colombia, Washington, and Oregon (Hughes 1999). The Western yellow-billed cuckoo is now very rare in scattered drainages in western Colorado, Idaho, Nevada, and Utah, with single, nonbreeding birds the most likely to occur (USFWS 2001a).

The primary threat to the Western yellow-billed cuckoo is the loss or fragmentation of high-quality riparian habitat suitable for nesting (Corman and Wise-Gervais 2005). Habitat loss and degradation from several interrelated factors include alteration of flows in rivers and streams, encroachment into the floodplain from agricultural and other development activities, establishment of nonnative vegetation, livestock grazing, diversion of surface and ground water for agricultural and municipal purposes, drought, wildfire, and prey scarcity due to pesticides (Ehrlich *et al.* 1992, USFWS 2013). Drought and prey scarcity (especially the loss of sphinx moth caterpillars to pesticides in the West) appear to play a role in yellow-billed cuckoo declines even where suitable nesting habitat remains (Ehrlich *et al.* 1992). A potential factor contributing to declines across the species' range in North America is the loss of forested habitat on its wintering grounds in South America where little is known of its ecology or distribution (Ehrlich *et al.* 1992). The loss or modification of riparian habitat is estimated to be at up to 90 percent in California (Hughes 1999), although yellow-billed cuckoos may rapidly colonize restored riparian woodlands where revegetation with native trees is successful (Anderson and Laymon 1989, McNeil *et al.* 2012).

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Description of the Action Area

The following describes the alignment of the BLM preferred alternative (Figure 1) from east to west. From the SunZia East Substation, at 6,618 feet mean sea level (msl), the project angles northwesterly along the west side of the Gallinas Mountains, at approximately 6,700 feet msl, heads westerly across Chupadera Mesa at 6,500 to 6,600 feet msl, then drops into the Rio Grande Valley, crossing the Rio Grande River at 4740 feet. After crossing the river the project rises to 6,000 feet msl and parallels the Rio Grande River at 5,000 to 6,000 feet msl to near Deming at 4,380 feet msl. From Deming the project heads west and crosses the Continental Divide at approximately 4,900 feet msl, entering Arizona at 4,400 feet msl. The project then crosses the Peloncillo Mountains, dropping into the San Simon Valley at 3,500 feet msl, then rising and passing the Pinaleño Mountains, then dropping into the Sulphur Springs Valley. West of the Sulphur Springs Valley it rises over the Winchester Mountains at 5,000 feet msl, crosses Allen Flats, then drops into the San Pedro River Valley, crossing the river at 3,548 feet msl. West of the San Pedro River the project rises to 4,260 feet, heads northwesterly on the west slope of the San Pedro River Valley, then turns west near Oracle at 3,980 feet msl. West of Oracle the

project drops to 2,200 feet, then turns north and passes the Picacho Mountains, then ends at the Pinal Central Substation at 1,475 feet msl.

The project traverses the following biomes (see Figures 3 and 4): Sonoran desertscrub, including lower Colorado River Valley subdivision and Arizona upland subdivision; Chihuahuan desertscrub; semidesert grassland; plains and Great Basin grassland; interior chaparral; interior and Sonoran riparian woodland; interior and Sonoran riparian scrubland; plains riparian wetlands; xeroriparian scrubland. The project crosses important riparian habitat at the Rio Grande and San Pedro River. Picacho Reservoir.

Picacho Reservoir is a shallow irrigation water storage reservoir dating to the 1880s . Sediment has accumulated in the reservoir and thick stands of salt cedar with areas including cottonwood and willow overstory have become established within the shallow pool and on the inside of the surrounding levee.

Environmental Baseline - Lesser Long-nosed Bat

Most records for this species in the United States are from mine or cave roosts (Findley *et al*. 1975; Hoffmeister 1986). As the species is both migratory and known to be capable of traveling distances of up to 40 miles from a roost nightly to forage, the bats could potentially occur near any point in the Arizona portion of the Project as well as the Project area within Hidalgo and Grant counties, New Mexico.

Known Lesser long-nosed bat roosts in New Mexico are between 11 and 70 miles south of the proposed project alignment. Individuals have been detected in Grant County north of the Project area (M. Ramsey, personal communication), and additional unknown roosts may be present within or near the Project area.

Lesser long-nosed bat roost locations within a 40 mile foraging range of the Project alignment are presented in Table 1 and Figure 5. In other words, bats from these roosts may forage in the action area along the project centerline. All known roosts in New Mexico are listed, although the Cowboy Flat roost in the Peloncillo Mountains is approximately 70 miles from the Project area and is not discussed further. Additional roosts may be present in Arizona, particularly in mining districts where potential sites may be numerous but unsurveyed. Lesser long-nosed bats may also move between nearby roosts in a single season. Mist-net captures and radio tracking suggest that additional roosts may be present in the eastern Rincon, Dos Cabezas, and Galiuro Mountains.

The entire Project area in Arizona is within foraging range of known, active lesser long-nosed bat roosts. A single roost site listed in Table 1 was reported from the Muleshoe Preserve in the Galiuro Mountains and described as a “small colony” (summarized in Cockrum 1991), but with little detail. The surrounding area does not appear to contain substantial mineral resources so was not heavily mined (BLM 1998), but sedimentary rocks that may contain caves are present in the area. The record was listed as being within Graham County, but also contained an apparently erroneous reference to Greenlee County. A second location is suspected but unconfirmed from within the Galiuro Wilderness boundary in Coronado National Forest (USFS 2011). The USFWS provided information on an occupied roost within the Muleshoe Preserve (S. Richardson, personal communication).

Foraging Habitat in the Action Area

Forage plants utilized by lesser long-nosed bats are not uniformly distributed across the landscape in the action area. Saguaro (*Carnegiea gigantea*), *Agave palmeri*, and *Agave chrysantha* are common forage plants in the action. *Agave parryi* may be found at higher elevations. Kearney and Peebles (1960) describe *Agave parryi* as occurring in Cochise and Pima counties at 4,500 to 8,000 feet. The distribution of saguaro includes the western portion of the action area from the San Pedro Valley extending westerly to the beginning of developed agricultural lands northeast of Eloy, Arizona (Shreve and Wiggins 1964). Slauson (2000) mapped the distribution of the lesser long-nosed bat relative to the distribution of *Agave palmeri* and *Agave chrysantha*, indicating the distribution of *A. chrysantha* in the western portion of action area, including the Winchester, Galiuro, Little Rincon, Rincon, and the north side of the Catalina Mountains. Slauson (2000) also indicates the distribution of *Agave palmeri* in the project area from approximately the Arizona-New Mexico state line west to the south end of the Rincon Mountains. Gentry (1982) indicates the distribution of *Agave palmeri* to include Hidalgo and Grant counties south of the Gila River and extreme western Luna County in Southwestern New Mexico in addition to southern Arizona, including portions of the action area. Shreve and Wiggins (1964) describe the saguaro as occurring on gravelly slopes, rocky ridges and outwash fans, the *Agave palmeri* as occurring on rocky hillsides and mesas, and *Agave chrysantha* occurring on arid foothills and mountain slopes. As described by Howell and Roth (1981), and others, *Agave palmeri* is patchily distributed. Ober *et al*. (2005) report variability between years in abundance of agave inflorescences and variation in calculated home ranges of radio telemetered lesser long-nosed bats as food resources varied. Ober *et al*. (2005) found that lesser long-nosed bats would change foraging areas upon cessation of agave nectar production and would vary activity patterns by increasing time spent foraging in periods of reduced forage availability, noting a change from a mean of 2.3 hours per night spent foraging in a relatively good year to 5.1 hours per night the following year when *Agave* inflorescences were less abundant. Since *Agave* plants die after flowering there is likely to be inter-annual variability of availability of *Agave* nectar, which is further confounded by variability in precipitation affecting *Agave* reproduction and growth. Lesser long-nosed bats forage over large areas in response to food availability both between and within years.

Environmental Baseline - Mexican long-nosed bat

Mexican long-nosed bat roosts are primarily known from two mountain ranges in New Mexico: a day-roost cave and an abandoned building used as a night roost in the Animas Mountains, and a day-roost cave in the Big Hatchet Mountains (Bogan *et al*. 2006). These roosts are between 40 and 55 miles south of the closest portions of the BLM preferred alternative (Table 13 and Figure 5). Radio-tracked lesser long-nosed bats and a single Mexican long-nosed bat using the Big Hatchet Mountains cave primarily foraged each night in the Animas Mountains or western Big Hatchet Mountains (Cryan and Valdez 2009). Although surveys are limited, the species likely occurs in the action area. A single Mexican long-nosed bat was netted near the Gila River, approximately 15 miles north of the Project area in New Mexico (M. Ramsey, personal communication). This may represent a vagrant individual, or may suggest that some individuals travel long distances from known major roosts, or that an unknown roost exists elsewhere in southwestern New Mexico.

Gentry (1982) indicates the distribution of *Agave palmeri* to include Hidalgo and Grant counties south of the Gila River and extreme western Luna County in southwestern New Mexico in addition to southern Arizona and describes an elevation range of 3,000 to 6,000 feet. *Agave parryi* may be found at higher elevations, generally 4,921 to 8202 feet (Gentry 1982).

Environmental Baseline - Yuma clapper rail

Within the Project area, the Yuma clapper rail has only been recorded from Picacho Reservoir in Pinal County, the only potentially suitable habitat in the action area. Picacho Reservoir is a shallow irrigation water storage reservoir dating to the 1880s. Sediment has accumulated in the reservoir and thick stands of salt cedar with areas including cattail (*Typha* spp.) and California bulrush (*Schoenoplectus californicus*) have become established within the shallow pool and on the inside of the surrounding levee. Depending on hydrologic conditions, suitable Yuma clapper rail nesting habitat may be present. Arthropod food resources are present, especially associated with flooded vegetation and moist soils within the pool. Picacho Reservoir was shown within the distribution of Yuma clapper rail by Wilbur and Tomlinson (1976) and by the FWS in 2008 (website map).

One clatter call was detected in bulrush during a survey in April 2011 during a period of standing water in the reservoir pool. Previous surveys include: 2008 (no detections), 2001 (no detections), 1999 (no detections), 1998 (2 detections), 1997 (2 detections), 1996 (1 detection), 1995 (5 detections), 1994 (2 detections), 1993 (7 detections), 1992 (2 detections), 1991 (0 detections), 1990 (0 detections). Surveys were not conducted from 2009-2011 due to a lack of water in the reservoir.

Environmental Baseline - Southwestern willow flycatcher

The proposed action crosses the San Pedro and Rio Grande Rivers where Southwestern willow flycatcher may occur. Link E180 would cross the Rio Grande within designated critical habitat, and Link C201 would cross the San Pedro River within designated critical habitat. Link C201 also lies within a portion of and crosses Paige Canyon, a tributary to the San Pedro River. The Rio Grande is a highly regulated river which restricts development of physical and biological features of habitat for Southwestern willow flycatcher. San Acacia Diversion Dam (SADD), built in 1935, diverts water into the Socorro Main Canal and Low Flow Conveyance Canal (LFCC). Spoil from the LFCC creates a levee on the west side of the river and Kellner jacks were installed to protect the levee. River maintenance below the SADD to below the Escondida Bridge in the Project area included straightening and cleaning vegetation from the channel (USBR 2003). The river is a simple channel without backwater sloughs or braiding in the upper San Acacia reach and flows do not overtop the banks in the Project area except in extreme events, limiting recruitment of riparian vegetation. Downstream from the proposed project crossing the channel widens and willows have become established on bars and low terraces (Moore and Ahlers 2006). Because of the low probability of overbank flow in the Project area, the probability of recruitment of cottonwood and willow away from the channel margin is low. In floodplain areas with irrigated agriculture, native riparian species can become established along unlined irrigation conveyance and drainage canals and in fields flooded with sufficient frequency if a seed source is available nearby. The cottonwood overstory in this portion of the action area consists of large mature trees and evidence of ongoing recruitment is not apparent. The cottonwood trees are likely relics of pre-river regulation circumstances. Likewise much of the salt cedar in the vicinity of the proposed Project consists of large mature plants.

The San Pedro is not a regulated river but flows are subject to depletion through groundwater pumping. Entrenchment of the upper San Pedro and deposition of alluvium downstream has altered the river from the pre-settlement period, apparently due to historical heavy livestock use and flooding (Hereford 1993).

Picacho Reservoir, an intermittent artificial pond and marsh, is located approximately 600 feet south from Link C880, approximately 3.5 to 6 miles east of the Pinal Central Substation. No nesting records are known for the reservoir, and it dries partially or completely in many years. However, the vegetation supported at the site has been modeled as having a high potential to support Southwestern willow flycatchers and is one of several regional sites listed as a priority for future surveys (Dockens and Paradzick 2004). Depending on hydrologic conditions, suitable Southwestern willow flycatcher nesting habitat may be present. Arthropod food resources are present, especially associated with moist soils within the pool.

Rio Grande

Southwestern willow flycatcher habitat along the Rio Grande River was classified and mapped in 2008 by the U.S. Bureau of Reclamation (USBR) from the U.S. 60 crossing, upstream from the proposed project crossing, downstream to Elephant Butte Reservoir (downstream from the proposed project crossing)(Ahlers *et al*. 2010). Riparian and floodplain habitat is mapped as unsuitable for Southwestern willow flycatcher nesting from approximately 0.25 mi north to 0.40 mi south of the Escondida Bridge, including the area of the proposed SunZia crossing. A band of habitat was mapped as moderately suitable for Southwestern willow flycatcher nesting beginning approximately 0.40 miles south of the bridge along the east bank of the river, approximately 328 feet downstream of the proposed SunZia crossing (Ahlers *et al*. 2010). Habitat in the San Acacia Reach (in this context, above the Escondida Bridge) is described as dominated by dry decadent exotic vegetation including salt cedar and Russian olive with an occasional cottonwood overstory. Quality Southwestern willow flycatcher nesting habitat is limited to small patches along the river channel and very little overbank flooding occurs due to the degraded (downcut) nature of the channel (Ahlers *et al*. 2010). Habitat in the Escondida reach (in this context, below the Escondida Bridge) is described as similar to the San Acacia reach although some suitable nesting habitat exists or is forming adjacent to the river and on recently formed bars (Ahlers *et al*. 2010).

Southwestern willow flycatcher surveys were conducted by the U.S. Bureau of Reclamation (USBR) along the Middle Rio Grande from 1997 to 2012. From 1997 through 2007 no Southwestern willow flycatchers were documented in the reach from the San Acacia Diversion Dam, upstream from the Project crossing, to the U.S. 380 bridge, downstream from the Project crossing (Moore and Ahlers 2012a) (Table 6). From 2007 to 2013 one pair was documented 2.8 miles downstream from the SunZia crossing (Table 6).

During 2008 Southwestern willow flycatcher surveys, one unpaired male was documented in the 10.4 mi reach between San Acacia Diversion Dam and the proposed SunZia crossing at a point 4.0 mi upstream of the crossing and 1unpaired male was documented 0.3 mi downstream of the proposed SunZia crossing in a narrow, mid-aged strip of cottonwood, saltcedar, Russian olive, and coyote willow adjacent to the river (Moore and Ahlers 2009).

In 2009 one unpaired male was documented in the 10.4 mi reach between San Acacia Diversion Dam and the proposed SunZia crossing at a point 2.9 mi upstream of the crossing and no Southwestern willow flycatchers were documented in the reach downstream to the US 380 bridge, 14.24 miles downstream (Moore and Ahlers 2010).

In 2010 no Southwestern willow flycatchers were documented in the 10.4 mi reach between San Acacia Diversion Dam and the proposed SunZia crossing and 1unpaired males was documented 2.75 mi downstream of the proposed SunZia crossing (Moore and Ahlers 2011).

In 2011 no Southwestern willow flycatchers were documented in the 10.4 mi reach between San Acacia Diversion Dam and the proposed SunZia crossing and 1unpaired males was documented 3 mi downstream of the proposed SunZia crossing (Moore and Ahlers 2012b).

In 2012 no Southwestern willow flycatchers were documented in the 10.4 mi reach between San Acacia Diversion Dam and the proposed SunZia crossing and 2 unpaired males and 3 pairs with nests were documented between 2.8 mi and 3.7 mi downstream of the proposed SunZia crossing on river bars and low terraces (Moore and Ahlers 2012a).

In 2013 no Southwestern willow flycatchers were documented in the 10.4 mi reach between San Acacia Diversion Dam and the proposed SunZia crossing and 1 pair and 2 pairs with nests were documented between 2.8 mi and 3.1 mi downstream of the proposed SunZia crossing on river bars and low terraces (USBR unpublished data).

San Pedro

The San Pedro River in the Lower San Pedro Basin (below The Narrows, approximately 10 miles north of Benson) is described as predominately an intermittent stream with small sections where it is perennial south of Dudleyville and in the vicinity of the Pima/Cochise County line (ADWR 2010), both north (downstream) of the proposed crossing. The proposed SunZia crossing lies just downstream of The Narrows on the San Pedro River. Depth to groundwater in the vicinity of the SunZia crossing is in the range of 27 to 116 feet below the elevation of the channel bottom at the U.S. Geological Survey (USGS) gauge site at The Narrows based on records from 1950-2010 (USGS 1979, ADWR 2010). Based on extensive field work in the Upper San Pedro Basin Stromberg (in Leenhouts *et al*. 2006) reported the median of annual maximum depth to groundwater beneath surfaces occupied by cottonwood was 6.6 feet and the median value for willow was 5.9 feet. There are scattered individual cottonwood trees in the vicinity of the proposed SunZia crossing but the groundwater is apparently too low to support quality Southwestern willow flycatcher habitat.

Southwestern willow flycatcher surveys were conducted 1996-2007 by AGFD along the lower San Pedro River in areas of perennial flow (Ellis *et al*. 2008). A site at Cascabel is included. Southwestern willow flycatcher surveys have been irregularly conducted in perennial reaches of the San Pedro on the San Pedro Riparian National Conservation Area 18 mi upstream of the SunZia crossing. The Cascabel site, approximately 12 mi north of the SunZia crossing, was surveyed in 1993, 1995, 1997, 1998, 2001, and 2002 and no Southwestern willow flycatchers were recorded (Stump *et al*. 2007).

The Three Links farm survey site, 1.75 to 5 airline miles north northwest of the proposed SunZia crossing, was surveyed for Southwestern willow flycatchers in 2004 (6 pairs documented), 2005 (6 pairs documented), 2006 (8 pairs documented), 2008 (19 pairs documented), 2009 (19 pairs documented), 2010 (19 pairs documented), 2011 (25 pairs documented), 2013 (30 pairs documented)(USBR unpublished data).

Environmental Baseline - Rio Grande silvery minnow Critical Habitat

As described under "Status of the Species in the Action Area" for SWWF, the Rio Grande in the Project area is highly regulated and developed, which restricts development of physical and biological features of habitat for Rio Grande silvery minnow. Designated critical habitat for the Rio Grande silvery minnow includes a portion of the Rio Grande from Cochiti Dam in Sandoval County, New Mexico, downstream to Elephant Butte Reservoir in Sierra County, New Mexico. Link E180 would cross the Rio Grande within designated critical habitat for the species. The 2003 critical habitat designation includes the floodplain 300 feet beyond bankfull width, unless the reach is bounded by levees, which would then form the critical habitat boundary (USFWS 2003). Activities outside the active channel may influence water quality or other habitat conditions within critical habitat.

PCEs within Rio Grande silvery minnow critical habitat include stream features related to substrate, flow, water quality, and cover that support minnow survival and reproduction. These features are expected to vary spatially and temporally in the Rio Grande, and are likely to be present at times within the Project area. This reach of the Rio Grande may occasionally dry during summer as water is diverted away from the river channel for irrigation, and PCEs related to the hydrologic regime may not be present in all years.

The proposed SunZia project would cross the Rio Grande and the associated riparian area within the area of designated critical habitat. Critical habitat extends 300 feet outward from bankfull (nominally the top of the river bank)(App. E - Figure 24). The San Acacia Reach is not perennial. There is a high degree of flow manipulation through regulation at diversion dams outside of storm events, although the spring runoff peaks and summer storm peaks often maintain surface flow (USFWS 2010). The reach including the SunZia crossing is a straight and incised river with extensive channel sections exhibiting a bi-modal bed composition with distinct layers of sand and gravel (Massong *et al*. 2002a, b). The San Acacia reach is a warm-water reach with higher levels of conductivity and turbidity than upstream and reduction of riparian vegetation and streambank destabilization are identified as water quality issues affecting the Rio Grande silvery minnow (USFWS 2010).

Riparian vegetation on the stream bank and in the floodplain provides shading of water in the river channel, which helps to maintain water temperature within the 35º F to 85º F range. Riparian vegetation also contributes large woody debris to the stream which provides shade and associated scour holes with deeper water less susceptible to surface warming.

Environmental Baseline - Kuenzler Hedgehog Cactus

The Kuenzler hedgehog cactus has not been documented in the Project area and surveys are limited, although suitable habitat occurs and the species is likely to be present. The species is cryptic, often grows in dense clumps of grass, and can be difficult to detect unless flowering. Therefore, we conclude the species may be present in the action area during the life of the project.

A population of the Kuenzler hedgehog cactus was detected during surveys for a realignment of U.S. Highway 54 near Carrizozo, New Mexico. This population is approximately 15 miles south of Link A10. Suitable habitat may be present in approximately 20 miles of the BLM preferred alternative, along links A10, A21, and E82 (Figure 6). No critical habitat has been designated.

The population discovered near Highway 54 exhibited characteristics of both *Echinocereus fendleri kuenzleri* and the related and unlisted *E. f. fendleri*, and may be a result of hybrid introgression. Four morphotypes were observed, two being more similar to *E. f. fendleri* (Marron and Associates 2000). Any *E. fendleri* individuals found within the Project area may belong to either the listed variety *E. f. kuenzleri*, or *E. f. fendleri*. The population located approximately 15 miles south of the Project area contained multiple growth types, showing a range of characteristics from both varieties. The population was determined to contain Kuenzler hedgehog cactus individuals, but represents the current northernmost population known. Surveys for the species and close examination of a range of individuals would be required to confirm which variety of *E. fendleri*, is present in the Project area.

Environmental Baseline - Todsen's Pennyroyal

Todsen's pennyroyal is found in two mountain ranges in southern New Mexico. Known populations exist on the west slope of the San Andres Mountains on White Sands Missile Range 70 miles southwest of the Project area, and approximately 20 scattered populations are located in two areas of the Sacramento Mountains east of Tularosa, approximately 90 miles southeast of the Project area. However, the Recovery Plan for the species suggested unknown populations could occur in suitable habitat on Chupadera Mesa, which is crossed by the BLM preferred alternative. Links E85 and E80d (not on but ranging from approximately 0.25 to 3 miles distant from the BLM preferred alternative) cross portions of the Yeso and San Andres formations, including locations with relatively steep, north-facing slopes.

The San Andres formation and small areas of the Yeso Formation are exposed in the southern foothills of the Gallinas Mountains, along links A10, A21, and E82 (Figure 6). Similar to Chupadera Mesa, no available information indicates the species is present near the Gallinas Mountains, and this area is discussed out of precaution. This area is entirely privately owned, and no surveys have taken place. Although slopes are generally not steep, topographic and aerial maps indicate that some small areas of northerly slopes may exist within exposures of the San Andres or Yeso formations where the species may be found. No critical habitat occurs in the action area.

Environmental Baseline - Yellow-billed cuckoo

As described under "Status of the Species in the Action Area" for SWWF, the Rio Grande in the Project area is highly regulated and developed. Also, as described under "Status of the Species in the Action Area" for SWWF, the San Pedro is not a regulated river but flows are subject to depletion through groundwater pumping. Entrenchment of the upper San Pedro and deposition of alluvium downstream has altered the river from the pre-settlement period, apparently due to historic heavy livestock use and flooding (Hereford 1993). These factors constrain development of physical and biological features of habitat for YBC.

Yellow-billed cuckoos from both the eastern and western populations described by the USFWS occur in New Mexico, and all yellow-billed cuckoos in Arizona are within the western population (USFWS 2001). The eastern population, including the Pecos River drainage and eastward, has not been proposed or petitioned for listing under the ESA. Any yellow-billed cuckoos present in the Project area would be from the Western DPS.

The yellow-billed cuckoo is known from the Rio Grande in New Mexico and the San Pedro River in Arizona within the Project area. Suitable habitat may be present at Picacho Reservoir in Pinal County, Arizona.

A YBCU territory was detected approximately 0.25 mi downstream of Escondida Bridge (see App. E – Figure 24) adjacent to (to the north) of the proposed SunZia crossing and a single detection was documented 1 mile downstream during 2009 surveys (Ahlers *et al*. 2009). Although overbank and scouring flows are limited in the Escondida Reach, river bars and lower terraces have formed providing suitable YBCU habitat composed of willows, cottonwood, and Russian olive (Ahlers *et al*. 2009). Surveys in 2013 included 4 detections between the Escondida Bridge and the proposed SunZia crossing (Ahlers 2013, unpublished data).

San Pedro River

The floodplain is dominated by a mesquite bosque, with individual willow, saltcedar, and cottonwood present in very small numbers. Mesquite bosques may be used as nesting habitat. The San Pedro River, from San Manuel upstream to St. David has not been well surveyed and much of it is private land. However, suitable habitat exists throughout much of this reach. The Three Links conservation property, 1.75 to 5 airline miles north northwest of the proposed SunZia crossing on the San Pedro River, is the nearest known occupied site. Although the number of breeding territories is unknown, repeated yellow-billed cuckoo detections a) during at least 2 of 3 Southwestern willow flycatcher survey periods in 2004, 2005, 2006, 2008, 2009, 2010, 2011, and 2013 and b) during yellow-billed cuckoo breeding season playback surveys in 2012 and 2013 indicate a breeding population exists (Tucson Audubon, unpublished data; USBR, unpublished data).

Despite lack of surveys from San Manuel to St. David, cuckoos have been found during the breeding season 12 miles and 18 miles to the south of the Three Links site at Pomerine and St. David respectively. The nearest known occupied habitat on the San Pedro River to the north of the Three Links site is 28 miles away in the San Manuel area, and suitable unsurveyed yellow-billed cuckoo habitat exists in between. Surveys conducted on the San Pedro River south of St. David, within the BLM San Pedro National Conservation Area have documented the greatest number of cuckoos in Arizona. The nearest known occupied habitat from the Three Links site in other drainages is 12 miles away at Hooker Hot Springs, 21 miles away at lower Cienega Creek, and 21 miles away at Tanque Verde Wash (USFWS, unpublished data).

Immediately south of the occupied St. David site, is the San Pedro Riparian National Conservation Area, which spans from St. David to the U.S./Mexico border on the upper San Pedro River (BLM website: accessed 09/17/13 http://www.blm.gov/az/st/en/prog/blm_special_areas/ncarea/sprnca.html). Yellow-billed cuckoos were surveyed on 42 miles along the upper San Pedro River for 7 years from 2001 to 2007 (Halterman 2002, 2003, 2004, 2005, 2006, 2007, 2009). The number of surveys varied from year-to-year with one to five surveys per year and with different methods used to determine population size. In 2001, a total of 40 to 52 pairs were estimated, and in 2002, 29 to 50 pairs. A total of 26 or more pairs were estimated in 2003, but the number of pairs was not estimated after that year. Year-to-year comparisons were made by summing the maximum number of yellow-billed cuckoos in each transect for each year, which yields a minimum population of individual yellow-billed cuckoos over the breeding season. In 2001, 71 individual yellow-billed cuckoos were located. The population rose to 114 individual yellow-billed cuckoos in 2002 and 128

individual yellow-billed cuckoos in 2003, before dropping to 101 yellow-billed cuckoos in 2004, 76 in 2005, and a low of 47 in 2006. In 2007, the number of yellow-billed cuckoos detected increased to 83. Other yellow-billed cuckoo populations have shown annual fluctuation in detections (Halterman 2007). During a separate Southwestern willow flycatcher surveys in 2001 and 2002, 36 and 81yellow-billed cuckoos were detected respectively along the San Pedro River (EEC 2002). A repeat of these Southwestern willow flycatcher surveys in 2009 documented only 26 yellow-billed cuckoos (Vernadero Group 2009). It is not known whether survey effort between these two time periods was comparable.

A number of conservation properties have been purchased in fee title or as easements since 1996 to offset the effects elsewhere to Southwestern willow flycatchers at Roosevelt Lake and the Salt River (SRP 2011b), and Southwestern willow flycatchers and yellow-billed cuckoos at Horseshoe Reservoir and the Verde River (SRP 2011a). These properties, which support yellow-billed cuckoos, include the San Pedro River Preserve, Adobe Preserve, Stillinger Preserve, Spirit Hollow and Spirit Hollow Annex on the lower San Pedro River. Other conservation properties along the lower San Pedro River include Cook's Lake, owned by USBR, and Three Links Farm, with conservation easements held by The Nature Conservancy and USBR (USFWS 2013).

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

General Discussion

The proposed action will result in disturbance in a 515 mile corridor, in two 400 foot rights-of-way, from Lincoln County, New Mexico to Pinal County, Arizona and from construction of two substations, fiber optic regeneration, and other ancillary facilities. Within the rights-of-way, transmission line construction will include permanent disturbance (approximately 60 feet square) at transmission line support structure sites (structure sites), temporary disturbance through drive and crush or clearing in a 200 foot square area centered on each structure, permanent disturbance through creation of new access roads between structures, and temporary disturbance through drive and crush or clearing at cable pulling sites and staging areas. The project crosses areas of largely un-fragmented native plant communities and riparian habitat at the Rio Grande and San Pedro Rivers. Conservation measures are included to avoid, minimize, rectify through reclamation, and compensate for impacts to species and habitat.

Effects of the Action - Lesser Long-nosed Bat

<u>Effects to Roost Sites</u>

Drilling during geotechnical exploration and drilling for structure foundations would be required prior to, and during, construction of the Project. In addition, blasting may be required in some areas with shallow soils or exposed bedrock. A site-specific blasting plan would depend on the

results of geotechnical exploration. Vibrations from drilling and blasting would have the potential to disturb lesser long-nosed bat if any occupied roosts are near the Project area.

No part of the BLM preferred alternative is near enough to any known roost site of the lesser long-nosed bat, thus disturbance of a roost site is not anticipated. Because there are no known unsurveyed mines or caves within 0.25 mile of the proposed right-of-way, no roost sites are anticipated to be present. If preconstruction surveys or other information indicates the presence of caves or abandoned mines of unknown potential to support bats within 0.25 mile of the proposed right-of-way, these would be surveyed for the presence of bat roosts. Blasting and drilling within 0.25 mile of occupied lesser long-nosed bat roosts would occur between November and April, when lesser long-nosed bats are not typically present in Arizona or New Mexico. Improvement of access roads and creation of new roads along the transmission line may facilitate public access to roost sites, increasing potential for disturbance of roosts by the public.

Effects to Foraging Habitat

Some forage plants used by lesser long-nosed bats would be removed or trimmed during the construction phase, and as required over the 75 year life of the Project during routine vegetation maintenance. Lesser long-nosed bat forage plants, including saguaro and paniculate agaves, within the ROW would be inventoried, avoided where possible, transplanted outside the ROW if appropriate, and augmented from local sources or nurseries to achieve a goal of no net loss of forage plants. Transplanted plants would be monitored for 3 years and supplementary water provided if rainfall is insufficient. It is anticipated that the transplanted plants will successfully re-establish and contribute to the native plant community. Vegetation management as described in Appendix D provides guidance for the construction and maintenance phases of the project.

Ground disturbance from the Project within lesser long-nosed bat range includes an estimated 742 acres from access roads, 520 acres from transmission line structures and ancillary facilities, and 1,786 acres of temporary disturbance subject to reclamation. Ground disturbance during emergency repairs would typically take place within the previously disturbed work area and would be reclaimed following maintenance activities. Because of the delay, potentially of years, between reclamation and actual availability of forage as agave nectar and pollen in reclaimed lands and uncertainty regarding efficacy of reclamation in achieving lesser long-nosed bat foraging habitat all impacts will be aggregated for analysis purposes for a total of 3,048 acres of ground disturbance. In addition to ground disturbance, vegetation management through the life of the project will reduce foraging habitat in areas where agave inflorescences could grow tall enough to exceed vegetation standards under energized conductors, generally in the area of the low point in the sag between structures, estimated to be an area 180 feet wide by 300 feet long or 1.25 acres per span and at an estimated 4 spans per mile, an additional 5 acres per mile of vegetation management associated habitat reduction. Based on an estimated 180 miles of Project in the range of lesser long-nosed bat a total of 1,125 acres of foraging habitat impacted by vegetation maintenance is estimated. Use of herbicides in vegetation management of the wirezone, around structures, and to control invasive species during reclamation of disturbed areas could adversely affect agave plants in an indeterminate amount. A total of 4,173 acres of impact to lesser long-nosed bat foraging habitat is estimated for the purpose of this analysis. With implementation of the conservation measures we anticipate that the project goal of no net loss of foraging habitat will be achieved following a recovery period needed for establishment of transplanted and supplemental plants.

Effects of the Action - Mexican long-nosed bat

Effects to Roost Sites

No part of the BLM preferred alternative is near enough to any known roost site of the Mexican long-nosed bat, thus disturbance of the roost site is not anticipated. Because there are no known unsurveyed mines or caves within 0.25 mile of the proposed right-of-way, no roost sites are anticipated to be present.

Effects to Foraging Habitat

Some forage plants used by Mexican long-nosed bats would be removed or trimmed during the construction phase, and as required over the life of the Project during routine vegetation maintenance. Mexican long-nosed bat forage plants, including saguaro and paniculate agaves within the ROW would be inventoried, avoided where possible, transplanted outside the ROW if appropriate, and augmented from local sources or nurseries to achieve a goal of no net loss of forage plants. Transplanted plants would be monitored for 3 years and supplementary water provided if rainfall is insufficient. As described for lesser long-nosed bat, it is anticipated that the transplanted plants will successfully re-establish and contribute to the native plant community. Vegetation management as described in Appendix D provides guidance for the construction and maintenance phases of the project.

Potential foraging range for the Mexican long-nosed bat was modeled around the newly discovered roost in the Peloncillo Mountains, with methods identical to those described for the lesser long-nosed bat. This is the sole known Mexican long-nosed bat roost within foraging range of the Project.

Ground disturbance from the Project within Mexican long-nosed bat range includes an estimated 224 acres from access roads, 179 acres from transmission line structures and ancillary facilities, and 588 acres of temporary disturbance subject to reclamation. Ground disturbance during emergency repairs would typically take place within the previously disturbed work area and would be reclaimed following maintenance activities. Because of the delay between reclamation and actual forage as *Agave* nectar and pollen in reclaimed lands and uncertainty regarding efficacy of reclamation in achieving Mexican long-nosed bat foraging habitat all impacts will be aggregated for analysis purposes for a total of 991 acres of ground disturbance. In addition to ground disturbance, vegetation management through the life of the project will reduce foraging habitat in areas where agave inflorescences could grow tall enough exceed vegetation standards under energized conductors, generally in the area of the low point in the sag between structures, estimated to be an area 180 feet wide by 300 feet long or 1.25 acres per span and at an estimated 4 spans per mile an additional 5 acres per mile of vegetation management associated habitat reduction. Based on an estimated 80 miles of Project in the range of Mexican long-nosed bat a permanent loss of a total of 400 acres of foraging habitat impacted by vegetation maintenance is estimated. Use of herbicides in vegetation management of the wirezone, around structures, and to control invasive species during reclamation of disturbed areas could adversely affect agave plants in an indeterminate amount. A total of 1400 acres of impact to Mexican long-nosed bat foraging habitat is estimated for the purpose of this analysis. With implementation of the conservation measures we anticipate that the project goal of no net loss of foraging habitat will be achieved following a recovery period needed establishment of transplanted and supplemental plants.

Effects of the Action - Yuma clapper rail

Collision with power lines has been recorded for clapper rails (Shire *et al*. 2000) and may occur in this project area. The nearest known potential source population is north of the action area along the Gila River, south and west of Phoenix, Arizona, approximately 57 miles northwest of Picacho Reservoir. Individuals dispersing from the Gila River to Picacho Reservoir may cross the Project area, and may be exposed to a risk of collision. Installation of bird diverters to increase visibility of the transmission lines is included in the proposed action. Transmission line cables will range in height from 30 feet to 135 feet above the ground surface, depending on proximity to support structures and line temperature.

The western terminus of the Project would be the proposed Pinal Central substation near Casa Grande, Arizona, to be sited approximately 4.5 miles west-northwest of Picacho Reservoir. Link C880 would approach within 600 feet of the levee at the north end of Picacho Reservoir, or approximately 0.3 mile from the typical high-water mark where vegetation changes from continuous shrub and tree cover to wetland plants.

The permitted Pinal Central-Tortolita transmission line would be located between the proposed Project and Picacho Reservoir along Link C880. Colocation of multiple transmission lines has the potential to increase the overall visibility of the entire utility corridor, facilitating avoidance by flying birds in some cases, or may increase the collision risk by increasing the density of obstacles (Avian Powerline Interaction Committee 2012). An Avian Protection Plan will be developed as a condition of the right-of-way grant by BLM.

Effects of Action - Southwestern willow flycatcher

Injury or mortality of individual Southwestern willow flycatcher from collision with transmission lines during dispersal and migration has not been identified as an issue although conservation measures are included in the project description to increase visibility of the project at the Rio Grande and San Pedro River crossings to reduce the risk of bird collisions.

Suitable Southwestern willow flycatcher nesting habitat is not currently present at the crossing locations of the Rio Grande or San Pedro River although the area is used by migrating individuals and may provide foraging habitat for birds nesting upstream and downstream. However, the Rio Grande crossing location has the potential to support the recovery of the species in the future as habitat conditions change, as is typical in Southwestern riparian systems (USFWS 2005a), subject to suitable hydrologic conditions.

Construction of the Project would result in permanent ground disturbance at structure locations and access roads within designated critical habitat at the Rio Grande, and vegetation management within designated critical habitat would occur over the life of the Project at the Rio Grande and San Pedro River. Permanent ground disturbance would preclude the recovery of riparian woodlands around the base of structures, and vegetation management would affect successional processes and the rate and degree of recovery of riparian woodlands within the remainder of the right-of-way. Five structure locations and associated work areas are within, and one is partially within mapped designated critical habitat adjacent to the Rio Grande River (App. E-Figure 24). Existing access roads would be used to reach these structure locations, although the roads may require improvements in the form of clearing and widening to 24 feet.

The following discussion provides details on the timing and extent of permanent ground disturbance and vegetation management.

Ground Disturbance

During the construction phase, each structure would require a cleared work area approximately 200 by 200 feet, although the configuration may be modified slightly by terrain or other constraints. Pulling and tensioning sites near the Rio Grande would be sited in open areas outside suitable habitat and designated critical habitat (see App. E – Figure 24). Existing road access is present near each proposed structure location at the Rio Grande. The majority of these roads (2) would be improved, typically by widening the road to 24 feet. Short spur roads may be necessary to reach each structure, as indicated on App. E – Figure 25, which shows preliminary design of structure locations and access roads within designated critical habitat at the Rio Grande. Estimates of the acreage of ground disturbance based on the preliminary design for the Rio Grande are included in Table 6.

The structure work areas would be completely cleared of riparian or other vegetation during construction, but low-growing grasses, forbs, and small shrubs would be used for reclamation and would be allowed to remain during operation of the Project. Ground disturbance may occur over the life of the Project if required for structure repair or maintenance, such as in a natural disaster or other emergency; however, this ground disturbance would typically take place within the previously disturbed work area and would be reclaimed following the maintenance activities. Construction is anticipated to take 24 months (SunZia website). Typically transmission line construction is completed in phases and workers move along the line as each phase is completed at a given location resulting in an interval of no activity at any given location until the next phase of work begins.

All structure locations, work areas, pulling and tensioning sites, and access roads at the San Pedro River would be located outside suitable habitat and designated critical habitat for the Southwestern willow flycatcher, and no permanent disturbance is anticipated at this location. Appendix C – Figure 27 shows the preliminary design of structure locations and access roads adjacent to designated critical habitat at the San Pedro River. Table 6 and App. E–Figure 27 indicate that there would be no or minimal ground disturbance within Southwestern willow flycatcher designated critical habitat based on the preliminary design of Link C201 at the San Pedro River. Based on preliminary design, access to structures on the west side of the San Pedro will include use of an existing right-of-way access road along the TEP 345 kV transmission lines north of the San Pedro crossing (App. E- Figure 27). It is assumed that use of the road may require grading and clearing to a width of 24 feet at the San Pedro crossing over a road length of 1100 feet. The crossing location is within a dry crossing area where mesquite vegetation is managed by TEP and is not suitable nesting habitat.

The current conditions at the Rio Grande, including the lack of over-bank flow on the east bank and the constraining levee on the west bank, appear to limit the development of suitable nesting habitat for Southwestern willow flycatchers (Moore and Ahlers 2010). However, suitable nesting habitat is present nearby to the north and south of the proposed crossing location (Ahlers *et al*. 2010), and the Project area may contain suitable habitat for foraging, migratory, and non-territorial individuals. Although trees would be trimmed every 3-5 years and limited to the specified heights within the wire zone and border zone (12 feet and 25 feet, respectively), they

would minimize the effect of fragmentation on riparian habitat by providing cover and foraging habitat across the right-of-way (see App. E - Figure 7 and 8). If environmental conditions support the recovery of suitable nesting habitat at this location in the future, vegetation management for the Project would likely limit but not necessarily preclude that recovery. The North American Electric Reliability Corporation (NERC) line clearance requirement, on which the vegetation clearance requirement is based, could be met while allowing the growth of dense patches of relatively short tree species such as narrowleaf willows or saltcedar, which may allow some nesting habitat to recover.

San Pedro River Crossing – Link C201

Placement of transmission line support structures (self-supporting dead-end lattice on the east side (App. E- Figure 9) and self-supporting lattice tangent on the west side (App. E – Figure 7)) on elevated landforms adjacent to the San Pedro River floodplain would reduce impacts to the existing mesquite bosque and future riparian vegetation that may develop. Channel downcutting and the lack of permanent flow at the San Pedro River crossing currently preclude the development of suitable nesting habitat for the Southwestern willow flycatcher. Should permanent or intermittent flows recover and persist in the future and support the development of riparian woodlands, vegetation management would continue as described above, allowing trees to reach approximately 12 feet above the elevation of the base of structures located adjacent to the river.

Vegetation Management at Rio Grande and San Pedro River Crossings

Vegetation will be managed to maintain vegetation to conductor clearance distances at the Rio Grande and San Pedro Rivers. Table 8 provides an estimate of the acreage that would be affected by vegetation trimming at the Rio Grande. This estimate would be in addition to the acreage provided in Table 6. Table 8 also provides the acreage within the wire zone and border zone at the San Pedro River, although only selective trimming would occur at this location as described above. The additional suitable habitat at the Rio Grande included in Table 8 accounts for undeveloped areas between structure numbers 310, 311, and 312, as shown on App. E-Figure 24. These areas are not within mapped designated critical habitat, but may be affected by future vegetation management.

All vegetation management outside areas of permanent disturbance would focus on minimizing any selective trimming and rapidly reclaiming disturbed areas within river floodplains, while maintaining the safety and reliability of the Project. Thus, vegetation management may temporarily reduce the amount of vegetation available to support arthropod prey species in proportion to the acreage affected. Although no insecticides are proposed to be used, use of herbicides is included, which could result in effects on arthropod prey. Reclaimed areas and those subject to wire zone-border zone management may differ in plant species composition from undisturbed areas, but are anticipated to provide similar availability of arthropod food resources.

Disturbance

Planned construction and maintenance would take place outside the Southwestern willow flycatcher nesting season. However, emergency maintenance activities associated with the proposed Project, including vegetation management may occur and could disturb migrating

Southwestern willow flycatchers and less likely nearby nesting Southwestern willow flycatchers if those activities take place during the nesting season.

Effects to Designated Critical Habitat

Permanent ground disturbance (5.69 acres at the Rio Grande crossing) and vegetation management disturbance (15.85 acres at the Rio Grande and 8.8 acres at the San Pedro crossing), as described above, would take place within designated critical habitat, affecting PCEs relating to vegetation structure and composition. The proposed Project would not cause the loss of any known Southwestern willow flycatcher territories, and would not prevent any MU from meeting its recovery goals. The Southwestern Willow Flycatcher Recovery Plan (USFWS 2002) provides goals for the number of territories in each Recovery Unit (RU) to support the eventual downlisting of the species. Delisting would be considered when downlisting goals are met and maintained, and suitable nesting habitat sufficient to support over twice the number of territories in each RU is permanently protected. The proposed Project would affect the following RUs:

- Rio Grande Recovery Unit, Middle Rio Grande Management Unit
    - The Middle Rio Grande Management Unit (MU) was given a minimum number of 100 territories to support downlisting the Southwestern willow flycatcher. The Middle Rio Grande MU currently supports approximately 350 territories (USFWS 2013).
- Gila Recovery Unit, Middle Gila-San Pedro Management Unit
    - The Middle Gila-San Pedro MU was given a minimum number of 150 territories to support downlisting the Southwestern willow flycatcher. The Middle Gila-San Pedro MU supported up to 233 territories in 2007 (Durst *et al*. 2008).

The stream in lower Paige Canyon has the characteristics of a major ephemeral desert wash, and no suitable nesting habitat is present at this location. Standard mitigation measures would reduce impacts to designated critical habitat in the San Pedro River downstream from Paige Canyon, by minimizing the risk of erosion from access roads and temporary disturbance in Paige Canyon.

Acquisition and protection of habitat to fully offset temporary and permanent disturbance that would take place within designated critical habitat is a committed conservation measure and would be a condition of the BLM right-of-way grant and Notice to Proceed.

Effects of the Action - Rio Grande silvery minnow – Critical Habitat

Preliminary engineering provided by the Proponent was used to estimate the ground disturbance that would occur as a result of structure sites and upgrades to the existing, unpaved access roads. No laydown, pulling, or tensioning areas would be located within designated critical habitat. Two structure locations are within, two are partially within, and four structure work areas are partially within designated critical habitat adjacent to the Rio Grande River (App. E-Figure 24).

Existing access roads would be used to reach these structure locations, although the roads may require clearing of vegetation and widening to 24 feet to accommodate equipment, reducing vegetative cover and increasing potential for runoff of sediment during storms. Table 8 provides the estimated acreage of permanent ground disturbance that would result from these features. No

direct effects to the active channel of the Rio Grande would occur, as the river would be spanned by Link E180. All ground disturbance would be minimized within the floodplain, and the potential for erosion would be minimized through the application of standard mitigation measures (see App. E – Table 5). This disturbance during emergency repairs would typically take place within the previously disturbed work area and would be reclaimed following maintenance activities.

The Project will affect an area the width of the ROW and 300 feet inland from bankfull on each side of the river. Vegetation management will affect water quality in the river through reduction of shading and thus potentially increase water temperature. In addition it may potentially reduce the contribution of woody debris and allocthonous organic material to the river, affecting food supply. Since 4.72 acres of impact of the Project are already accounted to road improvements and structure pads, the net increase in accounting for all effects is 0.78 acres for a total of 5.5 acres.

Effects of the Action - Kuenzler Hedgehog Cactus

Ground disturbance would occur during the construction phase of the Project, from the construction of new access roads, pulling and tensioning sites, and structure work areas. Ground disturbance may directly affect the Kuenzler hedgehog cactus through direct loss of individual plants, and may indirectly affect the species by facilitating establishment of invasive plant species. Based on typical conditions, the Project would result in the following estimated acreage of ground disturbance in potential Kuenzler hedgehog cactus habitat near the Gallinas Mountains, along the potential distribution shown on Figure 6:

- Construction or improvement of access roads: 60.9 acres of permanent disturbance
- Structure sites: 46.1 acres of permanent disturbance
- Work areas, pulling and tensioning sites: 151.7 acres of temporary disturbance

Although not all of this area is anticipated to be equally suitable habitat, further information is not available until private lands in the Project area are surveyed.

Herbicides may be used during reclamation and right-of-way maintenance for the proposed Project. Vegetation treatment with herbicides could directly affect 533 acres if the entire wirezone of the reaches of potential distribution of Kuenzler hedgehog cactus (Figure 6) were treated. Conservation measures include establishing buffers around Kuenzler hedgehog cactus identified during inventory within which herbicides would not be used. There is potential for unquantified effects on Kuenzler hedgehog cactus from use of herbicides.

Effects of the Action - Todsen's Pennyroyal

Todsen's pennyroyal could be affected by ground-disturbing activities through direct loss of individual plants, and may indirectly affect the species by facilitating establishment of invasive plant species. Ground disturbance would occur during the construction phase of the Project, from the construction of new access roads, pulling and tensioning sites, and structure work areas. Based on typical conditions in the Project description, Table 9 presents estimates of ground

disturbance near the Gallinas Mountains and Chupadera Mesa, within the potential Todsen's pennyroyal distribution shown on Figure 6 and 7, summarized below:

- Construction or improvement of access roads: 122.8 acres of permanent disturbance
- Structure sites: 78.7 acres of permanent disturbance
- Work areas, pulling and tensioning sites: 259.1 acres of temporary disturbance

Until surveys are completed on private lands, this analysis assumes that suitable habitat may be present throughout the potential distribution shown on Figures 6 and 7.

Herbicides may be used during reclamation and right-of-way maintenance for the proposed Project. Vegetation treatment with herbicides could directly affect 906 acres if the entire wirezone of the reaches of potential distribution of Todsen's pennyroyal (Figure 6 and 7) were treated.

Effects of the Action – Western yellow-billed cuckoo

Construction of the Project would result in permanent ground disturbance at structure locations and access roads within yellow-billed cuckoo habitat at the Rio Grande, and vegetation management within yellow-billed cuckoo habitat would occur over the life of the Project at the Rio Grande and San Pedro Rivers. Permanent ground disturbance would preclude the recovery of riparian woodlands around the base of structures, and vegetation management would affect successional processes and the rate and degree of recovery of riparian woodlands within the remainder of the right-of-way. Trees more than 10 to 15 feet high would require trimming during maintenance over the lifetime of the Project. Future recovery of nesting habitat at the Rio Grande or San Pedro River crossings could occur, and the success of that recovery may be reduced by maintenance activities within the right-of-way.

The location of yellow-billed cuckoo habitat that would be affected is the same as for the Southwestern willow flycatcher and for the purpose of consistency in this analysis, the estimates in Table 10 reflect estimates of ground disturbance and vegetation management within Southwestern willow flycatcher habitat, as shown in Table 7 and Table 8.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Approximately 64 percent of the action area is State and private land. Ongoing residential and commercial development along with recreation, vegetation management, and other activities will likely continue on state and private lands.

Cumulative Effects - Lesser Long-nosed Bat

Livestock grazing may affect lesser long-nosed bat foraging habitat from the area of the Willow Substation to Pinal Central Substation on lands largely managed by the Arizona State Land Department (ASLD), which manages land for the benefit of its trustees. Tucson Electric Power (TEP) maintains infrastructure and manages vegetation along two existing 345 kV lines, which

SunZia will generally follow from the area of the Willows Substation to the San Pedro River. The Red Horse Wind Project, including 28 turbines on ASLD and private lands, is approved by Cochise County for construction in Allen Flat, 13 miles west of Willcox adjacent to the SunZia alignment and may affect lesser long-nosed bat in that area.

Cumulative Effects - Mexican long-nosed bat

Livestock grazing on non-Federal lands may affect Mexican long-nosed bat foraging habitat from the Lordsburg, NM area west to San Simon area, near the Willows Substation, although that area is largely BLM managed land.

Cumulative Effects - Yuma clapper rail

Tucson Electric Power will construct, operate, and maintain the Pinal Central to Tortolita 500 kV transmission line with a similar alignment to SunZia. Operation of Picacho Reservoir by San Carlos Irrigation District, including to provide recreation benefits to Pinal County, may affect water levels and thus the quantity and quality of Yuma clapper rail habitat.

Cumulative Effects - Southwestern willow flycatcher

Land at the Rio Grande crossing is administered by the Middle Rio Grande Conservancy District. Ongoing consultation regarding the "Joint Biological Assessment, Bureau of Reclamation and Non-Federal Water Management and Maintenance Activities on the Middle Rio Grande, New Mexico" dated July 2012 (USBR 2012) addresses MRCGD maintenance activities. Land in the Rio Grande floodplain east of the Escondida Interior Drain to Bosquecito Road is privately owned (MRGCD 2012) and appears to have been used historically for agriculture.

The San Pedro River crossing is located within Arizona State Trust Land on the Three Links Grazing Allotment, which is managed for the benefit of the trustees. State lands west of the crossing are within the White House Allotment. Both allotments are subject to grazing which may affect establishment of nesting habitat if suitable conditions occur and may affect the quality of habitat used by migrant Southwestern willow flycatcher.

Tucson Electric Power maintains infrastructure and manages vegetation along two existing 345 kV lines crossing approximately 0.6 miles north of the proposed San Pedro crossing which may affect establishment of nesting habitat if suitable conditions occur and may affect the quality of habitat used by migrant Southwestern willow flycatchers.

Cumulative Effects - Rio Grande silvery minnow CH

Land at the Rio Grande crossing is administered by the Middle Rio Grande Conservancy District (MRGCD). Ongoing consultation regarding the "Joint Biological Assessment, Bureau of Reclamation and Non-Federal Water Management and Maintenance Activities on the Middle Rio Grande, New Mexico" dated July 2012 (USBR 2012) addresses MRCGD maintenance activities.

Cumulative Effects - Kuenzler Hedgehog Cactus

Potential Kuenzler hedgehog cactus habitat near the Gallinas Mountains is largely on private lands. Rural residential developments, recreation, and livestock grazing occur in this area, and are likely to continue or increase in the future with potential for direct and indirect effects on Kuenzler hedgehog cactus.

Cumulative Effects - Todsen's Pennyroyal

Potential Todsen's pennyroyal habitat near the Gallinas Mountains is largely on private lands. Rural residential developments and livestock grazing occur in this area, and are likely to continue or increase in the future with potential for direct and indirect effects on Todsen's pennyroyal. Potential Todsen's pennyroyal habitat on Chupadera Mesa is largely within New Mexico State Trust Land, primarily leased for cattle grazing. Private ranches are also present in the area.

Cumulative Effects - Yellow-billed cuckoo

Cumulative effects to yellow-billed cuckoo are in the same locations and similar to those identified for Southwestern willow flycatcher above.

CONCLUSION

After reviewing the current status of Lesser long-nosed bat, Mexican long-nosed bat, Southwestern willow flycatcher, Yuma clapper rail, Rio Grande silvery minnow, Kuenzler hedgehog cactus, Todsen's pennyroyal, and the proposed western yellow-billed cuckoo, the environmental baseline for the action area, the effects of the proposed SunZia Southwest Transmission Line Project, and the cumulative effects, it is the FWS's biological opinion that the SunZia Southwest Transmission Line Project , as proposed, is not likely to jeopardize the continued existence of the Lesser long-nosed bat, Mexican long-nosed bat, Southwestern willow flycatcher, Yuma clapper rail, Kuenzler hedgehog cactus, Todsen's pennyroyal, or the proposed western yellow-billed cuckoo, and is not likely to destroy or adversely modify designated critical habitat for Southwestern willow flycatcher or Rio Grande silvery minnow. Critical habitat for Todsen's pennyroyal has been designated on in the San Andres Mountains on White Sands Missile Range; however, this action does not affect that area and no destruction or adverse modification of that critical habitat is anticipated.

No critical habitat has been designated for lesser long-nosed bat, Mexican long-nosed bat, Yuma clapper rail, and Kuenzler hedgehog cactus, therefore, none will be affected.

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

Conclusion - Lesser Long-nosed Bat

- We reach this non-jeopardy conclusion for the following reasons: Implementation of the proposed action, including future vegetation management, will reduce forage availability, through removal and trimming of forage plants, along the ROW within the range of the lesser long-nosed bat and may reduce the likelihood that lesser long-nosed bat will utilize the ROW area in the future. Reduction or loss of forage availability on a 400- foot ROW crossed by bats foraging over a 40 mile radius from a roost represents a 0.91 percent reduction, although not all areas within a 40 mile radius of a roost are expected to provide foraging

habitat, however we anticipate that adequate forage vegetation will remain unaffected in adjacent areas so that the area within foraging range of known roosts remains capable of supporting foraging activities.

- Improvement of existing access roads and creation of new access along the transmission line corridor may increase recreational access to roost sites with potential for an increase in disturbance to roosts. Conservation measures to use existing roads to the extent practicable, permanently close new roads not needed for maintenance, and gate or block roads needed for maintenance to restrict public access are included in the proposed action thereby minimizing effects.
- Conservation measures to avoid and minimize effects to lesser long-nosed bat roosts and foraging habitat, with a goal of no net loss of foraging habitat, are integral to the proposed action.

Conclusion - Mexican long-nosed bat

We reach thisnon-jeopardy conclusion for the following reasons:

- Implementation of the proposed action, including future vegetation management, will reduce forage availability, through removal and trimming of forage plants, along the ROW within the range of the Mexican long-nosed bat and may reduce the likelihood that Mexican long-nosed bat will utilize the ROW area in the future. Reduction or loss of forage availability on a 400 foot ROW crossed by bats foraging over a 40 mile radius from a roost represents a 0.91 percent reduction, although not all areas within a 40 mile radius of a roost are expected to provide foraging habitat, however we anticipate that adequate forage vegetation will remain unaffected in adjacent areas so that the area within foraging range of known roosts remains capable of supporting foraging activities.
- Improvement of existing access roads and creation of new access along the transmission line corridor may increase recreational access to roost sites with potential for an increase in disturbance to roosts. Conservation measures to use existing roads to the extent practicable, permanently close new roads not needed for maintenance, and gate or block roads needed for maintenance to restrict public access are included in the proposed action thereby minimizing effects.
- Conservation measures to avoid and minimize effects to lesser long-nosed bat roosts and foraging habitat, with a goal of no net loss of foraging habitat, are integral to the proposed action.

Conclusion - Yuma clapper rail

We reach this non-jeopardy conclusion for the following reasons:

- Implementation of the proposed action will create physical obstructions in potential flight paths of Yuma clapper rails near Picacho Reservoir which may result in collisions resulting in injury or death. Habitat at Picacho Reservoir is isolated from other habitat areas in central Arizona, which will not be affected. The amount of movement between occupied habitats along the Salt and Gila Rivers in the Phoenix area and Picacho Reservoir is unknown; however, the likely movement path would follow the Gila River

and irrigated agricultural areas to the west of the terminus of the proposed action and limit the number of birds that might cross the power line corridor to the east.

- Conservation measures to increase visibility of the transmission lines to migratory birds, including Yuma clapper rail, will be included.

Conclusion - Southwestern willow flycatcher and critical habitat

We reach these non-jeopardy and non-adverse modification conclusions for the following reasons:

- Implementation of the proposed action, including future vegetation management, will interfere with the Rio Grande River crossing site's riparian successional processes and may reduce the likelihood that Southwestern willow flycatcher nests will be established in the future. We anticipate that adequate riparian vegetation will remain unaffected in upstream and downstream sites so that the Rio Grande Recovery Unit and Middle Rio Grande Management Unit remain capable of supporting nesting activities. The project won't affect stream flow, fluvial processes, or other river functions and we anticipate that the action won't preclude the FWS from reaching recovery goals.

- Implementation of the proposed action, including future vegetation management, will interfere with the San Pedro River crossing site's riparian successional processes and may reduce the likelihood that Southwestern willow flycatcher nests will be established in the future. We anticipate that adequate riparian vegetation will remain unaffected in downstream sites so that the Gila Recovery Unit and Middle Gila and San Pedro Management Unit remain capable of supporting nesting activities. The project won't affect stream flow, fluvial processes, or other river functions and we anticipate that the action won't preclude the FWS from reaching recovery goals.

- We do not anticipate that dispersal or migration activities will be measurably affected at either the Rio Grande or San Pedro River crossing because trees that do not exceed vegetation-to-conductor clearance standards will remain in the ROW, providing roosting and foraging opportunities; the 400-foot ROW width is a short distance to cross for dispersing and migrating Southwestern willow flycatchers; and because collision with transmission lines is not an identified threat to Southwestern willow flycatcher and we anticipate that the risk of collision with the transmission lines and support structures to be low.

- We anticipate minor effects to PCEs 1 (riparian vegetation) and 2 (insect prey populations) on 400 feet of stream length and up to 15.85 acres of ROW and the indirectly affected area, or approximately 0.07 percent of the 112.1 mile designated stream length of the Middle Rio Grande Management Unit and 0.08 percent of the 208,973 acres of critical habitat rangewide. Thus, while there is a measurable impact, the overall effect, considering the status of the Southwestern willow flycatcher and amount of acreage in the MU, does not raise to a level of significance to impact the function of critical habitat and the ability of the MU to reach its recovery goals.

- We anticipate minor effects to PCEs 1, and 2 on 400 feet of stream length and up to 8.8 acres of ROW and the indirectly affected area, or approximately 0.1 percent, of the 78.4 mile

designated stream length of the San Pedro in the Middle Gila/San Pedro Management Unit and 0.04 percent of the 208,973 acres of critical habitat rangewide. Thus, while there is a measurable impact, the overall effect, considering the status of the Southwestern willow flycatcher and amount of acreage in the MU, does not raise to a level of significance to impact the function of critical habitat and the ability of the MU to reach its recovery goals.

- Conservation measures to avoid and minimize effects to Southwestern willow flycatcher and avoid, minimize, and fully offset impacts to habitat through compensation are integral to the proposed action.

Conclusion - Rio Grande silvery minnow – Critical Habitat

We reach this non-adverse mofification conclusion for the following reasons:

- Implementation of the proposed action, including future vegetation management, will interfere with the Rio Grande crossing site's riparian successional processes and limit succession to a mature overstory forest, thus limiting stream shading, affecting water quality, and reducing the contribution of woody debris to the stream, affecting presence of low velocity habitat. However, we anticipate that adequate riparian vegetation will remain unaffected in upstream and downstream sites and we anticipate that the action won't preclude the FWS from reaching recovery goals.
- We anticipate effects to PCEs 2 (low velocity habitat) and 4 (water of sufficient quality) within up to 400 feet of stream length or 5.5 acres of ROW and the indirectly affected area, or 0.5 percent 157 miles and0.5 percent of the 11,418 acres of streambank area within designated critical habitat. The ability of the area to continue to contribute to the recovery of the Rio Grande silvery minnow will not be measurably affected or diminished.
- Conservation measures to avoid, minimize, and fully offset impacts to Rio Grande silvery minnow habitat through compensation are integral to the proposed action.

Conclusion - Kuenzler Hedgehog Cactus

We reach this non-jeopardy conclusion for the following reasons:

- Implementation of the proposed action will reduce the area of potential or suitable habitat for Kuenzler hedgehog cactus and may result in ground disturbance activities and injury to or destruction of individual plants. However, we anticipate that the capability of the area adjacent to the proposed ROW alignment to support Kuenzler hedgehog cactus will not be appreciably diminished and that the action won't preclude the FWS from reaching recovery goals. The action area is disjunct from other populations of Kuenzler hedgehog cactus, which will not be affected.
- Conservation measures to avoid and minimize effects to Kuenzler hedgehog cactus are integral to the proposed action.

Conclusion - Todsen's Pennyroyal

We reach this non-jeopardy conclusion for the following reasons:

- Implementation of the proposed action will reduce the area of potential or suitable habitat for Todsen's pennyroyal and may result in ground disturbance activities and injury to or destruction of individual plants. However, we anticipate that the capability of the area adjacent to the proposed ROW alignment to support Todsen's pennyroyal will not be appreciably diminished and that the action won't preclude the FWS from reaching recovery goals. The action area is disjunct from other populations of Todsen's pennyroyal, which will not be affected.
- Conservation measures to avoid and minimize effects to Todsen's pennyroyal are integral to the proposed action.

Conclusion – Yellow-billed cuckoo

We reach this non-jeopardy conclusion for the following reasons:

- Implementation of the proposed action, including future vegetation management, will interfere with the Rio Grande River and San Pedro crossing sites' riparian successional processes and may reduce the likelihood that yellow-billed cuckoo nests will be established in the future. However, we anticipate that adequate riparian vegetation will remain unaffected in upstream and downstream sites.

- We do not anticipate that dispersal or migration activities will be measurably affected at either the Rio Grande or San Pedro River crossings because trees that do not exceed vegetation-to-conductor clearance standards will remain in the ROW providing roosting opportunities, the 400-foot ROW width is a short distance for dispersing and migrating yellow-billed cuckoos, and collision with transmission lines is not an identified threat to yellow-billed cuckoo and we anticipate that the risk of collision with the transmission lines and support structures to be low.

- The low likelihood that individual yellow-billed cuckoos will be affected at either the Rio Grande or San Pedro River crossing renders the proposed action unlikely to affect the recovery of the species at the site, critical-habitat-wide, and rangewide scales.

- Conservation measures to avoid and minimize effects to Yellow-billed cuckoo and avoid and minimize impacts to habitat are integral to the proposed action.

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm," is defined (50 CFR 17.3) and means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. "Harass" is defined (50 CFR 17.3) and means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to the SunZia Transmission, LLC, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require SunZia Transmission, LLC to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the BLM or SunZia Transmission, LLC must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement. [50 CFR § 402.14(i)(3)].

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

AMOUNT AND EXTENT OF TAKE

Lesser long-nosed bat

The FWS anticipates the proposed action will result in the incidental take of an unquantifiable number of lesser long-nosed bat in the form of harassment due to: 1) the removal and redistribution of foraging habitat within and along the transmission line corridor; 2) a delay between removal of forage plants and availability of nectar and pollen in inflorescences of transplanted or planted forage plants; and 3) human disturbance during construction and maintenance. The FWS anticipates incidental take of lesser long-nosed bats will be difficult to detect because they are wide ranging and forage up to 40 miles from the roost each night, have a small body size, and roost below ground in caves and mines where they are difficult to monitor. The FWS chose foraging habitat as a surrogate because lesser long nosed bats in the wild feed

exclusively on nectar and pollen from inflorescences of columnar cacti and agaves and may be affected by reduction in foraging habitat through an increase in foraging time and flight distance. Although we cannot quantify the number of bats likely to be taken, we anticipate incidental take will be exceeded if the concentration of columnar cactus and agave flowers has not returned to pre-construction levels within five years of the completion of construction.

Mexican long-nosed bat

The FWS anticipates the proposed action will result in the incidental take of an unquantifiable number of Mexican long-nosed bats in the form of harassment due to: 1) the removal and redistribution of foraging habitat along the transmission line corridor; 2) a delay between removal of forage plants and availability of nectar and pollen in inflorescences of transplanted or planted forage plants; and human disturbance during construction and maintenance. The FWS anticipates incidental take of Mexican long-nosed bats will be difficult to detect because they are wide ranging and forage up to 40 miles from the roost each night, have a small body size, and roost below ground in caves and mines where they are difficult to monitor. The FWS choose foraging habitat as a surrogate because Mexican long nosed bats in the wild feed exclusively on nectar and pollen from inflorescences of agaves and may be affected by reduction in foraging habitat by increase in foraging time and flight distance. Although we cannot quantify the number of bats likely to be taken, we anticipate incidental take will be exceeded if the concentration of columnar cactus and agave flowers has not returned to pre-construction levels within five years of the completion of construction.

Yuma clapper rail

In determining if incidental take is likely to occur as a result of the proposed action, two conditions must be met; the listed species must be reasonably certain to occur in the location where take would occur and the proposed action must be reasonably certain to result in take. In analyzing whether or not incidental take of Yuma clapper rail would occur associated with the proposed project near Picacho Reservoir, our analysis first considered if both conditions were met.

We are unable to meet the two conditions for incidental take for the following reasons:

- Suitable habitat conditions for Yuma clapper rails in Picacho Reservoir depend on the presence of water for sufficient duration for the growth and maturation of marsh vegetation. Picacho Reservoir is not regularly operated for water storage by San Carlos Irrigation District although standing water does sporadically occur there. We are unable to be reasonably certain that presence of water would support suitable habitat for Yuma clapper rail and thus we are not reasonably certain that Yuma clapper rail will occur at Picacho Reservoir.

Because the two conditions in determining incidental take are not met, the FWS is unable to anticipate that incidental take of Yuma clapper rails will result from the proposed action.

Southwestern willow flycatcher

The proposed action does not include ROW maintenance during the nesting season. However, the FWS anticipates that the proposed action will alter behavior of an unquantifiable number of Southwestern willow flycatchers during maintenance activities if implemented during migration,

but we do not anticipate that these effects will result in incidental take because these activities would occur for a short duration (over a few days) on a small area, and alternate Southwestern willow flycatcher habitat is available adjacent to the project alignment. If emergency maintenance activities become necessary during the breeding season, the BLM would be required to initiate emergency consultation with FWS. Given the above, we do not anticipate that incidental take of Southwestern willow flycatchers will result from the proposed action.

Yellow-billed cuckoo

As described in the proposed action, construction and maintenance in riparian woodlands would take place between September 15 and March 1 to avoid disturbance of nesting or fledgling yellow-billed cuckoos and no incidental take is assigned to this activity. Because emergency maintenance at the Rio Grande and San Pedro river crossings during the nesting period is not reasonably certain to occur, we are unable to assign incidental take to this activity and emergency consultation will be required.

The Fish and Wildlife Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In this biological opinion, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat for the reasons stated in the Conclusions section.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

Lesser long-nosed bat

The FWS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of lesser long-nosed bat.

1.Protect and maintain lesser long-nosed bat foraging habitat.

2.Monitor implementation of conservation measures and report to our office.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the BLM must comply with the following term and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following term and condition will implement reasonable and prudent measure 1:

1.1 The BLM shall ensure that agave and saguaro salvage would be augmented, as necessary, to achieve a goal of no net loss of mature flowering plants within 5 years of initiation of monitoring following completion of initial restoration activities.

The following term and condition will implement reasonable and prudent measure 2:

2.1 The BLM shall submit an annual summary report to our office, by January 1 each year, documenting implementation of RPM 1.

Mexican long-nosed bat

The FWS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of Mexican long-nosed bat.

3.Protect and maintain Mexican long-nosed bat foraging habitat.

4.Monitor implementation of conservation measures and report to our office.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the BLM must comply with the following term and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following term and condition will implement reasonable and prudent measure 3:

3.1 The BLM shall ensure that agave would be augmented, as necessary, to achieve a goal of no net loss of mature flowering plants within 5 years of initiation of monitoring following completion of initial restoration activities.

The following term and condition will implement reasonable and prudent measure 4:

4.1 The BLM shall submit an annual summary report to our office, by January 1 each year, documenting implementation of RPM 3.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The BLM must immediately provide an explanation of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures.

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, New Mexico, 87113, telephone (505) 248-7889, within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Lesser Long-nosed Bat

- We recommend that the BLM work with us, Arizona Game and Fish Department (AGFD), and New Mexico Department of Game and Fish (NMDGF) to implement recovery actions for lesser long-nosed bat.

Mexican long-nosed bat

- We recommend that the BLM work with us, AGFD, and NMDGF to implement recovery actions for Mexican long-nosed bat.

Yuma clapper rail

- We recommend that the BLM work with us, AGFD, and California Department of Fish and Wildlife to implement recovery actions for Yuma clapper rail.

Southwestern willow flycatcher

- We recommend that the BLM work with us, AGFD, and NMDGF to implement recovery actions for Southwestern willow flycatcher.

Rio Grande silvery minnow – Critical Habitat

- We recommend that the BLM work with us, the Bureau of Reclamation, and NMDGF to implement conservation actions for Rio Grande silvery minnows.

Kuenzler Hedgehog Cactus

- We recommend that the BLM work with us and NMDGF to implement recovery actions for Kuenzler hedgehog cactus.

Todsen's Pennyroyal

- We recommend that the BLM work with us and NMDGF to implement recovery actions for Todsen's pennyroyal.

Yellow-billed cuckoo

- We recommend that the BLM work with us, AGFD, and NMDGF to participate in recovery planning and implementation of conservation actions for yellow-billed cuckoo.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the SunZia Southwest Transmission Line Project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

This also concludes the conference for the SunZia Southwest Transmission Line Project for effects on yellow-billed cuckoo. You may ask the FWS to confirm the conference opinion for the yellow-billed cuckoo as a biological opinion issued through formal consultation if the proposed species is listed or critical habitat is designated. The request must be in writing. If the FWS reviews the proposed action and finds there have been no significant changes in the action as planned or in the information used during the conference, the FWS will confirm the conference opinion as the biological opinion for the project and no further section 7 consultation will be necessary.

The FWS appreciates the BLMs efforts to identify and minimize effects to listed species from this project. We encourage you to coordinate the review of this project with the Arizona Game and Fish Department and the New Mexico Department of Game and Fish. We appreciate your continued coordination.

Please refer to consultation number 02EAAZ00-2013-F-0168 in future correspondence concerning this project. If you have questions or if we can be of further assistance, please contact Bill Werner (x217) or Mike Martinez (x224).

/s/Steven L. Spangle

cc (hard copy):
New Mexico Department of Game and Fish, Santa Fe, NM
Field Supervisor, New Mexico Ecological Services Office (Attn: George Dennis, Patricia Zenone, Cyndie Abeyta, Eric Hein, Laura Hudson, Lori Robertson, Deb Hill)

cc (electronic):
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Wildlife Biologists, Fish and Wildlife Service, Phoenix/Tucson, AZ
(Attn: Scott Richardson, Marit Alanen, Erin Fernandez, Jeff Servoss, Susan Sferra, Kathy Robertson, Ryan Gordon, Greg Beatty, Lesley Fitzpatrick)
Arizona Game and Fish Department, Phoenix, AZ

W:\William Werner\M BLM Final BO SunZia TL 02EAAZ00-2013-F-0168 111413.docx:cgg

LITERATURE CITED

General

Arizona Corporation Commission (ACC), 2005. Certificate of Environmental Compatibility, Docket L-00000B-04-0126, Decision 68043. Phoenix, AZ.

Bureau of Land Management (BLM). 2013. Final Environmental Impact Statement for the SunZia Southwest Transmission Project. 1050 pp. plus appendices.

_____. 2007. Final Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States. Bureau of Land Management, Nevada State Office. 539 pp.

Lesser Long-nosed Bat

Arends, A., L. J. Bonaccorsco, and M. Genoud. 1995. Basal rates of metabolism of nectarivorous bats (*Phyllostomidae*) from a semi-arid thorn forest in Venezuela. *Journal of Mammalogy*. 76: (3) 947- 956.

Arita, H.T. 1993. Conservation biology of the cave bats of Mexico. Journal of Mammalogy 74 (3): 693-702.

_____ . 1991. Spatial segregation in Long-nosed Bats, *Leptonycteris nivalis* and *Leptonycteris curasoae*, in Mexico. Journal of Mammalogy 72 (4): 706-714.

Arita, H.T., and S.R. Humphrey. 1988. Revision taxonomica de los murcielagos magueyeros del genero *Leptonycteris* (Chiroptera: Phyllostomatidae). Acta Zoologica Mexicana 29: 1-60.

Arizona Game and Fish Department (AGFD). 2009. Lesser long-nosed bat roost count summary data (2005 – 2009) provided by Angela McIntire, AGFD Bat Program Manager, to Scott Richardson, USFWS, on August 13, 2009.

_____. 2005. Comments submitted 5/3/05 and 5/12/05, in response to Federal Register Notice of Review (70 FR 5460) for the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*).

_____. 2003. Lesser long-nosed bat (*Leptonycteris yerbabuenae)*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona. 8 pp.

Barbour, R.W., and W.H. Davis. 1969. Bats of America. The University of Kentucky Press. 286 pp.

Bat Conservation International. 2011. Southwest Subterranean Program: Roost and Water Conservation for Pollinating and Insect-Eating Bats. Report to the USDA Natural Resources Conservation Service: Conservation Innovation Grants. 37 pp.

Bogan, M.A., P.M. Cryan, and C.D. Weise. 2006. Roosts and nocturnal movements of Long-nosed Bats (*Leptonycteris curasoae* and *L. nivalis*) in southwestern New Mexico. Final administrative report submitted to the BLM Las Cruces District Office. U.S. Geological Survey Fort Collins Science Center and University of New Mexico. 50 pp.

Bureau of Land Management (BLM). 1998. Muleshoe Ecosystem Management Plan and Environmental Assessment. 206 pp.

Cryan, P.M. 2007. Emergence counts of endangered Long-nosed Bats (*Leptonycteris curasoae* and *L. nivalis*) at major roosts in southwestern New Mexico during 2006. Final administrative report submitted to the BLM Las Cruces District Office. U.S. Geological Survey Fort Collins Science Center. 11 pp.

Cryan, P.M., and E. Valdez. 2009. Dispersal of Lesser long-nosed bats (*Leptonycteris yerbabuenae*) from a major roost in the Big Hatchet Mountains of Hidalgo County, New Mexico. Final administrative report submitted to the BLM Las Cruces District Office. 39 pp.

Cockrum, E. L. 1991. Seasonal distribution of northwestern populations of the long-nosed bats, *Leptonycteris sanborni* Family *Phyllostomidae*. Anal. Instit. Biol;. Univ. Nac. Autonoma de Mexico, Ser. Zool. 60:181-202.

Cockrum, E.L. and Y. Petryszyn. 1991. The long-nose bat, *Leptonycteris*: an endangered species in the Southwest? Occas. Papers. Mus. Texas Tech Univ. 142:1-32.

_____. 1986. Opportunism vs. specialization: the evolution of feeding strategies in frugivorous bats, by W. Junk. Pp. 105-118 in *Frugivorous and seed dispersal*. A. Estrada and T. H. Fleming, eds. Dordrecht, Netherlands.

Dalton, V.M., D.C. Dalton, and S.L. Schmidt. 1994. Roosting and foraging use of a proposed military training site by the long-nosed bat, Leptonycteris curasoae. Report to the Luke Air Force Natural Resources Program, Contract Nos. DACA65-94-M-0831 and DACA65-94-M-0753. 34pp.

England, A.E. 2012. Pollination Ecology of *Agave palmeri* in New Mexico, and Landscape Use of *Leptonycteris nivalis* in Relation to Agaves. Dissertation submitted to The University of New Mexico. 198 pp.

Findley, J.S. Harris, A.H., Wilson, D.E., and Jones, C. 1975. Mammals of New Mexico. University of New Mexico Press, Albuquerque, New Mexico. 360 pp.

Gentry, H.S. 1982. Agaves of continental North America. University of Arizona Press, Tucson. 679 pp.

Hoffmeister, D. F. 1986. *Mammals of Arizona*. Tucson: University of Arizona Press.

Horner, M.A., T.H. Fleming, and M.D. Tuttle. 1990. Foraging and movement patterns of a nectar feeding bat. *Leptonycteris curasoae*. *Bat Research News* 31:81.

Horner, M.A., T.H. Fleming, and C.T. Sahley. 1998. Foraging behaviour and energetics of a nectar-feeding bat, *Leptonycteris curasoae* (Chiroptera: Phyllostomidae). Journal of Zoology 244: 575-586.

Howell, D.J. and B.S. Roth. 1981. Sexual reproduction in agaves: the benefits of bats; the costs of semelparous advertising. Ecology, 62(1) 1-7.

Hoyt, R. A., J. S. Altenbach, and D. J. Hafner. 1994. Observation on long-nosed bats (*Leptonycteris)* in New Mexico. *Southwestern Naturalist*. 39:175-179.

Kearney, T., and R.H. Peebles. 1960. Arizona flora with supplement. University of California Press, Los Angeles. 1085 pp.

Lowery, S.F., S.T. Blackman, and D. Abbate. 2009. Urban movement patterns of lesser long-nosed bats (*Leptonycteris curasoae*): management implications for the Habitat Conservation Plan within the City of Tucson and the Town of Marana. AGFD Final Report. 21 pp.

Lowery, S.F., S.T. Blackman, and D. Abbate. 2009. Urban movement patterns of lesser long-nosed bats (*Leptonycteris curasoae*): management implications for the Habitat Conservation Plan within the City of Tucson and the Town of Marana. Research Branch, Arizona Game and Fish Department. Phoenix, Arizona. 25 pp.

Ober, H.K., and R.J. Steidl. 2004. Foraging rates of *Leptonycteris curasoae* vary with characteristics of *Agave palmeri*. The Southwestern Naturalist 49 (1): 68-74.

Ober, H.K., R.J. Steidl, and V.M. Dalton. 2005. Resource and spatial-use patterns of an endangered vertebrate pollinator, the Lesser long-nosed bat. The Journal of Wildlife Management 69 (4): 1615-1622.

Ober, H.K., R.J. Steidl, and V.M. Dalton. 2000. Foraging ecology of lesser long-nosed bats. Final Report to University of Arizona, School of Renewable Natural Resources, Tucson, Arizona. 25 pp.

Plant Sciences Center. 2012. *Agave palmeri*. Internet site accessed September 12, 2012. Available at: http://ag.arizona.edu/cochise/psc/agave_palmeri.htm

Rogers, G.F. 1985. Mortality of burned *Cereus giganteus*. Ecology 66 (2): 630 – 632.

Rojas-Martinez, A., A. Valiente-Banuet, M. del Coro Arizmendi, A. Alcantura-Eguren, and H.T. Arita. 1999. Seasonal distribution of the Long-Nosed Bat (*Leptonycteris curasoae*) in North America: does a generalized migration pattern really exist? Journal of Biogeography 26 (5): 1065-1077.

Shreve, F. & I. L. Wiggins. 1964. Vegetation and flora of the Sonoran Desert, 2 vols. Stanford Univ. Press, Stanford. 1740 pp.

Sidner, R. 2005. Fifteen years of monitoring the endangered lesser long-nosed bat (Leptonycteris curasoae) and other bat species on the Fort Huachuca Military Installation, Cochise

County, Arizona. June-November 2004. EEC Project Report to Commander, U.S. Army Garrison, Fort Huachuca, AZ. 105 pp.

_____. 2000. Report of activities under permit TE-821369-0. Report to the US Fish and Wildlife Service, Albuquerque, New Mexico.

Sidner, R. and F. Houser. 1990. Lunarphilia in nectar-feeding bats in Arizona. Bat Research News 31(4):15.

Slauson, L.A. 2000. Pollination biology of two chiropterophilous agaves in Arizona. American Journal of Botany 87(6): 825-836.

Tibbitts, T. 2006. Annual report for threatened and endangered species permit No. TE19458. Resources Management Division. Organ Pipe Cactus National Monument, Ajo, Arizona.

Tibbitts, Tim. 2005. Annual report for threatened and endangered species permit No. TE19458-1. Resources Management Division, Organ Pipe Cactus National Monument, Ajo, Arizona.

USDI, Bureau of Land Management (BLM). 2004. Proposed Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management. Arizona State Office. Phoenix, Arizona.

_____. 2003. Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management Environmental Assessment and Finding of No Significant Impact. September.

U.S. Fish and Wildlife Service (USFWS). 2012. Lesser long-nosed bat database. Tucson, AZ.

_____. 2007. 5-year review of lesser long-nosed bat / *Leptonycteris curasoae yerbabuenae*. Region 2, Southwest, Arizona Ecological Services Field Office, Phoenix, Arizona. 43 pp.

_____. 2005. Endangered and threatened wildlife and plants: 5-year review of lesser long-nosed bat, black-capped vireo, Yuma clapper rail, Pima pineapple cactus, gypsum wild-buckwheat, Mesa Verde cactus, and Zuni fleabane. Federal Register 70(21):5460-5463.

_____. 2001. Lesser long-nosed bat: General Species Information. Available at: http://www.fws.gov/arizonaes/Lesser.htm.

_____. 1997. Lesser Long-nosed Bat Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 49 pp.

_____. 1988. Endangered and threatened wildlife and plants; determination of endangered status for the two long-nosed bats. Federal Register 53 (190): 38456.

U.S. Forest Service (USFS). 2011. Coronado National Forest Galiuro Mountains Ecosystem Management Area Transportation Analysis Plan. Coronado National Forest, Safford Ranger District. 86 pp.

Weiss, J.L., and J.T. Overpeck. 2005. Is the Sonoran Desert losing its cool? Global Change Biology 11:2065-2077.

WestLand Resources. 2009. Lesser Long-nosed Bat survey of the Rosemont Holdings and vicinity. Report to Rosemont Copper Company. 51 pp.

Wolf, S. and D. Dalton. 2005. Comments submitted 4/20/05 and 5/2/05, in response to Federal Register Notice of Review (70 FR 5460) for the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*).

Mexican long-nosed bat

Arita, H.T. 1993. Conservation biology of the cave bats of Mexico. Journal of Mammalogy 74 (3): 693-702.

_____ . 1991. Spatial segregation in Long-nosed Bats, *Leptonycteris nivalis* and *Leptonycteris curasoae*, in Mexico. Journal of Mammalogy 72 (4): 706-714.

Arita, H.T., and S.R. Humphrey. 1988. Revision taxonomica de los murcielagos magueyeros del genero *Leptonycteris* (Chiroptera: Phyllostomatidae). Acta Zoologica Mexicana 29: 1-60.

Barbour, R.W., and W.H. Davis. 1969. Bats of America. The University of Kentucky Press. 286 pp.

Bat Conservation International. 2011. Southwest Subterranean Program: Roost and Water Conservation for Pollinating and Insect-Eating Bats. Report to the USDA Natural Resources Conservation Service: Conservation Innovation Grants. 37 pp.

Bogan, M.A., P.M. Cryan, and C.D. Weise. 2006. Roosts and nocturnal movements of Long-nosed Bats (*Leptonycteris curasoae* and *L. nivalis*) in southwestern New Mexico. Final administrative report submitted to the BLM Las Cruces District Office. U.S. Geological Survey Fort Collins Science Center and University of New Mexico. 50 pp.

Ceballos, G., T. H. Fleming, C. Chavez, J. Nassar. 1997. Population dynamics of *Leptonycteris curasoae* (Chiroptera: Phyllostomidae) in Jalisco, Mexico. Journal of Mammalogy 78 (4): 1220-1230.

Cockrum, E. L. 1991. Seasonal distribution of northwestern populations of the long-nosed bats, *Leptonycteris sanborni* Family *Phyllostomidae*. Anal. Instit. Biol;. Univ. Nac. Autonoma de Mexico, Ser. Zool. 60:181-202.

Cryan, P.M. 2007. Emergence counts of endangered Long-nosed Bats (*Leptonycteris curasoae* and *L. nivalis*) at major roosts in southwestern New Mexico during 2006. Final administrative report submitted to the BLM Las Cruces District Office. U.S. Geological Survey Fort Collins Science Center. 11 pp.

Cryan, P.M., and E. Valdez. 2009. Dispersal of Lesser long-nosed bats (*Leptonycteris yerbabuenae*) from a major roost in the Big Hatchet Mountains of Hidalgo County, New

Mexico. Final administrative report submitted to the BLM Las Cruces District Office. 39 pp.

Easterla, D.A. 1973. Ecology of the 18 species of Chiroptera at Big Bend National Park, Texas. Northwest Missouri State University Studies. 34:1-165.

Easterla, D.A. 1972. Status of *Leptonycteris nivalis* (Phyllostomidae) in Big Bend National Park, Texas. Southwestern Naturalist. 17:287-292.

England, A.E. 2012. Pollination Ecology of *Agave palmeri* in New Mexico, and Landscape Use of *Leptonycteris nivalis* in Relation to Agaves. Dissertation submitted to The University of New Mexico. 198 pp.

Gentry, H.S. 1982. Agaves of continental North America. University of Arizona Press, Tucson. 679 pp.

Hoffmeister, D.F. 1986. Mammals of Arizona. The University of Arizona Press, Tucson, AZ. 602 pp.

Hoyt, R.A., J.S. Altenbach and D.J. Hafner. 1994. Observations on long-nosed bats (*Leptonycteris*) in New Mexico. Southwestern Naturalist 39: 175-179.

Moreno-Valdez, A., R.L. Hunnicutt, and W.E. Grant. 2004. Colony dynamics of *Leptonycteris nivalis* (Mexican long-nosed bat) related to flowering *Agave* in northern Mexico. Journal of Mammalogy 85 (3): 453-459.

Plant Sciences Center. 2012. *Agave palmeri*. Internet site accessed September 12, 2012. Available at: http://ag.arizona.edu/cochise/psc/agave_palmeri.htm

Schmidly, D.J. 1991. The Bats of Texas. Texas A&M University Press, College Station, Texas. 188pp.

Sherwin, R. 2012. Lesser Long-nosed Bat monitoring report. Annual report submitted to U.S. Fish and Wildlife Service, Section 10 TE-71473A.

U.S. Fish and Wildlife Service (USFWS). 2009. 5-Year Reviews of 23 southwestern species. FR 74 (27): 6917-6919.

_____. 2002. Reintiation of Little Picket and Madrone Prescribed Fire Project: New Timelines and Additional Acreage for 2002.

_____. 1994. Mexican long-nosed bat recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico, USA.

_____. 1988. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for two long-nosed bats. Federal Register 53 (190): 38456-38460.

U.S. Forest Service. 2004. Biological assessment on eleven land and resource management plans, USDA Forest Service, Southwestern Region, Albuquerque, New Mexico, USA.

Wilson, D.E. 1985. Status report: *Leptonycteris sanborni* Hoffmeister, Sanborn's longnosed bat. U.S. Fish and Wildlife Service. Denver Wildlife Rescue Center, Museum of Natural History, Washington D.C., USA.

Yuma clapper rail

Anderson, B.W., and R.D. Ohmart. 1985. Habitat use by Clapper Rails in the lower Colorado River valley. Condor 87: 116-126.

Avian Powerline Interaction Committee. 2012. Reducing Avian Collisions with Powerlines: the State of the Art in 2012. Edison Electric Institute and APLIC. Washington, DC. 184 pp.

Banks, R.C. and R.E. Tomlinson. 1974. Taxonomic status of certain clapper rails of southwestern United States and northwestern Mexico. Wilson Bulletin. 86(4):325-335.

Conway, C.J., C.P. Nadeau, and L. Piest. 2010. Fire helps restore natural disturbance regime to benefit rare and endangered marsh birds endemic to the Colorado River. Ecological Applications 20(7): 20240-2035.

Conway, C.J., W.R. Eddleman, S.H. Anderson, and L.R. Hanebury. 1993. Seasonal changes in Yuma clapper rail vocalization rate and habitat use. Journal of Wildlife Management 57(2):282-290.

Eddleman, W.R. 1989. Biology of the Yuma clapper rail in the southwestern U.S. and northwestern Mexico. Final Report to Bureau of Reclamation, Yuma Projects Office and Fish and Wildlife Service, Region 2. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming. 127 pp.

Eddleman, W.R., F.L. Knopf, B. Meanley, F.A. Reid, and R. Zembal. 1988. Conservation of North American rallids. The Wilson Bulletin 100 (3): 458-475.

Hinojosa-Huerta, O., S. DeStefano, and W.W. Shaw. 2001. Distribution and abundance of the Yuma clapper rail (*Rallus longirostris yumanensis*) in the Colorado River delta, Mexico. Journal of Arid Environments 49: 171-182.

Hinojosa-Huerta, O., S. DeStefano, and W.W. Shaw. 2000. Abundance, distribution and habitat use of the Yuma clapper rail (*Rallus longirostris yumanensis*) in the Colorado River Delta, Mexico. Arizona Cooperative Fish and Wildlife Research Unit, University of Arizona, Tucson. 77 pp.

King, K.A., A.L. Velasco, J. Garcia-Hernandez, B.J. Zaun, J. Record, and J. Wesley. 2000. Contaminants in potential prey of the Yuma clapper rail: Arizona and California, USA, and Sonora and Baja, Mexico, 1998-1999. U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, Phoenix. 21 pp.

McKernan, R.L. and G.T. Braden. 2000. The status of Yuma clapper rail and yellow-billed cuckoo along portions of Virgin River, Muddy River and Las Vegas Wash, Southern Nevada, 2000. Report from San Bernardino County Museum, Redlands, California to U.S. Fish and Wildlife Service Southern Nevada Field Office, Las Vegas and Southern Nevada Water Authority, Las Vegas. 20 pp.

Ohmart, R.D., and R.E. Tomlinson. 1977. Foods of western Clapper Rails. The Wilson Bulletin 89 (2): 332-336.

Roberts, C.L. 1996. Trace element and organochlorine contamination in prey and habitat of the Yuma clapper rail in the Imperial Valley, California. U.S. Fish and Wildlife Service, Carlsbad Field Office, Carlsbad, California. 24 pp.

Rosenberg, K.V., R.D. Ohmart, W.C. Hunter, and B.W. Anderson. 1991. Birds of the Lower Colorado River Valley. University of Arizona Press, Tucson. 416 pp. Todd, R.L. 1971. Report on the study of the Yuma clapper rail along the Colorado River. Unpublished report for the Colorado River Wildlife Council Meeting, April 5-6, 1971 at Las Vegas, Nevada. 16 pp.

Shire, G.G., K. Brown, and G. Winegrad. 2000. Communication towers: a deadly hazard to birds, a report compiled by the American Bird Conservancy documenting the killing of 230 bird species. American Bird Conservancy. Washington, D.C. 23 pp.

Todd, R.L. 1986. A saltwater marsh hen in Arizona: a history of the Yuma clapper rail (*Rallus longirostris yumanensis*). Arizona Game and Fish Department, Federal Aid Project W-95-R. Completion Report. 290 pp.

Tomlinson, C.R. and K. Micone. 2000. Breeding status of the southwestern willow flycatcher and initial surveys for the Yuma clapper rail at various sites in southern Nevada. Program Activities Report, January 1, 1999 through December 31, 1999. Nevada Division of Wildlife, Las Vegas. 20 pp.

Tomlinson, R.E. and R.L. Todd. 1973. Distribution of two western clapper rail races as determined by responses to taped calls. Condor. 75(2):177-183.

U.S. Fish and Wildlife Service. 2010. Yuma clapper rail Recovery Plan (*Rallus longirostris yumanensis*). Draft First Revision. U.S. Fish and Wildlife Service, Southwestern Region, Albuquerque, New Mexico. 64 pp.

U.S. Fish and Wildlife Service. 1983. Yuma clapper rail Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 51 pp.

Wilbur, S.R. and R.E. Tomlinson. 1976. The literature of the western clapper rails. U.S. Fish and Wildlife Service. Special Scientific Report – Wildlife No. 194. Washington, D.C. 31pp.

Southwestern Willow Flycatcher

Ahlers, D., V. Johanson, S. Ryan, R. Siegle. 2010. Southwestern Willow Flycatcher Habitat Suitability, 2008. Highway 60 Downstream to Elephant Butte Reservoir, NM. U.S.

Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 271 pp.

Arizona Department of Water Resources (ADWR) 2010. Arizona Water Atlas. Volume 3: Southeastern Arizona Planning Area. Phoenix, Arizona. 617 pp.

Browning, M.R. 1993. Comments on the taxonomy of *Empidonax traillii* (willow flycatcher). *Western Birds* 24:241-257.

Bureau of Reclamation (USBR). 2003. Geomorphic assessment of the Rio Grande San Acacia reach, final report. Albuquerque, NM. 75 pp.

Cardinal S.N. and E. H. Paxton. 2005. Home range, movement, and habitat use of the southwestern willow flycatcher at Roosevelt Lake, AZ – 2004. U.S. Geological Survey Report to the U.S. Bureau of Reclamation, Phoenix, AZ.

Dockens, P.E.T., and C.E. Paradzick (*eds*). 2004. Mapping and monitoring Southwestern willow flycatcher breeding habitat in Arizona: a remote sensing approach. Nongame and Endangered Wildlife Program Technical Report 223. Arizona Game and Fish Department. Phoenix, Arizona. 82 pp.

Durst, S.L, M.K. Sogge, H.C. English, H.A. Walker, B.E. Kus, and S.J. Sferra. 2008. Southwestern willow flycatcher breeding site and territory summary – 2007. U.S. Geological Survey Open–File Report 2008–1303, U.S. Geological Survey, Colorado Plateau Research Station, Flagstaff, AZ., 31pp.

_____. 2004. Southwestern willow flycatcher potential prey base and diet in native and exotic habitat. Masters Thesis. Northern Arizona University, Flagstaff, AZ.

Ellis, L. A., D. M. Weddle, S. D. Stump, H. C. English, and A. E. Graber. 2008. Southwestern willow flycatcher final survey and monitoring report. Arizona Game and Fish Department, Research Technical Guidance Bulletin #10, Phoenix, Arizona, USA.

English, H.C., A.E. Graber, S.D. Stump, H.E. Telle, and L.A. Ellis. 2006. Southwestern willow flycatcher 2005 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report 248. Arizona Game and Fish Department, Phoenix, AZ.

Finch, D.M. and S.H. Stoleson, eds. 2000. Status, ecology, and conservation of the Southwestern willow flycatcher. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 131 p.

Finch, D.M., J.F. Kelly, and J.E. Cartron. 2000. Migration and winter ecology. *In* Finch, D.M., and S.H. Stoleson, *eds*. Status, Ecology, and Conservation of the Southwestern Willow Flycatcher. General Technical Report RMRS-GTR-60. U.S. Forest Service, Rocky Mountain Research Station. Ogden, Utah. 131 pp.

Graber, A.E., D.W. Weddle, H.C. English, S.D. Stump, H.E. Telle, and L.A Ellis. 2007. Southwestern willow flycatcher 2006 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report 249. Arizona Game and Fish Department, Phoenix, AZ.

Hereford, R. 1993. Entrenchment and widening of the upper San Pedro River, Arizona. Special paper 282. U.S. Geological Survey, Flagstaff, AZ. 46 pp.

Howell, S.N.G. and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, New York. 851 pp.

Hubbard, J.P. 1987. The Status of the Willow Flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Sante Fe, New Mexico. 29 pp.

Johnson, K.L. 1992. Management for water quality on rangelands through best management practices: The Idaho approach. Pages 415-469 in Naiman, R.J. ed. Watershed Management; Balancing Sustainability and Environmental Changes, Springer-Verlag, NY.

Leenhouts, J.M., J.C. Stromberg, and R.L. Scott. 2006. Hydrologic requirements of and consumptive ground-water use by riparian vegetation along the San Pedro River, Arizona: U. S. Geological Survey, Scientific Investigations Report 2005-5163.

McLeod, M.A., T.J. Koronkiewicz, B.T. Brown, and S.W. Carothers. 2005. Southwestern willow flycatcher surveys, demography, and ecology along the lower Colorado River and tributaries. Annual report submitted U.S. Bureau of Reclamation, Boulder City, NV, by SWCA Environmental Consultants, Flagstaff, AZ.

Middle Rio Grande Conservancy District (MRGCD). 2012. Map 157, 2012 Property Map Socorro County T2S R1W 24 & T2S R1E 19. Middle Rio Grande Conservancy District, Albuquerque, NM.

Moore, S.D., and D. Ahlers, 2012a. 2012 Southwestern Willow Flycatcher Study Results. Selected Sites along the Rio Grande from Bandelier National Monument to Elephant Butte Reservoir, *New Mexico*, U.S. Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 121 pp.

_____. and D. Ahlers, 2012b. 2011 Southwestern Willow Flycatcher Study Results. Selected Sites along the Rio Grande from Bandelier National Monument to Elephant Butte Reservoir, New Mexico, U.S. Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 98 pp.

_____. and D. Ahlers, 2011. 2010 Southwestern Willow Flycatcher Study Results. Selected Sites along the Rio Grande from Belen to Elephant Butte Reservoir, New Mexico, U.S. Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 86 pp.

_____. and D. Ahlers, 2010. 2009 *S*outhwestern Willow Flycatcher Study Results. Selected Sites along the Rio Grande from Velarde to Elephant Butte Reservoir, New Mexico, U.S. Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 92 pp.

_____. and D. Ahlers, 2009. 2008 Southwestern Willow Flycatcher Study Results. Seldon Canyon/Radium Springs, New Mexico, U.S. Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 28 pp.

_____. 2006. *2006 Southwestern Willow Flycatcher Study Results - Selected Sites Along the Rio Grande From Velarde to Elephant Butte Reservoir, New Mexico,* U.S. Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 77 pp.

Owen, J.C., M.K. Sogge, and M.D. Kern. 2005. Habitat and sex differences in physiological condition of breeding Southwestern willow flycatchers (*Empidonax traillii extimus*). The Auk 122 (4): 1261-1270.

Owen, J.C. and M.K. Sogge. 2002. Physiological condition of Southwestern willow flycatchers in native and saltcedar habitats. U.S. Geological Survey report to the Arizona Department of Transportation.

Paxton, E., J. Owen, and M. Sogge. 2010. Southwestern willow flycatcher response to catastrophic habitat loss. Report by the USGS Colorado Plateau Research Station, Flagstaff, AZ.

_____, K. Day, T Olson, P. Wheeler, M. MacLeod, T. Koronkiewicz, and S. O'Meara. 2010. Tamarisk biocontrol impacts occupied breeding habitat of the endangered Southwestern willow flycatcher. Poster presentation at Tamarisk Coalition annual conference. Reno, NV.

_____, M.K. Sogge, S.L. Durst, T.C. Theimer, and J.R Hatten. 2007. The ecology of the Southwestern willow flycatcher in central Arizona – a 10-year synthesis report. U.S. Geological Survey Open-file Report 2007-1381. 143 pp.

_____. 2000. Molecular genetic structuring and demographic history of the Willow Flycatcher (*Empidonax traillii*). Unpublished Master's Thesis. Northern Arizona University, Flagstaff, Arizona. 46 pp.

Phillips, A.R., J. Marshall, and G. Monson. 1964. The Birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pp.

_____. 1948. Geographic variation in *Empidonax traillii*. *The Auk* 65:507-514.

Ridgely, R.S. and G. Tudor. 1994. The Birds of South America: Suboscine Passerines. University of Texas Press, Austin, Texas.

Smith, A.B., C.E. Paradzick, A.A. Woodward, P.E.T. Dockens, and T.D. McCarthey. 2002. Southwestern willow flycatcher 2001 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report #191. Arizona Game and Fish Department, Phoenix, Arizona.

Sogge, M.K., E.H. Paxton, and A.A Tudor. 2005. Saltcedar and Southwestern willow flycatchers: lessons from long-term studies in central Arizona. As published on CD ROM in: Aguirre-Bravo, Celedonio, and others. Eds. 2005. Monitoring science and technology symposium: unifying knowledge for sustainability in the Western Hemisphere. 2004 September 20-24; Denver, CO. Proceedings RMRS-P037CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

_____. 2000. Breeding season ecology. *In* Finch, D.M., and S.H. Stoleson, *eds*. Status, Ecology, and Conservation of the Southwestern Willow Flycatcher. General Technical Report RMRS-GTR-60. U.S. Forest Service, Rocky Mountain Research Station. Ogden, Utah. 131 pp.

_____. Sogge, M.K., and R.M. Marshall. 2000. A survey of current breeding habitats. *In* Finch, D.M., and S.H. Stoleson, *eds*. Status, Ecology, and Conservation of the Southwestern Willow Flycatcher. General Technical Report RMRS-GTR-60. U.S. Forest Service, Rocky Mountain Research Station. Ogden, Utah. 131 pp.

_____. Sogge, M.K., and E.H. Paxton. 2000. A summary of observed physical deformities in the Willow Flycatcher: 1996-2000. U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Colorado Plateau Field Station. Flagstaff, Arizona. 8 pp.

_____. Sogge, M.K., R.M. Marshall, S.J. Sferra and T.J. Tibbitts. 1997. A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol. Technical Report NPS/NAUCPRS/NRTR-97/12. U.S. Department of the Interior, National Park Service, Colorado Plateau Research Station. 35 pp. + Appendices.

_____. Sogge, M.K., R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A Southwestern willow flycatcher survey protocol and breeding ecology summary. National Park Service/Colorado Plateau Res. Station/N. Arizona University, Tech. Rept. NRTR-97/12. 37 pp.

Spencer, J. A., S. J. Sferra, T. E. Corman, J. W. Rourke, and M. W. Sumner. 1996. Arizona Partners In Flight 1995 Southwestern willow flycatcher survey. Technical Report 97, March 1996. Arizona Game and Fish Department, Phoenix. 69 pp.

Stoleson, S.H, and D.M. Finch. 1999. Unusual nest sites for Southwestern willow flycatchers. The Wilson Bulletin 111 (4): 574-575.

Stump, S.D., Telle, H.E., E.M. Ray, and L.A. Ellis. 2007. Southwestern Willow Flycatcher Arizona Site Summary Notebook. Arizona Game and Fish Department, Phoenix, Arizona.

Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. *Western Birds* 18:137-162.

U.S. Army Corps of Engineers (USACE). 2000. Tres Rios Feasibility Study Environmental Impact Statement. Los Angeles District, Phoenix.

U.S. Bureau of Reclamation (USBR). 2012. Joint Biological Assessment. Bureau of Reclamation and Non-Federal Water Management and Maintenance Activities on the Middle Rio Grande, New Mexico, Part I – Water Management. U.S. Bureau of Reclamation, Albuquerque Area Office, Albuquerque, New Mexico.

_____. 2003. U.S. Bureau of Reclamation's Water and river maintenance operations, Army Corps of Engineers' flood control operation, and non- Federal actions on the Middle Rio Grande, New Mexico: March 1, 2003 through February 28, 2013. U.S. Bureau of Reclamation, Albuquerque New Mexico.

U.S. Fish and Wildlife Service (USFWS). 2011. Designation of Revised Critical Habitat for the Southwestern Willow Flycatcher: Proposed Rule. *Federal Register* 76 (157): 50542.

_____. 2005a. Designation of Critical Habitat for the Southwestern Willow Flycatcher: Final Rule. *Federal Register* 70 (201): 60886.

_____. 2005b. Biological opinion on the Forest Service's continued implementation of the land, resource, and management plans for the 11 Southwestern Region national forests and grasslands, R2/ES-TE, 02-21-03-F-0366. U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico.

_____. 2002. Southwestern Willow Flycatcher Recovery Plan, Region 2, Albuquerque, NM.

_____. 1997a. Final determination of critical habitat for the Southwestern willow flycatcher. *Federal Register* 62(140):39129-39146.

_____. 1997b. Correction; final determination of critical habitat for the Southwestern willow flycatcher. *Federal Register* 62 (161): 44228.

_____. 1995. Final rule determining endangered status for the Southwestern willow flycatcher. *Federal Register* 60:10694-10715.

U.S Geological Survey (USGS). 1979. Maps showing ground-water conditions in the Lower San Pedro basin area, Pinal, Cochise, Pima, and Graham Counties, Arizona. Water Resources Investigations. Open File Report 80-954. Flagstaff, Arizona.

Rio Grande silvery minnow

Massong, T., P. Makar, and T. Bauer. 2007. Geomorphic summary of the Middle Rio Grande: Velarde to Caballo. U.S. Bureau of Reclamation, Albuquerque, New Mexico. http://www.middleriogrande.com/LinkClick.aspx?fileticket=LQ6pzOneklU%3D&tabid=467&mid=1132.

Magaña, H.A. 2007. A case for classifying the Rio Grande silvery minnow (*Hybognathus amarus*) as an omnivore. Unpublished PhD dissertation. The University of New Mexico, Albuquerque. 109 pp.

Porter, M.D., and T.M. Massong. 2004. Habitat fragmentation and modifications affecting distribution of the Rio Grande silvery minnow. Proceedings of the Second International Symposium on GIS/Spatial Analyses in Fishery and Aquatic Sciences 2: 421-432.

Roberson, A. 2010. A little fish in Big Bend: Rio Grande silvery minnow showing signs of reproduction in Texas. Eddies 3 (1): 20-23.

Torres, L.T. 2007. Habitat availability for Rio Grande silvery minnow (*Hybognathus amarus*), Pena Blanca, Rio Grande, New Mexico. Unpublished Master's Thesis. Water Resources Program, University of New Mexico. Albuquerque, NM. 70 pp.

Sublette, J., M. Hatch, and M. Sublette. 1990. The Fishes of New Mexico. University of New Mexico Press, Albuquerque, New Mexico.

U.S. Army Corps of Engineers (USACE). 2012a. Programmatic biological assessment of U.S. Army Corps of Engineers Rio Grande Floodway, San Acacia to Bosque del Apache Unit, Socorro, New Mexico. U.S. Army Corps of Engineers, Albuquerque District, Albuquerque, New Mexico.

_____. 2012b. Draft general reevaluation report/supplemental environmental impact statement II. Rio Grande Floodway, San Acacia to Bosque del Apache Unit, Socorro, New Mexico. U.S. Army Corps of Engineers, Albuquerque District, Albuquerque, New Mexico.

U.S. Bureau of Reclamation (USBR). 2012. Joint Biological Assessment. Bureau of Reclamation and Non-Federal Water Management and Maintenance Activities on the Middle Rio Grande, New Mexico, Part I – Water Management. U.S. Bureau of Reclamation, Albuquerque Area Office, Albuquerque, New Mexico.

_____. 2003. U.S. Bureau of Reclamation's Water and river maintenance operations, Army Corps of Engineers' flood control operation, and non- Federal actions on the Middle Rio Grande, New Mexico: March 1, 2003 through February 28, 2013. U.S. Bureau of Reclamation, Albuquerque New Mexico.

_____. 2001. U.S. Bureau of Reclamation's discretionary actions related to water management, U.S. Army Corps of Engineers water operations rules, and non-Federal actions related to ordinary operations on the Middle Rio Grande, New Mexico: June 30, 2001 through December 31, 2003. U.S. Bureau of Reclamation, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service (USFWS). 2010. Rio Grande silvery minnow (*Hybognathus amarus*) Recovery Plan, first revision. USFWS, Albuquerque, New Mexico. 210 pp.

_____. 2008. Establishment of a Nonessential Experimental Population of Rio Grande silvery minnow in the Big Bend reach of the Rio Grande in Texas. FR 73 (236): 74357-74372.

_____. 2007. Rio Grande Silvery Minnow (*Hybognathus amarus*) Recovery Plan. U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office. Albuquerque, NM. xiii + 175 pp.

_____. 2003a. Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico. Memorandum From Regional Director, Region 2 to Area Manager, Albuquerque Area Office, Bureau of Reclamation, March 17, 2003. U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico. Available electronically at: http://www.fws.gov/southwest/es/NewMexico/ES_bio_op.cfm.

_____. 2003b. Designation of critical habitat for the Rio Grande silvery minnow; Final Rule. FR 68 (33): 8087-8135.

_____. 2001. Programmatic biological opinion on the effects of actions associated with the U.S. Bureau of Reclamation's, U.S. Army Corps of Engineers', and non-Federal entities' discretionary actions related to water management on the Middle Rio Grande, New Mexico. U.S. Fish and Wildlife Service, Regional Office, Albuquerque, New Mexico. Available electronically at: http://www.usbr.gov/uc/albuq/library/eis/pdfs/bo_mrg_june_2001.pdf.

_____. 1999. Final designation of critical habitat for the Rio Grande silvery minnow. FR 64 (128): 36274-36290.

_____. 1994. Final Rule to list the Rio Grande silvery minnow as an endangered species. FR 59 (138): 36988-36995.

Kuenzler Hedgehog Cactus

Bureau of Land Management. 2007. Final Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States. Bureau of Land Management, Nevada State Office. 539 pp.

Marron and Associates. 2000. Discussion of Introgressive Populations of Kuenzler's Hedgehog Cactus From Along US 380 in Lincoln County, NM. Biological Report for the US 380 Improvements Project from Carrizozo to Hondo, NM.

May, B.C. 2006. The effects of fire on Kuenzler's hedgehog cactus. Unpublished Master's Thesis. Texas Tech University. Lubbock, Texas.

May, B.C., D.B. Webster, C.M. Britton, T. Bryson. 2008. Macro- and micro-habitat characteristics of Kuenzler's Hedgehog Cactus, *Echinocereus fendleri* var. *kuenzleri*. Haseltonia 14: 170-175.

Sivinski, R.C. 2004. Effects of a natural fire on a Kuenzler's Hedgehog Cactus (*Echinocereus fendleri* var. *kuenzleri*) and Nylon Hedgehog Cactus (*Echinocereus viridiflorus*) population in southeastern New Mexico. *In*: Barlow-Irick, P., J. Anderson, and C. McDonald, *eds*. Southwestern Rare and Endangered Plants: proceedings of the fourth conference. March 22-26, 2004, Las Cruces, New Mexico. U.S. Forest Service, Fort Collins, Colorado. RMRS-P-48: 93-97.

U.S. Fish and Wildlife Service (USFWS). 2005. 5-year Review: Kuenzler's Hedgehog Cactus. U.S. Fish and Wildlife Service. Albuquerque, New Mexico. 18 pp.

_____. 2003. Biological Opinion on the realignment and reconstruction of U.S. 54, Carrizozo to Vaughan (MP 130-201). New Mexico Ecological Services Field Office, Albuquerque, NM. Accessed October 2009 from: http://www.fws.gov/southwest/es/Documents/R2ES/Highway_54_improvements_Carrizozo_to_Vaughn_BO_NMSHTD.pdf

_____. 1985. Kuenzler Hedgehog Cactus Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. iv + 44 pp.

_____. 1979. Determination that *Echinocereus kuenzleri* is an endangered species. FR 44 (209): 61924-61927.

Todsen's Pennyroyal

Bureau of Land Management. 2007. Final Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States. Bureau of Land Management, Nevada State Office. 539 pp.

New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endangered plants of New Mexico. University of New Mexico Press, Albuquerque.

U.S. Fish and Wildlife Service (USFWS). 2001. Todsen's Pennyroyal (*Hedeoma todsenii*) Revised Recovery Plan. U.S. Fish and Wildlife Service. Albuquerque, New Mexico. 37 pp.

_____. 1985. Todsen's Pennyroyal (*Hedeoma todsenii* R.S. Irving) Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 26 pp.

_____. 1981. Determination of two New Mexico plants to be endangered species and threatened species with critical habitat. FR 46 (12): 5730-5733.

Yellow-billed cuckoo

Ahlers, D., S.D. Moore, and V. Johanson. 2009. *Yellow-billed Cuckoo Study Results - 2009.* U.S. Department of the Interior - Bureau of Reclamation, Denver, Colorado, and Albuquerque Area Office, New Mexico, 30 pp.

Anderson, B.W., and S.A. Laymon. 1989. Creating habitat for the yellow-billed cuckoo (*Coccyzus americana*). U.S. Department of Agriculture, Forest Service. General Technical Report PSW-110: 468-472.

Avian Powerline Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Powerlines: the State of the Art in 2012. Edison Electric Institute and APLIC. Washington, DC. 184 pp.

Banks, R.C. 1990. Geographic variation in the yellow-billed cuckoo: corrections and comments. The Condor 92 (2): 538.

Banks, R.C. 1988. Geographic variation in the yellow-billed cuckoo. The Condor 90 (2): 473-477.

Corman, T.E. and R.T. Magill. 2000. Western yellow-billed cuckoo in Arizona: 1998 and 1999 survey report. Nongame and Endangered Wildlife Program, Arizona Game and Fish Dept., Tech. Rept. 150. 49pp.

Corman, T.E. and Wise-Gervais, C. *Eds*. 2005. Arizona Breeding Bird Atlas. University of New Mexico Press, Albuquerque, NM. 636 pp.

Engineering and Environmental Consultants, Inc. (EEC). 2002. Year 2002 Southwestern Willow Flycatcher Survey and Yellow-billed Cuckoo Detections on the San Pedro Riparian National Conservation Area and Babocomari Cienega. Prepared for Directorate of Installation Support, U.S. Army Garrison, Fort Huachuca, Arizona.

Ehrlich P.R., D.S. Dobkin, and D. Wheye. 1992. Birds in Jeopardy. Stanford University Press, Stanford, CA.

Fleischer, R.C., M.T. Murphy, and L.E. Hunt. 1985. Clutch size increase and intraspecific brood parasitism in the yellow-billed cuckoo. The Wilson Bulletin 97 (1): 125-127.

Franzreb, K.E., and S.A. Laymon. 1993. A reassessment of the taxonomic status of the yellow billed cuckoo. Western Birds 24:17-28.

Halterman, M.M. 2009. Sexual dimorphism, detection probability, home range, and parental care in the yellow-billed cuckoo. Ph.D. Dissertation, Univ. of Nevada, Reno, NV.

_____. 2007. Surveys and life history studies of the yellow-billed cuckoo: summer 2006. Admin. Rept. , Bureau of Reclamation, Boulder City, NV. 13pp.

_____. 2006. Surveys and life history studies of the yellow-billed cuckoo: summer 2005. Admin. Rept. , Bureau of Reclamation, Boulder City, NV. 24pp.

_____. 2005. Surveys and Life History Studies of the Yellow-Billed Cuckoo: Summer 2004. Administrative report to the Bureau of Reclamation, Boulder City office and Bureau of Land Management, Sierra Vista, AZ, 23pp.

_____. 2004. Surveys and life history studied of the yellow-billed cuckoo: summer 2003. Admin. Rept. , Bureau of Reclamation, Boulder City, NV and Bureau of Land Management, Sierra Vista, AZ. 43pp.

_____. 2003. Surveys and Life History Studies of the Yellow-Billed Cuckoo: Summer 2002. Administrative report to the Bureau of Reclamation, Boulder City, NV and Bureau of Land Management, Sierra Vista, AZ, 45pp.

_____. Draft Survey Methodology and Natural History of the Yellow-billed Cuckoo. Southern Sierra Research Station, P.O. Box 1316 Weldon CA 93255.

_____. and S.A. Laymon. 1995. Population status, site tenacity, and habitat requirements of the Yellow-billed Cuckoo at the Bill Williams River, Arizona: Summer 1994. Admin. Rept. USDI Fish and Wildlife Service, Bill Williams River NWR, Cooperative Agreement # 1448-00002-94-022.

Hanna, W. C. 1937. California cuckoo in the San Bernardino Valley, California, Condor 39:57-59.

Hereford, R. 1993. Entrenchment and widening of the upper San Pedro River, Arizona. Special paper 282. U.S. Geological Survey, Flagstaff, AZ. 46 pp.

Holmes, J.A., C. Calvo, and M.J. Johnson. 2008. Yellow-billed cuckoo distribution, abundance, habitat use, and breeding ecology in the Verde River watershed of Arizona, 2004–2005 Final Report. Admin Rept. Arizona Game and Fish Dept. 34 pp. Hughes, J.M. 1999. Yellow-billed cuckoo (*Coccyzus americanus*), The Birds of North America Online (A. Poole, *ed*.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/418

Hughes, J.M. 1999. Yellow-billed Cuckoo (*Coccyzus americanus*), The Birds of North America Online (A. Poole, *ed*.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/418

Jay, A. 1911. Nesting of the California cuckoo in Los Angeles County, California. The Condor 8:69-73.

Johnson, M.J., J.A. Holmes, C. Calvo, I Samuels, S. Krantz, and M.K. Sogge. 2007. Yellow-billed cuckoo distribution, abundance, and habitat use along the lower Colorado and tributaries, 2006 annual report. U.S. Geological Survey Open-File Report 2007-1097. 219 pp.

Kunzmann M.R., A. Rybak, and P.S. Bennett. 2000. Yellow-billed cuckoo (*Coccyzus americanus occidentalis*) habitat identification factors using GPS and GIS analysis techniques. *In* Proceedings of the 2000 Environmental Systems Research Institute (ESRI) Twentieth Annual User Conference. June 26-30, 2000. San Diego, California.

Laymon, S.A. 1980. Feeding and nesting behavior of the yellow-billed cuckoo in the Sacramento Valley. California Dept. of Fish and Game, Wildlife Management Branch, Sacramento, CA, Admin Rep. 80-2.

Laymon, S.A., and M.D. Halterman. 1989. A proposed habitat management plan for yellow-billed cuckoos in California. U.S. Department of Agriculture, Forest Service General Technical Report PSW-110: 272-277.

McNeil, S.E., D. Tracy, J.R. Stanek, and J.E. Stanek. 2012. Yellow-billed cuckoo distribution, abundance, and habitat use on the lower Colorado River and tributaries, 2011 annual report. Lower Colorado River Multi-species Conservation Program, Bureau of Reclamation, Boulder City, NV. 121pp.

Rosenberg, K.V., R.D. Ohmart, and B.W. Anderson. 1982. Community organization of riparian breeding birds: response to an annual resource peak. The Auk 99 (2): 260-274.

Salt River Project. 2011a. Horseshoe and Bartlett Reservoirs. Habitat Conservation Plan. Annual Implementation Report. Public Review Version. Prepared for U.S. Fish and Wildlife Service. Phoenix, Arizona.

Salt River Project. 2011b. Roosevelt Habitat Conservation Plan Annual Report. Public Review Version. Prepared for U.S. Fish and Wildlife Service. Phoenix, Arizona. SRP 2011bU.S. Fish and Wildlife Service (USFWS). 2001. 12-month finding for a petition to list the yellow-billed cuckoo (*Coccyzus americanus*) as an endangered species in the western continental United States. FR 66 (143): 38611-38626.

U.S. Fish and Wildlife Service (USFWS). 2013. Proposed rule to list the yellow-billed cuckoo (*Coccyzus americanus*) as a threatened species in the western continental United States. FR 78 (192): 61622-61666.

_____. 2009. Species assessment and listing priority form: Yellow-billed Cuckoo, Western United States Distinct Population Segment. USFWS, Sacramento, California. 46 pp.

_____. 2001. 12-month finding for a petition to list the Yellow-Billed Cuckoo (*Coccyzus americanus*) as an endangered species in the western continental United States. FR 66 (143): 38611-38626.

Vernadero Group. 2009. 2009 Southwestern willow flycatcher (*Empidonax traillii extimus*) and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) monitoring report: San Pedro Riparian National Conservation Area and the Babocomari Cienega, Santa Cruz and Cochise Counties. Prepared for Environmental and Natural Resources Division Directorate of Public Works. U.S. Army Garrison, Fort Huachuca, Arizona.

TABLES

Table 1.Lesser Long-nosed Bat Roost Locations.

Mountain Range	Location	Source	Nearest Link (Distance)
Hidalgo County, New Mexico			
Animas	Pine Canyon	Bogan *et al*. 2006	B120b (56 miles)
Big Hatchet	Natural cave	Bogan *et al*. 2006	B120b (46 miles)
Peloncillo	Cowboy Flat	Cockrum 1991	B160a (70 miles)
Peloncillo	Granite Pass area	Cockrum 1991	B160a (26 miles)
Peloncillo	Abandoned mine	Sherwin 2012	B160a (21 miles)
Peloncillo	Abandoned mine	Sherwin 2012	B160a (11 miles)
Cochise County, Arizona			
Chiricahua	Blue Mountain (multiple roosts)	Cockrum 1991	B160a (33 miles)
Dos Cabezas	Abandoned mine	Bat Conservation International 2011	C110 (17 miles)
Dragoon	Abandoned mine	USFWS 1999	C261 (26 miles)
Little Rincon	Abandoned mine	S. Richardson, personal communication	Link C201 (2.4 miles)
Graham County, Arizona			
Galiuro	Muleshoe Preserve (location uncertain)	Cockrum 1991	C212 (estimated at 13 miles)
Galiuro	Muleshoe Preserve	S. Richardson, personal communication	C441 (10.2 miles)
Pima County, Arizona			
Santa Rita	Abandoned mine	WestLand Resources 2009	C201 (32 miles)
Santa Rita	Abandoned mine	WestLand Resources 2009	C201 (28 miles)
Santa Rita	Gunsight Pass	WestLand Resources 2009	C201 (31 miles)
Empire	No details (location uncertain)	Lowery *et al*. 2009	C201 (23 miles)
Rincon	Saguaro National Park (natural cave)	Lowery *et al*. 2009	C201 (17 miles)
Rincon	Colossal Cave (inactive)	Cockrum and Petryszyn 1991	C201 (16 miles)
Santa Catalina	Unnamed mine	W. Werner, personal communication	C680 (17 miles)
Pinal County, Arizona			
Picacho	Picacho State Park (inactive)	Cockrum 1991	C820 (9 miles)
Slate	Multiple abandoned mines	Cockrum 1991	C850 (35 miles)

Table 2.Mexican Long-nosed Bat Roost Locations.

Mountain Range	Location	Source	Nearest Link (Distance)
Hidalgo County, New Mexico			
Animas	Pine Canyon	Bogan *et al*. 2006	B120b (56 miles)
Big Hatchet	Natural cave	Bogan *et al*. 2006	B120b (46 miles)
Peloncillo	Cowboy Flat	Cockrum 1991	B160a (70 miles)
Peloncillo	Abandoned mine	Sherwin 2012	B160a (11 miles)

Table 3. Yuma clapper rail - Compiled survey data 2000-2010

Location	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mohave Division	0	NS	0	0	NS	NS	NS	NS	NS	NS	NS
Havasu NWR											
Topock Marsh	41	36	18	25	36	71=	46	42	31	45	42
Topock Gorge	41	38	32	66	79	43	31	61	58	57	59
Havasu Division	NS	NS	7	0	NS	NS	0	0	NS	NS	NS
Bill Williams River NWR	2	9	6	10	17	7	14	7	6	11	17
Parker Division	#	0	0	NS	NS	NS	0	NS	NS	NS	NS
Palo Verde Division	NS	9	NS	3	NS	5	0	NS	NS	NS	NS
Cibola NWR	49	31	56	60	54	82	42	33	17	34	6
Imperial Division	23	15	13	21	22	36	29	11	23	26	17
Imperial NWR	11	24	56	46	27	26	47	21	19	43	23
Laguna Division	90	53	60	119	63	46	91	95	83	106	90
S. Imperial Dam	27	4	3	34	NS	NS	17	29	40	27	34
Imperial Dam Marsh	NS	NS	NS	NS	NS	NS	12	3	7	7	9
Mittry Lake	6	NS	NS	10	NS	NS	8	7	8	12	4
Teal Alley	34	32	20	24	23	23	21	27	14	16	11
YPG Slough	23	17	37	51	40	23	33	29	14	34	32
Yuma Division	NS	2	1	NS	5	1	0	2	2	4	7
Limitrophe Division	NS	NS	3	NS	NS	9	0	NS	NS	NS	1
Lower Gila River	1	17	NS	3	64*	13+	23	13	23	24	20
Phoenix Area	11	44	57	35	52	28	23	37	26	28	15

Picacho Reservoir	NS	0	NS	NS	NS	NS	NS	NS	0	NS	NS
Imperial Wildlife Area	161	202	233	308	240	334	310	398	226	191	132
Salton Sea NWR	69	49	94	154	203	186	95	102	126	96	135
Salton Sea area	4	4	3	1	1	3	2	0	1	0	0
US TOTAL	503	533	639	851	863	890	753	822	641	639	564
Cienega/Mexico	257	93	129	243							

Table 4. Formal Consultations: Yuma clapper rail Fiscal Year 2000-2010

Consultation Number	Title	Finding
2000-0273	Interim Surplus Criteria and California Water Plan	Non-jeopardy
2000-0349	EPA Concentrated Animal Feeding	Non-jeopardy
2002-0129	Colorado River Marina	NLAA
2002-0299	Tilapia Removal in Virgin River	NLAA
2002-0509	Lake Mead National Recreation Area Fire Management Plan	NLAA
2003-0003	Roosevelt Incidental Take Permit	Non-jeopardy
2003-0022	Statewide Safe Harbor for Gila Topminnow and Desert Pupfish	Non-jeopardy
2003-0107	Field 11 and Headquarters Pond Prescribed Burn	Non-jeopardy
2003-0210	BLM Statewide Fire Suppression Program	Non-jeopardy
2004-0161	Lower Colorado River Multi-Species Conservation Program	Non-jeopardy

2004-0255	Cotton Lane Bridge over the Gila River	Non-jeopardy
2005-0176	Mittry Lake and Imperial Ponds Prescribed Burn	Non-jeopardy
2005-0231	Field 13 and Triangle Prescribed Burn	Non-jeopardy
2005-0277	Whiskey Slough Prescribed Burn	Non-jeopardy
2005-0751	Quigley Ponds Wildlife Area Prescribed Burn	Non-jeopardy
2005-0784	BLM Lake Havasu Field Office RMP	Non-jeopardy
2006-0001	Marsh Creation and Prescribed Burn at Arlington Wildlife Area	Non-jeopardy
2006-0174	Field 14 and Imperial Ponds Prescribed Burn	Non-jeopardy
2006-0224	Colorado River Interim Guidelines for Lower Basin Shortages	Covered by LCR MSCP
2006-0226	Transwestern Pipeline Phoenix Expansion Project	NLAA
2007-0122	Crystal Beach Unit 1Prescribed Burn	Non-jeopardy
2007-0196	BLM Yuma Field Office RMP	Non-jeopardy
2007-0197	Fossil Creek Allotment Management Plan	NLAA
2007-0198	Hackberry/Pivot Rock Allotment Management Plan	NLAA
2007-0212	South Limitrophe Vegetation Clearing Project	Non-jeopardy??
2007-0463	BLM Arizona Strip RMP	Non-jeopardy
2008-0126	City of Tempe Rio Salado Safe Harbor Agreement	Non-jeopardy
2008-0195	Vegetation Treatment Program for Safety and Law Enforcement in the Limitrophe, Lower Colorado River	Non-jeopardy
2008-0219	Bill Williams River Bridge Fire Repair Project	Non-jeopardy
2008-0348	Renovation of Cibola High Levee Pond	Non-jeopardy
2008-0452	Hidden Shores Village RV Park Expansion	Incomplete

2008-0486	Federal Funding for Sportfish Stocking in Arizona	NLAA
2009-0018	Integrated treatment of Noxious Weeds or Invasive Plants on the Tonto National Forest	Incomplete
2009-0118	Phoenix Reach of the Rio Salado Safe Harbor Agreement	Non-jeopardy
2009-0509	Hazardous Fuels Reduction and Vegetation Restoration in the Lower Gila River	Non-jeopardy
2011-0025	Mittry-Quigley Hazardous Fuels Reduction	Non-jeopardy
2011-0187	NRCS Conservation Practices Programmatic Consultation	Incomplete

Total Informal Consultations since 2000: 134

Table 5. Estimated rangewide population for the Southwestern willow flycatcher based on 1993 to 2007 survey data for Arizona, California, Colorado, New Mexico, Nevada, Utah, and Texas[1].

State	Number of sites with WIFL territories 1993-07[2]	Percentage of sites with WIFL territories 1993-07	Number of territories[3]	Percentage of total territories
Arizona	124	43.1 %	459	35.3 %
California	96	33.3 %	172	13.2 %
Colorado	11	3.8 %	66	5.1 %
Nevada	13	4.5 %	76	5.9 %
New Mexico	41	14.2 %	519	40.0 %
Utah	3	1.0 %	7	0.5%
Total	288	100 %	1,299	100 %

[1]Durst *et al.* 2008.

[2]Site boundaries are not defined uniformly throughout the bird's range.

[3] Total territory numbers recorded are based upon the most recent years survey information from that site between 1993 and 2007.

Table 6. Southwestern willow flycatcher surveys results on Middle Rio Grande River, New Mexico between 1997-2013.

Table 7.Acreage of Permanent Ground Disturbance Within Southwestern Willow Flycatcher Designated Critical Habitat.		
	Rio Grande (Link E180)	**San Pedro River (Link C201)**
Road Improvements	0.91	0

Location	Year						
	1997-2007[1]	2008[2]	2009[3]	2010[4]	2011[5]	2012[6]	2013[7]
Below San Acacia Diversion Dam and greater than 3.0 miles above SunZia crossing	No birds	1 unpaired male	No birds	No birds	No birds	No birds	No birds
Near SunZia crossing (3.0 miles above or below)	No birds	1 unpaired male	1 unpaired male	1 unpaired male	1 unpaired male	2 unpaired males	1 pair[8]
More than 3.0 miles below SunZia crossing downstream to US 380 bridge	No birds	No surveys	No birds	No birds	1 unpaired male	3 pairs with nests	2 pairs with nests

Structure Pads	4.78	0
Total	**5.69**	**0**

1 Moore and Ahlers 2012
2 Moore and Ahlers 2009
3 Moore and Ahlers 2010
4 Moore and Ahlers 2011
5 Moore and Ahlers 2012
6 Moore and Ahlers 2012
7 US Bureau of Reclamation, unpublished data
8 2.8 miles downstream of crossing

Table 8.Acreage of Vegetation Management Within Southwestern Willow Flycatcher Habitat.				
	Rio Grande			San Pedro River
	Designated Critical Habitat	Additional Suitable Habitat	Total	Designated Critical Habitat
Wire Zone (90 feet wide per line)	7.05	0.98	8.03	3.8
Border Zone (110 feet wide per line)	8.80	1.19	9.99	5.0
Total	**15.85**	**2.17**	**18.02**	**8.8**

Table 9.Acreage of Permanent Ground Disturbance Within Rio Grande Silvery Minnow Designated Critical Habitat.	
Road Improvements	0.67
Structure Pads	4.05
Total	**4.72**

Table 10.Acreage of Ground Disturbance Within Todsen's Pennyroyal Potential Habitat.		
	Gallinas Mountains	Chupadera Mesa
Road Improvements	60.9	61.9
Structure Pads	46.1	32.6
Temporary Disturbance	151.7	107.4
Total	**258.7**	**201.9**

Table 11.Acreage of Disturbance Within Yellow-billed Cuckoo Habitat.		
	Rio Grande	San Pedro River
Permanent Disturbance		
Road Improvements	0.91	0
Structure Pads	4.78	0
Total	**5.69**	**0**
Vegetation Management		
Wire Zone (90 feet wide per line)	8.03	3.8
Border Zone (110 feet wide per line)	9.99	5.0
Total	**18.02**	**8.8**

Figures

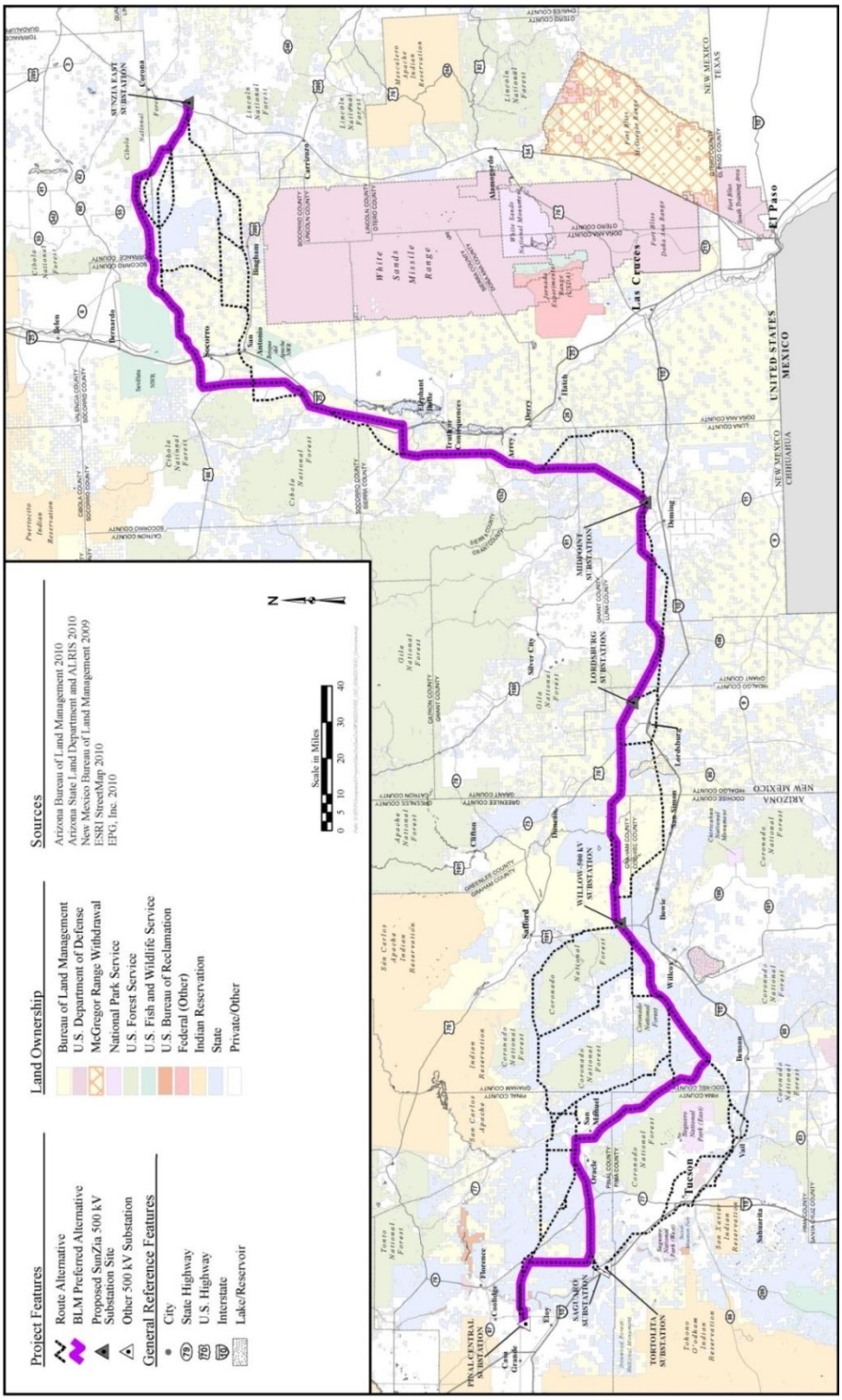

Figure 1. Alternative Routes and Land Ownership [BLM preferred alternative highlighted in purple]

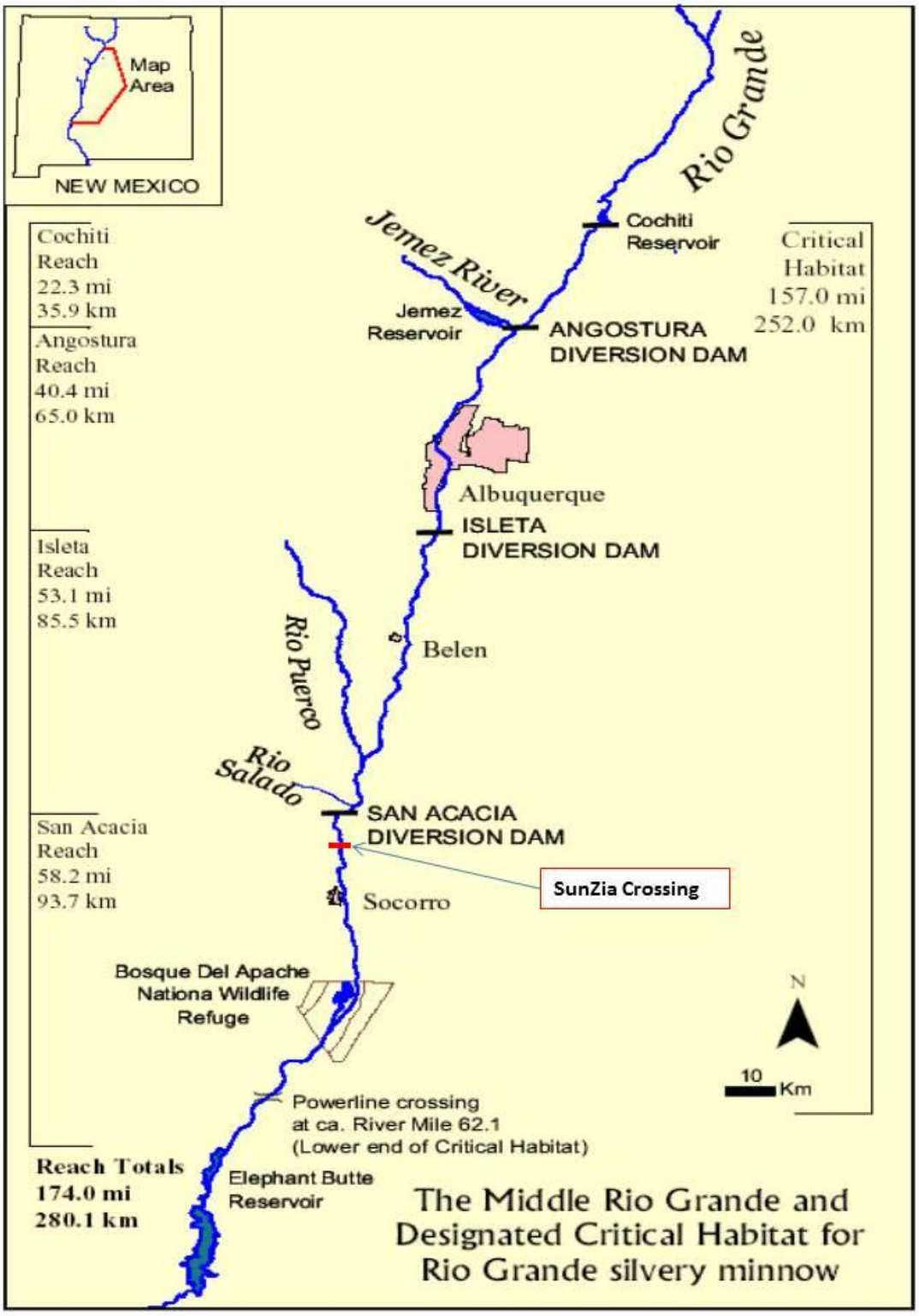

Figure 2. Rio Grande silvery minnow critical habitat

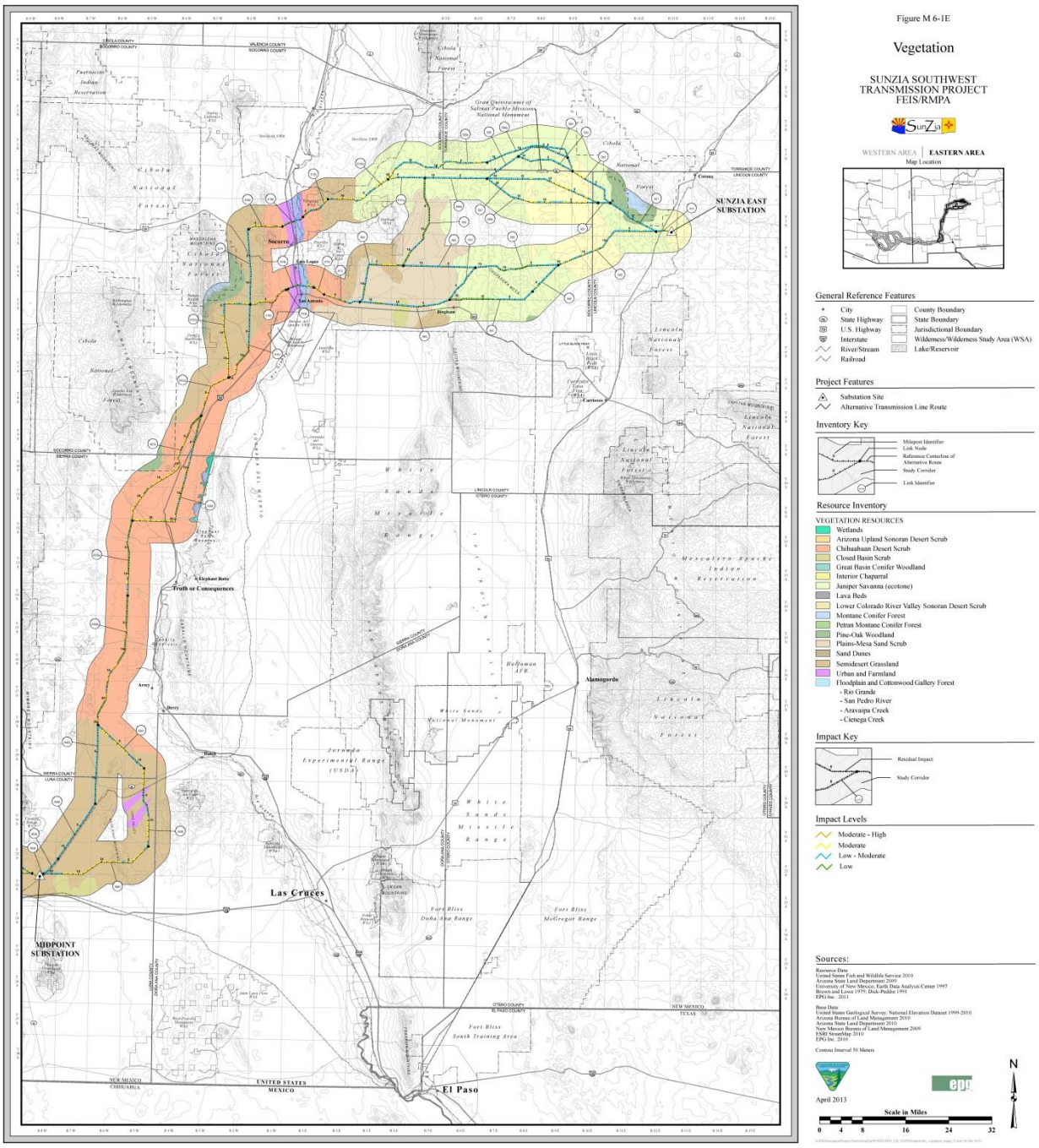

Figure 3. Vegetation associations in study corridor (eastern portion)

(see Figure 1 for BLM preferred alignment)

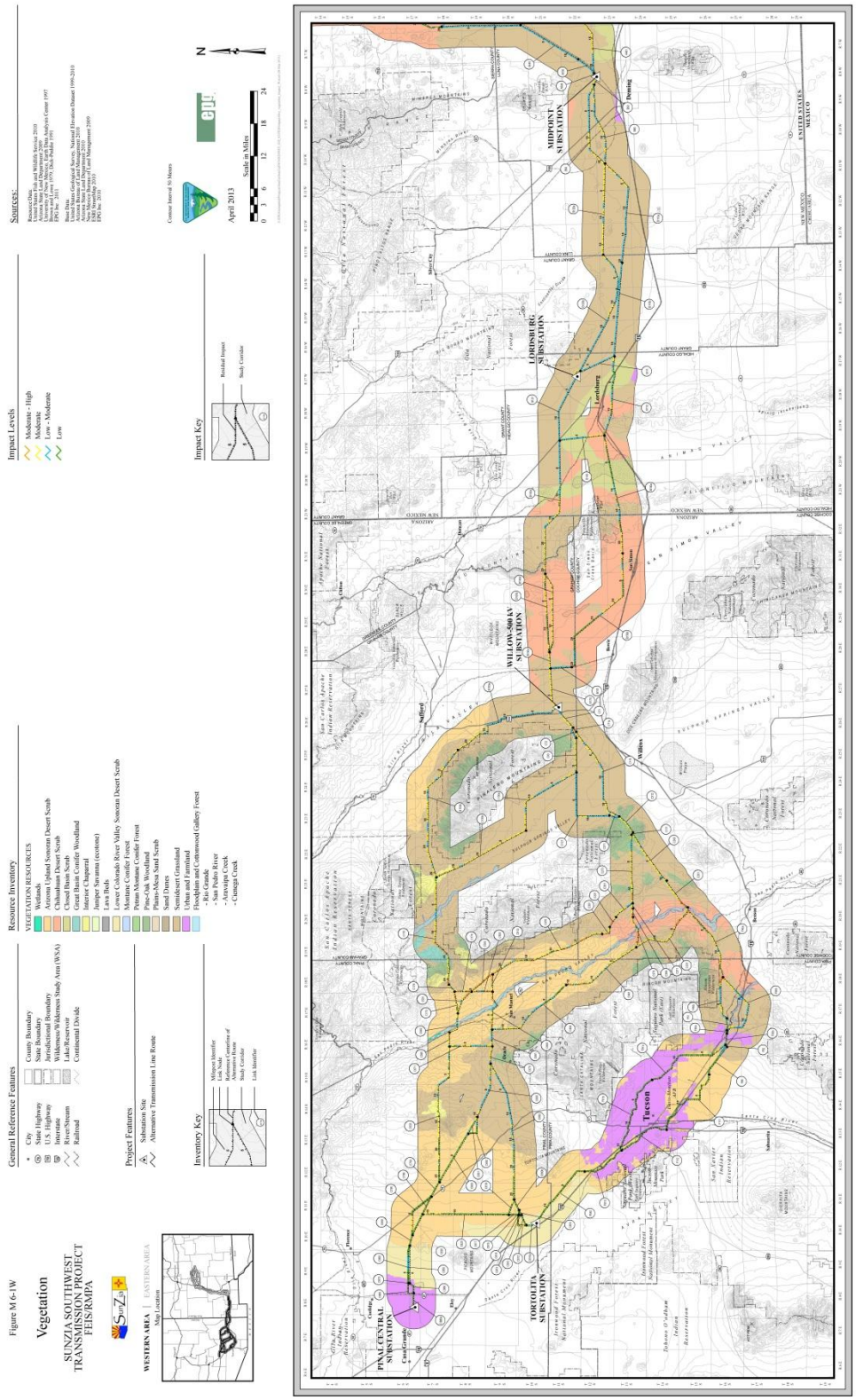

Figure 4. Vegetation associations in study corridor (western portion)

(see Figure 1 for BLM preferred alignment)

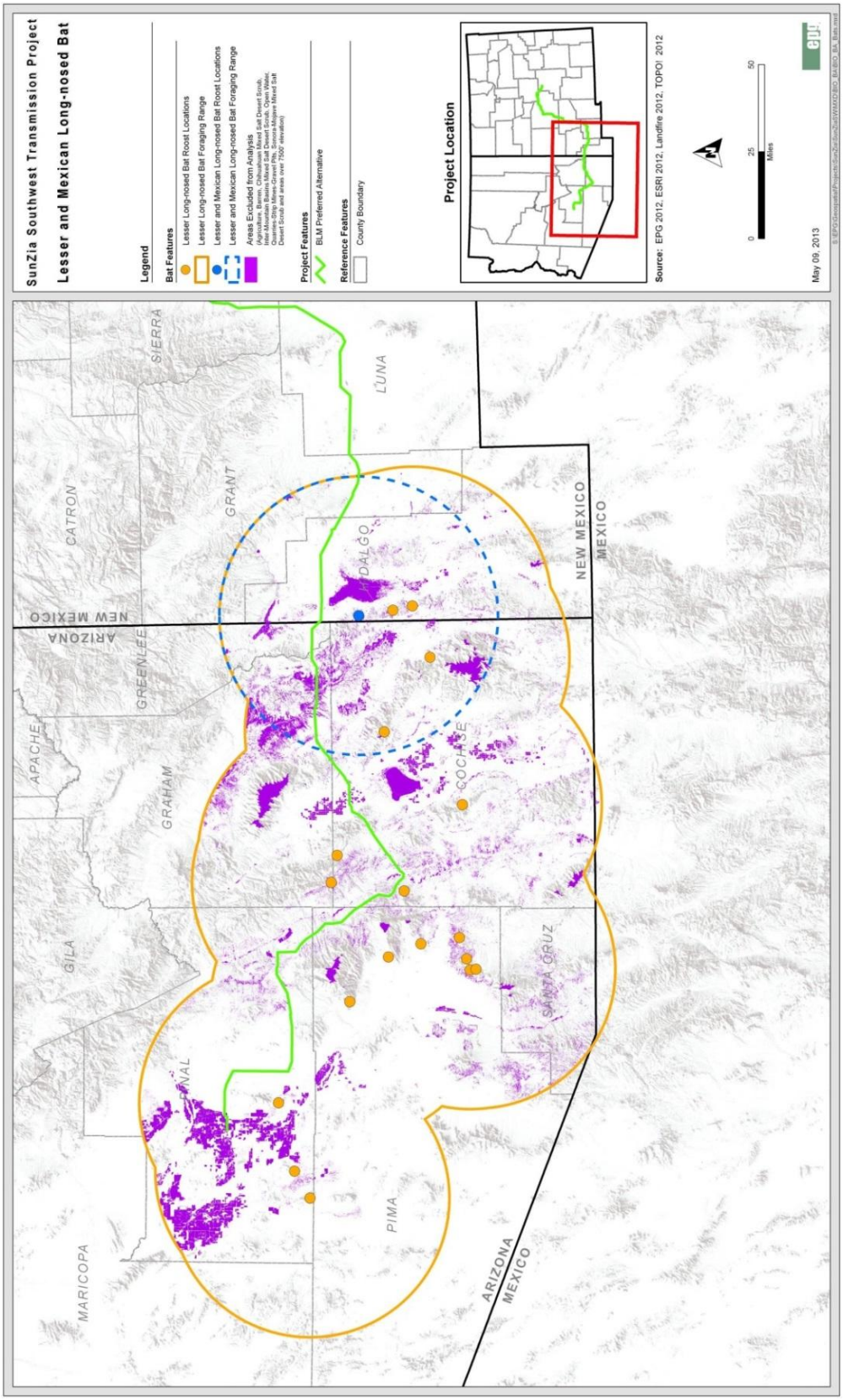

Figure 5. Lesser and Mexican long-nosed bat roost locations

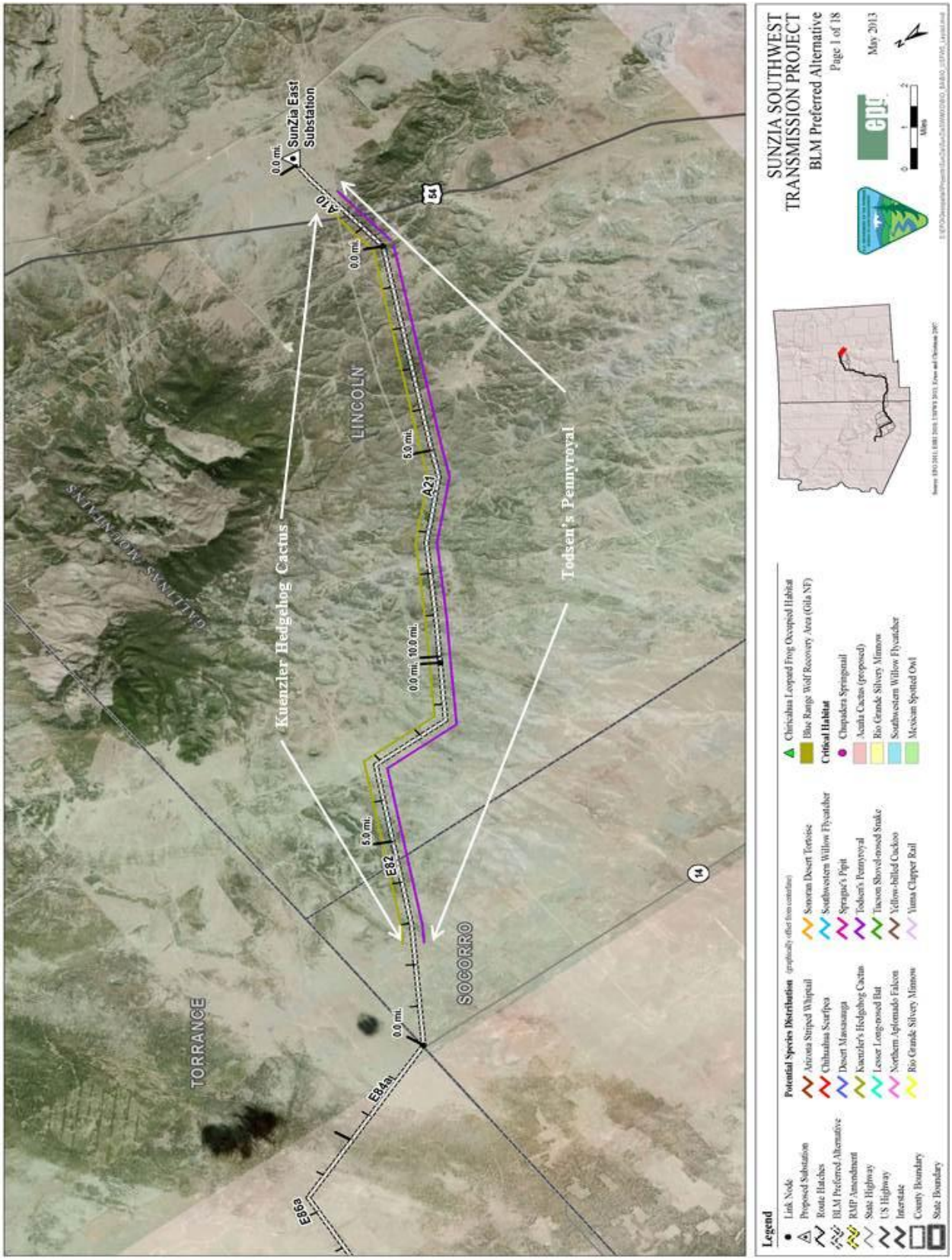

Figure 6. Kuenzler hedgehog cactus and Todsen's pennyroyal potential habitat

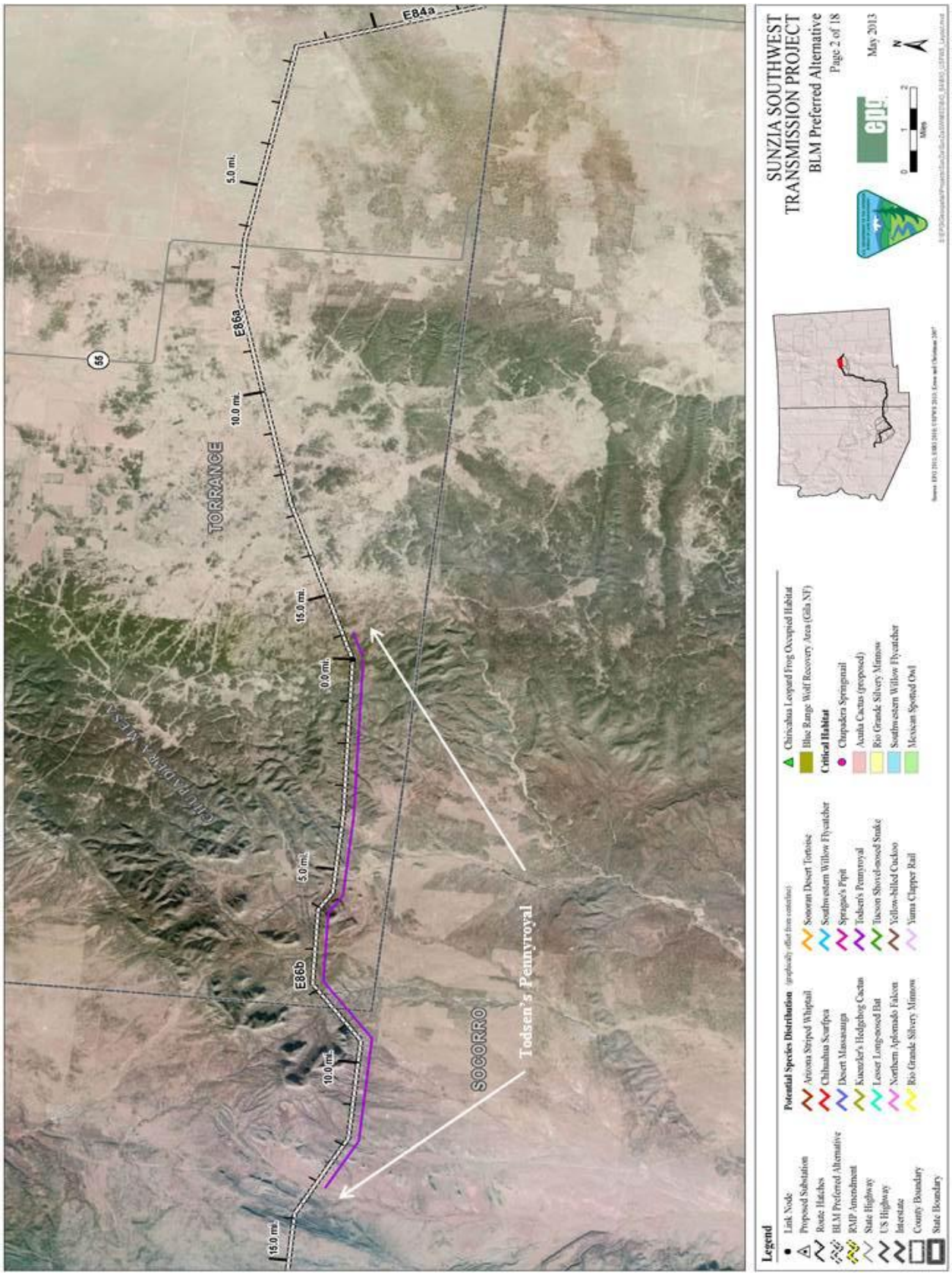

Figure 7. Todsen's pennyroyal potential habitat

Appendix A: Concurrences

In our July 2, 2013 memorandum we advised that we concur with your determinations that the proposed action, summarized in the body of the biological opinion under "Description of the Proposed Action" and described in detail in App. D, "may affect, is not likely to adversely affect" the Mexican gray wolf, jaguar and proposed critical habitat, ocelot, piping plover and designated critical habitat, and Rio Grande silvery minnow and we provide our rationales below.

Mexican gray wolf (MGW)

Historically Mexican gray wolves were generally found in montane forests, although prior to increases in grazing and other human activities would occur in grasslands in the Southwest as well. Prior to the introduction of grazing livestock, wolves were primarily predators of medium to large mammals over a large hunting territory, although other small prey may be taken opportunistically. The entire SunZia project lies within an area where MGW are designated as an experimental non-essential population with identified recovery zone. The San Andres Mountains within White Sands Missile Range (WSMR) in New Mexico and the Blue Range in Arizona are designated as primary recovery zones as part of an ongoing recovery effort which includes release of wolves into the wild, although the WSMR area has not been utilized for release of wolves. The remainder of WSMR is a secondary recovery zone. The SunZia alignment passes to the north of the WSMR secondary recovery zone, to the east of the Blue Range secondary recovery zone west of Interstate 25, and south of the Big Burro Mountains secondary recovery zone. In July 2013 the FWS proposed expanding the non-essential population area and dropping the practice of capturing wolves found outside recovery zones (78 FR35799).

Rationale for concurrence:

- It is unlikely that the species currently is resident the action area of the proposed project based on recent known records. Conservation measures are designed to minimize effects to MGW if confirmed in the project area. Any effects are expected to be insignificant.

- The design of the transmission lines includes long spans between support structures, minimizing interference with movement of large mammals. These effects are insignificant.

Jaguar and proposed critical habitat

In the United States, jaguars were historically found in varied habitats, including Madrean evergreen woodlands, semidesert grassland, desertscrub, and pine-oak woodland (Ortega-Huerta and Medley 1999; McCain and Childs 2008). The largest remaining blocks of habitat are in a number of mountain ranges near the United States-Mexico border. The FWS proposed to designate critical habitat for the jaguar in August 2012 (77 FR 50239), and revised this proposal on July 2013 (78 FR 53390). The proposed critical habitat includes mountainous areas in southeastern Arizona and southwestern New Mexico south of Interstate10 within Madrean evergreen woodland and semi-desert grassland vegetation communities in areas with greater than 1 to 50 percent cover. Jaguars range over large areas and numbers within the United States are low.

Rationale for concurrence:

- It is unlikely that the species currently is resident the action area of the proposed project based on recent known records. Conservation measures are designed to minimize effects to jaguar if confirmed in the project area. Any effects are expected to be insignificant.

- The Project would have no effect on proposed critical habitat for the jaguar. No critical habitat is proposed in the action area north of Interstate 10.

Ocelot

Ocelots are rare in Arizona with recent records of 4 individuals, 3 south of Interstate 10 and 1 north of Interstate-10 in Madrean Evergreen Woodland (USFWS 2010). An ocelot skull was found in prehistoric Davis Site near Redington in the San Pedro Valley (Burt 1961) but other bones were not found, as for other mammals of the area, raising questions of its origin.

Rationale for concurrence:

- Because ocelots are rare in Arizona and based on locations of recent records, it is not likely that the species currently occurs in the action area of the proposed project.

- If ocelots are confirmed in the project area, conservation measures are designed to minimize effects to the species, including that if an Ocelot is confirmed to occur in the Project area, construction or maintenance will only be conducted after coordination with the USFWS and applicable state game agencies to develop measures to avoid disturbance.

- The proposed project area occurs outside of Madrean Evergreen Woodland, the habitat type in which ocelots have been recently documented in Arizona.

- New access road segments will be relatively narrow and unpaved, and will not be lighted, fenced, or used frequently following construction. Existing access road segments will not experience significant increases in traffic due to the proposed project following construction. Because much of the project roughly parallels Interstate 10 or crosses state highways, providing primary access, construction traffic on county roads will likely be dispersed across multiple roads and increases in traffic will be short term. Therefore, we do not anticipate that ocelots will be struck by vehicles or impeded from crossing the new road segments.

- Construction and maintenance activities associated with the proposed project will be of short-duration and maintenance activities will be infrequent. Maintenance activities include bi-annual aerial or ground patrol of the transmission line for maintenance needs for reliability and safety and subsequent repairs. Vegetation maintenance to maintain adequate clearance to energized conductors would be conducted every 2-5 years.
- No permanent lights or noise-generating equipment, except for transmission line audible noise, will be located within the project area except at 3 new substations, which are located in open grassland areas.

- For the reasons above, we anticipate any potential direct effects (disturbance to ocelots and ocelot movement, and ocelot injury or death caused by collision with vehicles) are discountable and indirect effects (loss of habitat and habitat connectivity) are insignificant.

Piping plover and designated critical habitat

Rationale for concurrence:

- Piping plovers are rare or accidental in the Rio Grande Valley and are not known to reproduce or overwinter in the Project area. An avian protection plan (APP) and an associated migratory bird conservation strategy would be developed as a condition of the right-of-way grant and Notice to Proceed. The APP would specifically address the risk of collision for all bird species and would provide for the application of bird diverters and other appropriate measures at the Rio Grande, which would minimize risk to piping plover. Any effects are expected to be discountable.

- The Project would have no effect on designated critical habitat for the piping plover. No critical habitat is designated within Arizona or New Mexico.

Rio Grande silvery minnow

Rationale for concurrence:

- The transmission line crossings will span the channel of the Rio Grande River and helicopters will be used to string the pull lines between support structures located on the floodplain, minimizing potential for direct effects. These effects are insignificant.

- Conservation measures are designed to minimize impacts to water quality and the threat of stranding of fish in overbank areas caused by construction activities. These effects are insignificant.

Northern Mexican gartersnake with critical habitat (Proposed)

Rationale for concurrence:

- Because conservation measures are included to implement Standard and Selective Mitigation Measures (App. D – Tables 5 and 6) to minimize disturbance in the stream crossing area during construction and maintenance through design, including that structures on each side of the San Pedro River on each line are located above and outside of riparian habitat (structures 7 and 8 on App. E – Figure 27), any effects are insignificant.

Maintenance activities to maintain vegetation-to-conductor clearance conducted every three to five years may result in use of vehicles and ground disturbance at the San Pedro River crossing with a potential for crushing of Northern Mexican gartersnakes. Because the transmission lines, by design, are elevated above the existing vegetation at the San Pedro crossing (mesquite trees), minimizing need for vegetation pruning, and this effect is infrequent and of short (over a few days) duration, any effects are insignificant.

Literature Cited for Appendix A

Burt, W.H. 1961. A fauna from an Indian site near Redington, Arizona. Journal of Mammalogy 42:115-116.

McCain, E.B., and J.L. Childs. 2008. Evidence of resident jaguars (*Panthera onca*) in the southwestern United States and the implications for conservation. Journal of Mammalogy 89 (1): 1-10.

Ortega-Huerta, M.A., and K.E. Medley. 1999. Landscape analysis of Jaguar (*Panthera onca*) habitat using sighting records in the Sierra de Tamaulipas, Mexico. Environmental Conservation 26 (4): 257-269.

U.S. Fish and Wildlife Service (USFWS). 2010. Draft Ocelot *(Leopardus pardalis*) Recovery Plan, First Revision. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.

Appendix B: Conference Report – Northern Aplomado Falcon

Consultation History

April 1, 2013 BLM transmitted Biological Assessment for SunZia Southwest Transmission Project and requested formal consultation

May 1, 2013 FWS responded that information in the BLM March 28, 2013 memorandum and in the BA was not sufficient to initiate formal consultation

May 7, 2013 SunZia contractor, BLM, and FWS met to review BA information needs

June 4, 2013 FWS received BLM memorandum dated June 3, 2013 transmitting revised biological assessment requesting formal conference for northern aplomado falcon

September 30, 2013 Draft biological and conference opinion and conference report provided to BLM for review

Description of the Proposed Action

Appendix D of the BO includes a complete description of the proposed action and is included herein by reference. In summary, the proposed action is for the Bureau of Land Management (BLM) to issue a right-of-way grant to SunZia Transmission, LLC for the construction and operation of two 500 kV transmission lines from the proposed SunZia East Substation in Lincoln County, New Mexico, through Lincoln, Socorro, Sierra, Luna, Grant, and Hidalgo counties in New Mexico and Cochise, Greenlee, Graham, Pima, and Pinal counties in Arizona to the Pinal Central Substation in Pinal County (Appendix D - Figure 1).

Conservation Measures from the BA for the Northern Aplomado Falcon (AF)

Standard and selective mitigation measures (Appendix D – Tables 5 and 6) are designed to reduce ground disturbance and the potential for invasive plant colonization within aplomado falcon habitat, and are designed to reduce the potential for direct disturbance of aplomado falcons and their nests. The following conservation measures provide additional detail regarding seasonal considerations and other potential impacts.

- AF-1: Potentially suitable habitat (level or rolling terrain, current or former grasslands) within the proposed right-of-way would be characterized by grazing allotment or similar units by protocol (Young *et al*. 2002), unless previously verified by the BLM Las Cruces District Office (LCDO).
- AF-2: Preconstruction surveys would take place in habitat classified as moderate or high suitability for the aplomado falcon within the proposed right-of-way and a 1-mile buffer.
- AF-3: All existing raptor nests or other large nests found during preconstruction surveys would be preserved in place, if possible, or relocated if necessary.

- AF-4: Construction would not take place within 1 mile of occupied aplomado falcon nests between February 1 and September 1.

Status of the Species in the Action Area

Aplomado falcons in Arizona and New Mexico are part of a non-essential population (NEP) established in 2006 (71 FR 42298), and as such are subject to advisory conference with the USFWS under Section 7(a)(4) of the ESA rather than consultation under Section 7(a)(2), when outside of the National Park Service and NWR systems. No portion of the Project would cross National Park or NWR lands; thus, conference rather than consultation is required for the aplomado falcon. Critical habitat is not designated for NEPs.

Aplomado falcons could use a broad area of habitat within the Project area, generally west of the Rio Grande/Interstate 25 in New Mexico (see Appendix D - Figure 1). Suitable habitat is present east of the Rio Grande south of the Project area, on and near Bosque del Apache NWR and the Armendaris Ranch in Socorro County. However, the species is wide-ranging both while nesting and during juvenile dispersal, and individuals are occasionally observed outside of suitable habitat, long distances from release sites and nests.

Hack (release) sites were selected based on extent and quality of available habitat and prey base, proximity to other hack sites and habitat blocks, logistics, and landowner cooperation. Hack sites used recently include the Armendaris Ranch (partially within the action area), and a private ranch west of Deming in Grant County (in the action area). There is potential for dispersal from these hack sites into other locations within the action area.

The LCDO developed a habitat model for the aplomado falcon. An initial version of the model was run for all lands within the LCDO boundary (Figure 1), based on remote sensing, soil maps, topography, and other data. Portions of BLM-administered lands within the LCDO boundary were verified by recording existing conditions through field surveys, according to a standardized protocol (Young *et al*. 2002). However, not all BLM-administered lands were verified, and no state or private lands were verified. No comparable information was developed for the Socorro Field Office, where additional reintroductions have taken place on private lands. Table 1 presents the results of each model for portions of the Project area within the LCDO only.

Although the models do not provide complete site-specific information, they indicate that suitable aplomado falcon habitat is present on approximately 90 miles of the BLM preferred alternative (Table 1) and widespread through much of the Las Cruces District Office area along the proposed project route. In addition, vegetation management, including prescribed fire, has been used to improve habitat quality in some areas since the models were generated, and will continue to be used in the future.

Effects of the Action

Large areas of available but unoccupied habitat, coupled with the naturally low densities of aplomado falcons, and with full implementation of the proposed conservation measures should preclude significant negative effects resulting from habitat loss.

Ground clearing for Project construction could potentially affect areas near aplomado falcon nests. Aplomado falcons use existing nests constructed by other raptor species, which may be

removed or relocated during Project construction if avoidance is not feasible. Large areas of available but unoccupied habitat, coupled with the naturally low densities of aplomado falcons, should preclude negative effects resulting from habitat loss.

Power lines present an electrocution risk to a wide range of bird species, particularly large birds. Depending on tower construction, raptors of moderate size such as falcons may also be at risk on lower-voltage lines (Lehman 2001). However, spacing between an electricity source and a ground on 500 kV transmission lines, such as the Project, would be great enough to eliminate the risk of electrocution for aplomado falcons.

The Project would result in temporary and permanent loss of potential aplomado falcon foraging habitat through ground clearing during the construction phase. Some vegetation recovery post-construction is likely natural as a result of reclamation although structure pads, access roads, and ancillary facilities would cause permanent habitat loss. While the loss of some vegetation may reduce overall prey abundance, the buffering ability of the large home ranges of aplomado falcons should protect against a significant reduction in prey base. Indirect effects on the aplomado falcon are expected to be minimized through standard mitigation measures, including reclamation.

Proposed RMP amendments in the Socorro and Mimbres planning areas would affect land use by permitting a 400-foot-wide utility right-of-way. Effects of these proposed RMP amendments would be limited to those associated with construction and operation of the proposed Project as it would utilize the entire 400 foot width.

Each of the right-of-way avoidance areas that would be subject to proposed RMP amendments is currently adjacent to existing transmission lines, and the proposed Project would represent the expansion of an existing right-of-way. The proposed RMP amendment to Visual Resource Management (VRM) designations would allow the creation of a 400-foot-wide utility right-of-way and the construction of the proposed Project over approximately 1.5 miles of potentially suitable habitat for the northern aplomado falcon.

Because of the small change in available land area within the reestablishment area and with full implementation of the identified conservation measures the FWS does not consider the reduction in usable habitat area from construction of the SunZia Transmission Project to be significant. The FWS does, however, offer conservation recommendations for NAF in the project area:

- We recommend that the project be located such that existing utility ROW roads can be utilized for construction and maintenance, thus reducing ground disturbance.
- We recommend that temporary construction disturbance, such as pull sites and staging yards, and ancillary facilities, such as regeneration facilities, not be located in high quality habitat to the extent practicable.
- We recommend that BLM continue to implement recovery actions and participate in recovery planning for NAF.

<u>Conclusion</u>

After reviewing the proposed action we conclude the project is not likely to jeopardize the continued existence of the 10(j) non-essential, experimental population of northern aplomado falcon. Because of the northern aplomado falcon's status as a non-essential experimental population in New Mexico and Arizona, they are treated as proposed for listing for section 7 consultation purposes. By definition, a nonessential experimental population is not essential to the continued existence of the species. Thus, no proposed action impacting a population so designated could lead to a jeopardy determination for the entire species. With full implementation of the proposed conservation measures, the presence of large areas of available unoccupied habitat, and the naturally low densities of aplomado falcons, there should be only insignificant effects resulting from the proportionately small areas of habitat loss.

Literature Cited

Lehman, R.N. 2001. Raptor electrocution on power lines: current issues and outlook. Wildlife Society Bulletin 29 (3): 804-813.

Young, K.E., B.C. Thompson, D.M. Browning, Q.H. Hodgson, J.L. Lanser, A. Lafón Terrazas, W.R. Gould, and R. Valdez. 2002. Characterizing and predicting suitable Aplomado Falcon habitat for conservation planning in the northern Chihuahuan Desert. New Mexico Cooperative Fish and Wildlife Research Unit. Las Cruces, New Mexico. 171 pp. + appendices.

Tables

Table 1.BLM Las Cruces District Office Aplomado Falcon Habitat Models.

Suitability	Miles of BLM Preferred Alternative	Percent of BLM Preferred Alternative
Unverified Model		
Not Suitable	47.50	25.36
Low	108.20	57.77
Moderate	9.40	5.02
High	22.20	11.85
Total	**187.30[1]**	**100.0**
Verified Model		
BLM lands, not verified	90.74	48.32
Not Suitable	11.21	5.97
Low	4.58	2.44
Moderate	2.07	1.10
High	20.91	11.13
Not BLM lands	58.30	31.04
Total	**187.80[1]**	**100.0**

[1]Totals differ due to rounding.

Figure 1. BLM New Mexico Field Office Boundaries

Appendix C: Technical Guidance

Tucson Shovel–nosed Snake

According to the BA, standard and selective mitigation measures would reduce ground disturbance within the range of the Tucson shovel-nosed snake (TSNS), and would provide contractors with information on the importance of protecting all wildlife during construction and maintenance. Biological monitors would be present in any areas or seasons determined necessary, but monitoring is anticipated to be minimally effective for the TSNS as the species is not likely to be detected prior to ground-disturbing activities. In addition, we recommend that BLM and the applicant coordinate with the Bureau of Reclamation, Phoenix Area Office, Environmental Resource Management Division, regarding construction in Central Arizona Project canal mitigation lands in the area of the link C850 crossing of the canal. We also recommend that BLM and the applicant minimize disturbance in all potential TSNS habitat through use of existing access roads and avoiding vegetation clearing. Avoid locating pull sites in TSNS potential habitat.

Sprague's Pipit

According to the BA, standard and selective mitigation measures would reduce ground disturbance and the potential for invasive plant colonization within habitat for the Sprague's pipit. We also recommend that BLM and the applicant minimize disturbance in all potential Sprague's pipit wintering habitat through use of existing access roads, avoid vegetation clearing, and avoid locating pull sites in potential habitat. Implementation of the APP will further protect individual birds.

Appendix D – Description of Proposed Action

Note: The following description is excerpted from the Biological Assessment provided by BLM:

"3. Project Description

The proposed action is for the BLM to issue a right-of-way grant to SunZia Transmission, LLC (Proponent, or Applicant) for the construction and operation of two 500 kV transmission lines from the proposed SunZia East Substation in New Mexico to the permitted Pinal Central Substation in Arizona.

The BLM would require a final Plan of Development (POD) in the stipulations of the right-of-way grant, to be completed before a Notice to Proceed is issued. A preliminary (draft) POD has been prepared in conjunction with the Draft and Final EIS, according to the Project description. The POD details the methods and procedures that would be used in construction of the Project, and serves as a reference for contractors, construction crews, agency personnel, resource inspectors, and environmental compliance monitors. In addition to a detailed Project description, the POD contains best management practices (BMP) and mitigation measures; specifies environmental compliance field activities; and includes a number of plans developed to achieve regulatory compliance and resources protection, such as:

Construction Plan and Program
Flagging, Fencing, and Signage Plan
Transportation Management Plan
Fire Protection Plan
Blasting Plan Methodology
Erosion, Dust Control, and Air Quality Plan
Hazardous Materials Management Plan
Emergency Preparedness and Response Plan Guidelines
Environmental Compliance Management Plan
Biological Resources Protection Plan
Noxious Weed Management Plan
Historic Properties Identification and Treatment Plan
Paleontological Resources Literature Review and Treatment Plan
Stormwater Pollution and Prevention Plan Methodology
Right-of-Way Preparation, Reclamation, and Monitoring Framework Plan

"A Construction, Operation, and Maintenance (COM) Plan will be a component of the final POD, and will contain the final, detailed engineering and siting of all Project features. For documents developed prior to site-specific engineering and completion of the COM Plan, including the Draft and Final EIS and this BA, impacts have been assessed along a reference centerline according to the typical conditions presented in the Project description. The reference centerline forms the basis for the analysis in this BA, and detailed siting of Project features (i.e., structures, substations, and access roads) would be determined and guided by the need to avoid impacts to sensitive, narrowly distributed resources such as rare plants or cultural resource sites. However, preliminary engineering has been developed to support detailed estimates of ground disturbance and other impacts in two locations, where the proposed Project would cross designated critical habitat.

"Where sensitive locations are identified, avoidance of impacts as described in Section 1.12 ("Mitigation **MEASURES**) would be a condition of the right-of-way grant.

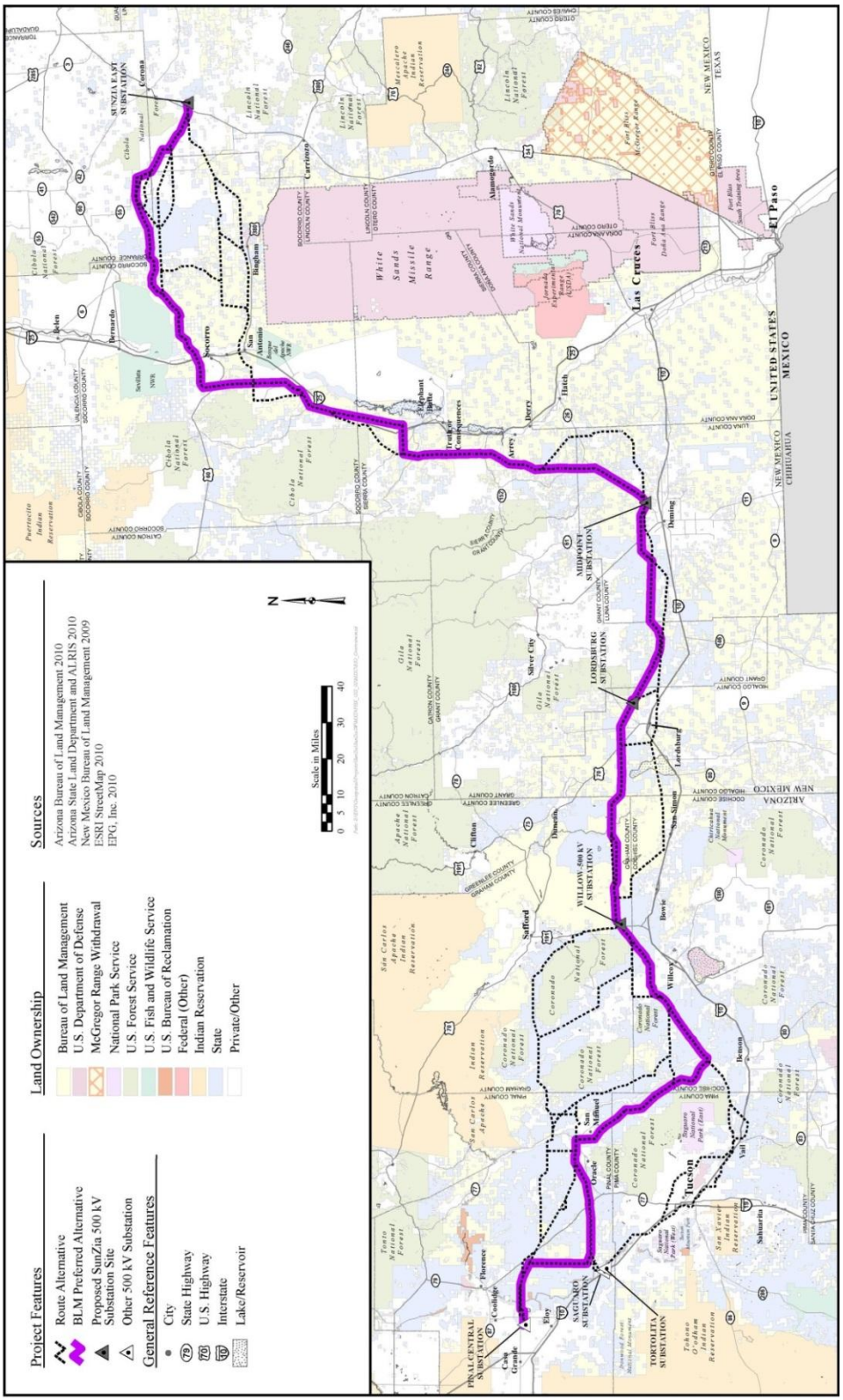

Figure 1. Alternative Routes and Land Ownership [BLM preferred alternative highlighted in purple]

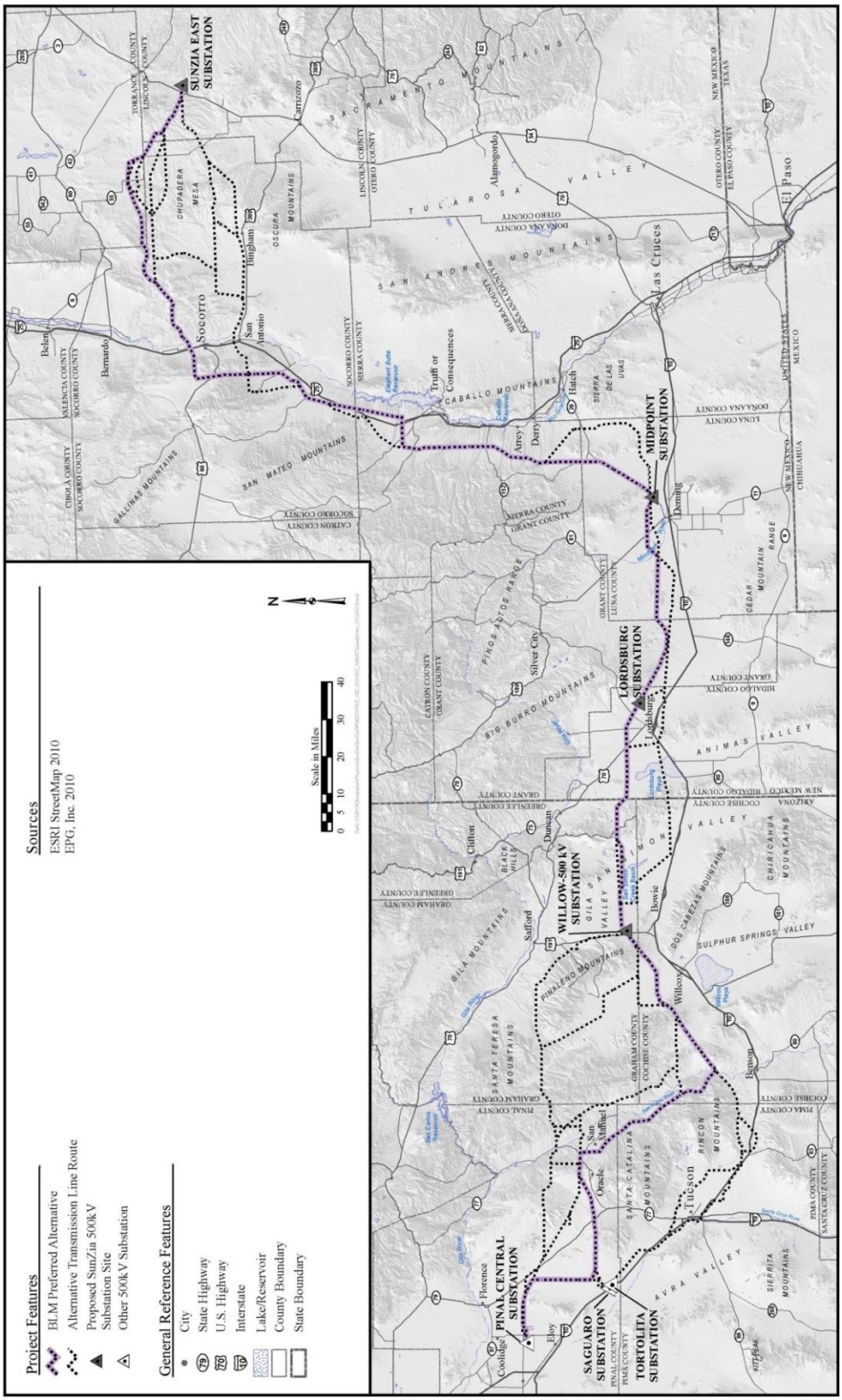

Figure 2. Alternative Routes and Landforms [BLM preferred alternative highlighted in purple]

1.1. "OVERHEAD TRANSMISSION LINES

"Two 500 kV overhead transmission lines would be constructed for the proposed Project. Both alternating current (AC) and direct current (DC) configurations are being considered as design options. The impact analysis in this BA assumes that Option B would be constructed.

> **Option A**: Two transmission lines would be constructed and operated, each as a 500 kV single-circuit, AC facility.
>
> **Option B**: One transmission line would be constructed and operated as a 500 kV single-circuit AC facility, and one transmission line constructed and operated as a 500 kV single-circuit DC facility.

"Each transmission line would extend between the proposed SunZia East Substation and the permitted Pinal Central Substation, for a length of approximately 515 miles. The transmission line components include structures, foundations, conductors, insulators and associated hardware, overhead groundwire (OHGW), and fiber optic facilities. Table 1 summarizes typical design characteristics for each of the two options, and Figure 3 is a diagram of the typical transmission line and right-of-way configuration.

"Under typical conditions, the Project features described in Table 1, with the exception of the access roads, would result in approximately 10.3 acres per mile of ground disturbance (7.9 acres per mile of temporary ground disturbance and 2.4 acres per mile of permanent ground disturbance). Access roads (as presented in Table4) may result in 1.6 to 6.7 acres per mile of ground disturbance, depending on terrain and the presence of existing roads.

"In most cases, newly constructed access roads would be permanent; however, certain access roads may be closed or reclaimed at the discretion of the landowner or land management agency. Locations where access roads would be closed or reclaimed would be identified during right-of-way acquisition, as conditions to a right-of-way grant. As these locations have not been identified to date, access roads are assumed to be permanent for the purposes of Section 7 consultation. Additional detail on each component of the Project is presented in the following sections.

Table 1.Typical Design Characteristics of the Proposed 500 kV Transmission Line Project

General Description	
Structure type	Guyed and self-supporting steel tubular and lattice structures
Structure height	Typical 135 feet; range of height varies with span and terrain
Span length	1,200 to 1,600 feet (3 to 4 structures per mile)
Right-of-way width Typical	200 feet per transmission line (circuit) – 400 feet total for two transmission lines
Narrow, due to special conditions	165 feet per transmission line (circuit) – 330 feet total for two transmission lines

Table 1.Typical Design Characteristics of the Proposed 500 kV Transmission Line Project		
Electrical Properties		
Structure Base Areas	**Option A**	**Option B**
Nominal voltage in kilovolts	500 kV to 525 kV AC	500 kV to 525 kV AC and 500 kV DC
Capacity in megawatts	3,000 MW	4,500 MW
Circuit configuration (preliminary determination)	Horizontal, vertical, or delta	AC: Horizontal, vertical, or delta DC: Horizontal
Conductors 1590 ACSR 'Lapwing,' 1.5-inch diameter conductor (3 conductors/bundle)	3 conductor bundles per phase	AC: 3 conductor bundles per phase DC: 2 conductor bundles per phase
Minimum conductor clearance above ground (per NESC requirements)	30 to 35 feet	AC: 30 to 35 feet DC: 30 to 38 feet
Land Permanently Disturbed		
Permanent Structure Base Area Required[1]		
Guyed (lattice or tubular) 4-foot diameter base plus 4 anchors (1 approximate 45-foot x 45-foot base area per line)	4,050 sq. feet (2,025 sq. feet per structure)	
Self-supporting Lattice 3-foot diameter x 4 legs (1 approximate 60-foot x 60-foot base area per line)	7,200 sq. feet (3,600 sq. feet per structure)	
Self-supporting Tubular 8-foot diameter (1 approximate 53-foot x 53-foot base area per line)	5,650 sq. feet (2,825 sq. feet per structure)	
Dead-end Lattice 6-foot diameter x 4 legs (1 approximate 55-foot x 55-foot base area per line)	6,050 sq. feet (3,025 sq. feet per structure)	
Dead-end Tubular [2]	**Option A**	**Option B**
AC: 10-foot diameter (3 approximate 33-foot x 33-foot base areas for Option A; 1 approximate 45-foot x 45-foot for Option B) DC: 12-foot diameter (1 approximate 45-foot x 45-foot base area)	6,550 sq. feet (3,225 sq. feet per structure)	4,050 sq. feet (2,025 sq. feet per structure)
Ancillary Facilities		
Fiber Optic Communication Regeneration Station	100 feet x 100 feet (0.23 acre); located at 75-mile intervals	
Ground electrode facility	One facility near each terminus (DC only)	
Access Roads[3]		
New roads	24 feet total width (20-foot-wide travelway and 2-foot-wide berms/drainage on each side)	
Improve existing roads	24 feet total width (20-foot-wide travelway and 2-foot-wide berms/drainage on each side)	

Table 1.Typical Design Characteristics of the Proposed 500 kV Transmission Line Project	
Land Temporarily Disturbed	
Structure work area[4]	Each structure site will be 200 feet x 200 feet (0.9 acre)
Construction yard	One yard every 40 miles; approximately 15 to 20 acres per site
Concrete batch plant	One plant every 30 miles; approximately 3 to 5 acres per site
Wire pulling/tensioning/splicing site (full)	Approximately200 feet x 600 feet (2.8 acres); one every 18,000 feet, alternating every 9,000 feet with reduced site
Wire pulling/tensioning/splicing site (reduced)	Approximately 200 feet x 400 feet (1.8 acres); one every 18,000 fe*et al*ternating every 9,000 feet with full site

NOTES:
[1] Permanent structure base areas include the area surrounding each structure foundation necessary for Project maintenance, rounded up to the nearest 50 square feet.
[2] Diameter indicated for each single pole; the dead-end structure for the AC line could have a single- or three-pole configuration.
[3] Typical main access road or spur road width indicated; maximum road widths will be specified in the POD and are dependent on terrain and construction specifications for selected transmission line route.
[4] Temporary structure work area is inclusive of permanent structure base area.
ACSR = aluminum conductor, steel reinforced
MW = megawatt
NESC = National Electrical Safety Code

1.2. "STRUCTURES

"A variety of 500 kV structure types could be used for the proposed Project. Additional structure types may be identified during future engineering and design, but are anticipated to result in similar impacts to those identified in the Draft EIS and this BA. The locations for each structure type would be determined during final design, and selected based on site-specific conditions (i.e., road access, topography, terrain, land use, constrained right-of-way) or to mitigate impacts resulting from the Project. Proposed structures vary in height, with none anticipated to exceed 200 feet, in order to remain below the threshold at which the structure may affect navigable airspace based on Federal Aviation Administration regulations.

"Similar structure types would be used for either the AC or DC transmission lines, except that each DC structure would contain only two sets of bundled conductors, versus three sets for an AC structure. Components of a representative structure are shown in Figure 4. In addition, the guyed structures would be vertical for the DC transmission line, as compared to V-shaped towers for the AC transmission line. The Project would be constructed within a 400-foot combined right-of-way, unless constraints caused by resources or terrain require a wider separation between lines. Figure 3 shows the standard configuration of a right-of-way for Option B, two 500 kV transmission lines.

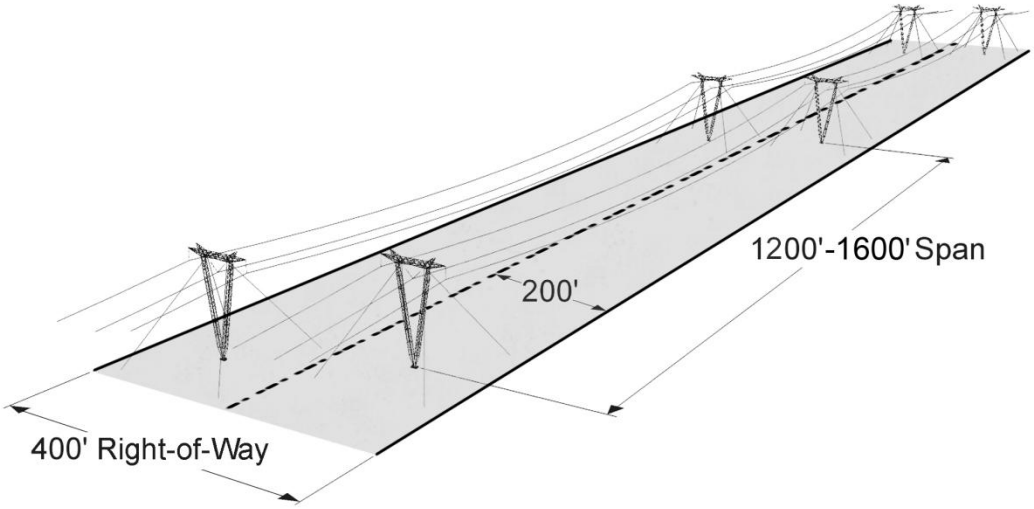

Figure 3. Typical 500 kV Transmission Line and Right-of-Way Configuration

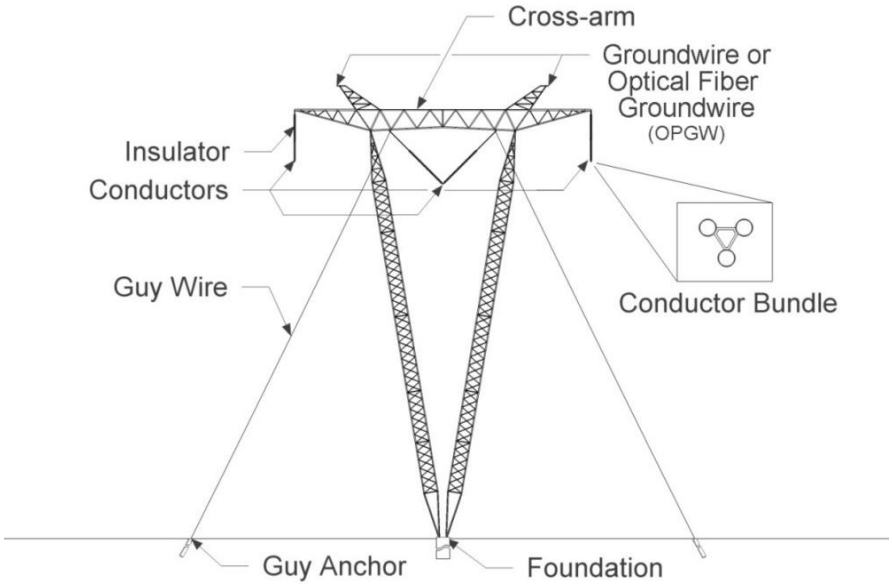

Figure 4. Typical 500 kV Structure Diagram

"*Guyed "V" Lattice* – The single-circuit, guyed, V-shaped lattice (GVL) structure would be galvanized steel (Figure **5**). The typical structure height would be 135 feet, ranging between 130 and 160 feet, with a typical span between structures of 1,400 feet. This tangent structure would be used where the AC transmission line proceeds in a straight line or directly parallel to the adjacent transmission line, and up to an angle of 15 degrees. Due to the simplicity of the design and assembly, the GVL is cost-efficient and results in less ground disturbance during construction than other structure design options. The DC line would require use of the guyed lattice tangent structure, rather than the GVL design (Figure 12).

"*Guyed "V" Tubular* – The single-circuit, guyed, V-shaped tubular (GVT) structure would be made of self-weathering or galvanized steel (Figure **6**), and would be a tangent structure used for

AC lines as an alternate to the GVL. The DC line would require use of the guyed tubular tangent structure (Figure 13). The typical structure height would be 135 feet, and would range between 130 and 160 feet with a typical span of 1,400 feet between structures.

"*Self-Supporting Lattice* – The single-circuit, self-supporting lattice (SSL) structure would be made of galvanized steel (Figure 7). The typical structure height would be 135 feet, ranging between 130 and 160 feet, with a typical structure span of 1,500 feet. The SSL structure could be used as a tangent structure, but also can accommodate larger angles (15 to 90 degrees) and longer spans than the GVL or GVT structures. However, the SSL structure is heavier and requires larger foundations than the GVL or GVT structures. Maintenance activities are faster on the SSL structure than on other structure design options, due to the configuration of the circuits and climbing legs.

"*Self-Supporting Tubular* – The single-circuit, self-supporting tubular (SST) structure would be made of self-weathering or galvanized steel (Figure 8). The typical structure height would be 145 feet, ranging between 145 and 170 feet, with a typical structure span of 1,000 feet. The SST structure has a smaller footprint and typically would be used in areas of narrow or constrained right-of-way; however, these structures would be taller and closer together (requiring more structures per mile) than other tangent structures proposed for the Project.

"*Dead-end Lattice* – A single-circuit, self-supporting, dead-end lattice (DEL) structure made of galvanized steel (Figure 9) would primarily be used for large angles or terminations. The DEL structure would have a larger footprint than the SSL, due to a larger base and a wider horizontal configuration. The typical structure height would be 135 feet, ranging between 130 and 160 feet.

"*Dead-end Tubular* – A single-circuit, self-supporting, dead-end tubular (DET) structure made of self-weathering or galvanized steel (Figure 10) would primarily be used for larger angles in those areas where right-of-way may be too constrained to accommodate a DEL structure. The typical structure height would be 145 feet, ranging between 130 and 160 feet.

"*Dead-end Tubular, 3-Pole* – The dead-end tubular, 3-pole (DET3) alternative to the DET is a self-supporting tubular steel structure also used for larger angles; however, the DET3 includes three poles, each with a single conductor bundle (Figure 11). The typical structure height would be 100 feet. The DET3 structure would be used for the AC structure in areas where a lower height is desired, although the three adjacent structures would require additional right-of-way and would have a larger footprint.

"Figure 12 through Figure 17 show the six structures configured for a DC transmission line (except for the DET3).

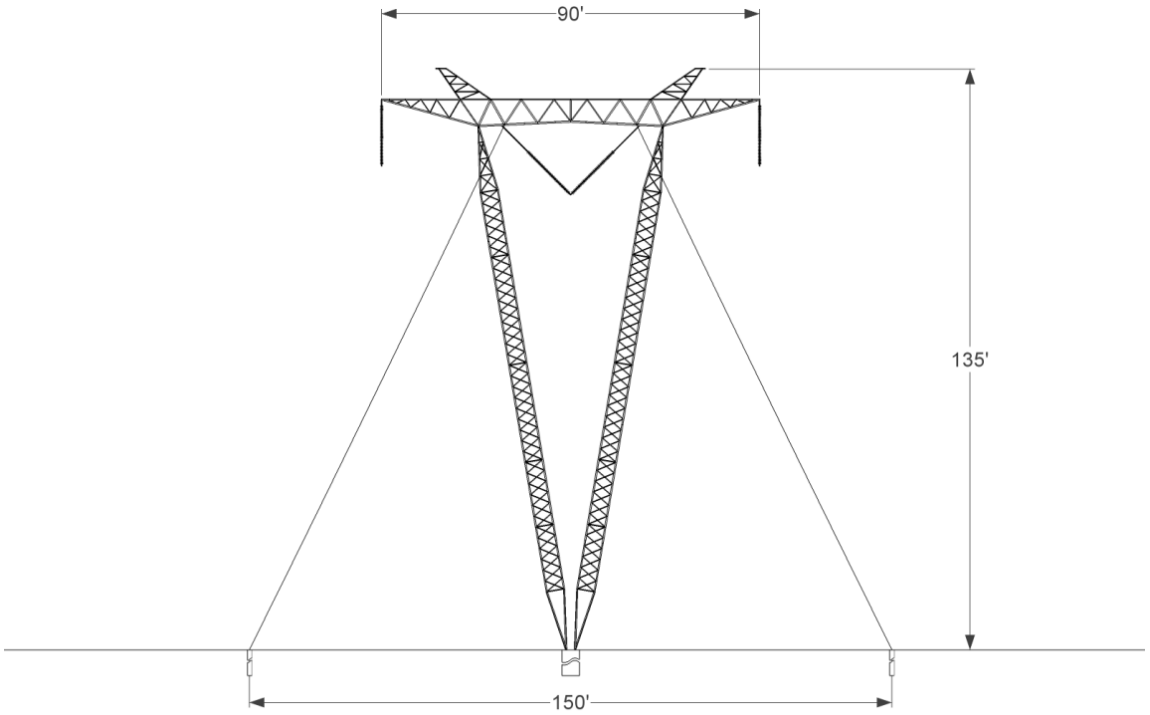

Figure 5. Typical AC Guyed "V" Lattice Tangent Structure

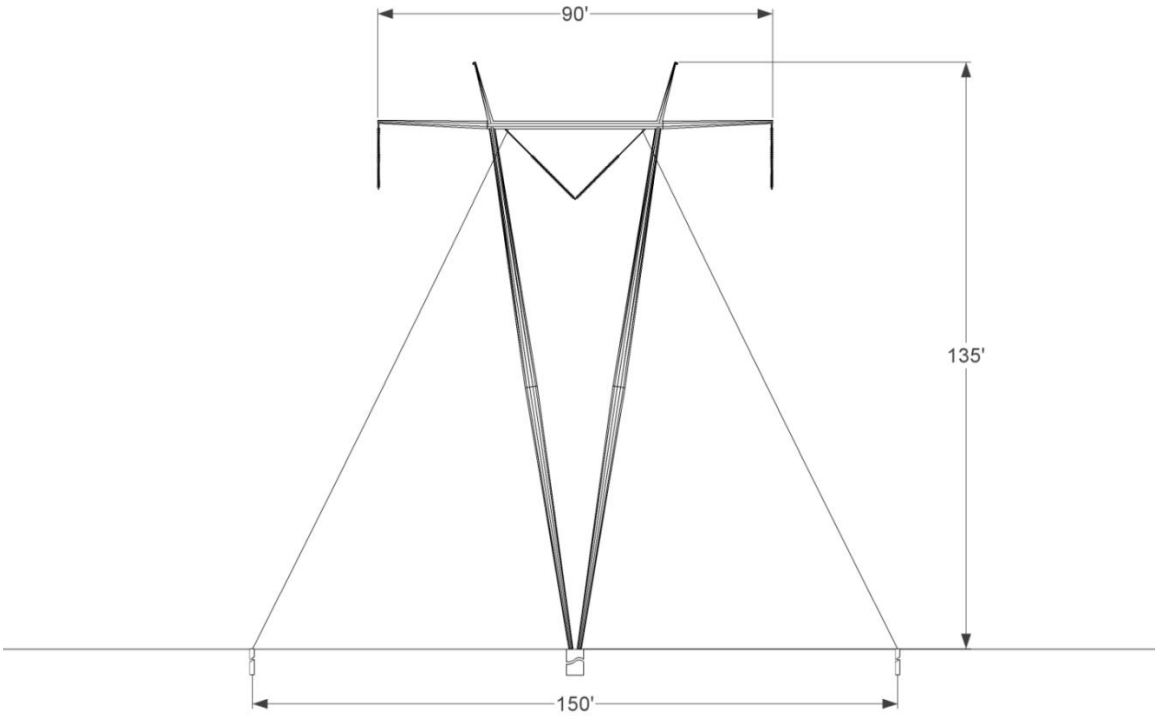

Figure 6. Typical AC Guyed "V" Tubular Tangent Structure

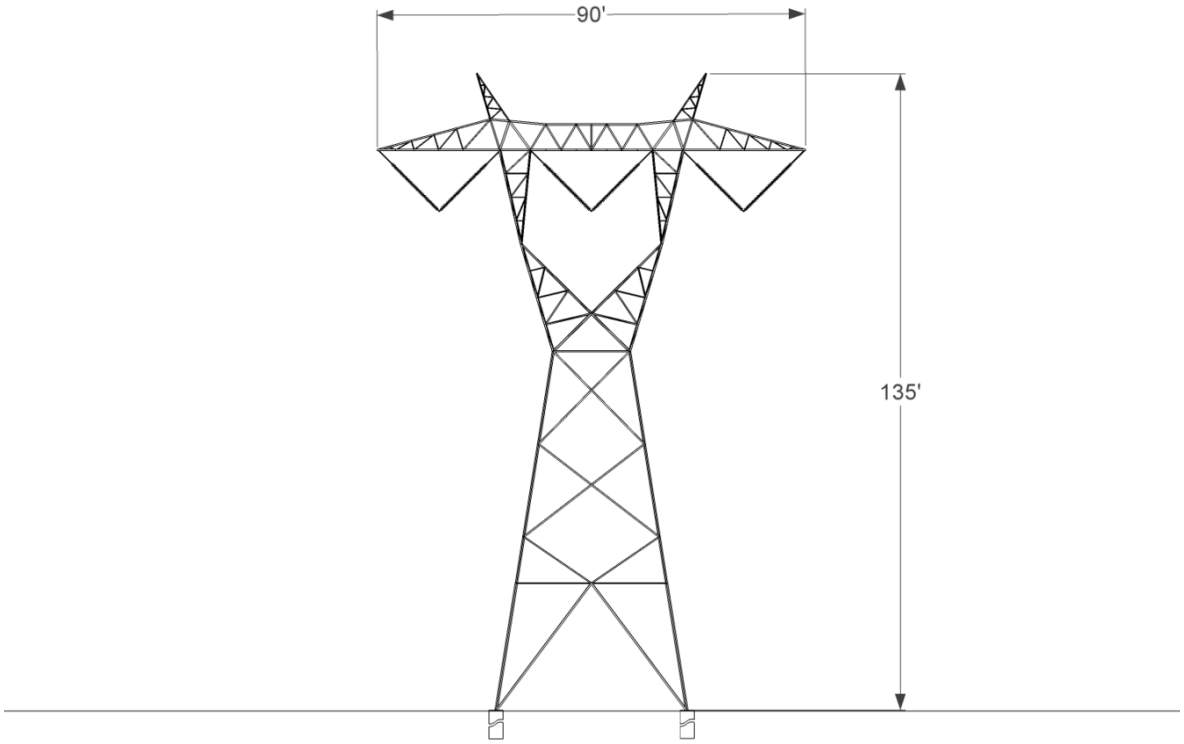

Figure 7. Typical AC Self-Supporting Lattice Tangent Structure

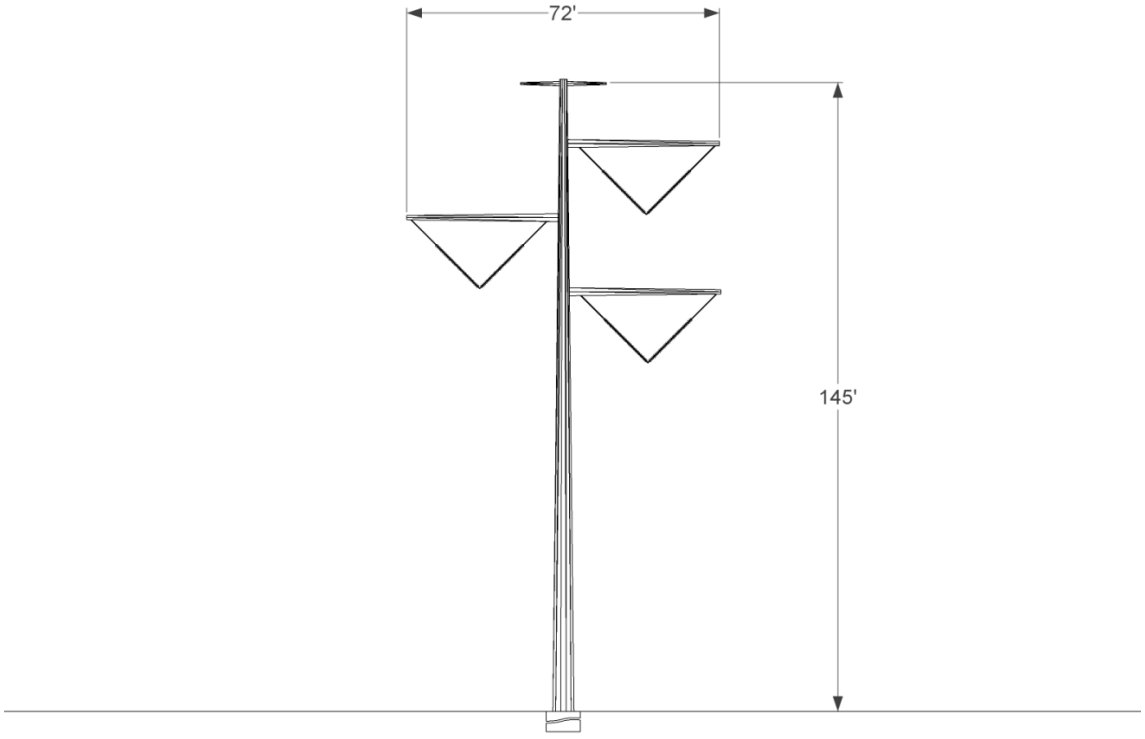

Figure 8. Typical AC Self-Supporting Tubular Tangent Structure

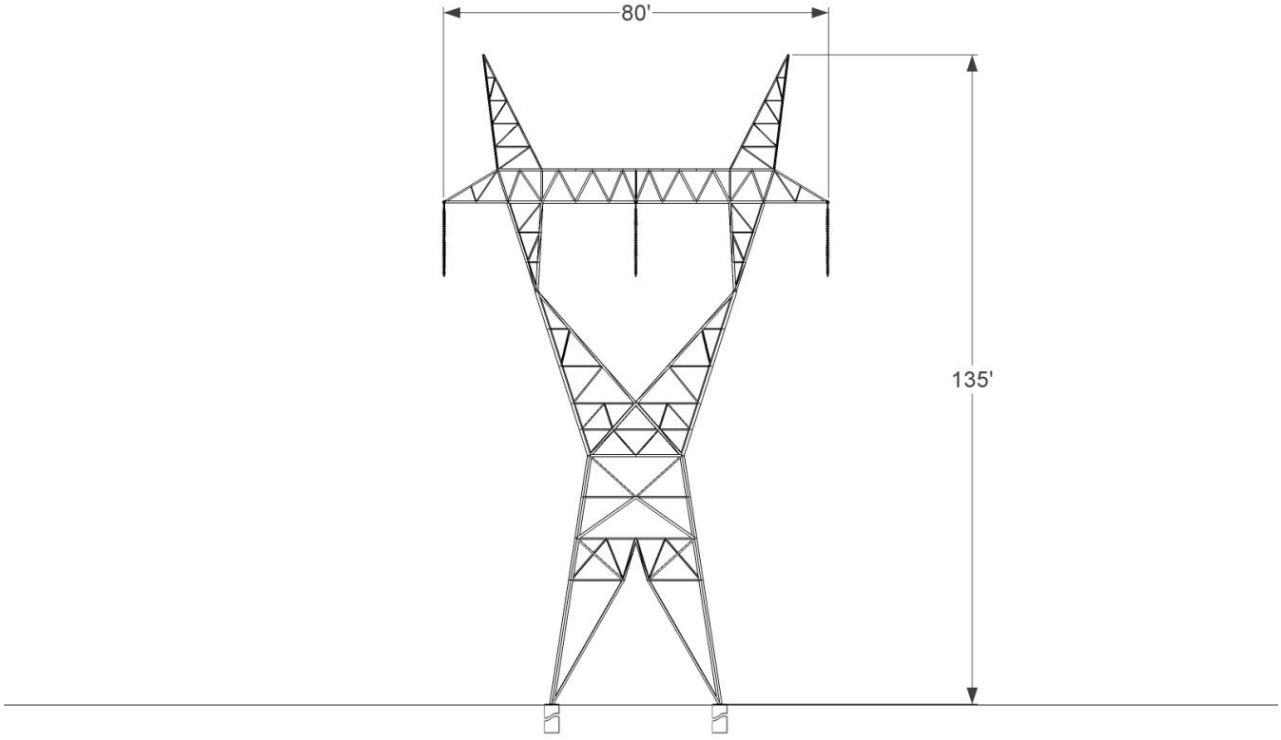

Figure 9. Typical AC Self-Supporting Dead-End Lattice Structure

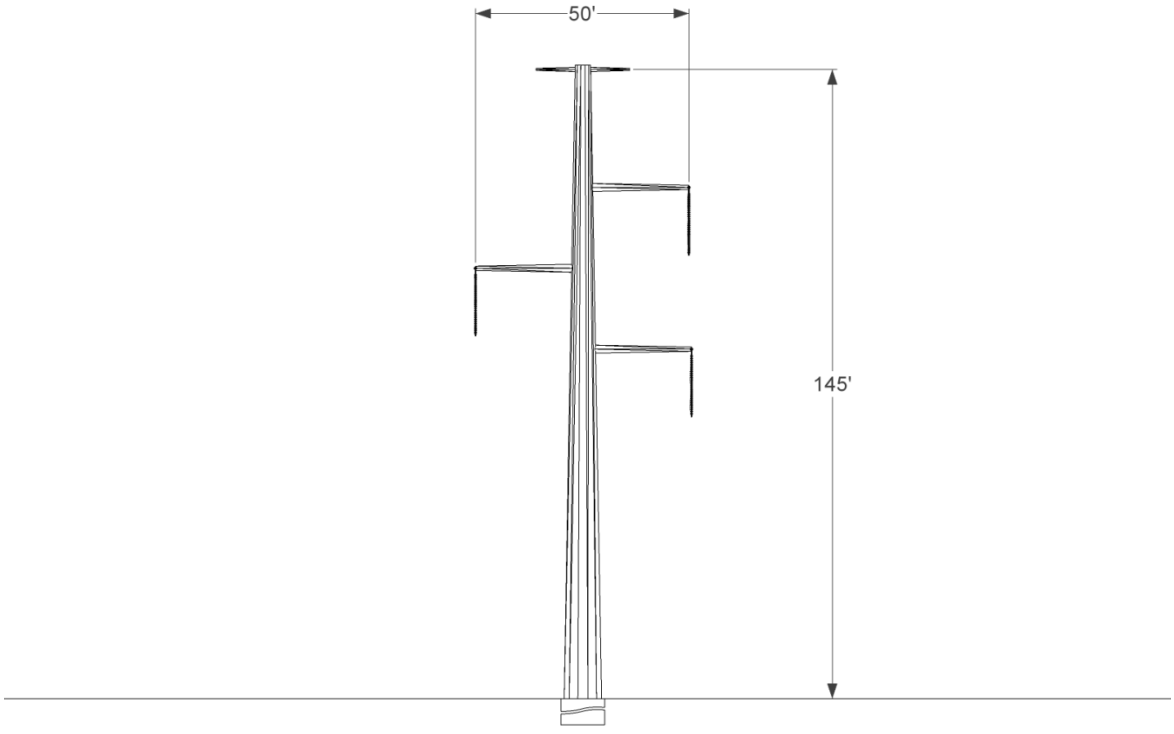

Figure 10. Typical AC Self-Supporting Dead-End Tubular Structure

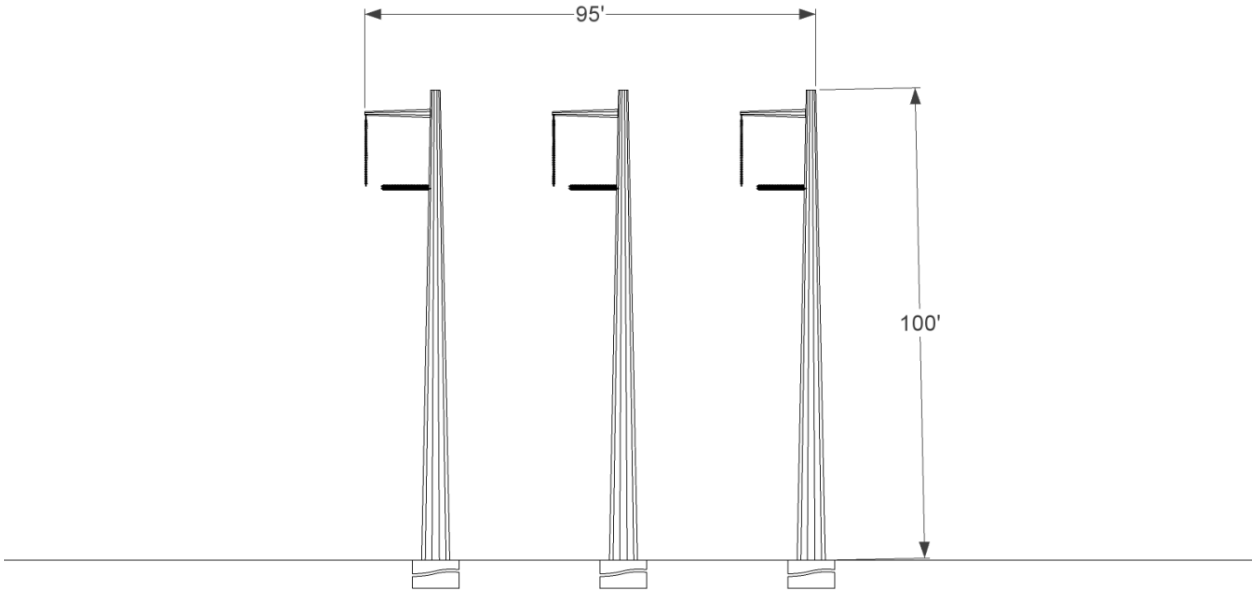

Figure 11. Typical AC Self-Supporting Dead-End Tubular, 3-Pole Structure

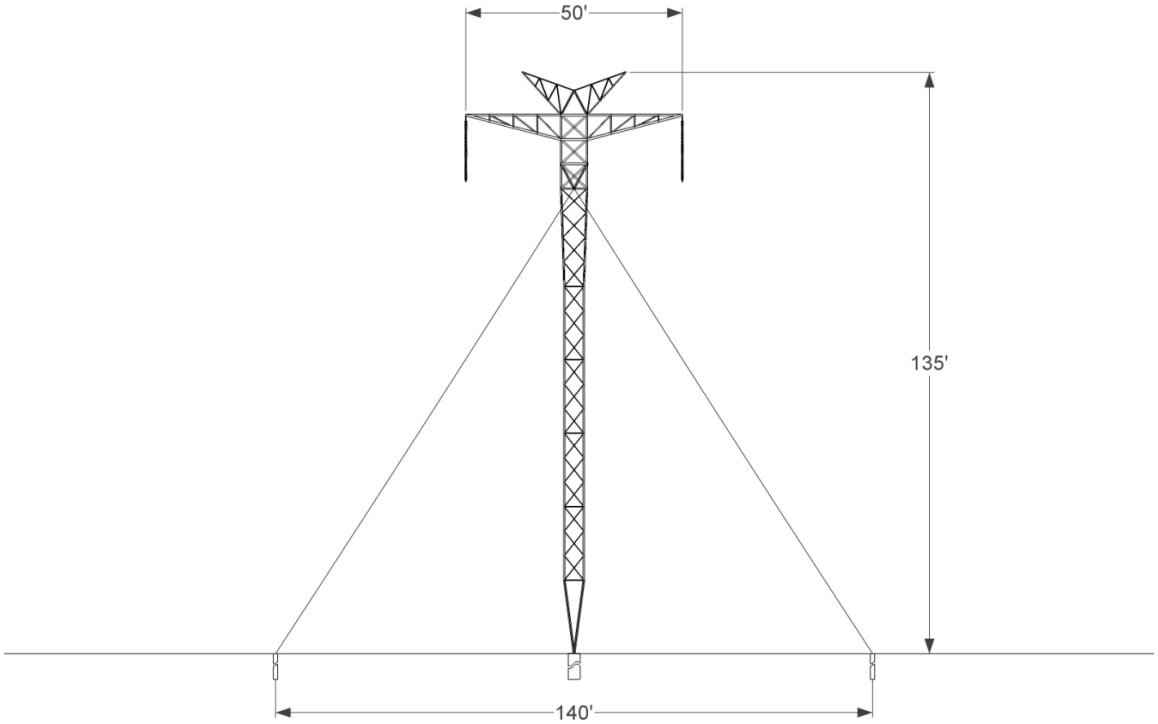

Figure 12. Typical DC Guyed Lattice Tangent Structure

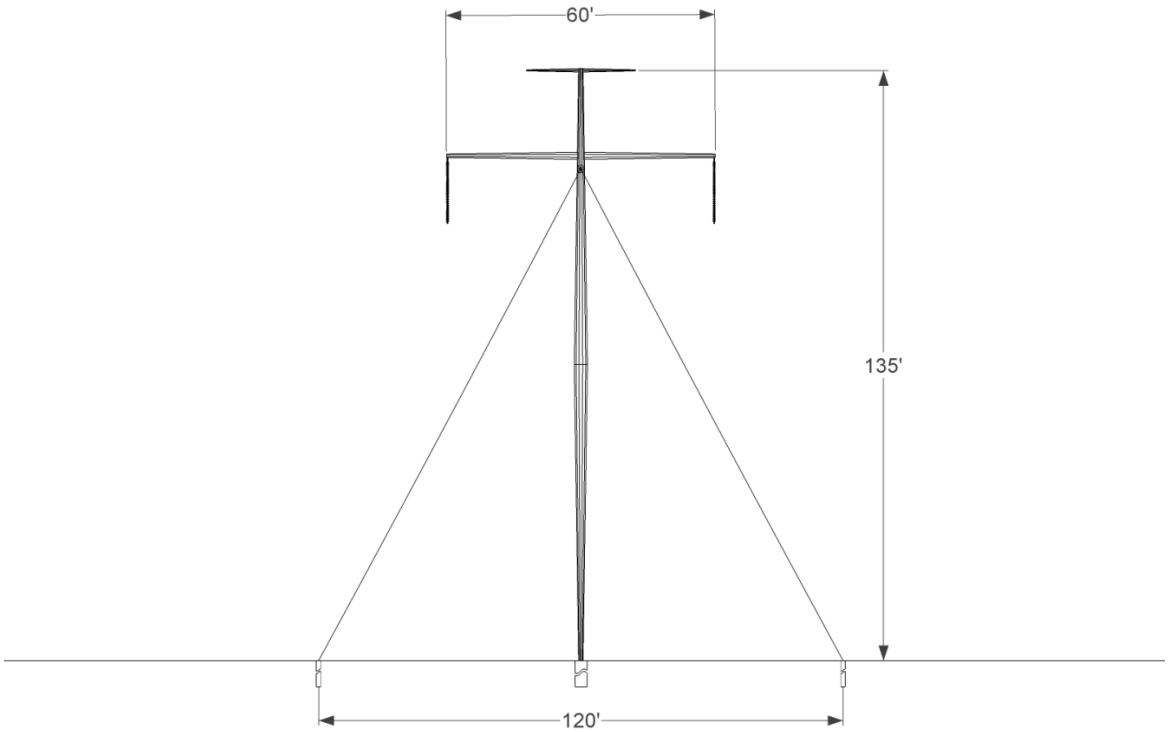

Figure 13. Typical DC Guyed Tubular Tangent Structure

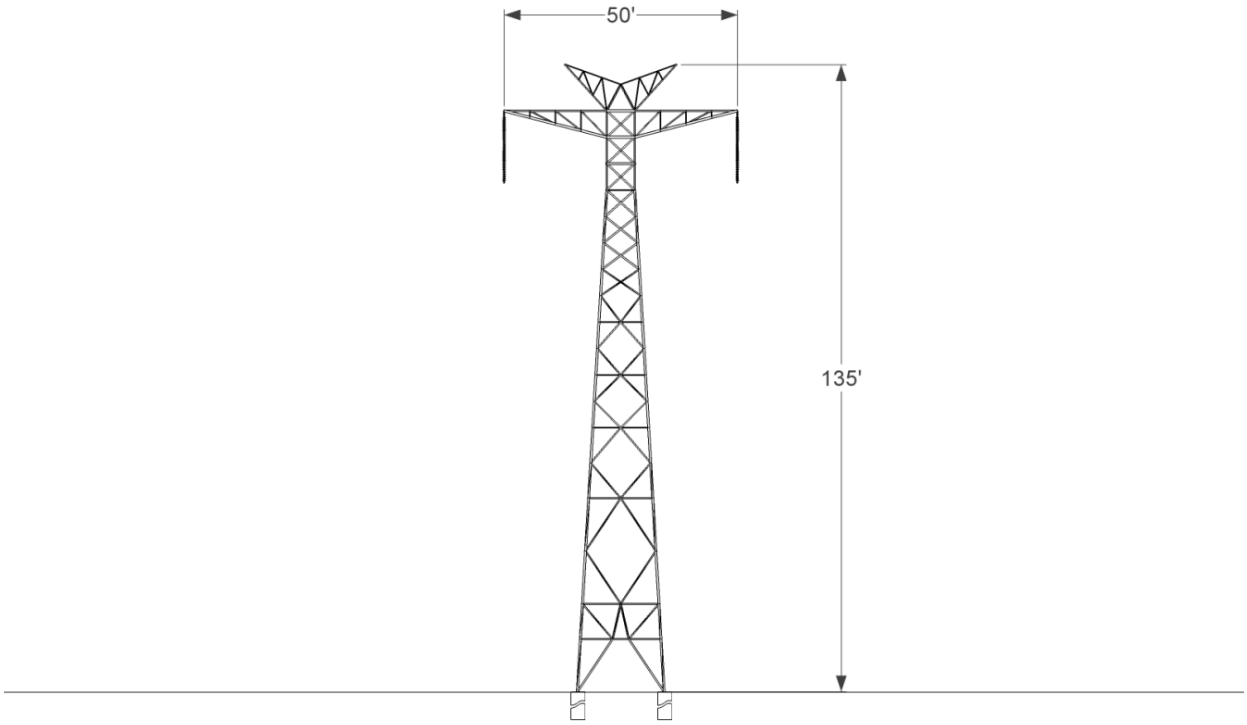

Figure 14. Typical DC Self-Supporting Lattice Tangent Structure

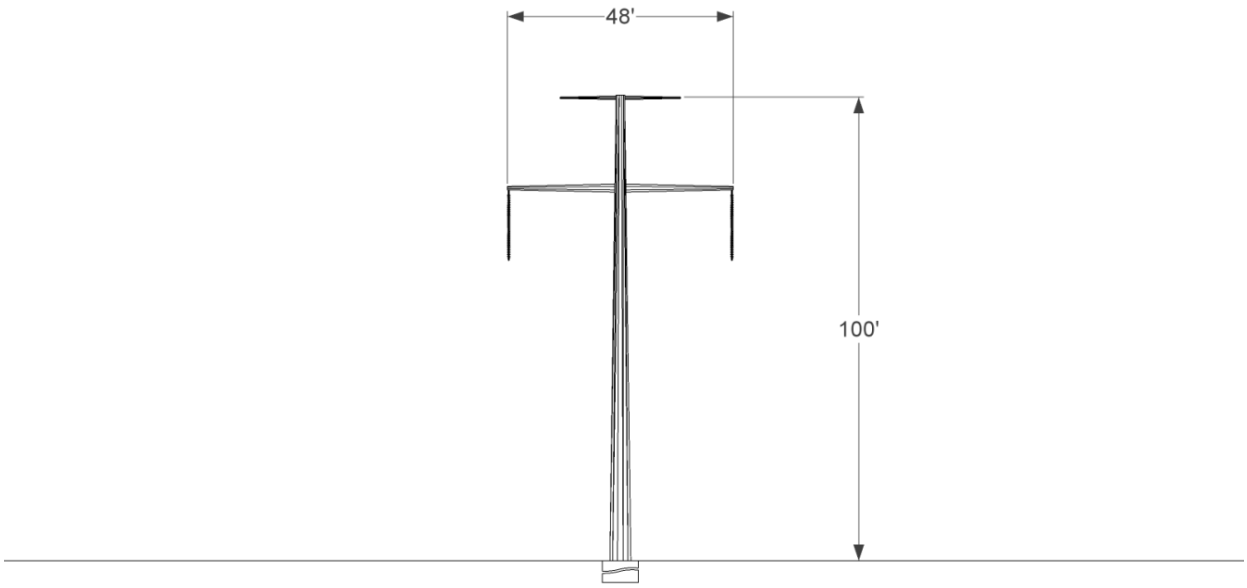

Figure 15. Typical DC Self-Supporting Tubular Tangent Structure

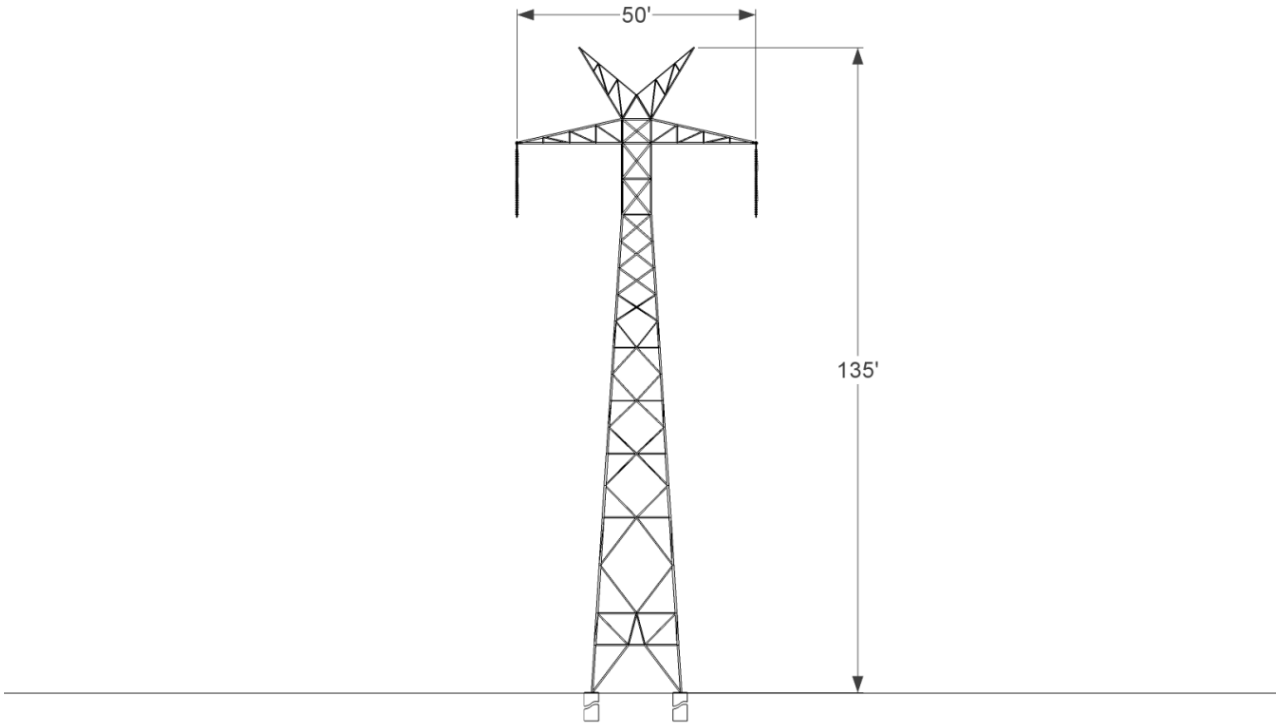

Figure 16. Typical DC Self-Supporting Dead-End Lattice Structure

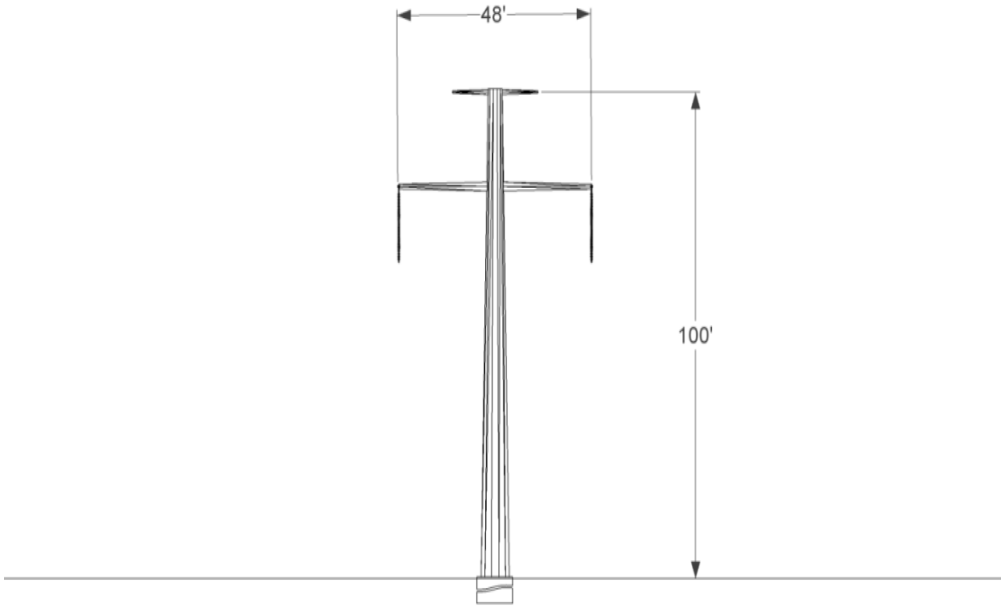

Figure 17. Typical DC Self-Supporting Dead-End Tubular Structure

1.3. "FOUNDATIONS

"Each structure type requires specific foundations, although foundation design would be similar for either AC or DC structures. The guyed (GVL or GVT) structures would require a center pier and four anchors for the guy wires. The center pier would be cast-in-place concrete, a precast concrete foundation, or grillage foundation (a grillage consists of buried galvanized steel members designed to resist foundation loads). Grouted soil, grouted rock, disk, or log anchors would be used. For drilled anchors, each anchor hole would be 6 to 12 inches in diameter and range in depth from 10 to 40 feet. For disk or log anchors, typical excavations are 6 feet by 3 feet wide, and 10 feet to 15 feet deep.

"Each SSL structure would require four cast-in-place drilled pier footings, each ranging from 3 to 6 feet in diameter (based on soil conditions) and 15 to 40 feet in depth. The footings would be installed by placing reinforcing steel and a structure stub into the foundation hole, positioning the stub, and encasing it in concrete.

"The SST structures would be installed on a single drilled pier foundation, which would typically be 6 feet in diameter (but could range from 4 to 8 feet in diameter based on soil conditions), and would be 20 to 50 feet deep.

"The DEL structures require four footings installed on drilled pier foundations, which would typically be 6 feet in diameter (but could range from 4 to 8 feet in diameter based on soil conditions), and would be 20 to 50 feet deep.

"The DET structures would be installed on a single drilled pier foundation, which typically would be 10 feet in diameter (but could range from 8 to 12 feet in diameter based on soil conditions), and would be 20 to 50 feet deep.

1.4. "CONDUCTORS

"The conductors are the wire cables strung between transmission line structures over which the electric current flows. Conductors for the Project would be aluminum with a steel-reinforced core. The aluminum carries most of the electric current, and the steel provides tensile strength to support the aluminum strands. The AC transmission line would consist of three phases for each circuit, including a bundle containing three conductors per phase.

"The minimum conductor height above ground for the AC transmission line would be 30 to 35 feet, at 176 degrees Fahrenheit conductor operating temperature, based on National Electrical Safety Code (NESC) and Applicant design standards. The exact height of each structure would be governed by topography and safety requirements for conductor clearance.

"The DC transmission line would use the same conductor as the AC transmission line, except that each DC structure would contain only two sets of bundled conductors. Minimum conductor height above ground for the DC transmission line would be 38 feet, based on NESC standards.

1.5. "INSULATORS AND ASSOCIATED HARDWARE

"Insulators, which are made of an extremely low conducting material such as porcelain, glass, or polymer, are used to suspend the conductors from each structure. They inhibit the flow of electrical current from the conductor to the ground, the structure, or another conductor. A permanent assembly of insulators, ranging from 20 to 28 feet long, would be used to position and support each of the three conductor bundles to the structures.

1.6. "OVERHEAD GROUNDWIRE AND ELECTRODES

"To protect conductors from lightning strikes, two OHGWs would be installed on the top of the structures. Current from lightning strikes would be transferred through the groundwires and structures into the ground. The groundwires would be composed of extra-high strength steel wire of 0.5-inch diameter. One or both of the OHGWs would be a 1-inch diameter fiber-optic groundwire (OPGW) that would facilitate data transfer—required for system control and monitoring between the transmission facilities—along the fiber path.

"The DC structures (Option B) would use the same OHGWs as the AC structures. In addition, Option B would require two ground electrode facilities, one near each AC/DC converter station terminal location (SunZia East and Pinal Central substations), to maintain electrical current continuity during emergency conditions. Ground electrodes provide an earth return for the electrical current when one of the poles of the DC line is out of service. These conditions are most often the result of an unexpected outage on the transmission line, which would result in the electrical current flowing through the earth for a short time (typically 10 minutes to less than an hour).

"Each ground electrode facility would consist of a network of drilled deep-earth wells (electrodes), grouted to a depth of 100 feet to more than 1,000 feet deep, depending upon the geological structure and electrical parameters of the area. Each site may be up to 600 acres in size (although other uses may be allowed within the site). Each well would be electrically interconnected to a small control building via buried low voltage underground cables, and each

well and the electrode line would be continuously monitored via a telecommunications link that would use fiber optic or fixed radio communications equipment. Ground current would be effectively shared through the buried electrode network interconnecting the wells, to create a very low resistance earth connection by distributing the ground current over a large area. Surface access to the wells would be via utility access vault type arrangements to prevent any public access to the well connections or the electrode components.

1.7. "FIBER OPTIC REGENERATION STATION

"As the data signal passes through the optical fibers in the groundwire, the signal degrades with distance. Fiber optic regeneration stations are required to amplify the system control and monitoring signals carried over the OPGW attached to the transmission structures. Sites for fiber optic regeneration stations would be located within the proposed substations at approximately 75-mile intervals, and at other remote sites located along the transmission line route approximately halfway between the substations. Locations of regeneration sites have not been identified, but would be identified in the final POD. The remote regeneration sites would be adjacent to the proposed transmission lines and within the right-of-way, at locations near existing low-voltage electric distribution lines, and easily accessible by vehicle. Typically, a separate permanent access spur road, up to 12 feet wide, would be located within the transmission line right-of-way as required for maintenance purposes for each site. Permanent access roads built for the transmission lines would be used to the extent practicable. An extension of a distribution line would be needed to serve each facility.

"The remote regeneration sites would typically be in a fenced area of 100 feet by 100 feet, with building dimensions 12 feet wide by 32 feet long by 9 feet tall. The OPGW cable supported on the transmission structures would be routed in and out of the regeneration site building from the nearest transmission structure, either underground or overhead, along two separate paths. Electronic equipment that is required to support the fiber optic cable installation would be located inside the building. At each remote site, an emergency diesel and/or propane generator would be installed to provide backup power should an outage of the local electric distribution supply system occur.

1.8. "SUBSTATIONS

"Several substations would be associated with the proposed Project, constructed on private or state lands, and therefore not included in the BLM right-of-way grant. The size of each substation is dependent on whether an AC-only or an AC/DC facility is installed at the site. The parcel would include the secure, fenced area containing the electrical equipment, plus sufficient area surrounding the substation components for placement of transmission structures entering and exiting the substation, and to provide setbacks to buffer neighboring lands. The maximum height of structures in the substation would typically be 170 feet. The substation yards would be open-air and include equipment such as transformers, circuit breakers, disconnect switches, lightning/surge arrestors, reactors, capacitors, bus (conductor) structures, and a microwave antenna. Typically, substation components would be surrounded by an 8-foot-high chain-link fence topped with barbed wire. Typical design characteristics for the substations are listed in 2, and may vary subject to local regulations. Estimated areas of ground disturbance for each substation are listed in 3.

Table 2.Typical Design Characteristics of a 500 kV Substation		
Equipment	Transmission line take-off structures Power circuit breakers Power transformers Switching equipment Bus work or bus conductor	Control house Microwave antenna Current limiting reactors Capacitor banks
Access road Width Road surface Grading	Minimum 24 feet wide, based on site-specific conditions (a maximum of 28 feet, including drainage/berms on each side) Gravel Heavy road base to support larger equipment	
Fire protection facilities	Fire-wall barriers for protection from transformers	
Substation/Reactive compensation grounding	Copper wire will be used to facilitate personnel ground protection	
Land permanently disturbed	Each substation site: 35 to 85 acres	
Land temporarily disturbed	Each substation site: 5 to 20 acres (in addition to permanent disturbance)	
Voltage	Multiple voltages; can change voltage from 500 kV to 345 kV to 115 kV	

"As proposed, AC transmission lines would interconnect the proposed SunZia East Substation at the eastern terminus with the Pinal Central Substation at the western terminus. The SunZia East Substation would be located in Lincoln County, New Mexico, near US Route 54 and County Road A035. The Pinal Central Substation has been permitted and will be constructed by SRP at a location in Pinal County, Arizona, near US Route 287 and US Route 87. The Project would include the following three intermediate substations:

Midpoint Substation would be located in Luna County, New Mexico, near the town of Deming

Lordsburg Substation would be located in Hidalgo County, New Mexico, near the existing Hidalgo Substation

Willow-500 kV Substation would be located in Graham County, Arizona, near US Route 191 and the existing TEP 345 kV transmission lines

"The DC transmission line would not include interconnections with these intermediate substations, but would require AC/DC converter stations in the substation at each terminus.

Table 3.Substations: Estimated Temporary and Permanent Ground Disturbance (in acres)				
Substations	**Option A – Temp**	**Option A – Perm**	**Option B – Temp**	**Option B – Perm**
SunZia East	15	45	20	85
Willow-500 kV	5	40	5	35
Midpoint	5	60	5	60
Lordsburg (Hidalgo)	5	40	5	35
Pinal Central[1]	5	0	10	45
Subtotal	**35**	**185**	**45**	**260**
Total Disturbance	**220**		**305**	
[1]Disturbance areas indicated are the portion within the Pinal Central Substation for the SunZia transmission line facilities.				

1.9. "PRECONSTRUCTION ACTIVITIES

"Following are descriptions of preconstruction activities for the Project.

1.9.1.“Right-of-Way and Land Acquisition

“New permanent and temporary land rights (e.g., right-of-way grant, easements, license agreement, and fee simple) are required for Project facilities, such as the transmission line corridor, access roads, and temporary work sites. Where the proposed transmission lines would parallel an existing transmission line, the right-of-way would be adjacent to or overlap the existing right-of-way to the extent feasible. The right-of-way width must be sufficient to accommodate “conductor blowout” (the swinging of the conductor midway between structures) due to wind, as well as maintenance clearances at the structure sites.

“The Applicant filed a preliminary right-of-way application with the BLM in September 2008 for a major right-of-way for the transmission lines. The duration of the right-of-way would be 50 years, with a width of up to 1,000 feet. The terrain, separation criteria, and final design will determine the corridor centerline and total width of the right-of-way. Typically, each line would require 200 feet within a 400-foot-wide right-of-way for the two proposed transmission lines. Once the BLM has issued a Record of Decision (ROD), the right-of-way application would be finalized with Project design details and right-of-way width (see Figure 3.for a typical right-of-way configuration).

“Additional right-of-way may be required in areas where the proposed transmission lines would turn at a sharp angle. In some areas, a narrower right-of-way may be required due to certain site conditions or constraints. In these locations, the right-of-way could be as narrow as 330 feet for limited distances. Access roads may be located outside of the transmission line right-of-way where required, due to steep terrain or other restrictive site conditions. Access roads would be identified in the POD and approved by the BLM before construction. Areas that are used temporarily (e.g., roads, staging areas, batch plants) may require temporary use permits.

“Sites for substations will be purchased in fee, leased with a long-term land lease, or secured with a right-of-way, depending on whether the site is on state or private land.

1.9.2.“Geotechnical Investigation

“The purpose of the geotechnical investigation is to collect information regarding subsurface stability, used in the final design of each transmission structure and foundation. This activity helps to ensure the system is designed and constructed to be safe, reliable, and cost efficient, and can reduce the overall environmental disturbance during initial build and over the life of the Project. The geotechnical investigation would consist of the drilling and sampling of soils to a typical depth of 30 to 40 feet below the existing ground; however, borehole depth may exceed 50 feet, depending on soil conditions. The boreholes would have a diameter of approximately 8 inches and would be backfilled with auger cuttings and on-site soils. No new road construction or blading would be required for the investigation. Surface disturbance would be limited to the actual tracks left by the drill rig and support vehicles within the work areas, and along overland access routes.

“Helicopter-transported drill rigs may be used for geotechnical exploration in areas where existing roads do not provide adequate access or where overland travel is expressly prohibited. Geophysical exploration techniques may be employed in areas where drilling is not practical, to assist in subsurface characterization, and may use instrumentation combined with surficial actuation to identify subsurface soil and rock stratification.

1.9.3.“Centerline Survey

“The engineering survey would involve verifying and staking the centerline of the transmission line route, structure center hubs, access roads (where needed), spur roads to structure sites, and temporary work areas. Some engineering survey activities may begin as early as 2 years prior to the start of construction. Required cultural, paleontological, and biological resource surveys may begin once certain survey information is available. Depending on the route approved in the ROD, the centerline may be adjusted at this stage to accommodate engineering requirements.

1.10.“CONSTRUCTION ACTIVITIES

“Construction activities would be similar regardless of design option (AC or DC). Construction specifications could be refined during detailed engineering; however, these refinements would be within the limits of the detailed analysis addressed by the Draft EIS. Any changes to Project design or construction would be reflected in the final POD, as necessary. The POD will also include a list of those mitigation measures to which the Applicant has committed to protect the environment during Project construction and operation. The design, construction, and operation of the Project would meet or exceed the requirements of the NESC, U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Standards, and the Applicant's requirements for safety and protection of landowners and their property.

1.10.1.“Access Roads

“Roads enable access to the right-of-way and structure sites for both construction and long-term maintenance of the transmission lines. To limit the amount of new road construction for the Project, existing paved and unpaved access roads would be used, to the extent practicable, for the transportation of materials and equipment from the storage yards to the areas where they would be needed along the transmission line right-of-way. Because access roads must be sufficient to bear the weight and endure heavy construction vehicle use, existing access roads may need to be upgraded to meet construction requirements. Affected private landowners and agencies would be consulted before road upgrades or construction begins. Relevant road construction criteria of the affected agencies and landowners, including BLM requirements, will be outlined in the POD. The POD will also document specific plans for the construction, rehabilitation, and/or maintenance of the roads, including general locations of access roads and construction methods (i.e., overland drive and crush, cut and clear), based on site-specific conditions.

“The typical transmission tower span would be 1,200 to 1,600 feet, based on the use of either a guyed-V structure or the SSL structure. In order to limit the amount of new road construction for the Project, existing roads within 700 feet of the Project reference centerline are proposed to be used for access to the Project right-of-way and Project facilities, where practicable. Where existing roads could be used for construction and operation purposes, only spur roads to Project or structure work areas may be needed. Where existing roads are beyond 700 feet from the Project representative centerline, constructing a new road from structure-to-structure would typically result in less ground disturbance than building spur roads from existing roads to each Project or structure work area. The number of new spur roads would be held to a minimum, consistent with their intended use (e.g., structure construction or conductor stringing and tensioning). Some existing roads could require upgrading to meet BLM standards for road construction. All existing roads would be left in a condition equal to or better than their condition

prior to construction, in accordance with BLM, state, and/or local road standards or private landowner agreements.

“Where new roads are required to meet the access needs of the Project, it is anticipated that a single new road would be constructed to serve both 500 kV facilities (Figure 1). In locations of steep or rugged terrain, two separate access roads may be required to accommodate construction of the two parallel transmission lines. New roads may be built as either temporary or permanent access. Where new roads are required for construction purposes only, or to access temporary work areas (e.g., wire pulling and tensioning sites, concrete batch plants), access roads may be built for temporary use. Temporary roads serve the needs for Project access during the construction phase, but are not anticipated to be necessary for operations or decommissioning purposes. Upon completion of construction activities, temporary access roads would be reclaimed according to the procedures specified in the final POD. Where new roads are required for construction and operation purposes, or where landowners or land-management agencies require, access roads would be constructed for permanent use.

“All access roads (new, improved, or spur), temporary or permanent, would typically be constructed with a travel-surface width of 20 feet, and 2-foot berms and/or drainage ditches on both sides of the travel surface, for a total roadway width of 24 feet. In steep terrain, total disturbance would likely exceed 24 feet, due to cut and fill conditions (Figure 2). In addition, roads may be routed around specific areas due to topographical constraints or to avoid sensitive resources. In some locations, helicopters may be used for construction (structure placement) in areas where there are environmental constraints or terrain restrictions, or where it is economically practical.

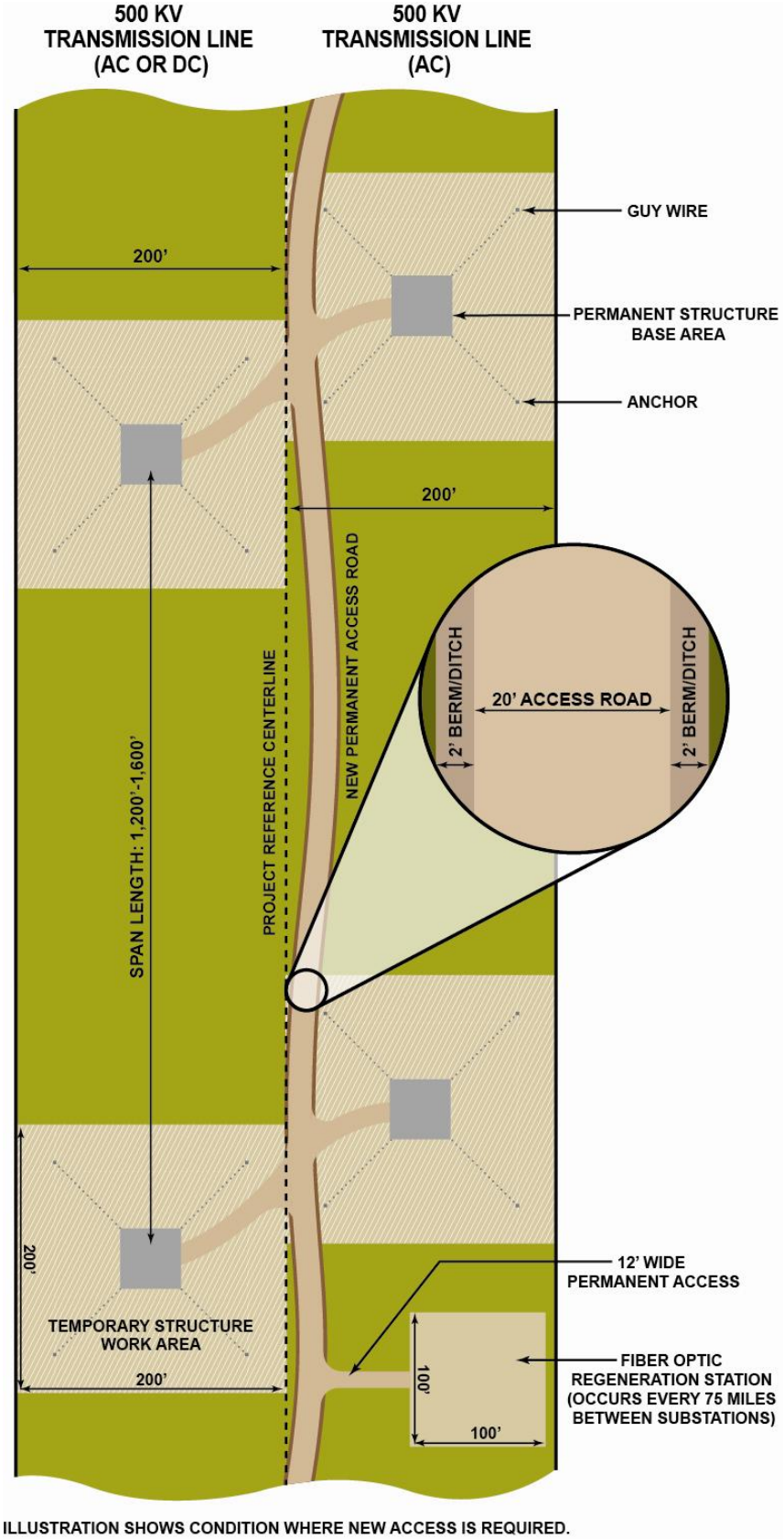

Figure 1. Typical Right-of-Way Configuration

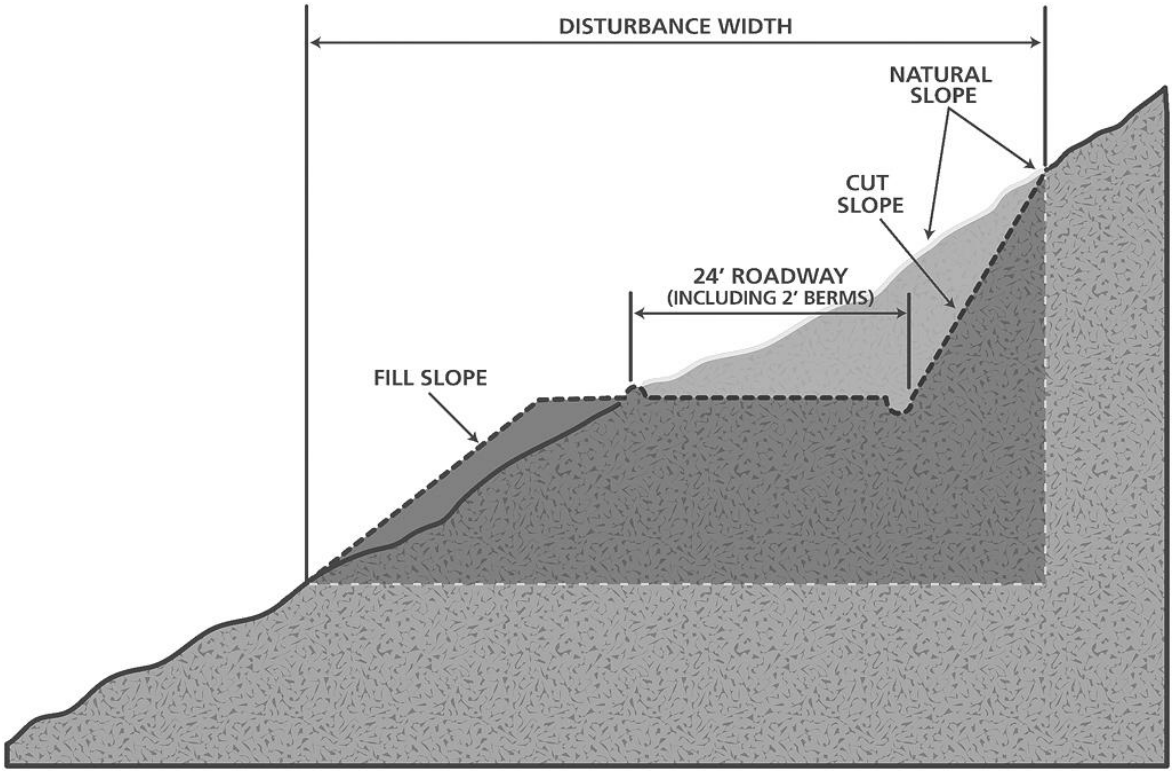

Figure 2. Typical Roadway Cut and Fill Conditions

"To reduce the severity of Project disturbance where operations access will be required, overland road construction methods (i.e., overland drive and crush; overland cut and clear) may be implemented where feasible. Overland drive and crush is defined as vehicular travel to the Project right-of-way and/or facilities without significantly modifying the landscape; vegetation is crushed but not cropped, thereby minimizing disturbance to root mass and organics in the soil, and soil may be compacted but no surface soil is removed. It is anticipated that overland drive and crush could be implemented where new access is required in flat terrain (0 to 3 percent slope) and within the following vegetation communities:

semidesert grassland
Lower Colorado River subdivision of Sonoran desertscrub
Chihuahuan desertscrub
plains and Great Basin grassland
sand dunes
plains-mesa grassland
plains-mesa sand scrub
desert grassland

"Where new roads are required outside of the vegetation communities identified above, and where no grading is necessary (i.e., areas of 0 to 3 percent slope), overland cut and clear would be used to the greatest extent possible. Overland cut and clear is the removal of all vegetation to improve or provide suitable access for equipment. All vegetation is removed using above-ground cutting methods that leave the root mass intact. Soil is compacted but no surface soil is removed.

"In certain areas, it could be necessary to block roads after construction to restrict future access for general and undesired use. Such areas would be identified through negotiations with the landowner or land-management agency, and identified in the final POD. Methods for road closure or management may include installing locking gates or obstructing the path with earthen berms or boulders. The option to reopen blocked access roads for maintenance and emergency repairs would be available, when necessary, where necessary access is impeded.

1.10.2."Access Levels

"For the EIS analysis, three levels of access were identified and the associated amount of ground disturbance from upgrading or constructing access was estimated (Table 4). Existing roads suitable for access and the general condition for each have been mapped. This information was used to provide an estimate of the potential ground disturbance that could result from using existing access roads, upgrading existing roads, or constructing new roads. This access model was used to generate estimates of ground disturbance resulting from access roads for this BA.

Table 4.Access Levels and Associated Potential Ground Disturbance

Access Level	Access Road Condition	Area of Potential Ground Disturbance			
		Slope (percent)	Access Road Miles per Mile of Transmission Line	Spur Road Length[1] (feet)	Ground Disturbance Ratio (acres per mile)
1	No road improvements required, 24-foot spur road used for width of disturbance	0 – 8	1.1	770	1.6
		8 – 15	1.5	1,050	2.2
		15 – 35	1.8	1,260	2.6
		35+	2.3	1,610	3.4
2	Road improvements required with 10-foot width used for ground disturbance with 24-foot spur road width of disturbance	0 – 8	1.1	770	2.8
		8 – 15	1.5	1,050	3.4
		15 – 35	1.8	1,260	3.8
		35+	2.3	1,610	4.6
3	Construct new access road with 24-foot width total disturbance	0 – 8	1.1	(1)	3.2
		8 – 15	1.5	(1)	4.4
		15 – 35	1.8	(1)	5.2
		35+	2.3	(1)	6.7

[1] Spur roads are included within temporary structure work areas

"Existing roads suitable for Project construction access were mapped, and segments of the Project alternatives were designated as Level 1 based on two criteria associated with these roads: (1) alternatives are within 700 feet of an existing road suitable for construction, and alternatives parallel that existing road for a minimum of 700 feet, or (2) where an existing road suitable for construction crosses the proposed Project right-of-way, or another existing road suitable for construction crosses the proposed Project right-of-way within 0.5 mile along the Project representative centerline.

“Existing roads requiring improvements were also mapped and segments of the Project alternatives were designated as Level 2, based on the same criteria as described for Access Level 1.

“Areas of Project alternatives greater than 700 feet from existing roads, or where existing roads crossed the proposed Project right-of-way but did not have another road cross the proposed Project right-of-way within 0.5 mile, would require new access roads to be constructed and were designated as Access Level 3. In addition, access levels were combined with vegetation data to identify areas of potential temporary disturbance, thus minimizing impacts to environmental resources as a result of Project construction.

1.10.3.“Equipment Staging and Construction Yards

“Staging of equipment would be located at pulling and tensioning sites or other temporary work areas. These areas would be used to lay out equipment for specific Project activities at nearby locations. Construction yards would be located approximately every 40 miles, and concrete batch plants would be located on temporary work sites of approximately 3 to 5 acres, located every 30 miles along the right-of-way.

1.10.4.“Structure Pad and Right-of-Way Preparation

“Clearing or trimming of natural vegetation would be required for construction purposes (access, spur roads, structure sites), land surveying activities, clearances for electrical safety, long-term maintenance, and reliability of the transmission lines. Within or adjacent to the right-of-way, mature vegetation would be removed under or near the conductors to provide adequate electrical clearance, as required by the NESC. Typically, only large trees or fast-growing vegetation approximately 12 feet or higher would be topped or removed on level terrain. Where structures are sited on elevated terrain, conductors may span vegetation with sufficient clearance to reduce or eliminate the need for trimming or removal. In sensitive areas or seasons, as determined by the BLM or other agencies, clearing of natural vegetation would occur by hand.

1.10.5.“Typical Structure Site and Work Area

“At each structure site, work areas are required to facilitate the safe operation of equipment and construction. Typical work areas in flat terrain would require an area of 200 feet by 200 feet of temporary disturbance for equipment and construction tasks. The work area would be cleared of vegetation to the extent necessary. Access within the work area would be overland travel with grading, as required in the work site. After construction, all temporary work areas would be restored in accordance with the Reclamation Plan included as an appendix to the POD. Permanent disturbance associated with the structures and structure footings would include an area of up to 60 feet by 60 feet (all dimensions are approximate for tangent structures).

“Specific structure sites and work areas would be identified in the POD, once a final route has been determined. Preliminary engineering has been prepared for the crossing locations of the Rio Grande and San Pedro River, and is presented where appropriate in this document.

1.10.6.“Structure Site and Work Area in Steep or Rough Terrain

“Work areas may be expanded to 200 feet by 300 feet in areas of steep or rough terrain, though the size of the work area may vary depending on site conditions. Approximately two-thirds of this area would be permanently disturbed, to accommodate structures and crane pads used for both construction and operations crews. The remaining one-third of the area would be restored in compliance with the Reclamation Plan, following temporary construction use.

“At structure sites in areas of rough and steep terrain, where economically practicable or a result of sensitive resource issues, helicopters may be used for construction purposes. This would involve ferrying work crews, supplies, and structure materials to the structure sites.

1.10.7.“Foundation Installation

“Power equipment would be used to excavate foundations. Where the soil permits, a vehicle-mounted power auger or backhoe will be used. In rocky areas, the foundation holes may be excavated by drilling and blasting or installing special rock anchors. Soil stabilization by water or a gelling agent may be required for excavation in extremely sandy areas. The BLM would be notified in advance of any required blasting so that the area can be cleared and sensitive resources protected. After excavations are completed, cast-in-place, precast, or drilled pier footings would be installed, depending on the structure type.

“The excavation and installation of the foundation would require access to the site by a power auger or drill, a crane, material trucks, and concrete trucks using the access roads. In environmentally sensitive areas or areas of steep terrain, excavation and installation of the foundation may use a power auger or drill brought in by helicopter or all-terrain vehicle (ATV).

“Foundation holes left open or unguarded would be covered to protect the public and wildlife. If practicable, fencing may be used. Soil removed from foundation holes would be stockpiled on the work area and used to backfill the foundation holes, as necessary. Any remaining soil would be spread on the access road. The upper 6 inches of topsoil would be stockpiled separately, to ensure that the best possible topsoil for reseeding is not covered by auger cuttings during site rehabilitation. Some large rocks may be left onsite to help blend the area with the surrounding landscape.

1.10.8.“Structure Assembly and Erection

“Structures would be assembled and erected onsite using appropriately sized cranes; except where helicopter construction is employed due to access or environmental constraints, such as in areas with rough or steep terrain. The construction specification would be written to allow the contractor the flexibility to use ground-based or helicopter construction methods, or a combination of both.

“When helicopter construction methods are employed, construction activities would be based at a fly yard. Fly yards would be used for material storage and partial assembly of each structure in multiple sections or components. The structure sections or components would be assembled by weight, based on the lifting capacity of the helicopter, and transported to the final structure

location for installation. Heavy-lift helicopters capable of lifting 15,000 to 20,000 pounds per flight (depending on elevation) would be used.

“When ground-based construction methods are employed, tubular pole sections or bundles of steel for lattice towers and associated hardware for each structure would be delivered to the site by trucks and flatbed trailers. Tubular pole sections would be assembled on the ground at the site; the assembled structure would then be lifted onto foundations using a crane. The contractor would also have the option to assemble the tubular pole sections in place, assisted by helicopter. Lattice tower subsections, or tower components, would be pre-assembled on the ground using a truck-mounted crane. The pre-assembled bottom portion of towers (leg extensions) would be lifted onto foundations using a crane. Once the leg extensions are bolted to the foundation stub angles, the remaining tower components (tower body, body extension, cross arms, groundwire peaks) would be lifted in sequence and bolted to each other and to the leg extensions, completing the lattice tower erection. The crane would move along the right-of-way from one location to another, erecting structures.

1.10.9.“Ground Rod Installation

"As part of standard construction practices, prior to wire installation, structure footing resistance along the route would be measured. Grounding of structures would be accomplished by installation of driven ground rods, typically ¾-inch by 16 feet deep, or counterpoise (grounds), which consist of a bare copper-clad or galvanized steel cable buried a minimum of 12 inches deep, extending from one or more structure legs for approximately 200 feet within the right-of-way.

1.10.10.“Stringing Conductors and Groundwire

“Conductors and groundwires would be placed on the transmission line support structures by a process called stringing. The first step to wire stringing would be to install insulators (if not already installed on the structures during ground assembly) and stringing sheaves. Stringing sheaves are rollers that are temporarily attached to the lower portion of the insulators at each structure to allow conductors and OHGWs to be pulled along the line. In addition, temporary clearance structures (guard structures) would be erected, where required for safety and protection during wire stringing operations. Guard structures consist of H-frame poles and nets placed on either side of an obstacle. These structures prevent groundwire, conductors, or equipment from falling on an obstacle.

“Equipment for erecting guard structures includes augers, line trucks, pole trailers, and cranes. Guard structures may not be required for small roads or may be accommodated by line trucks or other methods. On such occasions, other safety measures such as barriers, flagmen, or other traffic control would be used.

“Once the stringing sheaves and temporary guard structures are in place, a pilot line would be pulled (strung) from tower to tower (or pole to pole) by helicopter, truck, or ATV, and threaded through the stringing sheaves at each structure. A larger diameter, stronger line (pulling line or hard line) would then be attached to the pilot line and strung. This process is repeated until the groundwires and conductors are pulled through all sheaves. Groundwires and conductors would

be strung using powered pulling equipment at one end, and powered braking or tensioning equipment at the other.

“The 500 kV lines use a three-conductor bundle for each phase (three bundles for AC, two bundles for DC). The conductor would be delivered on steel reels containing approximately 9,000 feet of conductor per reel; therefore, conductor joints would occur approximately every 9,000 feet. These joints, also called splices or compression sleeves, would provide electrical continuity and mechanical strength between adjacent reels of conductors. Following the initial stringing operation, pulling and tensioning the wires/conductors would be required to achieve the correct sagging of transmission lines between structure supports. Typically, sites for tensioning and pulling equipment are approximately 200 feet by 600 feet, and would be required approximately every 18,000 feet. However, to accommodate directional changes within the Project alignment and site-specific design requirements, smaller 200 feet by 400 feet pulling, tensioning, and/or splicing sites would be located at 9,000-foot intervals between the larger 200 feet by 600 feet tensioning and pulling sites. In addition, when construction occurs in steep and rough terrain, larger, less symmetrical pulling and tensioning areas at more frequent locations may be required. Once a final route has been determined, pulling, tensioning, and splicing sites would be identified in the POD and final BA.

1.10.11.“Substation and AC/DC Converter Stations

“Preparation and construction at the substation sites would require the following:

Cut-and-fill grading (terrain dependent)
Placement and compaction of structural fill to serve as a sub-base under the foundations for equipment
Subsurface grounding grids
Subsurface control conduits
Grading to maintain drainage patterns
Oil spill containment facilities
Gravel-surfaced yard
Gravel-surfaced parking areas approximately 100 by 100 feet
Gravel-based roads (a minimum of 24 feet wide, based on site-specific conditions)
Fencing and gate
Facility construction
Revegetation with native plants, where practicable

1.10.12.“Waste Removal

“Construction sites, material storage yards, and access roads would be kept orderly. Refuse and trash would be removed from the sites and disposed of in an approved landfill. In remote areas, trash and refuse would be removed to a construction staging area until proper disposal can be facilitated. No open burning of construction trash would occur without appropriate approval.

1.10.13.“Reclamation

“The right-of-way would be reclaimed to its original condition as is practicable, through methods described in the Reclamation Plan as described in the POD. In areas of temporary disturbance,

all practical means would be made to reclaim the land to its original contour, natural drainage patterns, and vegetation (i.e., use of native plants or seed mix) along the right-of-way, as required by the BLM and outlined in the POD.

1.10.14.“Labor Force and Equipment

“The proposed Project would consist of several phases of construction at various locations, allowing some shared personnel between work sites according to the task schedule. An estimated 206 workers would be required for construction of each transmission line, and approximately 55 workers would be needed to construct each new substation. Four new AC substations would be constructed with the first AC transmission line, followed by the expansion of each of those substations for the second AC transmission line. In the case where the second line is a DC transmission line, two new AC/DC converter substations would be added to the initial four AC substations, for a total workforce of 110. In total, the maximum substation construction workforce would be 424 for Option A, or 330 for Option B. (Actual construction workforce at any one time would be less than the maximum.)

1.11.“OPERATION, MAINTENANCE, AND DECOMMISSIONING

“The transmission lines would be protected with power circuit breakers and line relay protection equipment. If a conductor fails, power would be automatically removed from the line. Lightning protection would be provided through OHGW or OPGW.

“All buildings, fences, and other structures with metal surfaces located within 200 feet from the centerline of the right-of-way would be grounded, as needed. Typically, residential buildings located 200 feet or more from the centerline would not require grounding; the need to ground other structures beyond 200 feet would be determined by the NESC. All metal irrigation systems that parallel transmission lines for a distance of 1,000 feet or more and within 100 feet of the centerline would be grounded. If grounding were required outside the right-of-way, a temporary use permit would be obtained, as needed.

1.11.1.“Maintenance

“The transmission lines would be patrolled bi-annually for maintenance, either by helicopter or by driving patrol. Over-flight line maintenance during the spring and fall of each year is based on weather conditions, helicopter availability, and statutory requirements of the states served by the Applicant. Spring and fall over-flight maintenance activities are conducted prior to peak demand of summer and winter months, to identify and resolve conditions that pose an immediate hazard to the public or employees, or that risk immediate loss of supply or damage to the electrical system. Maintenance crews would be trained and adhere to Bird Management and Avian Protection Plans for all maintenance activities. Avian monitors would routinely identify nest locations and check structures for nesting activity during appropriate seasons. Over-flight maintenance activities are conducted at a distance and speed that would not result in disturbance to avian species or nests.

“Monitoring and maintenance would be done from approved or existing access roads. When access into the structure locations needs improvement, a tracked bulldozer or other heavy equipment would be used after notifying the BLM Authorized Officer. As necessary,

maintenance crews would be required to re-scarify and reclaim newly disturbed areas to pre-existing conditions. Any berms or boulders that were in place to limit access would also be restored after completion of the maintenance work.

“The Project right-of-way would not be chemically treated with pesticides or herbicides unless needed, and only upon prior approval of the land manager or owner. Chemical treatment generally would be limited to areas with noxious weeds. The Applicant would comply with requirements of the land-managing agencies regarding management of noxious weeds (e.g., cleaning equipment to prevent spread of noxious weeds) along access roads, within the right-of-way, and at temporary use areas. Woody vegetation would be removed using mechanical or hand-cutting methods, but chemical treatment of cut stumps of invasive species (e.g., tamarisk or Russian olive) may take place as well.

“Periodic (every 2 to 5 years) mechanical treatment of trees and woody vegetation in the right-of-way would occur, generally in the summer and fall seasons, to avoid disturbance of nesting birds and other sensitive wildlife. Vegetation management would take place to achieve clearances required by NESC and North American Electric Reliability Corporation (NERC) standards, including allowances for conductor sag or sway, and up to 5 years of vegetation growth. Procedures for vegetation treatment and noxious weed management would be outlined in the final POD. However, preliminary site-specific vegetation management planning is discussed in this document regarding designated critical habitat for the Southwestern Willow Flycatcher at the crossings of the Rio Grande and San Pedro River.

“Inspection and maintenance of the communication regeneration sites, including the buildings, communication facilities, and other physical equipment, would occur as needed. Maintenance of the communication facilities would consist of testing, repairing, and replacing electronic equipment located within the building at the regeneration site.

“The substation yards would be maintained and inspected according to BMPs and the Applicant’s standards.

1.11.2.“Fire Protection and Emergency Response

“Emergencies are any events requiring immediate response to a condition and may include fires, car-to-pole contacts, downed poles, transformer outages, and/or outages due to downed wires. All applicable fire laws and regulations, including BLM fire safety standards, would be observed during the operations period. If extreme fire conditions were to occur, the BLM and other land management agency representatives would be contacted and access would be restricted. Maintenance personnel would coordinate with the agency representatives and implement practical measures to report and suppress fires, such as brush clearing, prior to work; stationing a water truck at the job site to keep the ground vegetation moist in extreme fire conditions, enforcing red flag warnings, and providing “fire behavior” training to all pertinent personnel.

“Responding crews would vary in number and equipment needs, depending on the size and severity of the emergency. Typically, a four-person crew with a line truck, aerial lift truck, and an assist truck would respond to the emergency to make repairs. Crews may be required to respond to an emergency in a remote area without roads. In areas without vehicle access, helicopters may be used to respond quickly to emergencies. Refueling of equipment and helicopter staging areas would be at nearby airports or staging areas on private property.

1.11.3.“Decommissioning

“The term of the BLM right-of-way grant to allow use of Federal land would be limited to 50 years, although the useful life of the Project facilities is projected to be at least 50 years and up to 75 years. The transmission lines and associated facilities would be decommissioned at the end of the useful life of the Project if the facilities were no longer required (after 50 years, or longer with a new right-of-way grant or renewal). Subsequently, conductors, insulators, concrete pads, and hardware would be dismantled and removed from the right-of-way. Tower and pole structures would be removed and foundations broken off at least 2 feet below ground surface. All areas of permanent disturbance would be restored in accordance with a Termination and Reclamation Plan approved by the BLM Authorized Officer.

1.12.“MITIGATION MEASURES

“Table 5 presents the standard mitigation measures, developed as a part of the Project description in the Draft EIS and POD. Standard mitigation measures would be applied Project-wide, wherever the applicable affected resource occurs. Standard mitigation measures typically include BMPs or address widely distributed resources. Table 6 presents the selective mitigation measures, which are used to reduce or avoid site-specific impacts. For each table, standard and selective mitigation measures that are italicized would not reduce impacts to ESA-listed species or other biological resources, but are included for numbering consistency with the Draft EIS and POD. Those measures that do address biological resources form the basis for conservation measures presented by species.

Table 5.Standard Mitigation Measures

Standard mitigation measures are part of the Project description, and describe Project-wide engineering standards and construction, operation, or maintenance practices.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
1	Prior to construction, a detailed POD will be developed to further describe Project features, selective mitigation, and procedures. At a minimum, the POD will address Project design, construction and operation considerations, biological considerations (including noxious weed management), archaeological considerations, paleontological considerations, hazardous materials management, and reclamation considerations.	●	●	●
2	All vehicle movement outside the right-of-way would typically be restricted to designated access, contractor acquired access, or public roads.	●	●	●
3	The boundary of construction activities would typically be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate survey or construction activity limits.		●	
4	The alignment of any new access roads or overland route would follow the designated area's landform contours where possible, provided that such alignment does not additionally impact resource values. This would minimize ground disturbance and/or reduce scarring (visual contrast).	●	●	
5	In construction areas where grading is not required, vegetation would be left in place wherever possible, and original contour would be maintained to avoid excessive root damage and allow for regrowth. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission lines, as determined by the appropriate land-managing agency.	●	●	
6	To limit new disturbance, existing access roads in the Project area would be used to the extent practicable, provided that doing so does not additionally impact resource values.	●	●	●
7	Construction holes left open overnight would be appropriately fenced or covered to prevent damage to wildlife or livestock.		●	
8	In construction areas (e.g., marshalling yards, structure sites, spur roads from existing access roads) where grading is required, surface restoration would be implemented as required by the landowner or		●	

Table 5.Standard Mitigation Measures

Standard mitigation measures are part of the Project description, and describe Project-wide engineering standards and construction, operation, or maintenance practices.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
	BLM Authorized Officer. The method of restoration would normally consist of returning disturbed areas back to their natural contour, reseeding (where required), cross drains installed for erosion control, placing water bars in the road, and filling ditches.			
9	Watering facilities (e.g., tanks, developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities to their predisturbed condition, as required by the landowner or land management agency. Temporary watering facilities would be provided for wildlife and livestock until permanent repair or replacement is complete.		●	
10	*Nonspecular conductors would be used, where specified by the BLM Authorized Officer, to reduce visual impacts.*	●	●	
11	*"Dulled" metal or self-weathering finish structures would be used to reduce visual impacts, if specified by the BLM Authorized Officer.*	●	●	
12	*Structures and/or groundwire would be marked with high-visibility devices where required by government agencies (e.g., FAA).*	●	●	●
13	*On agricultural land, right-of-way would be aligned, in so far as practicable, to reduce the impact to farm operations and agricultural production.*	●		
14	Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural and ecological resources. To assist in this effort, the construction CIC or a resource specialist would address: (a) Federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources and the purpose and necessity of protecting them.	●	●	
15	*Cultural resources would continue to be considered during post-EIS phases of Project implementation, in accordance with an executed agreement. This would involve intensive surveys to inventory and evaluate cultural resources within the selected corridor and any appurtenant impact zones beyond the corridor, such as access roads and construction equipment yards. This would also require completion and approval of a cultural inventory report, approval of*	●	●	●

Table 5.Standard Mitigation Measures

Standard mitigation measures are part of the Project description, and describe Project-wide engineering standards and construction, operation, or maintenance practices.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
	an HPTP, and implementation of the HPTP to ensure proper data recovery and recordation prior to construction in the sensitive areas identified in the HPTP. Monitoring of construction activities would be required to ensure that cultural sites that are to be avoided during construction remain undisturbed.			
16	*Project Owners would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line would be evaluated on a regular basis so that damaged insulators or other line materials that could cause interference are repaired or replaced.*			●
17	*Project Owners would apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing right-of-way, to the mutual satisfaction of the parties involved.*	●	●	●
18	Roads would be built as near as possible at right angles to the streams and washes. Culverts or temporary bridges would be installed where necessary. All construction and operations activities shall be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks.	●	●	●
19	To the extent practicable, structures would be sited with a minimum distance of 200 feet from streams.	●		
20	*All requirements of those entities having jurisdiction over air quality matters would be adhered to, any necessary dust control plans would be developed, and permits for construction activities would be obtained. Open burning of construction trash would not be allowed unless permitted by appropriate authorities.*		●	
21	*Fences and gates would be repaired or replaced to their original, predisturbed condition, as required by the landowner or the BLM Authorized Officer if they are damaged or destroyed by construction activities. New temporary and/or permanent gates would be installed only with the permission of the landowner or the BLM. Temporary gates not required for postconstruction access control (see SE 6) would be removed following construction completion, and the area restored in accordance with the POD (see ST 1).*		●	●

Table 5.Standard Mitigation Measures

Standard mitigation measures are part of the Project description, and describe Project-wide engineering standards and construction, operation, or maintenance practices.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
22	*Transmission line materials would be designed and tested to minimize corona. Bundle configuration and larger diameter conductors would be used to limit the audible noise, radio interference, and television interference due to corona. Tension would be maintained on all insulator assemblies to ensure positive contact between insulators, avoiding sparking. Caution would be exercised during construction and operations to avoid scratching or nicking the conductor surface, which may provide points for corona to occur.*	●	●	●
23	During operation of the transmission lines, the right-of-way would be maintained free of nonbiodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the landowner or management agency.		●	●
24	*In consultation with appropriate land-management agencies, specific mitigation measures for paleontological resources would be developed and implemented to mitigate any identified adverse impacts. These measures would include: preparation of a PRMP; paleontological surveys; personnel education; monitoring ground disturbance for fossils; curation of fossils; and deposition of fossils in a paleontological repository.*	●	●	
25	Preconstruction surveys for species listed under the ESA or specified by the appropriate land management agency as sensitive or of concern would be conducted in areas of known occurrence or suitable habitat. Timing of the surveys would be determined by the construction schedule, within the appropriate season for each species. Monitoring of construction activities would be required in some areas to ensure that effects to these species are avoided during construction. If Bald Eagle or Golden Eagle nests are identified during preconstruction surveys, seasonal restrictions on construction within a specified buffer would be implemented where applicable, according to current USFWS protocols, to comply with the BGEPA. Preconstruction nesting-season surveys for migratory birds, and surveys for Burrowing Owls in suitable habitat, would be conducted as needed to comply with the MBTA.	●	●	●

Table 5.Standard Mitigation Measures

Standard mitigation measures are part of the Project description, and describe Project-wide engineering standards and construction, operation, or maintenance practices.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
26	Preconstruction native plant inventories and surveys for noxious weed species as stipulated by the appropriate land-administering agency would also be conducted once transmission line centerline, access roads, and tower sites have been located.	●	●	
27	Surveys for bat roosts would be conducted within ¼ mile of the Project right-of-way in areas that potentially contain caves, karst features, or mines. Occupied bat roosts would be avoided.	●	●	
28	Paniculate agave plants (*Agave palmeri, A. parryi*, and *A. chrysantha*) and saguaro cacti (*Carnegiea gigantea*) within the known range of the Lesser Long-nosed Bat or Cactus Ferruginous Pygmy-owl would be avoided or salvaged for replanting within the right-of-way or suitable adjacent habitat. Only agaves not possessing flower stalks would be salvaged, and only saguaros of transplantable size (15 feet or less in height) would be salvaged.	●	●	
29	Electrical facility design would be in accordance with "Suggested Practices for Raptor Protection on Power Lines" (Avian Power Line Interaction Committee 2006).	●		

BGEPA – Bald and Golden Eagle Protection Act
CIC – Compliance Inspection Contractor
HPTP – Historic Properties Treatment Plan
MBTA – Migratory Bird Treaty Act
PRMP – Paleontological Resources Monitoring Plan

Table 6. Selective Mitigation Measures

Selective mitigation measures are applied as needed to reduce or avoid site-specific impacts.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
1	No widening or upgrading of existing access roads would be undertaken in the area of construction and operations, except for repairs necessary to make roads passable, where soils and vegetation are very sensitive to disturbance, or where existing archaeological sites are present.	●	●	●
2	There would be no blading of new access roads in select areas of construction and operations. Existing crossings would be utilized at perennial streams, designated recreational trails, and irrigation channels. Off-road or cross-country access routes would be used for construction and maintenance in select areas. This would minimize ground disturbance impacts. These access routes must be flagged with an easily seen marker, and the route must be approved in advance of use by the BLM Authorized Officer or landowner.	●	●	
3	Overland access (i.e., drive-and-crush or cut-and-clear) would be used to the greatest extent possible in areas where no grading would be needed to access work areas. Drive-and-crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed, but not cropped. Soil is compacted, but no surface soil is removed. Cut-and-clear is considered as brushing off (removal) of all vegetation to improve or provide suitable access for equipment. All vegetation is removed using above-ground cutting methods that leave the root crown intact.		●	●
4	All new access roads not required for maintenance would be permanently closed using the most effective and least environmentally damaging methods appropriate to that area (e.g., stock piling and replacing topsoil, or rock replacement), with concurrence of the landowner or appropriate land management agency. This would limit new or improved accessibility into the area.			●
5	In addition to standard reseeding and recontouring practices (see ST 8), a detailed Project reclamation plan would be developed to mitigate site-specific resource impacts.		●	●
6	To minimize disturbance to sensitive habitats or resources, access roads required for operations purposes would be gated or otherwise blocked from public access.		●	●

Table 6. Selective Mitigation Measures

Selective mitigation measures are applied as needed to reduce or avoid site-specific impacts.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
7	Modified tower design or alternate tower type would be used to minimize ground disturbance, operational conflicts, visual contrast, and/or avian conflicts.	●		●
8	In designated areas, structures would be placed so as to avoid, and/or to allow conductors to span sensitive features such as riparian areas, water courses, roads, trails, bat roosts, and cultural sites within limits of standard tower design. This would minimize the amount of sensitive features disturbed and/or reduce visual contrast.	●		
9	*Standard tower design would be modified to correspond with spacing of existing transmission line structures where feasible, and within limits of standard tower design. The typical span would be modified to correspond with existing structures, but not necessarily at every location. This would reduce visual contrast and/or potential operational conflicts.*	●		
10	*At highway, canyon, and trail crossings, structures are to be placed at the maximum distance practicable from the crossing to reduce visual impacts.*	●		
11	*To reduce visual contrast, mineral or asphalt emulsions (e.g., Permeon™ or approved equivalent) would be applied in rocky areas where newly exposed rock color would create strong landscape contrasts.*	●	●	
12	With the exception of emergency repair situations, right-of-way construction, restoration, maintenance, and termination activities in designated areas would be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed threatened and endangered, or other sensitive animal species. Sensitive periods, species affected, and areas of concern would be approved in advance of construction or operations by the BLM Authorized Officer.		●	●
13	Helicopter placement of structures may be used to reduce ground disturbance (e.g., to minimize soil erosion, vegetation loss, and visual impacts).		●	
14	To minimize disturbance to riparian vegetation and woodlands, and to reduce visual contrast, clearing of trees in and adjacent to the right-of-way would be minimized to the extent practicable to satisfy conductor-clearance requirements (NESC and up to 10 years of timber growth). Trees and other vegetation would be removed selectively (e.g., edge		●	

Table 6.Selective Mitigation Measures

Selective mitigation measures are applied as needed to reduce or avoid site-specific impacts.
NOTE: Italicized mitigation measures do not apply to biological resources

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	**Construction**	**Operations**
	feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate.			
15	To minimize bird collisions, bird diverters would be installed and maintained on groundwires, transmission lines, and/or guywires in areas of heavy bird use (i.e., Rio Grande and other riparian corridors). Groundwires would be replaced with one-inch diameter OPGWs to increase visibility where practicable and appropriate.		●	●
16	To reduce ground disturbance and visual contrast, the separation between the transmission lines and existing utilities, roads, or railroads would be minimized to the extent practicable.	●		

1.13.“RESOURCE MANAGEMENT PLAN AMENDMENTS

1.13.1.“Introduction

“Management direction of public land and resources is provided in land use plans or RMPs for each BLM field or district office. The BLM must review relevant plans to determine if a proposed project is in conformance with the management decisions and objectives of those plans. If a proposed project is not in conformance, the BLM can either choose to deny the project, adjust the project to conform to the RMP, or amend the plan to address nonconformance. There are two types of plan amendments identified in this EIS that may be required to conform to RMPs: (1) right-of-way exclusion or avoidance, and (2) visual resource management (VRM) objectives.

“The BLM preferred alternative includes proposed plan amendments to the Socorro and Mimbres RMPs for specific corridor locations along the BLM preferred route. The BLM preferred plan amendment alternative is the 400-foot-wide corridor that may be included as an amendment to RMPs for conformance with VRM and right-of-way management objectives. No amendments to the RMPs in Arizona would be required for the BLM preferred alternative.

1.13.2.“Socorro RMP: Proposed Plan Amendment

“For the Socorro RMP, the BLM preferred alternative would affect 383 acres of VRM Class II lands and 296 acres of VRM Class III lands, resulting in nonconformance due to visual contrast of the proposed Project along links E101b and E133. Table7 provides a summary of the effects of the proposed plan amendments within the Socorro Field Office area for the BLM preferred alternative.

Table 7.Proposed Plan Amendments – Socorro RMP		
BLM Preferred Alternative: Links	**Plan Amendment Change**	**Acres Affected by Plan Amendment Change for 400-foot-wide Corridor**
E101b	VRM Classification	456
E133	VRM Classification	223
E101b and E133	Right-of-way avoidance area	538
A161 and E211	Right-of-way avoidance area	495

1.13.3.“Las Cruces Field Office, Mimbres RMP: Proposed Plan Amendment

“For the Mimbres RMP, right-of-way plan amendments would be required for links A440, A530, and B120b where the BLM preferred alternative would cross designated avoidance areas. Table provides a summary of the effects of the proposed plan amendments for right-of-way avoidance within the Las Cruces Field Office area for the BLM preferred alternative.

Table 8.Proposed Plan Amendments – Mimbres RMP		
BLM Preferred Alternative: Links	**Plan Amendment Change**	**Acres Affected by Plan Amendment Change for 400-foot-wide Corridor**
A440	Right-of-way avoidance area	87
A530	Right-of-way avoidance area	92
B120b	Right-of-way avoidance area	15

1.13.4.“Summary of Proposed Plan Amendments

“No right-of-way avoidance areas subject to the proposed plan amendments were so designated for the protection of ESA-listed species. However, the Northern Aplomado Falcon may be present in areas affected by RMP amendments. The potential effects of RMP amendments on this species are addressed in the species by species analysis. No other ESA-listed species are anticipated to be affected by RMP amendments.

1.14.“INTERRELATED AND INTERDEPENDENT ACTIONS

“No actions outside of the proposed Project description are identified as interdependent or interrelated. Although the purpose and need of the Project is primarily to support transmission from new generation sources in New Mexico and southern Arizona, no new generation sources have been permitted or have contracted to deliver energy via the proposed Project.”

Appendix E: Additional Description of Proposed Action

Vegetation Management in Lesser Long-nosed Bat and Mexican Long-nosed Bat Habitat

The following is excerpted from the BA Section 6.1.1.3.:

> "Saguaros and agaves would be avoided during construction, where possible; should removal be required, they would be transplanted outside of the area of ground disturbance or used during reclamation. Salvage and replanting of mature agaves may trigger flowering, which may affect the timing of nectar availability to bats from those individual plants (Plant Sciences Center 2012).
>
> "Routine vegetation management over the life of the Project would be necessary to meet NERC and NESC standards for conductor clearance. The following vegetation management practices would be limited to areas directly under or within approximately 10 horizontal feet of the conductors (the wire zone), an area approximately 90 feet wide for each transmission line. Typically, saguaros not salvaged during the construction phase would be topped at approximately 12 feet or removed from the wire zone over the life of the Project. Any paniculate agave would be assumed to have the potential to exceed 12 feet in height when blooming, and would be salvaged and replanted outside the wire zone prior to blooming, or removed if salvage is not feasible. Where detected, agave in the wire zone would be salvaged during the construction phase, although new plants are anticipated to grow and require salvage over the life of the Project.
>
> "In steep or rolling terrain, trimming or removal of saguaros and agaves would be limited to those that may encroach on the minimum clearances specified by NERC and NESC standards, and other saguaros and agaves would be spanned. Removal or trimming of any saguaros or agaves would only take place after an individual assessment of the clearance risk that each plant poses."

Avian Protection Plan and Bird Diverters – Yuma Clapper Rail

The following is excerpted from the BA Section 6.2.2.3.:

> "An Avian Protection Plan (APP) and an associated migratory bird conservation strategy would be developed as a condition of the right-of-way grant and Notice to Proceed. The APP would specifically address the risk for all bird species of collision with transmission lines, and would provide for the application of bird diverters and other appropriate measures at identified locations, including Picacho Reservoir."

Vegetation Management in Southwestern Willow Flycatcher and Yellow-billed Cuckoo Habitat

The following is excerpted from the BA Section 6.2.6.3.:

> "NESC standards require a minimum ground clearance of 30 feet (AC) to 38 feet (DC) for 500 kV transmission lines, at the maximum allowable conductor sag. Under typical operating conditions, the conductors would sag to approximately 45 feet of ground clearance, depending on the span length and other design factors. NERC standards

require minimum clearances between vegetation and conductors, based on the system voltage and elevation. NERC standards for vegetation clearance on a 500 kV system at 4,000 to 5,000 feet elevation, similar to the Rio Grande crossing, would be approximately 6 feet (AC) to 9 feet (DC), after accounting for conductor sag, vegetation growth, and sway of conductors or vegetation. Thus, safe clearances under normal conditions in still weather would be inadequate in high winds or other adverse operating conditions. This analysis estimates that approximately twice the minimum clearance would be required; thus, 18 feet of clearance beneath the conductors would allow up to approximately 12 feet of vegetation growth while maintaining 30 feet of ground clearance.

"The vegetation management within the right-of-way would take place to meet a goal of a maximum tree height of 12 feet at the lowest point of the conductor sag within the wire zone, allowing space for sway of conductors or vegetation while still achieving or exceeding the minimum required clearances (Figure 7). Vegetation trimming to achieve this clearance would be conducted every 3 to 5 years or as necessary, and would cause temporary disturbance to Southwestern Willow Flycatcher critical habitat. All vegetation management would be conducted outside the Southwestern Willow Flycatcher nesting season, with the exception of emergency situations.

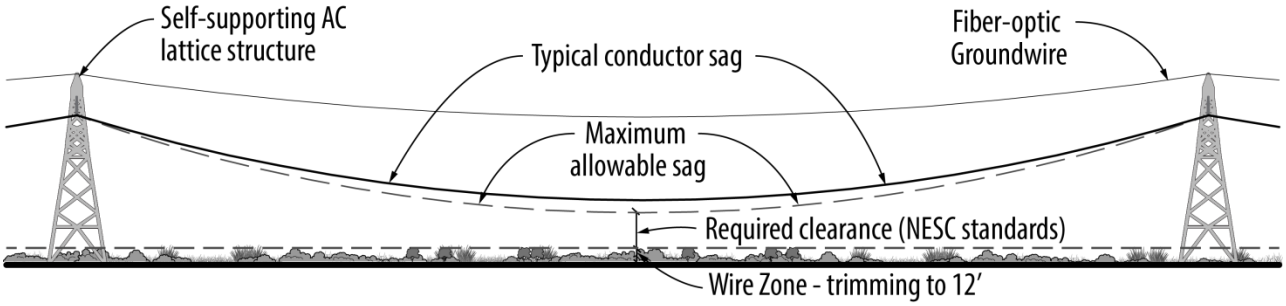

Figure 3.Right-of-way Profile: Conductor Sag and Wire Zone Vegetation Management

Rio Grande Crossing – Link E180

"Vegetation within the right-of-way at the Rio Grande crossing would be maintained in a wire zone-border configuration Figure 8. Vegetation directly under or within approximately 10 feet of the conductors horizontally would be maintained at a 12-foot nominal height. Vegetation within the right-of-way but outside the wire zone would be maintained to a height of approximately 25 feet. Vegetation beyond the right-of-way would not typically be maintained, but hazard trees with the potential to grow into or fall into the right-of-way within the minimum NERC-required clearances would be selectively trimmed or removed. All trees would be removed from within the structure work areas, and low-growing vegetation would be planted for reclamation in those areas as described above. Additional details, including existing vegetation height, preliminary engineering, and vegetation management needs, are shown in Figure 25 and Figure 26."

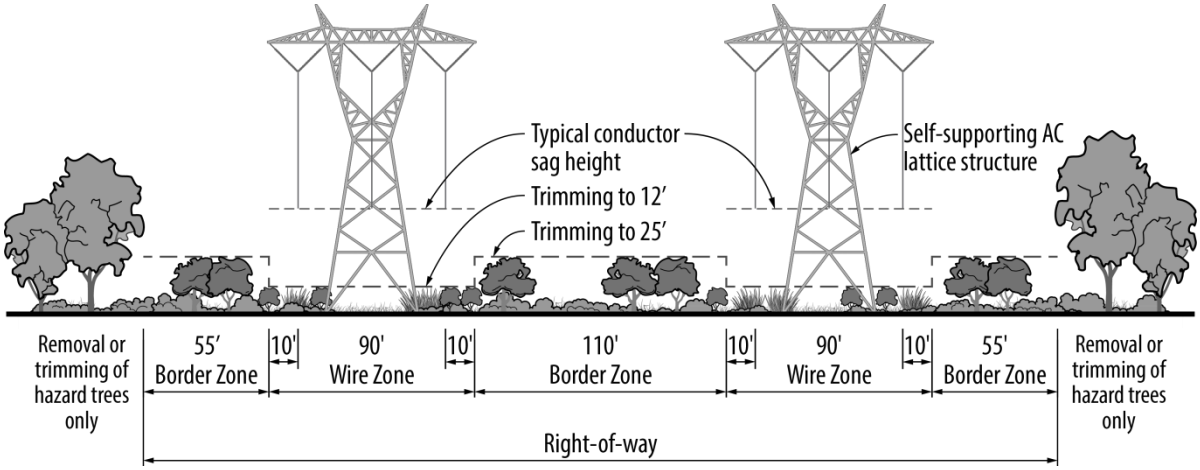

Figure 4.Right-of-way Cross-section: Wire Zone – Border Zone Vegetation Management

***

"Vegetation at the San Pedro River would be maintained in a wire zone-border configuration, but vegetation height would be maintained relative to the base of the structures rather than the level of the floodplain due to the terrain at this location. Figure B-68 shows the existing conditions, taken from the approximate proposed location of a structure above the west bank of the floodplain, facing directly across towards proposed structure locations above the east bank of the floodplain, adjacent to Cascabel Road. The canopy height of the mesquite bosque in the floodplain at this location is similar to the elevation at the proposed structure locations, sited above the floodplain. Thus, only individual tree tops or branches would be selectively trimmed if they exceed a height of 12 feet above the base elevation of the structures within the wire zone, or 25 feet above the base elevation of the structures within the border zone. The river channel is approximately 20 to 30 feet lower in elevation than the structure locations, as shown to scale on Figure 28 and Figure 29. Trees in the wire zone would thus be allowed to reach heights of 12 feet near the structures to approximately 42 fe*et al*ong the river channel before selective trimming would be necessary."

***

"The BLM, Proponent, and USFWS are currently working to identify and acquire habitat to offset the temporary and permanent disturbance that would take place within designated critical habitat. No specific parcels can be identified at this time; however, compensatory mitigation is a committed measure and would be a condition of the right-of-way grant and Notice to Proceed."

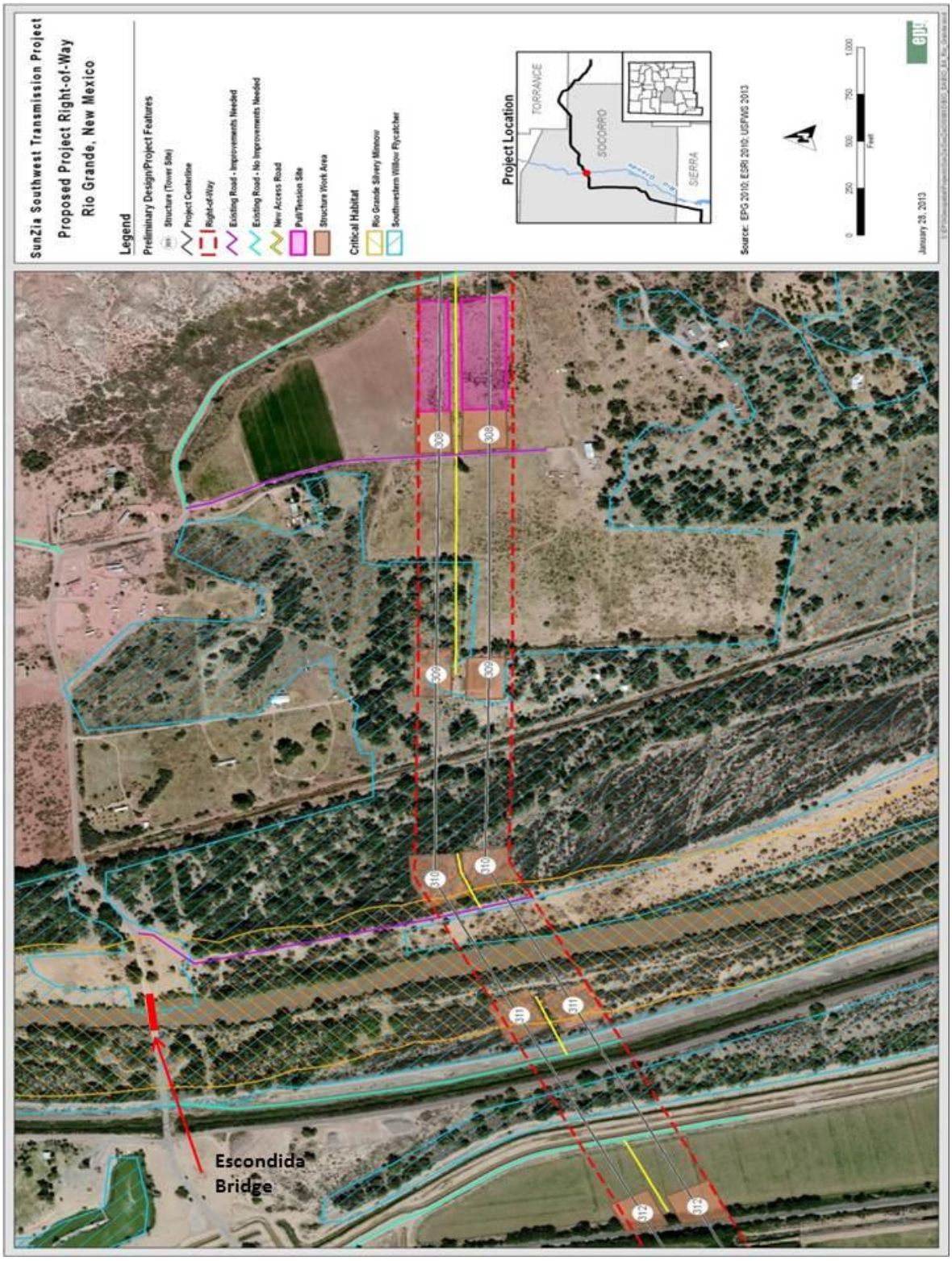

Figure 24. SunZia Rio Grande crossing - Preliminary Engineering and Ground Disturbance within Southwestern Willow Flycatcher and Rio Grande silvery minnow Designated Critical Habitat. Escondida Bridge marked for reference.

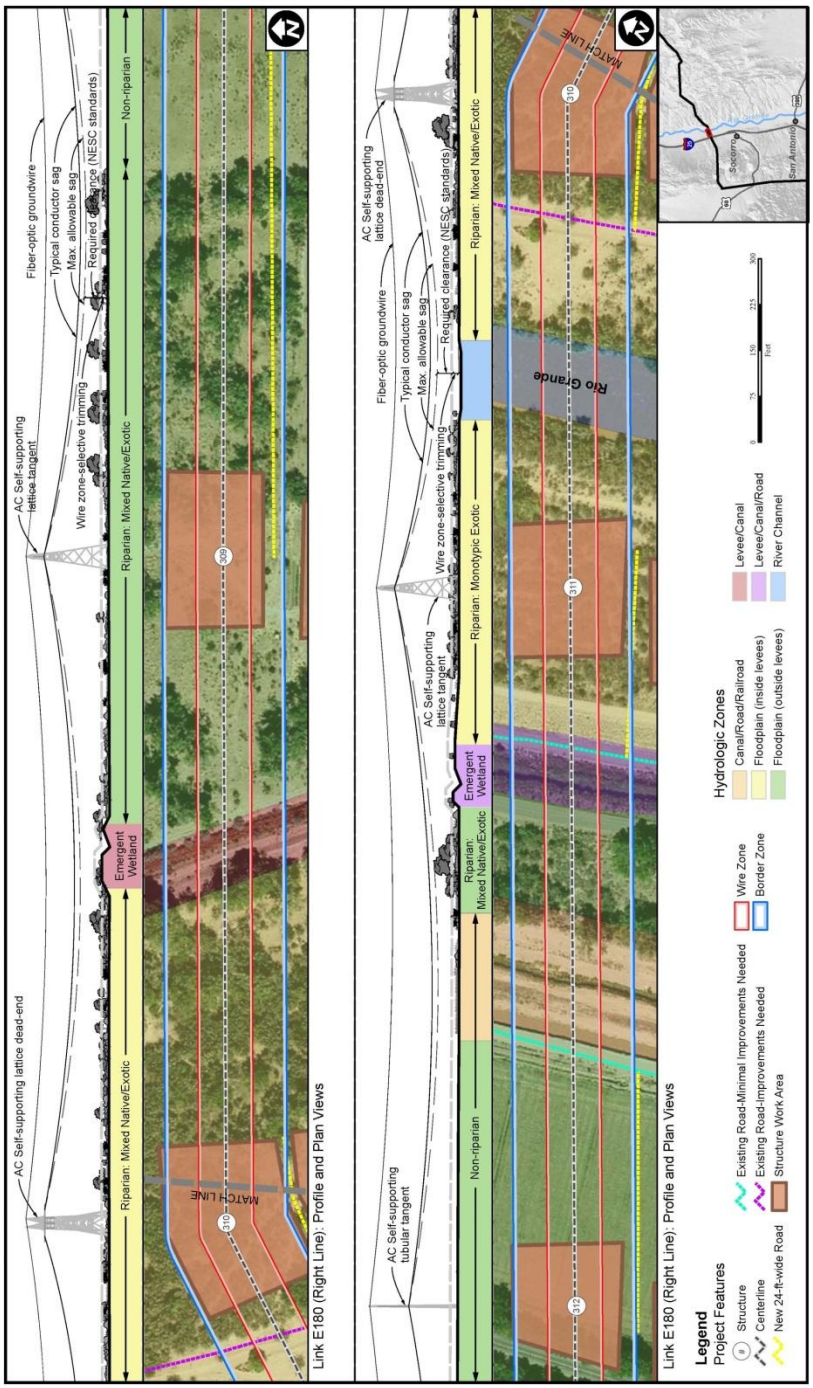

Figure 25. Preliminary Engineering Profile, Topography, and Vegetation Management at the Rio Grande (North Line).

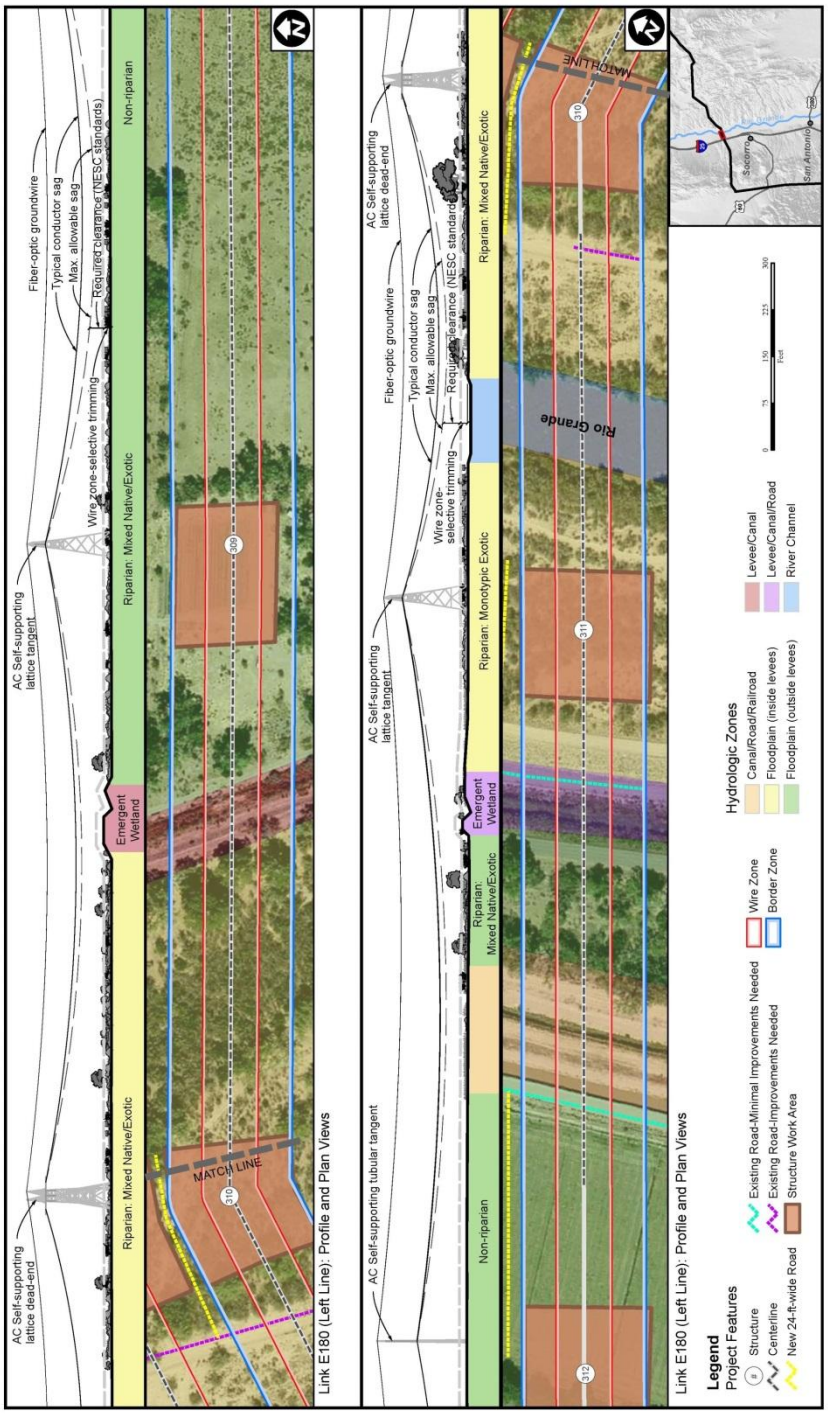

Figure 26. Preliminary Engineering Profile, Topography, and Vegetation Management at the Rio Grande (South Line).

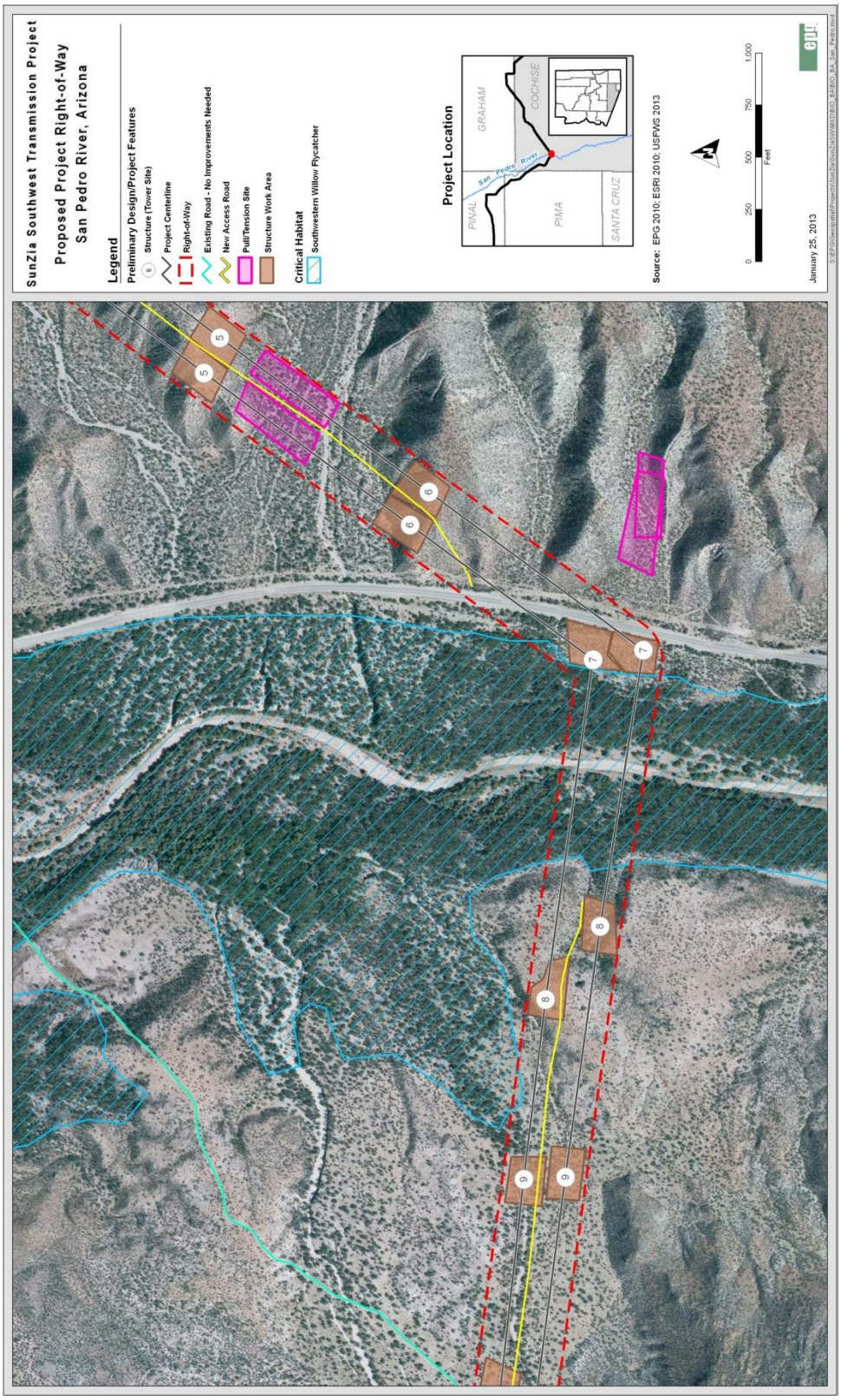

Figure 27. Preliminary Engineering and Ground Disturbance within Southwestern Willow Flycatcher Designated Critical Habitat at the San Pedro River.

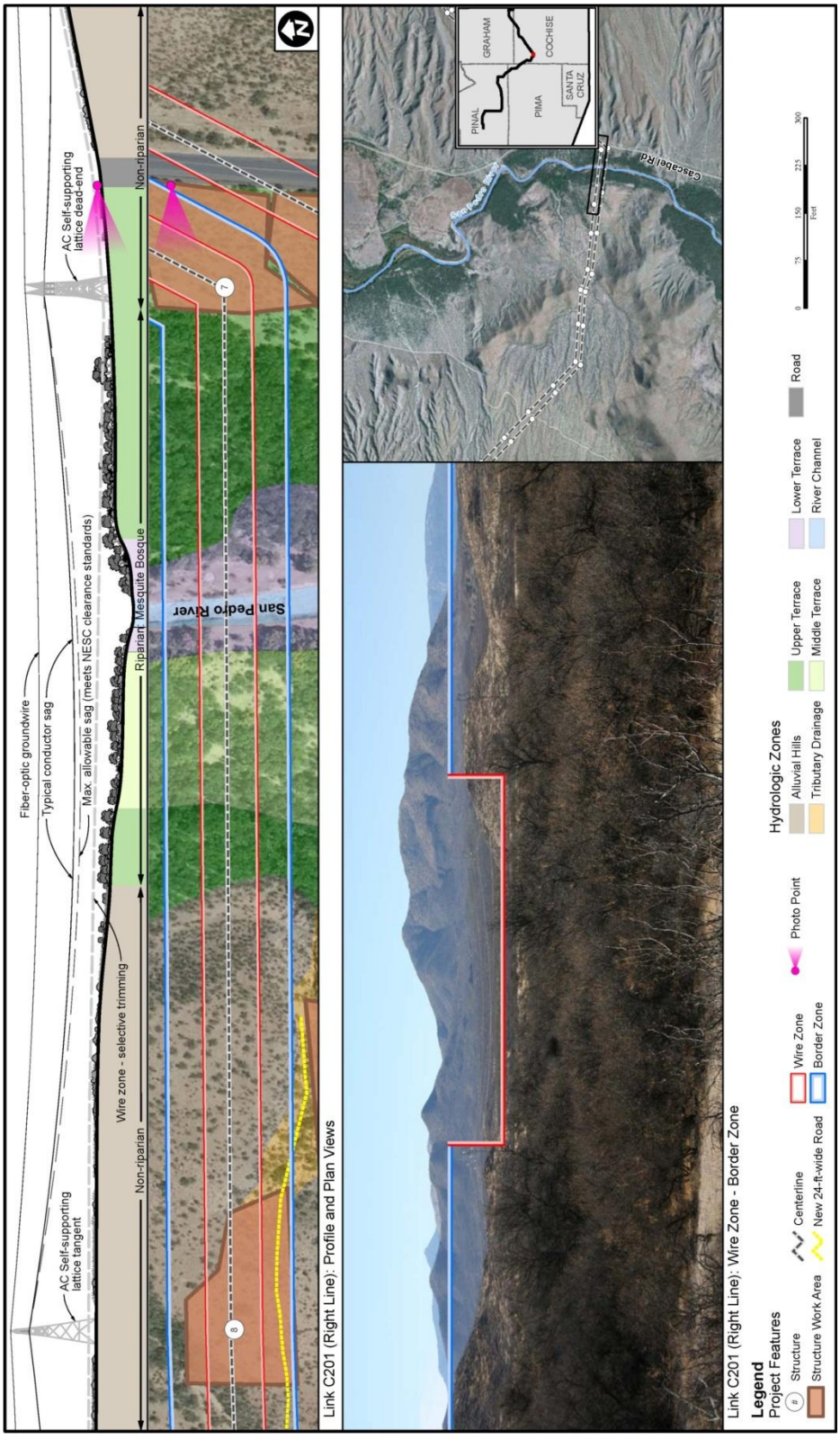

Figure 28. Preliminary Engineering Profile, Topography, and Vegetation Management at the San Pedro River (North Line).

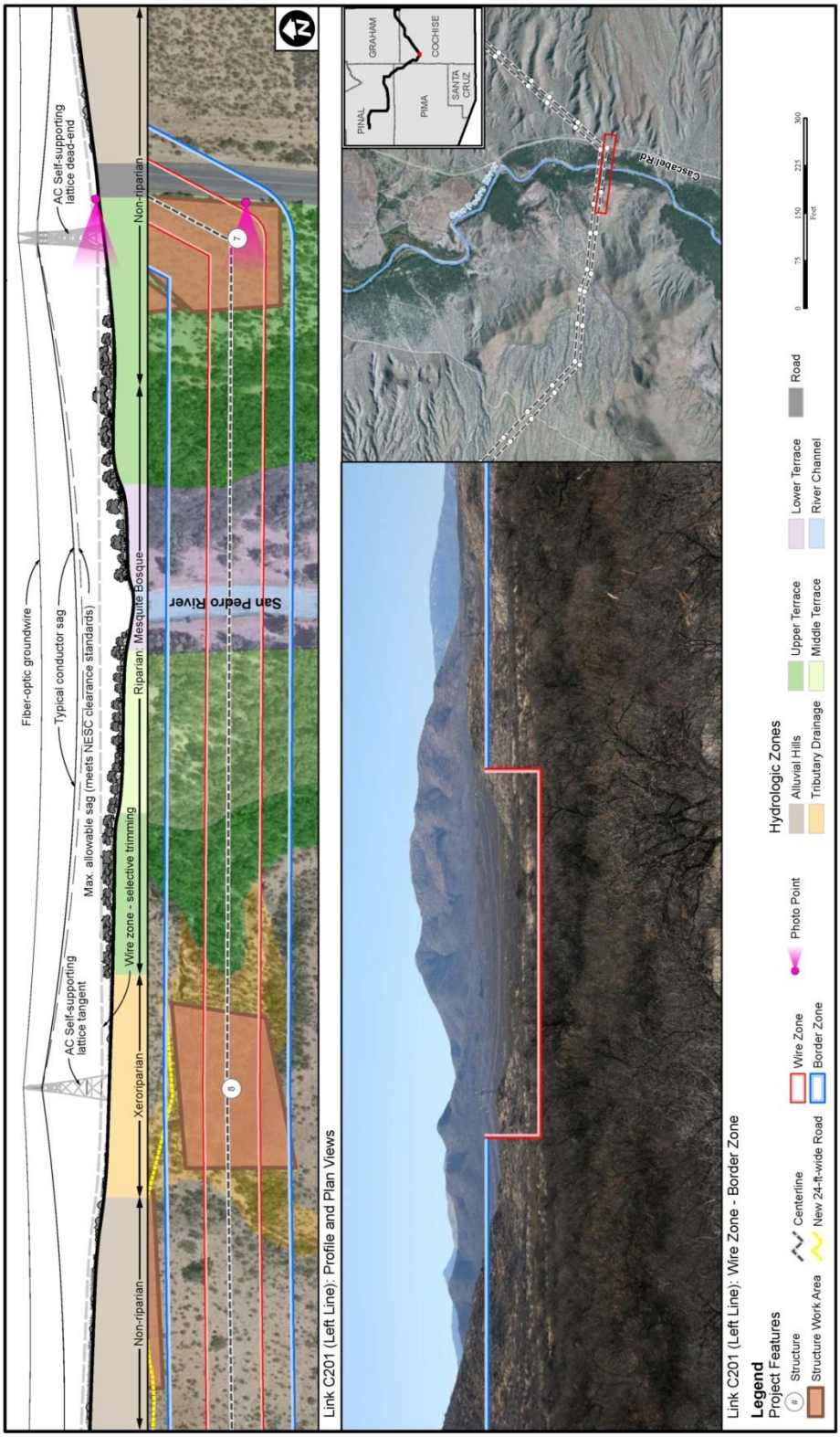

Figure 29. Preliminary Engineering Profile, Topography, and Vegetation Management at the San Pedro River (South Line).

Effects to Designated Critical Habitat- Rio Grande Silvery Minnow

The following is excerpted from the BA Section 6.5.1.3.:

> "The BLM, Proponent, and USFWS are currently working to identify and acquire habitat to offset the temporary and permanent disturbance that would take place within designated critical habitat at the Rio Grande crossing location. No specific parcels can be identified at this time; however, compensatory mitigation is a committed measure and would be a condition of the right-of-way grant and Notice to Proceed."

Vegetation Management in Kuenzler Hedgehog Cactus Habitat

The following is excerpted from the BA Section 6.7.1.3.:

> "Herbicides may be used during reclamation and right-of-way maintenance for the proposed Project. Herbicides may affect the Kuenzler hedgehog cactus directly by injuring or killing individual plants, and indirectly by killing bunch grasses and other "nurse plants" associated with Kuenzler hedgehog cacti. Herbicide use would follow the policies of the final Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States (BLM 2007), including herbicide-specific buffer distances to be used near ESA-listed plants."

Vegetation Management in Todsen's Pennyroyal Habitat

The following is excerpted from the BA Section 6.7.2.3.:

> "Herbicides may be used during reclamation and right-of-way maintenance for the proposed Project. Herbicides may directly affect Todsen's pennyroyal by killing individual plants. Herbicide use would follow the policies of the final Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States (BLM 2007), including herbicide-specific buffer distances to be used near ESA-listed plants."