Updated Biological Assessment for Long-Term River Management of the Rio Grande Canalization Project

Title:

Version: **FINAL**

Date: **March 2017**

Prepared for:

United States Section
International Boundary and Water Commission
4171 N Mesa St., Suite C310
El Paso, TX 79902

Prepared by: IDEALS-AGEISS, LLC

848 W. Hadley Ave.
Las Cruces, NM 88005

Contract Number: **IBM15D0006**

Task Order Number: **IBM16T0016**

TABLE OF CONTENTS

Section **Page**

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF APPENDICES

Appendix

LIST OF ABBREVIATIONS / ACRONYMS

BA	Biological Assessment
BMP	Best Management Practice
BO	Biological Opinion
cfs	cubic feet per second
CMA	Channel Maintenance Alternative
DPS	Distinct Population Segment
EBID	Elephant Butte Irrigation District
ECOS	Environmental Conservation Online System
EIS	Environmental Impact Statement
ESA	Endangered Species Act
IPaC	Information for Planning and Conservation Trust Resources Report
NEPA	National Environmental Policy Act
PL	Public Law
RGCP	Rio Grande Canalization Project
RMP	River Management Plan
ROD	Record of Decision
RPM	Reasonable and Prudent Measure
SWFL	southwestern willow flycatcher
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USIBWC	U.S. Section of the International Boundary and Water Commission
YBCU	yellow-billed cuckoo

1.0 INTRODUCTION

In 2011, U.S. Section of the International Boundary and Water Commission (USIBWC) completed a Biological Assessment (BA) for the implementation of the Record of Decision (ROD; USIBWC 2009) for the Final Environmental Impact Statement for River Management Alternatives of the Rio Grande Canalization Project (RGCP). The purpose of this BA is to determine all likely effects on threatened, endangered, candidate, and proposed species resulting from the implementation of long-term river management actions set forth originally in the Integrated Land Management Alternative described in the 2009 ROD and updated by the 2016 *Rio Grande Canalization Project River Management Plan* (RMP). The RMP was developed to provide guidance for preserving and enhancing the resources of the RGCP in a manner consistent with USIBWC mission requirements and recent USIBWC resource management commitments (USIBWC 2016c).

1.1 RGCP Background

1.1.1 RGCP Historical Background

Between 1938 and 1943, the USIBWC constructed the RGCP spanning a 105-mile reach of the Rio Grande from Percha Diversion Dam, NM to American Dam in El Paso, TX. The RGCP was constructed to facilitate compliance with equitable allocation of water between the United States and Mexico under the U.S.-Mexico Convention of 1906 (Act of June 4, 1936, PL 648; 49 Stat. 1463) and to provide flood protection against a 100-year flood event. The RGCP included acquisition of a right of way for the river channel and adjoining floodways as well as improvement of the alignment and efficiency of the river channel to convey deliveries to Mexico and the U.S. Bureau of Reclamation's (USBR's) Rio Grande Project.

As part of the RGCP, a deeper main channel was dredged to facilitate water delivery for irrigation. Hydraulic capacity of the dredged channel ranged from 2,500 to 3,000 cubic feet per second (cfs) in the Upper Rincon Valley, to less than 2,000 cfs in the Lower Mesilla Valley (Parsons 2001). In general, the dredged channel followed the alignment of the existing channel in most locations but reduced the in-channel length by 10 percent. Canalization included placing rip rap along a portion of the channel banks to prevent lateral migration of the channel (Tetra Tech 2015). Flood protection levees, currently designed to provide a 100-year level of flood protection, were placed along two-thirds of the length of the RGCP (57 miles along the west side of the channel and 74 miles along the east side), where the channel was not confined by hillslopes or canyon walls (e.g., Selden Canyon).

The USIBWC has been responsible for maintaining flood control and water delivery capabilities of the RGCP since its completion in 1943. To fulfill its mission, the USIBWC undertakes the following operation and maintenance activities: 1) sediment removal from the channel and lower end of tributary arroyos; 2) leveling of the floodway; 3) vegetation management along channel banks, floodways, and levees; 4) replacement of channel bank rip rap; 5) maintenance of sedimentation/flood control dams in the tributary arroyos (since the construction of those dams in the early 1970s); and 6) maintenance of all RGCP infrastructure, including levee roads, bridges, and the American Diversion Dam.

1.1.2 ROD Background

In 2004, the USIBWC completed the *Final Environmental Impact Statement (EIS) River Management Alternatives for the USIBWC Rio Grande Canalization Project* for long-term management alternatives of the RGCP. The RGCP EIS evaluated four long-term River Management Alternatives: a) No Action, b) Flood Control Improvement, c) Integrated Land Management, and d) Targeted River Restoration (USIBWC 2016c). Alternatives addressed practices such as flood control, channel maintenance and erosion reduction, as well as environmental measures intended to enhance river floodplain hydrologic connectivity, and support restoration of native riparian and aquatic habitats along the RGCP. The USIBWC issued a ROD on June 4, 2009 for the Integrated Land Management Alternative. The ROD committed the USIBWC to continuing the flood control and water delivery mission while implementing environmental enhancements such as establishing up to 30 riparian habitat restoration sites, 12 of which target dense riparian habitat suitable for breeding for the endangered SWFL. The 2011 BA provided additional background on the history of development of the Final EIS alternatives.

The USIBWC recognizes the need to accomplish flood control, water delivery, and operation and maintenance activities in a manner that complies with environmental regulations and enhances or restores the riparian ecosystem. The RGCP Conceptual Restoration Plan (USACE 2009) was developed in coordination with the USACE, and was incorporated into the ROD. The plan focuses on restoring healthy riparian function, improving terrestrial wildlife habitat at sites, and enhancing the natural riverine process. The ROD identified a phased implementation approach for restoration measures. Phase I included the collection of additional site-specific data and design of site-specific implementation plans, which was documented in the 2011 *RGCP River Restoration Site Implementation Plans*. The Conceptual Plan (USACE 2009) and Site Implementation Plans (TRC 2011) are guides for restoration site implementation, including the site improvements for SWFL breeding habitat. In addition, the RMP was updated in accordance with the ROD.

One of the primary requirements of the USIBWC from the 2009 ROD involved identification of methods to improve river management through an evaluation of adaptive management strategies aimed at channel maintenance activities and levee protection. Sediment delivery has been a continual challenge USIBWC faces in operating the RGCP. Sediment deposition on the alluvial fans can result in sediment plugs, island formation, and aggradation that prevents draining of irrigation return flow that could result in increased water-surface elevations and associated impacts to levee freeboard and flood conditions (Tetra Tech 2015). The sedimentation may also be affecting the delivery of water to U.S. stakeholders and Mexico due to reductions in channel and drain return efficiencies (Tetra Tech 2015). As part of the adaptive management strategy approach, the USIBWC is evaluating channel maintenance alternatives to address the sediment related problems along the RGCP.

1.2 Purpose and Need of this BA

The 2011 BA covered the following long-term river management actions:

- Habitat restoration at 30 sites along the RGCP;
- Environmental water transactions;

- Levee system management consisting of routine levee and road maintenance in addition to ongoing levee improvement and floodwall construction;
- Floodway management involving grazing leases elimination and mowing modifications; and
- Channel maintenance at American Dam and Mesilla Dam

The purpose of this BA is to update the 2011 BA. In addition to the above-listed activities previously covered under the 2011 BA, this updated BA discusses the following:

- Inclusion of the newly-listed yellow billed cuckoo (Impacts from the 2011 proposed action were analyzed for the cuckoo at that time when it was listed as a candidate species.)
- Update the exclusion of critical habitat for the southwestern willow flycatcher
- Proposed channel maintenance activities and alternatives discussed in the RMP
- Update of ROD implementation

1.2.1 New Listings and Critical Habitat Updates

In 2014, the U.S. Fish and Wildlife Service (USFWS) designated the Western distinct population segment of yellow-billed cuckoo (*Coccyzus americanus*) (YBCU) as threatened (USFWS 2014a). Critical habitat for YBCUs was proposed in 2014 (USFWS 2014b), but the RGCP was not included in critical habitat designation. Similarly, in the Critical Habitat Rule dated January 3, 2013, the USFWS designated approximately 1,227 stream miles as critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*) (hereafter referred to as SWFL) but excluded the RGCP because of USIBWC's existing riparian habitat restoration efforts.

This BA includes the new status for the YBCU under the Endangered Species Act (ESA), as well as other species that have potential to occur within the RGCP. These species include the SWFL, least tern (*Sterna antillarum*), and aplomado falcon (*Falco femoralis*). It also discusses the exclusion of the critical habitat for the SWFL.

1.2.2 Channel Maintenance Activities

To address sediment issues, the USIBWC worked with stakeholders to finalize the Channel Maintenance Plan chapter of the RMP in December 2016. The RMP proposed channel maintenance alternatives for sediment removal as well as for non-sediment removal discussed in this BA include:

- Proposed sediment removal activities
- Conceptual alternatives to channel maintenance, such as construction of arroyo sediment traps and a modification of a vortex weir
- Island vegetation destabilization and island removal

The 2011 BA included channel dredging at only two locations, upstream of Mesilla Diversion Dam and American Diversion Dam. The Proposed Action in this BA includes the channel maintenance activities outlined in the 2016 RMP, which include the channel work discussed in the 2011 BA.

1.2.3 Update of ROD Implementation, including Restoration Sites

An important element of the Integrated Land Management Alternative consisted of habitat restoration at 30 sites along the RGCP (Figure 1). The sites were identified in a *Conceptual Restoration Plan and Cumulative Effects Analysis* (hereafter referred to as Conceptual Plan) completed in 2009 by the USIBWC with technical assistance from the U.S. Army Corps of Engineers (USACE), based in part on flood inundation and water-surface elevation modeling results. The USIBWC proposed restoration of aquatic habitat at three of the 30 sites totaling approximately 550 acres and restoration of a mosaic of native plant communities—grasslands, riparian woodlands, riparian forests, and dense riparian shrub in compliance with the 2009 ROD. Since the 2012 Biological and Conference Opinion (BO), restoration activities have included cessation of mowing on 1,838 acres of No-Mow Zones (which includes most restoration sites).

This BA also includes a discussion of current conditions of the 558 total acres of restoration sites as well as the No-Mow Zones along the RGCP. It also covers the status of the Environmental Water Transaction Program to deliver water to the restoration sites.

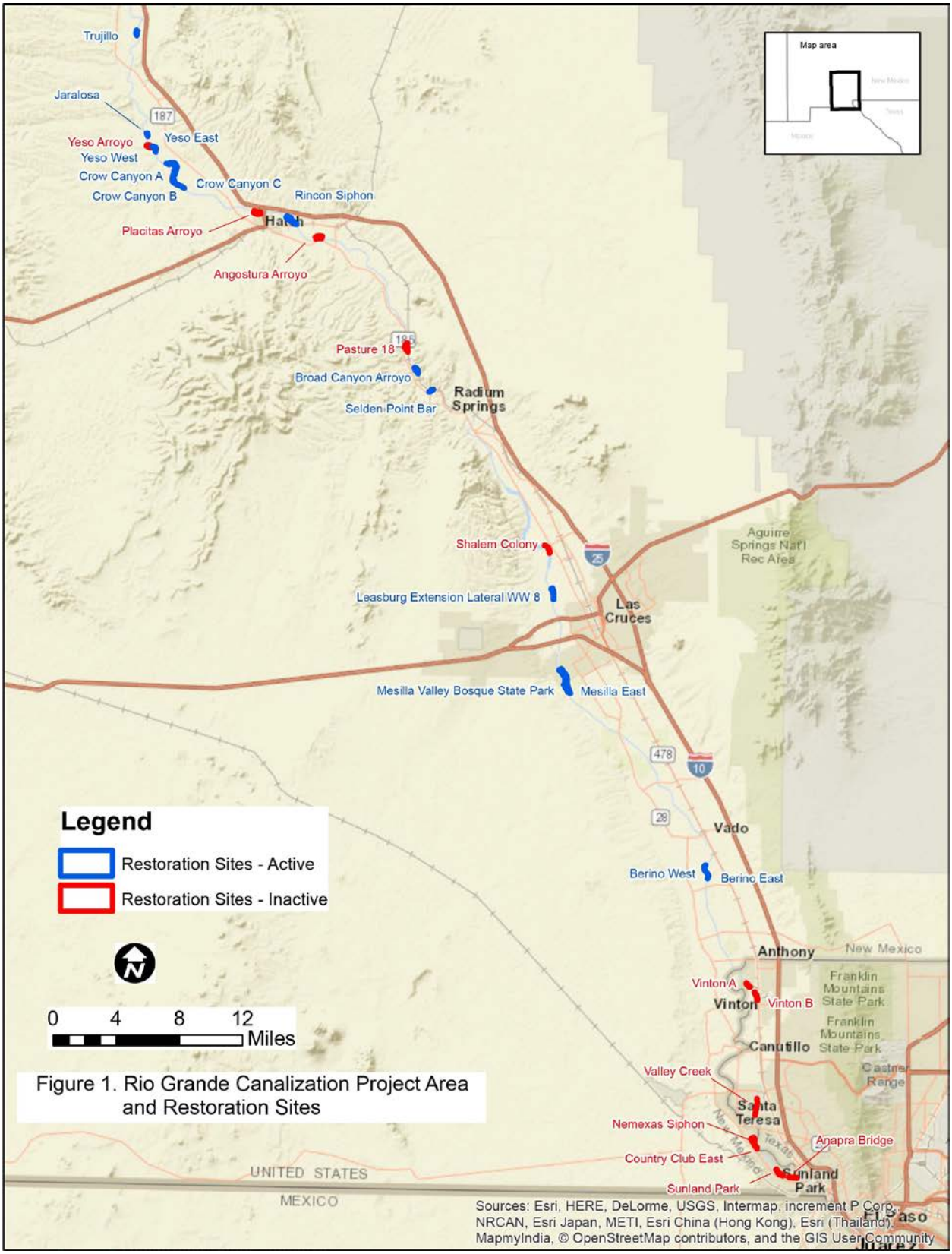
1.3 Regulatory Compliance

Section 7 of the ESA of 1973, as amended, requires federal agencies to use their authorities to carry out programs to conserve threatened and endangered species, and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species or result in the destruction or adverse modification of their critical habitat. A BA is prepared to determine whether federal actions may affect listed or proposed species and designated and proposed critical habitat.

This BA will enhance the USIBWC's compliance with the following federal and state laws and regulations:

- National Environmental Policy Act (NEPA) (Public Law [PL] 91-190, 42 United States Code, [USC] 4321 et seq.);
- ESA of 1973 (PL 93-205) and amendments of 1988 (PL 100-478);
- New Mexico Endangered Plant Species Act (9-10-10 New Mexico Statutes Annotated and attendant Regulation 19 New Mexico Annotated Code 21.2);
- New Mexico Wildlife Conservation Act of 1974 (New Mexico Statutes Annotated 17-2-37 through 17-2-46, 1978 compilation); and
- Chapters 67 and 68 of the Texas Parks and Wildlife Code, and Section 65.171-65.184 of Title 31 of the Texas Administrative Code.

Figure 1. Rio Grande Canalization Project Area and Restoration Sites



2.0 DESCRIPTION OF THE PROPOSED ACTION

The USIBWC has consulted with USFWS for previous maintenance and restoration activities in the RGCP including some channel maintenance. Previous actions as well as the new Proposed Action are summarized in Table 1. The Proposed Action in this BA includes levee system maintenance as described in the 2011 BA, as well as the following actions discussed in greater detail below:

- Channel maintenance activities
- Floodway/vegetation management

2.1 Channel Maintenance Activities

In compliance with the ROD, USIBWC finalized major portions of the RMP in 2014 and all chapters of the RMP, including the channel maintenance chapter, in December 2016.

The 2016 RMP Part 4, regarding channel maintenance, proposed a 5-year plan of sediment excavation activities as well as laid out potential implementation of conceptual alternatives for non-sediment removal activities. The proposed channel maintenance activities, shown in Figure 2, include:

- Sediment Removal
  - Sediment excavation at designated locations with chronic sedimentation issues, listed in Table 2
  - Channel maintenance at gauging stations
  - Removal of sediment at arroyo and drain confluences
  - Sandbar and island removal of areas that impede the normal flow and flood capacity, within locations listed in Table 2
- Non-sediment Removal (conceptual), as listed in Table 3
  - Construction of sediment traps in arroyos
  - Island destabilization by removing vegetation on islands in particular stretches
  - Modification of an existing vortex weir
  - Construction of low-elevation spur dikes

One of the many challenges that the USIBWC faces in operating the RGCP is the historically significant and ongoing sediment delivery from the tributary arroyos. The arroyos upstream from the Leasburg Diversion Dam have a significant effect on the hydraulic and sediment-transport conditions in the vicinity of the arroyos. Most of the arroyo fans create significant backwater effects that extend upstream over relatively long distances, and many of the fans have resulted in erosion of the opposite bank (Tetra Tech 2015). To address the sediment issues, and as part of its commitments in the 2009 ROD to evaluate the overall necessity of channel dredging though monitoring and modeling for the RGCP, the USIBWC contracted Tetra Tech to conduct a *Channel Maintenance Alternatives and Sediment Transport Study*, which was finalized in October 2015. The 2016 RMP incorporated the results and recommendations outlined in the October 2015 Channel Maintenance Alternatives Study, which evaluated several sediment management options at nine locations that have chronic sediment accumulation issues within the RGCP. Table 3 incorporates all nine locations included in the 2015 study as well as other problem areas.

The 2015 study evaluated channel maintenance alternatives that were classified as sediment removal or non-sediment removal alternatives. USIBWC has incorporated some of the alternatives in the RMP; however, the study alternatives are conceptual in nature and their implementation depends on numerous variables such as logistics, feasibility, appropriations, available funding, construction designs, property acquisition, and permitting. Sediment removal alternatives evaluated in the 2015 study include:

- Short channel excavation – mechanically excavate a pilot channel within the overall main channel of the RGCP from the vicinity of the mouth of the arroyo or drain downstream over a relatively short distance.
- Long channel excavation – mechanically excavate a pilot channel within the overall main channel of the RGCP from the mouth of the arroyo or drain downstream over a relatively long distance.
- Localized sediment removal – mechanically excavate localized areas (i.e., at a specified area of interest or at the mouth of the arroyo or drain).

Non-sediment removal alternatives evaluated in the 2015 study include:

- Construct sediment traps in arroyos: At many of the sites where tributary sediment loading is the primary concern, construction of sediment traps within the arroyo upstream from the confluence with the RGCP would greatly reduce coarse-grained sediment supply to the RGCP. The arroyo sediment traps could be designed in series in a manner that traps the coarsest material in the upstream trap and progressively finer material proceeding toward the mouth. All of the sediment traps would include a series of trapping features (rock check structures, piles or fence screens) designed to trap the coarse material and allow a portion of the finer (sand, silt and clay) fractions to pass to reduce maintenance and manage the most problematic coarse material. All of the sediment traps would also include an embayment at the downstream end connecting to the Rio Grande. A debris rack would be necessary at the upstream entrance to the trap to capture floating debris that could affect the performance of the trapping features. Trapping features would be constructed with rebar and wire screens with progressively finer mesh openings in the downstream direction. USIBWC has contracted a design firm to produce construction drawings and specifications of two pilot arroyo sediment traps on small tributaries (Thurman I and II), and the design work is targeted for completion in spring 2017.
- Perform island destabilization: This alternative addresses sites where sedimentation has resulted in the formation of large, vegetated islands or bars and involves mechanical destabilization of the features and vegetation removal. The islands and bars create backwater, reduce conveyance efficiency, and induce upstream deposition.
- Modify vortex weir: Vortex weirs are boulder structures that provide grade-control to maintain the upstream channel gradient (Tetra Tech 2015). This alternative would modify the vortex weir which spans the width of the river, to allow water to pass through the middle section of the weir.
- Construct low-elevation spur dikes: The spurs are constructed with rock rip rap or boulders, laid out with a slight upstream orientation, and have a top elevation that is less than the top of bank elevation to control bedload movement. The spurs could be designed to constrict the flows and increase the velocity and energy between the spur nose and opposite bank, thereby increasing sediment-transport rates.

Table 1. Comparison of IBWC Proposed Actions

Proposed Action	2011 BA	2017 BA
Levee System Maintenance	▪ Levee maintenance, rehabilitation, and construction in specific areas	No change from 2011 BA. Continue levee maintenance, as documented in the USIBWC River Management Plan. Continue specific levee improvement construction projects
Channel Maintenance	▪ Dredging upstream of Mesilla Dam and American Dam	▪ Continuation of 2011 BA and the dredging upstream of the Mesilla Dam and American Dam ▪ Sediment removal (see Table 2) ▪ Non-sediment removal • Construct sediment traps in arroyos • Modify vortex weir • Construct low-elevation spur dikes ▪ Bank stabilization – rip rap, gravel addition, or planting ▪ Island destabilization/ removal
Floodway/Vegetation Management	▪ Grazing lease program – currently being phased out except for one lease approximately 1 mile downstream of Mesilla Dam ▪ Vegetation treatments of annual mowing of 2,674 acres and select target treatments for 3,053 acres (managed grasslands, SWFL habitat, native riparian, and restoration sites)[1] ▪ Establishment of 30 restoration sites and proposed treatment for each site ▪ Water transfer framework for the restoration sites	▪ No change from 2011 BA. All actions from 2011 BA are considered. ▪ In No-Mow Zones, the USIBWC would remove invasive species, such as saltcedar, using one of five methods: 1) manual/herbicide; 2) mechanical/ herbicide; 3) herbicide only; 4) excavation; and 5) mastication

[1-] The Record of Decision (ROD) indicates USIBWC would implement 1,983 acres of managed grasslands and 553 acres of restoration sites, *out of which* 149 acres are targeted flycatcher habitat and 368 acres are discontinued mowing. The 2011 BA incorrectly added these for a total of 3,053. The correct total should be 2,536 (1,983+553). The ROD does not specifically cite the 2,674 acres of continued mowing referenced in the 2011 BA.

BA Biological Assessment
SWFL southwestern willow flycatcher
USIBWC U.S. Section of the International Boundary and Water Commission

Based on Table 4.7 of the RMP, USIBWC has identified several areas along the RGCP to focus efforts for channel maintenance (Table 2). Conceptual plans for some of these areas are contained in the Channel Maintenance Alternatives Study (2015) and alternative actions and the appropriate figures are referenced in Table 3. The Channel Maintenance Alternatives Study (2015) analyzed nine problem locations where sediment accumulates and recommended the best alternative for each location. The RMP incorporates the recommendations from the 2015 study. For areas where channel maintenance alternatives were recommended in lieu of sediment excavation, the RMP includes sediment excavation in case the alternatives are not feasible to implement.

For the purpose of this BA and the determination of impacts to the islands, the sediment removal from the 5-year Plan which includes islands (Table 2) and the non-sediment island destabilization from the 2015 Study are combined because they both represent impacts to island vegetation. Within the channel maintenance area, there are 72.97 acres of islands. Of this acreage, 29.26 acres currently or historically had SWFL or YBCU observation (2010-2016). Of those 29.26 acres, 28.07 acres would potentially be removed under the Proposed Action. For the remaining 43.71 acres without flycatcher or cuckoo observation, 23 acres contain suitable SWFL habitat. Total island acreage and acreage with potential habitat are summarized in Table 4.

Figure 2. Proposed Channel Maintenance Activities at Selected Locations

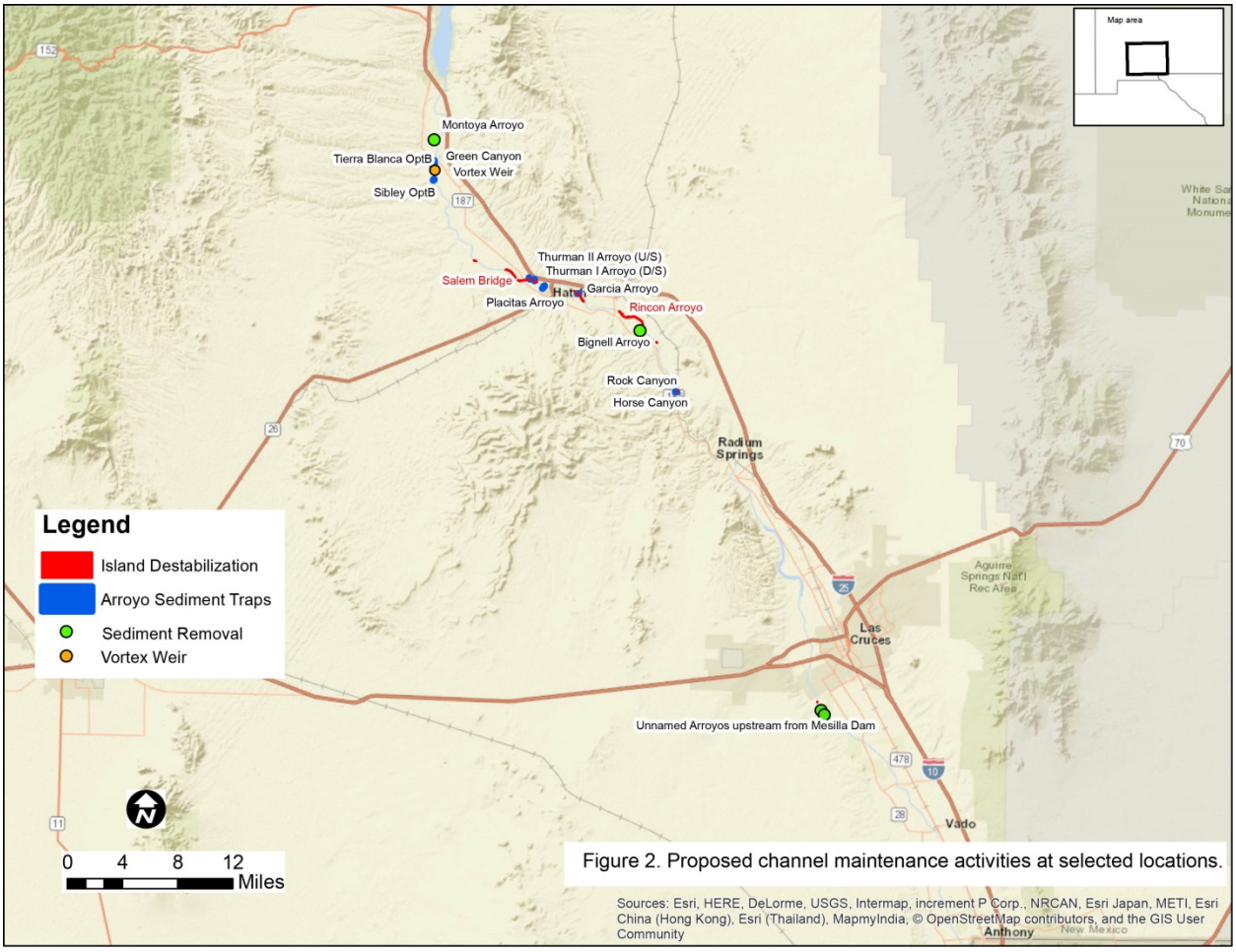


Table 2. Five-Year Plan of Proposed Channel Maintenance Activities (2014-2019)

Site Name	Excavation (Cubic Yards)	Description of Maintenance
Tipton Arroyo	5,556	Sediment fan has built up immediately downstream from the mouth. Propose to remove arroyo sediment from river channel.
Trujillo Arroyo	6,667	Propose to remove point bar forming along west channel bank. East channel bank across from and downstream of the arroyo mouth is eroding toward the maintenance roadway. Erosion has cut into the opposite bank about 20 or 30 feet threatening the maintenance roadway along channel bank. Therefore, work would also include river bank stabilization to protect the channel bank using a combination of rip rap with gravel bedding material and sandbar willow (*Salix spp.)* pole planting for a distance of approximately 300 linear feet.
Montoya Arroyo	4,750	Excavate sediment at mouth; re-align arroyo to merge with river at an angle in lieu of perpendicular.
Holguin Arroyo	4,000	Excavate sediment at mouth; re-align arroyo to merge with river at an angle in lieu of perpendicular.
Tierra Blanca/Green Arroyos	21,780 (long channel excavation)	Tierra Blanca enters on the west bank and Green on the east bank. Sediment has built up from the mouth to 0.4 mile downstream to the vortex weir installed in the 1990s. Long excavation for 3,420 linear feet is proposed. A sediment trap CMA was proposed for Tierra Blanca.
Sibley Arroyo	13,300 (short channel excavation)	A point bar forms on the west side downstream from the mouth of the arroyo. Re-align arroyo to merge with river at an angle in lieu of perpendicular. Short excavation for 1,400 feet is proposed. A sediment trap CMA was recommended for this arroyo.
Hatch Siphon	3,704	As a result of reduced velocity as flows encounter the sheet pile wall, sediment load is deposited over this area creating two islands (Figure 4-5B in 2016 draft Channel Maintenance Plan). One of these islands was removed in 2014 (Figure 4-3 in 2016 draft Channel Maintenance Plan). Propose regular sediment removal (islands) from the channel. Also, remove branches and vegetation along sheet pile wall and rock rip rap.
Salem Bridge	35,556	Large vegetated sandbar has formed upstream and downstream from the bridge. It will be monitored and if it begins to obstruct delivery flows it will be considered for removal.
Thurman I and II Arroyo	8,340 (localized channel excavation)	Propose to remove arroyo sediment from river channel. Re-align arroyo to merge with river at an angle in lieu of perpendicular and widen arroyo mouth. Localized excavation for a distance of 880 feet is proposed. Sediment trap CMAs were recommended for these arroyos.
Placitas Arroyo	13,000 (short channel excavation)	There is a potential for heavy sediment inflows to the river at this location, and it is necessary to keep the mouth clear of sediment annually to ensure proper drainage to the river. Also, the arroyo would be re-aligned to merge with river at an angle in lieu of perpendicular. A sediment trap CMA was recommended for this arroyo.

Site Name	Excavation (Cubic Yards)	Description of Maintenance
Hatch Bridge	33,333	Large vegetated sandbars have formed upstream and downstream from the bridge. Propose to monitor for flow obstruction potential and remove islands if they become too large and obstruct water deliveries.
Rincon Siphon	5,000 (long channel excavation)	As a result of reduced velocity as flows encounter the sheet pile wall, sediment load is deposited over this area. The excess sediment upstream of the Rincon Siphon was removed in 2014 (Figure 4-4 in 2016 draft Channel Maintenance Plan) because the normal flows were overbanking into the floodway and around the siphon, eroding small flows have eroded the west floodway and created another small channel. The levees in this area may be compromised during heavy flood flows if this erosion continues. Propose regular sediment removal (sandbars, islands and/or deltas) from the channel beginning from sheet pile wall upstream to the Santa Fe Railway Bridge. Also, remove branches and vegetation along sheet pile wall and rock rip rap.
Garcia I Arroyo	11,330 (localized channel excavation)	Sediment removal would take place within arroyo mouth and river channel and the arroyo would be re-aligned to merge with river at an angle in lieu of perpendicular. A sediment trap CMA was recommended for this arroyo.
Rincon Arroyo to Bignell Arroyo (includes Reed)	85,051 (Bignell localized channel excavation for 18,111 and 66,940 acres from Rincon to Reed)	Work at Rincon Arroyo includes re-aligning the arroyo mouth to merge with river at an angle in lieu of perpendicular. Work also includes river bank stabilization along the opposite riverbank using a combination of rip rap with gravel bedding material and sandbar willow (*Salix spp.*) pole planting for a distance of approximately 400 linear feet. Note that the opposite river bank has eroded 40 feet into the floodway and erosion is 50 feet away from the levee toe (Figure 4-5 in 2016 draft Channel Maintenance Plan). If riverbank erosion continues, the structural integrity of the levee may be compromised during a heavy storm. At Reed Arroyo, a point bar forms on the west side downstream from the mouth of the arroyo and needs to be removed. Re-align arroyo to merge with river at an angle in lieu of perpendicular. Long excavation of 6,210 feet is proposed for Rincon and Reed arroyos. For Bignell Arroyo, a sediment fan builds up immediately downstream from the mouth. Propose to remove arroyo sediment from river channel. Re-align arroyo to merge with river at an angle in lieu of perpendicular. Proposed localized excavation for 280 feet.
Hersey Arroyo	6,944	A sediment fan builds up immediately downstream from the mouth. Propose to remove arroyo sediment from river channel.
Rock Canyon to 1.4 mile below Rincon/ Tonuco Drain Confluence	71,240 (localized channel excavation)	Sediment deposition occurs in this area preventing proper drainage of irrigation return flow into the river channel (Figure 4-6 in 2016 draft Channel Maintenance Plan). Propose localized sediment removal from the river channel beginning upstream of the drain to 1,500 feet downstream.

Site Name	Excavation (Cubic Yards)	Description of Maintenance
0.17 mile upstream of Mesilla Dam to Mesilla Bridge	58,170 (long channel excavation)	As a result of decreased flow velocities upstream of the diversion dam, sediment load is deposited over this river reach. This reach needs annual monitoring because of this dynamic. Propose regular sediment removal from the channel including from 0.17 mile upstream of Mesilla Dam (Figure 4-7 in 2016 draft Channel Maintenance Plan). Excavation work immediately upstream of Mesilla Dam for 0.25 mile would be worked out with USBR. Sediment was excavated in January 2016 in cooperation with USBR upstream of the dam.
East Drain to Vinton Bridge	38,050 (short channel excavation)	The 2015 CMA Study recommended long excavation in this stretch over 8,920 feet.
Country Club Bridge	43,000 (long channel excavation)	Recent levee raising efforts resulted in the new levee toe being located adjacent to the riverbank. The levee may be compromised during high river flows. Therefore, work would include river bank stabilization using a combination of rip rap with gravel bedding material and sandbar willow (*Salix spp.*) pole planting for a distance of approximately 790 linear feet.
Sunland Park Bridge to American Dam	176,250 (long channel excavation)	As a result of decreased flow velocities upstream of the dam, sediment load is deposited over this river reach. Annual attention is necessary because of this dynamic. Propose regular sediment removal from the channel including immediately upstream of American Dam and placement of excavated material at designated disposal areas located on the landside of the west levee. Propose to monitor for flow obstruction potential and remove islands if they become too large and obstruct deliveries and/or water measuring devices (gaging stations) located at the Courchesne Bridge. The proposed work would also enable efficient flow of water from the Montoya Drain into the river (Figure 4-14B in 2016 draft Channel Maintenance Plan). This flow is currently being impeded by sediment accumulation at the outfall and under the gate.
	Total 640,271	

CMA Channel Maintenance Alternative
USBR U.S. Bureau of Reclamation

Table 3. Channel Maintenance Alternative Actions Considered in the RMP from the 2015 Study

Channel Maintenance Alternative	Location	Description of Maintenance	Conceptual Layout in CMA Study	Limitations for Implementation
Arroyo Sediment Traps	Tierra Blanca	Excavated sediment traps in this section total approximately 4.4 acres (average depth 4 feet and volume approximately 17.7 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.1 in CMA study Appendix H	2015 study rerouted the arroyo mouth upstream to stay within USIBWC ROW
Arroyo Sediment Traps	Green	Excavated sediment traps in this section total approximately 2.7 acres (average depth 4 feet and volume approximately 10.0 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.2 in CMA study Appendix H	Already an existing NRCS sediment dam on the Green; 2015 study rerouted the arroyo mouth downstream to stay within USIBWC ROW
Arroyo Sediment Traps	Sibley	Excavated sediment traps in this section total approximately 2.7 acres (average depth 3 feet and volume approximately 8.2 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.3 in CMA Study Appendix H	2015 study rerouted the arroyo mouth upstream to stay within USIBWC ROW
Arroyo Sediment Traps	Thurman II	Excavated sediment traps in this section total approximately 1.0 acre (average depth 3 feet and volume approximately 2.9 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.4 in CMA Study Appendix H	Under design in FY16-17 for pilot project implementation
Arroyo Sediment Traps	Thurman I	Excavated sediment traps in this section total approximately 1.4 acres (average depth 3 feet and volume approximately 4.1 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.5 in CMA Study Appendix H	Under design in FY16-17 for pilot project implementation
Arroyo Sediment Traps	Placitas	Excavated sediment traps in this section total approximately 3.5 acres (average depth 4 feet and volume approximately 14.0 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.6 in CMA Study Appendix H	Could overlap regional efforts; outreach is needed in local community
Arroyo Sediment Traps	Garcia Arroyo	Excavated sediment traps in this section total approximately 0.6 acre (average depth 3 feet and volume approximately 1.7 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.7 in CMA Study Appendix H	Near active flycatcher territories; uses old arroyo mouth

Channel Maintenance Alternative	Location	Description of Maintenance	Conceptual Layout in CMA Study	Limitations for Implementation
Arroyo Sediment Traps	Rock Canyon	Excavated sediment traps in this section total approximately 1.7 acres (average depth 3 feet and volume approximately 5.2 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.8 in CMA Study Appendix H	Outside of USIBWC ROW
Arroyo Sediment Traps	Horse Canyon	Excavated sediment traps in this section total approximately 1.2 acres (average depth 3 feet and volume approximately 3.6 acre-feet). Both rebar mesh and wire mesh would be used for debris screening.	Figure H.9 in CMA Study Appendix H	Outside of USIBWC ROW
Vortex Weir	In channel downstream of Tierra Blanca/ Green Arroyos	Modify weir to open up the middle portion of the channel.	Figure 28 in the CMA Study Report	Outside of USIBWC ROW
Island Destabilization	Salem Bridge to Placitas Arroyo	Clearing, grubbing and disposal of herbaceous and woody vegetation from islands and bars to promote the erosion of these islands after mechanical vegetation removal.	Figures J.1 t J.5 in CMA Study Appendix J	Near active flycatcher territories
Island Destabilization	Rincon Arroyo to Bignell Arroyo	Clearing, grubbing and disposal of herbaceous and woody vegetation from islands and bars to promote the erosion of these islands after mechanical vegetation removal.	Figures J.6 to J.11 in CMA Study Appendix J	Near active flycatcher territories
Island Destabilization	Montoya Drain to American Dam	Clearing, grubbing and disposal of herbaceous and woody vegetation from islands and bars to promote the erosion of these islands after mechanical vegetation removal.	Figures J.12 to J15 in CMA Study Appendix J	None
Spur Dikes	Upstream of Country Club Bridge to NeMexas Siphon	Construction of spur dikes to narrow the channel, more efficiently conveying the upstream sediment supply and reducing sediment deposition	Figures 24 and 25 in the CMA Study Report; Figure I.11 in Appendix I	Need scouring analysis; includes island bar destabilization and vegetation removal as part of this alternative

Adapted from Tables 4-13 and 4-14 in RMP
CMA Channel Maintenance Alternative
FY fiscal year
NRCS Natural Resources Conservation Service
ROW right of way
USIBWC U.S. Section of the International Boundary and Water Commission

Table 4. Island Acreage and Habitat Proposed for Removal

Island Description	Acreage
Islands within the channel maintenance areas	72.97
Islands within the channel maintenance areas proposed for destabilization	71.78
Islands within the channel maintenance area with SWFL or YBCU observations proposed for island destabilization or removal	28.07
Islands without historic SWFL or YBCU observations but with SWFL habitat classification 3 to 5 proposed for island destabilization	23.0
Total Acreage of SWFL Habitat Proposed for Possible Removal	**51.07**

SWFL southwestern willow flycatcher
YBCU yellow-billed cuckoo

2.2 Floodway/Vegetation Management

General vegetation treatments used by USIBWC and implemented by both the Operations and Maintenance Division and the Environmental Management Division of the USIBWC were addressed in the 2011 BA. Mowing of the floodway outside the main channel but between the flood control levees is completed annually in specific areas to remove obstructions to flood flows and to maintain flood capacity (USIBWC 2016c). The USIBWC (2009) has committed to restricting activities that destroy restored riparian vegetation by mechanical (e.g., mowing, fire), chemical (e.g., herbicide use), or biological (e.g., grazing, biocontrol agents) means (USFWS 2012).

In accordance with the ROD, to date, USIBWC completed cessation of mowing 1,838 acres of floodplain to allow for native vegetation to develop. The Now-Mow Zones are discussed in detail in the Affected Environment Section (Section 4.2).

Within the current No-Mow Zone areas, approximately 27.5 acres of moderate habitat, 5.5 acres of suitable habitat, and 9.5 acres of highly suitable SWFL habitat has developed. Additionally, many acres of No-Mow Zones are developing mesquite forests that would benefit the YCBU. However, the cessation of mowing can allow for invasive species, such as saltcedar, to dominate habitats. To ensure the long-term persistence of riparian habitats and associated species, USIBWC would remove and control invasive species, primarily saltcedar, in the No-Mow Zones (USIBWC 2016c). In No-Mow Zones, the USIBWC would remove invasive species using one of five methods: 1) manual/herbicide; 2) mechanical/ herbicide; 3) herbicide only; 4) excavation; and 5) mastication (USIBWC 2016c). Best management practices (BMPs) would be employed for both chemical and mechanical control of invasive species and are described in Section 8.0. In addition to the vegetation management, USIBWC may conduct a burn rotation once every 10 years of grasslands to regenerate plants and seeds, as recommended by USFWS (USFWS 2012).

Additionally, USIBWC will continue to implement restoration sites, per the ROD, as discussed in the 2011 BA, and discussed further in Section 4.3 and Table 6.

2.3 Adaptive Management

Per the ROD, USIBWC's River Management Plan discussed an adaptive management strategy in implementing river management alternatives from the ROD. Adaptive management is a science-based decision process which allows for the outcomes of the management actions to be monitored and the results could lead to adjusted management decisions. Adaptive management requires ongoing evaluation of strategies. Some of these adaptive management strategies for consideration include:

- Selection of the appropriate restoration sites. USIBWC will evaluate the progress of restoration activities as well as established habitat outside of restoration sites on a yearly basis. USIBWC may move, add, or expand restoration sites based on environmental conditions.
- Vegetation management in the No-Mow Zones. Areas within the No-Mow Zones that develop native vegetation will be left alone and not managed. Areas that develop with predominately invasive species will be treated, unless the habitat is occupied, and managed to promote native vegetation restoration. No-Mow Zones may be changed if resulting habitats are not optimal.
- Island habitat removal. In areas with well-developed riparian flycatcher habitat where islands will be removed, USIBWC may consider the feasibility of transplanting the native vegetation by the root ball to other areas where bank stabilization is necessary. The creation of inset floodplains may also be considered.
- Widening the fringe No-Mow Zones to 35 feet will be considered.
- Creation of bank cuts and river meanders. These structures will be considered so that during high flow water comes into the property or creates an island inside the floodplain.

2.4 Timeline for the Implementation of the Proposed Action

A 10-year timeframe (2009 through 2019) was selected for implementation of the Integrated Land Management Alternative which was outlined in the 2011 BA and subsequent BO (USFWS 2012). The ROD set a 10-year implementation period where the first Phase (2009 to 2014) included studies, pilot projects of restoration sites, and the creation of an environmental water rights transaction framework, and the second Phase (2014 to 2019) includes completing the implementation of the remaining restoration sites (USIBWC 2016c) and initiating channel maintenance activities. It is unlikely that USIBWC will implement all of the proposed channel maintenance alternatives within the proposed timeframe, and will focus on priority projects with available resources.

While the ROD outlined a timeframe through 2019, the intention of the ROD and its EIS was to determine USIBWC's long-term management of the RGCP. USIBWC anticipates continuation of the measures and commitments documented in the ROD for the foreseeable future. The RMP contemplates a 5-year plan for channel maintenance activities (2014-2019); however, USIBWC proposes to continue updating the 5-year plan accordingly, with minimal changes anticipated for future work beyond 2019.

For vegetation management, there are approximately 698 remaining acres allowed in the ROD to be designated as No-Mow Zones, and these will be designated in future years to accommodate new conditions, such as increased flycatcher buffer areas or new restoration sites (USIBWC 2016c). The BO (USFWS 2012) outlined additional vegetation management to include the establishment of a minimum of

53.5 acres targeted for flycatcher habitat (dense riparian shrub habitat) by 2017 and up to 119 acres by 2019 (USIBWC 2016c).

3.0 CONSULTATION HISTORY

Several of the measures proposed under the Integrated Land Management Alternative and updated by the RMP have the potential to affect the SWFL and YBCU and other listed, proposed, or candidate species. A small population of the federally and state endangered SWFL is now known to breed within the 105-mile reach of the RGCP including on some of the restoration sites. YBCUs have also been detected throughout this reach. The Proposed Action includes environmental enhancements for restoration of dense riparian shrub suitable for breeding SWFLs. A goal of increased distribution and population of SWFLs in New Mexico has been met and as discussed in Section 6.3.2, continues to satisfy the Lower Rio Grande recovery target and contribute to efforts to delist the species. The analysis of likely effects presented in this BA focuses on proposed channel maintenance actions and alternatives, vegetation management, and the continued site restoration identified in the 2012 BO.

Since project planning began in 1999, the USFWS has attended meetings and field trips with the USIBWC and others to discuss project features, design, and construction methods. On February 2004, the USIBWC sent a letter to the USFWS requesting consultation pursuant to Section 7 of the ESA. This consultation concerned the effects of the Integrated Land Management Alternative—as set forth in the final EIS released later that year—on the endangered flycatcher, the endangered interior least tern (*Sterna antillarum*), and the then-threatened bald eagle (*Haliaeetus leucocephalus*). In its response letter to the USIBWC on June 28, 2004, the USFWS concurred with an effect determination of—May Affect, Is Not Likely to Adversely Affect for all three listed species (SWCA 2011). USFWS prepared the *Fish and Wildlife Coordination Act Report for the Rio Grande Canalization Project, New Mexico and Texas*, dated March 2005.

On August 31, 2009, after the ROD had been signed, the USIBWC again requested consultation information from the USFWS regarding the potential effects on listed and proposed fish and wildlife resources during the implementation phase of the Integrated Land Management Alternative. The need for this new consultation reflects modifications of the Integrated Land Management Alternative since public release of the final EIS in 2004, including mainly the newly proposed habitat restoration at 30 sites along the RGCP, together with proposed flood flows and an environmental water transfer framework necessary to make habitat restoration possible. As part of this new consultation, safeguards recognized under the ESA were sought for the environmental water transfer framework (SWCA 2011). To implement the ROD, the USIBWC conducted several studies including endangered species surveys and developed a BA. The 2011 BA for implementation of the ROD included site specific information and species data collected during the phased implementation.

On September 9, 2011, the USIBWC provided the draft BA to the USFWS to initiate formal consultation, in accordance with Section 7 of the ESA, on possible effects of the proposed Integrated Land Management Alternative for Long-Term Management (decision in 2009 ROD) of the RGCP in Sierra County and Doña Ana County, NM, and El Paso County, TX on the endangered SWFL and on the flycatcher's proposed critical habitat (USIBWC 2016c). The action described in the 2011 BA included:

- Habitat restoration on 30 sites
- Levee maintenance, rehabilitation, and construction
- Channel maintenance at two locations

- Phasing out grazing
- Vegetation treatments, including annual mowing and the implementation of No-Mow Zones (managed grasslands, flycatcher habitat, and native riparian enhancements at restoration sites)

The USFWS issued a BO in August 2012 which provides RPMs that the USIBWC will undertake to ensure the protection of the SWFL, including establishing and maintaining breeding habitat and developing a flycatcher management plan (Consultation No. 02ENNM00-2012-F-0016 and Previous Consultation No. 2-22-00-I-025 [USFWS 2012]).

As provided in 50 CFR § 402.16, re-initiation 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, that is, when the amount of dense riparian shrub habitat suitable as flycatcher breeding habitat quantified as described above or in the flycatcher management plan is less than 53.5 acres; (2) new information reveals effects of the agency action that may affect listed species or designated 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 designated 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. Since the 2012 BO, the YBCU has been listed as a threatened species and channel maintenance activities are being considered by the USIBWC. A comparison of the proposed actions and historical consultations is provided in Table 5.

Table 5. Comparison of USIBWC Proposed Actions and Determination

Proposed Action and Species Determination	2004 BA	2011 BA	2017 BA
Levee System Maintenance	▪ Construct 6 miles of new levee ▪ Increase levee height in specific areas ▪ Increase floodway vegetation	Levee maintenance, rehabilitation, and construction in specific areas	No change from 2011 BA. Continue levee maintenance, as documented in the USIBWC River Management Plan. Continue specific levee improvement construction projects.
Floodway/ Vegetation Management	▪ Continue mowing outside the main channel but between the flood control levees ▪ Implement BMPs for management of grazing leases. Develop grazing management plan. ▪ Modified grassland management to replace current mowing regimes on 1,641 acres ▪ Conduct native planting ▪ Bosque enhancement through selective removal of exotic vegetation in existing bosques to allow establishment of native vegetation ▪ Reconfiguration of stream bank for native woody vegetation regeneration by shaving down the banks to within 1 foot of the irrigation flows to promote inundation during moderately-high storm flows ▪ Voluntary conservation easements outside the ROW to enhance the connectivity of riparian communities with upland areas, provide buffer zones, and increase corridor width. Approximately 1,618 acres potentially identified.	▪ Grazing lease program – currently being phased out except for one lease approximately 1 mile downstream of Mesilla Dam ▪ Vegetation treatments of annual mowing of 2,674 acres and select target treatments for 3,053 acres (managed grasslands, SWFL habitat, native riparian, and restoration sites) ▪ Establishment of 30 restoration sites and proposed treatment for each site ▪ Water transfer framework for the restoration sites	▪ No change from 2011 BA. All actions from 2011 BA are considered. ▪ In No-Mow Zones, the USIBWC would remove invasive species, such as saltcedar, using one of five methods: 1) manual/herbicide; 2) mechanical/ herbicide; 3) herbicide only; 4) excavation; and 5) mastication

Proposed Action and Species Determination	2004 BA	2011 BA	2017 BA
Channel Maintenance	▪ Continue to remove debris and deposits during non-irrigation periods and installation of rip rap as outlined in the No Action Alternative. Excavated material deposited within RGCP ROW. ▪ Excavated material deposited outside the ROW ▪ Routine maintenance of the pilot channel continued as well as maintenance of American Diversion Dam and irrigation facilities ▪ Reopening of 6 meanders within the ROW ▪ Excavate the entrances of selected arroyos to increase the amount of backwater and bottom variation to increase the amount of slow-moving waters during the late spring and early summer	Dredging upstream of Mesilla Dam and American Dam	▪ Continuation of 2011 BA and the dredging upstream of the Mesilla Dam and American Dam ▪ Sediment removal ▪ Non-sediment removal • Construct sediment traps in arroyos • Modify vortex weir • Construct low-elevation spur dikes ▪ Bank stabilization – rip rap, gravel addition, or planting ▪ Island destabilization/ removal
Species Analyzed and Determination	Determination for the preferred alternative – Integrated USIBWC Land Management ▪ Southwestern willow flycatcher (E) – *may affect is likely to adversely affect* ▪ Aplomado falcon (E) – *no effect* ▪ Least tern (E) – *may affect not likely to adversely affect* ▪ Bald eagle (T) – *may affect not likely to adversely affect* ▪ Sneed pincushion cactus (E) – *no effect* ▪ Mexican Spotted owl (E) – *no effect* ▪ Black-footed ferret (E) – *no effect* ▪ Whooping crane (E) – *no effect* ▪ Chiricahua leopard frog (C) – *no effect* ▪ American peregrine falcon (E) – *no effect* ▪ Arctic peregrine falcon (E) – *no effect* ▪ Piping plover (T) – *no effect* ▪ Gila trout (E) – *no effect* ▪ Todsen's pennyroyal (E) – *no effect*	▪ Southwestern willow flycatcher (E) – *may affect is likely to adversely affect* ▪ Yellow-billed cuckoo (C) – *not likely to jeopardize* ▪ Aplomado falcon (E) – *may affect not likely to adversely affect* ▪ Least tern (E) – *may affect not likely to adversely affect* ▪ Sprague's pipit (C) – *may affect not likely to adversely affect*	**Vegetation management** ▪ Least tern (E) – *may affect not likely to adversely affect* ▪ Aplomado falcon (E and ENEP) – *no effect* ▪ Southwestern willow flycatcher (E) – *may affect not likely to adversely affect* ▪ Yellow-billed cuckoo (T) – *may affect not likely to adversely affect* **Sediment removal** ▪ Least tern (E) – *may affect not likely to adversely affect* ▪ Aplomado falcon (E and ENEP) – *no effect* ▪ Southwestern willow flycatcher (E) – *may affect not likely to adversely affect*, except for two locations, which have a "*may affect is likely to adversely affect*" immediately upstream of Hatch Siphon and immediately upstream of Rincon Siphon ▪ Yellow-billed cuckoo (T) – *may affect not likely to adversely affect*

Proposed Action and Species Determination	2004 BA	2011 BA	2017 BA
			Non-sediment removal
			▪ Least tern (E) – *no effect* ▪ Aplomado falcon (E and ENEP) – *no effect* ▪ Southwestern willow flycatcher (E) – *no effect* Yellow-billed cuckoo (T) – *no effect*
			Bank stabilization – rip rap, gravel addition, or planting
			▪ Least tern (E) – *no effect* ▪ Aplomado falcon (E and ENEP) – *no effect* ▪ Southwestern willow flycatcher (E) – *no effect* ▪ Yellow-billed cuckoo (T) – *no effect*
			Island destabilization/removal
			▪ Least tern (E) – *may affect not likely to adversely affect* ▪ Aplomado falcon (E and ENEP) – *no effect* ▪ Southwestern willow flycatcher (E) – *may affect is likely to adversely affect* ▪ Yellow-billed cuckoo (T) – *may affect not likely to adversely affect*

C = candidate species T = threatened species E= endangered species
ENEP = Experimental, Non-essential Population. Any reintroduced population established outside the species' current range, but within its historical distribution. For purposes of Section 7 consultation, experimental, non-essential populations are treated as proposed species (species proposed in the Federal Register for listing under Section 4 of the Endangered Species Act), except on National Wildlife Refuges and National Parks, where they are treated instead as threatened.

BA biological assessment
BMP best management practice
SWFL southwestern willow flycatcher
RGCP Rio Grande Canalization Project
ROW right of way
USIBWC U.S. Section of the International Boundary and Water Commission

4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 Overview of the RGCP, Past and Current Conditions and Updated ROD Activities

The Rio Grande flows from its headwaters in southern Colorado through New Mexico, discharging into the Gulf of Mexico as it forms the border between Texas and Mexico. The primary source of surface water for the 1,885 miles of river begins in the mountains of Colorado. From a water resources perspective, the area of influence for the project begins at Elephant Butte Reservoir, New Mexico, and extends south approximately 200 miles along the Rio Grande to Fort Quitman, Texas. The drainage basin above Elephant Butte Reservoir is 25,923 square miles and has a 79-year runoff average of 904,900 acre-feet (USIBWC 2004). There are no major tributaries in the project area. Description of water flows and storage are provided in the 2011 BA.

Historically, the Rio Grande in southern New Mexico was characterized by a wide, active floodplain with numerous marshes, backwater, oxbow pools, and a fringe forest of cottonwoods (*Populus* spp.), willows (*Salix* spp.), and shrubby phreatophytes (USFWS 2005a). Stream flows, although subject to great fluctuations, were believed to be perennial in all years. By 1880 however, most of the land along the river that could be irrigated was now under development. Stream flows became more erratic and, in the Mesilla Valley, ceased completely at times. It was these conditions that eventually led to the development of several major water projects on the river (SWCA 2011). For the purposes of channel maintenance and habitat restoration, it is worth noting that the river flows are regulated such that little to no flow is present in the river during the winter non-irrigation months (typically November through February, although this has varied in recent years). The incised channel and dam operations prevent overbank flows, scouring of floodplain areas, and flushing of sediments. This condition occurs year round except during high flows when contributing arroyos may cause bank overflows or flushing of sediment.

There are four mainstem diversions (Percha, Leasburg, Mesilla, and American), and more than 1,000 miles of canals, laterals, and drains along the RGCP downstream of Caballo Dam (USIBWC 2004). The channel and floodway have a capacity ranging from 22,000 cfs in the upper reaches to 11,000 cfs in the lower reaches. Within the United States, the USIBWC operates and maintains the channel and floodway. Maintenance includes dredging sand out of the channel and mowing the floodway to limit the growth of riparian vegetation to maintain floodwater conveyance (SWCA 2011).

4.2 Vegetation Management at the No-Mow Zones

The 2016 RMP documents the vegetation management measures, including development of habitat restoration sites and areas of continued or discontinued mowing. The USIBWC is implementing No-Mow Zone areas along the RGCP as stipulated in the ROD. Cessation of mowing at restoration sites, and riparian fringe, along with selective treatment of exotic vegetation, will allow native vegetation to establish itself for the improvement and restoration of riparian habitats. USIBWC will promote the growth of target species including: Goodding's willow (*Salix gooddingii*), cottonwood (*Populus deltoides* ssp), coyote willow (*Salix exiqua*), Alkali sacaton (*Sporobolus airoides*), pale wolfberry (*Lycium pallidum*), four-wing saltbush (*Altriplex canescens*), screwbean mesquite (*Prosopis pubescens*), arrow weed (*Pluchea sericea*), three-leaf sumac (*Rhus trilobata*), false indigo (*Amorpha fruticosa*), apache

plume (*Fallugia paradoxa*), desert willow (*Chilopsis linearis*), and inland saltgrass (*Distichlis spicata*) (USIBWC 2016c). Implementations of the No-Mow Zone areas include:

- 553 acres of habitat restoration sites (see Table 6)
- 1,983 acres of native vegetation. USIBWC has determined these acres will include:
  - 15-foot wide band of riparian vegetation along the bank of the river, the "fringe," to armor the banks and provide habitat
  - 100-foot buffers around restoration sites
  - 0.25-mile buffers around flycatcher territories
  - Connectivity No-Mow Zones to connect flycatcher buffers or restoration site buffers
- Areas within the USIBWC right of way but outside of levees, or where no levees exist, and where USIBWC has traditionally never maintained (also referred to as the Pre-ROD No Maintenance Zones)
- Three (3) No-Mow Zones called "Green Zones" from the 1999 Memorandum of Understanding with Southwest Environmental Center, which were made permanent in the ROD. These areas are included in the areas where mowing has stopped along the riparian fringe.

As of June 2016, USIBWC has designated 1,838 acres of No-Mow Zones out of the 2,536 acres allowed in the ROD. However, restoration sites which fall under the Pre-ROD No Maintenance Zones (Trujillo) or Selden Canyon (Broad Canyon Arroyo, Selden Point Bar) are not included in these No-Mow Zones because no maintenance has been done in the past in these areas. In many of the No-Mow areas, cessation of mowing has allowed the habitat to convert to saltcedar (invasive) habitat and not native species. Management and removal of saltcedar in the No-Mow Zones to promote native species restoration is preferred (USIBWC 2016c).

A majority of No-Mow Zones were designated by USIBWC in the areas buffering SWFL territories near Hatch, NM and in the southern portion of the RGCP from Country Club restoration sites to Anapra Bridge (Figure 1). These areas connect flycatcher territory buffers or restoration site buffers. Other No-Mow Zone areas are included around several restoration sites as well as thin strips along portions of the RGCP (15-foot wide band of riparian vegetation along the bank of the river). In August 2016, these No-Mow Zone areas were surveyed for potential habitat (IDEALS-AGEISS 2016).

Large No-Mow Zones that occur from the Garfield exit of I-25 south to 187 Bridge (2.1 miles north of Hatch) connect several restoration sites (Figure 3). A wider No-Mow Zone area begins on the eastern side of the river channel between Jaralosa Arroyo and Yeso Arroyo at 3.7 miles north of the highway 187 bridge (crossing to Salem). This No-Mow Zone includes both sides of the river channel and extends south to just past the 187 bridge. Throughout this stretch there is very little riparian species growth in the No-Mow Zones and bare ground, weedy species, grasses, and low shrubs dominate. These No-Mow areas overlap with several restoration sites including Jaralosa, Yeso, and Crow Canyon. A broad No-Mow Zone south of the Crow Canyon restoration sites running downstream to the 187 bridge is largely comprised of heavily disturbed open weedy species with sparse shrub component and a great deal of bare ground. A few large cottonwoods occur within this stretch.

The next stretch of No-Mow Zones (Figure 4) begins on both sides of the river channel at the Hatch bridge (Highway 26) and runs downstream to the railroad crossing (railroad to Rincon). Throughout this stretch the north and northeast side of the river has a great deal of saltcedar growth while the south and southeast side of the river has very little vegetation from the river edge to the levee road and is heavily disturbed. At the downstream end of these No-Mow sections there is overlap with restoration sites at Rincon Siphon.

Table 6. Updated USIBWC Restoration Sites in the RGCP

Site Name	Total Acres	SWFL acres	Targeted Habitat Type(s)	Pre-ROD Condition	Implementation Status	February 2017 Condition	Implementation Comments
Trujillo	14	10 (and up to 14)	Dense riparian shrubs, woodland	Part of Pre-ROD No Maintenance Zone	ACTIVE (USFWS)	Native vegetation thriving	Slated for supplemental irrigation in FY17
Jaralosa	4.5	0	Open riparian woodland	Mowed	ACTIVE (Contractor)	Mixed native/ nonnative; Saltcedar removed; plantings underway Feb 2017	▪ Potential YBCU habitat ▪ Irrigation is more challenging due to limited irrigation infrastructure
Yeso Arroyo	10.6	0	Aquatic habitat	Mowed	POTENTIALLY REMOVED	Mowed	Needs review of potential levee impacts
Yeso East	9.7	0	Open riparian woodland	Mowed	ACTIVE (Contractor)	Saltcedar removed; plantings underway Feb 2017	▪ Potential YBCU habitat ▪ Slated for supplemental irrigation in FY17
Yeso West	2.5	1.7	Aquatic habitat	Part of Pre-ROD No Maintenance Zone	ACTIVE (Contractor)	Saltcedar removed; plantings underway Feb 2017	Target habitat changed to flycatcher habitat
Crow Canyon A	90	0	Riparian savanna and shrubland	Mowed	ACTIVE (USFWS)	Would benefit from irrigation	▪ Potential YBCU habitat ▪ Irrigation is more challenging due to limited irrigation infrastructure
Crow Canyon B	25.6	10.6	Dense riparian shrubs, meadow	Mowed	ACTIVE (USFWS)	Native vegetation thriving in southern portion	Slated for supplemental irrigation in FY17
Crow Canyon C	3.4	3.4	Dense riparian shrubs, woodland	Mowed	ACTIVE	Saltcedar removed; plantings underway Feb 2017	Inset floodplain/terrace
Placitas Arroyo	21.8	0	Aquatic habitat	Mowed	POTENTIALLY REMOVED	Mowed	Needs review of potential levee impacts
Rincon Siphon A-D	28	18 (and up to 22.7)	Dense riparian shrubs	Rincon B – portions were leased for agricultural leases, some of which were let fallow	ACTIVE (USFWS)	Saltcedar excavated; plantings underway	▪ Potential YBCU habitat ▪ Slated for supplemental irrigation in FY17 ▪ Site was expanded from original 16.3 acres

Site Name	Total Acres	SWFL acres	Targeted Habitat Type(s)	Pre-ROD Condition	Implementation Status	February 2017 Condition	Implementation Comments
Angostura Arroyo	15.4	0	Aquatic habitat	Mowed	POTENTIALLY REMOVED	Mowed	Needs review of potential levee impacts
Lack Property	51	51	Dense riparian shrubs	Not USIBWC property	REMOVED; landowner not interested in selling	--	--
Pasture 18	--	0	--	Not USIBWC property	REMOVED; Conceptual Restoration Plan did not recommend this site	--	Potential for YBCU habitat
Horner	--	--	Dense riparian shrubs, riparian woodland	Not USIBWC property	REMOVED; land acquisition unsuccessful	--	Included in 2012 Biological Opinion as a high priority site
Broad Canyon Arroyo	30	4 (and up to 5.9)	Dense riparian shrubs, saltgrass meadow	Part of Pre-ROD No Maintenance Zone	ACTIVE (USFWS)	Native vegetation on lower terraces thriving; upper terraces could benefit from irrigation	USIBWC obtained permit to drill groundwater well at this site
Broad Canyon Ranch Middle	13.8	0	Saltgrass meadow	Not USIBWC property	REMOVED	--	Non-USIBWC property; site under restoration by other entities
Broad Canyon Ranch South	20.6	0	Saltgrass meadow	Not USIBWC property	REMOVED	--	Non-USIBWC property; site under restoration by other entities
Selden Point Bar	7.7	6.9 (and up to 7.8)	Dense riparian shrubs	Not USIBWC property	ACTIVE (USFWS)	Saltcedar cleared; native plantings underway	▪ USIBWC acquired property in 2011 ▪ USIBWC obtained permit to drill groundwater well at this site ▪ Flycatcher site in drought contingency plan
Bailey Point Bar	16.6	16.6	Dense riparian shrubs	Not USIBWC property	REMOVED	--	Private land; land acquisition unsuccessful

Site Name	Total Acres	SWFL acres	Targeted Habitat Type(s)	Pre-ROD Condition	Implementation Status	February 2017 Condition	Implementation Comments
Shalem Colony	14.2	0	Screwbean mesquite and riparian grassland	Unmowed due to narrow floodplain	Inactive	Large mesquites	▪ Potential YBCU habitat ▪ Minimal work – mesquites already established. Needs saltcedar removal only
Leasburg Extension Lateral WW 8	30	4.1 (and up to 14.1)	Dense riparian shrubs	Mowed	ACTIVE (USFWS)	Native vegetation thriving	▪ Site irrigated since 2014 ▪ Site expanded from original 4.1 acres
Clark Lateral	6	4.5 (and up to 6)	Dense riparian shrubs	Mowed	POTENTIALLY REMOVED	Mixed native and non-native	Leased to City of Las Cruces and is part of recreation trail. This site could still be implemented with a different target habitat (ex: enhanced recreation plantings/open riparian woodland) but is not ideal for flycatcher.
Mesilla Valley Bosque State Park	31.8	0 (and up to 4)	Riparian forest, shrubland, meadow and grassland	Mowed; leased to New Mexico State Parks in 2008	ACTIVE (USFWS)	Saltcedar removed; limited plantings with New Mexico State University	▪ Enhanced recreation in north part ▪ Portions could benefit flycatcher/YBCU ▪ Site covers USIBWC land, but State of New Mexico has long-term lease ▪ Potential for collaboration with EBID/New Mexico ▪ Expanded from Conceptual restoration plan
Mesilla East	70	15.8 (and up to 25.8)	Dense riparian shrubs	Mowed	ACTIVE (USFWS)	Plantings have been unsuccessful	▪ Site expanded from original 15.8 acres ▪ Site implementation plans differ for target habitat ▪ Site slated for irrigation in FY17
Berino East	10.3	5 (and up to 9.5)	Dense riparian shrubs and forest	Mowed	ACTIVE (Contractor)	Native vegetation thriving	Plantings were done in excavated swales and along bank in 2015
Berino West	9.5	10.3	Dense riparian shrubs	Mowed	ACTIVE (Contractor)	Native vegetation thriving	Plantings were done in excavated swales and along bank in 2015

Site Name	Total Acres	SWFL acres	Targeted Habitat Type(s)	Pre-ROD Condition	Implementation Status	February 2017 Condition	Implementation Comments
Vinton A	14.7	0	Riparian forest	Mowed	INACTIVE	Mixed native and non-native	Texas site requires agreement with Texas irrigation district
Vinton B	20	0	Riparian woodland	Mowed	INACTIVE	Mixed native and non-native	Texas site requires agreement with Texas irrigation district
Valley Creek	22	0	Riparian woodland – recreation enhancement	Part of recreation lease to City of El Paso	INACTIVE	Maintained by City of El Paso	Texas site requires agreement with Texas irrigation district
NeMexas Siphon	16.7	16.7	Dense riparian shrubs	Not USIBWC property	POTENTIALLY REMOVED	Mixed native and non-native	▪ Title issues have prevented USIBWC acquisition ▪ USIBWC has flowage easement over this site ▪ Potential flycatcher and YBCU habitat
Country Club East	29	0	Riparian forest and woodland	Mowed	Inactive	Not mowed; Mixed native and non-native	▪ Texas site requires agreement with Texas irrigation district ▪ Site crosses Texas/New Mexico border
Sunland Park	28.8	0 (and up to 5)	Riparian woodland	Part of recreation lease to City of Sunland Park which was left fallow	Inactive	Not mowed; Mixed native and non-native; large cottonwoods	▪ Under lease to City of Sunland Park through March 2017, through river park trail system ▪ Lease renewal will remove this site ▪ Northern portion has YBCU potential
Anapra Bridge	11	0	Open riparian woodland	Part of recreation lease to City of Sunland Park	Inactive	Not mowed; Mixed native and non-native	Under lease to City of Sunland Park through 2017, through river park trail system

EBID Elephant Butte Irrigation District
FY Fiscal Year
RGCP Rio Grande Canalization Project
ROD Record of Decision
USFWS U.S. Fish and Wildlife Service
USIBWC U.S. Section of the International Boundary and Water Commission
YBCU yellow-billed cuckoo

Figure 3. No-Mow Zones and Restoration Sites from Garfield Exit of I-25 to the 187 Bridge

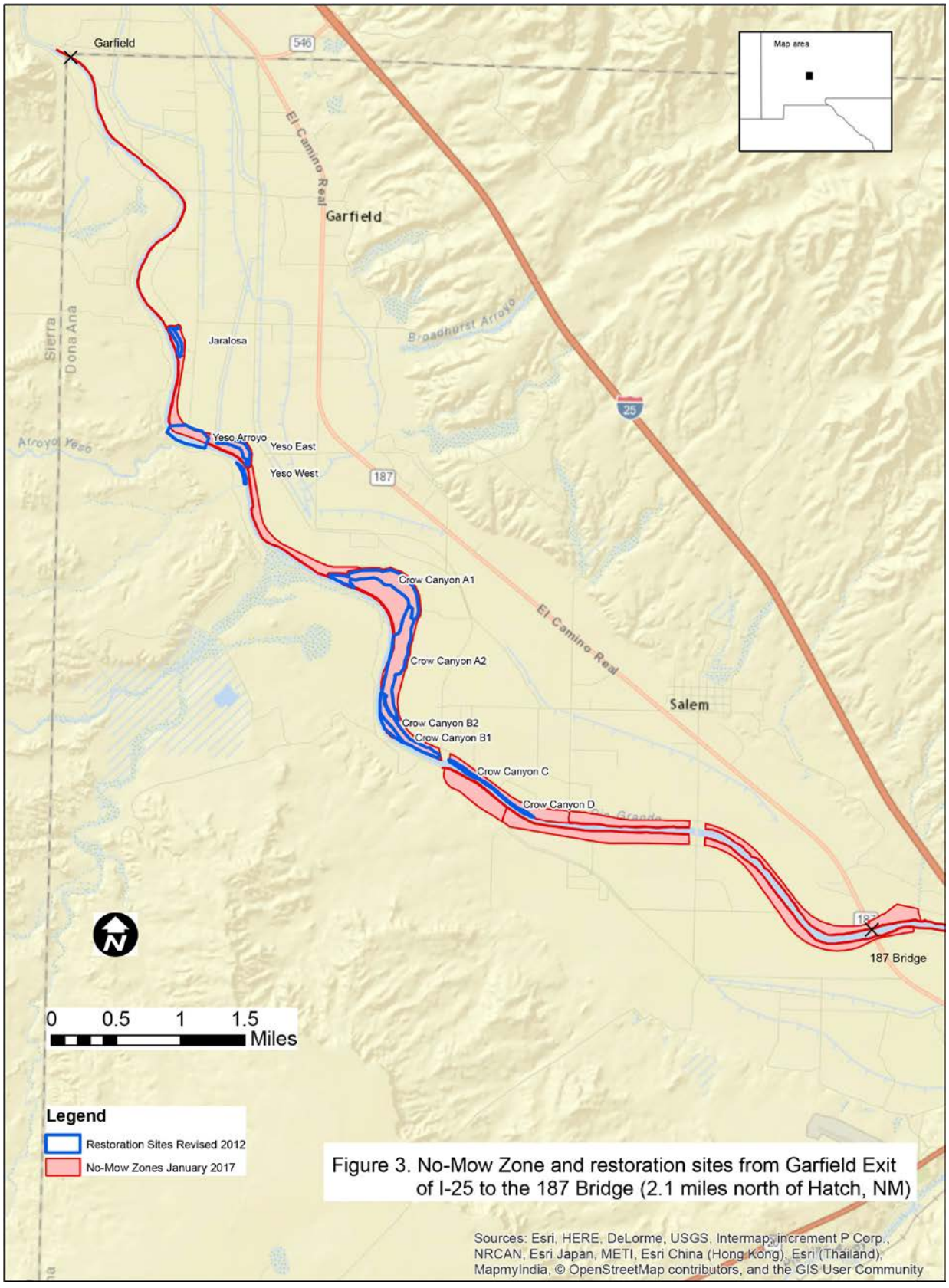
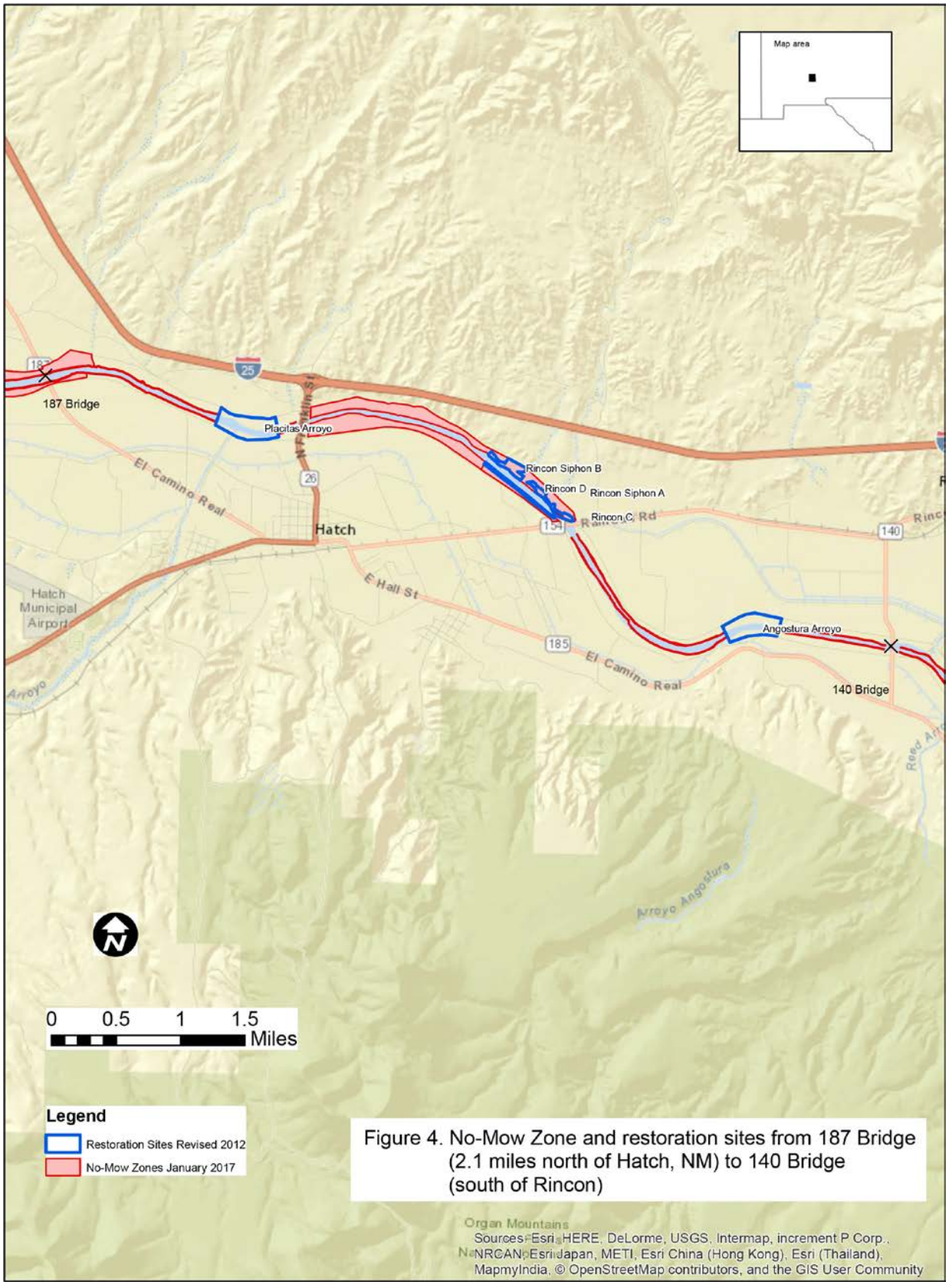


Figure 4. No-Mow Zones and Restoration Sites from 187 Bridge to 140 Bridge



The final stretch near the Hatch territories, from bridge 140 at Rincon, downstream to Pasture 18, the No-Mow Zones begin on both sides of the river channel at 0.8 mile downstream from the 140 bridge and continue for 2.2 miles (Figure 5). Vegetation on both sides of the river away from the riparian vegetation associated with the river bank is comprised of very little riparian species growth; bare ground, weedy species, grasses, and low shrubs dominate. In the continuation of this No-Mow Zone downstream for 1.6 miles on the northeast side of the river only, the vegetation is the same.

The southern No-Mow Zone areas, between the Country Club East restoration site and Anapra Bridge, buffer several restoration sites (Figure 6). In this stretch several No-Mow Zones overlap multiple restoration sites including, from north to south, NeMexas Siphon, Country Club East, Sunland Park and Anapra Bridge. The large No-Mow areas on the east bank running south of the Country Club East restoration site are vegetated with scattered shrubs and intermittent grass cover, a few larger saltcedar and a lot of bare ground. No YBCU and SWFL habitat occurs in this No-Mow Zone. The large No-Mow Zone on the west and southwest side of the river across from the Sunland Park restoration site is heavily disturbed with sparsely scattered shrubs and a great deal of bare ground. A small section toward the north end of this No-Mow Zone has a narrow wooded strip of fairly large mixed vegetation growing that is currently too sparse to provide YBCU and SWFL habitat.

The Pre-ROD No Maintenance Zones totaled approximately 3,383 acres, and are areas where USIBWC does not conduct any vegetation maintenance or mowing. No YBCU potential breeding habitat occurs within the No-Mow Zones. However, there are approximately 45.2 acres of potential habitat occurring within the Pre-ROD No Maintenance Zones, areas that have never undergone vegetation management. So as the No-Mow Zone areas further develop in native vegetation, there is potential for additional cuckoo habitat.

The No-Mow Zones implemented by 2016 totaled approximately 1,838 acres, of which approximately 1,134 acres are located near and north of Hatch, NM (referred to as Hatch section). This last No-Mow section is identified as being important to breeding SWFLs and YBCUs. A total of 27.5 acres of moderately suitable flycatcher habitat occur within the No-Mow Zones (Figures 7-17) not including the restoration sites. The majority (24.0 acres) of this occurs within the Hatch section. Approximately 5.6 acres of the total of 7.5 acres of suitable SWFL habitat occur within the Hatch section (Figures 8-10). All of the highly suitable SWFL habitat (9.5 acres) found within the No-Mow Zones occurs within the Hatch section. In the 2016 habitat assessment, a total of approximately 166.8 acres of moderately suitable SWFL habitat, 60.3 acres of suitable habitat, and 16.6 acres of highly suitable habitat were identified. Approximately 57 percent of the highly suitable habitat falls within the No-Mow Zones, the majority of moderately suitable (84 percent) and suitable habitat (88 percent) falls outside of the No-Mow Zones.

The Hatch section of No-Mow Zones and restoration areas found within the Percha and Hatch river reaches appears to overlap with historic SWFL and YBCU detections. Within the Radium Springs reach, there are SWFL and YBCU detections both within and outside of the Selden Point Bar restoration area (Appendix A, Figure 2). However, there are no areas covered under the No-Mow Zones, only the Pre-ROD No Maintenance Zones. Moving downstream, historic SWFL and YBCU detections overlap with restoration areas. However, the YBCU potential habitat area on the south end of the Hatch reach does not fall within the No-Mow Zone, nor is it within a restoration area (Figure 9). It does fall within the Pre-ROD No Maintenance Zone, an area that does not have a mowing or vegetation management regime.

Figure 5. No-Mow Zones and Restoration Sites from 140 Bridge to Pasture 18 Restoration Site

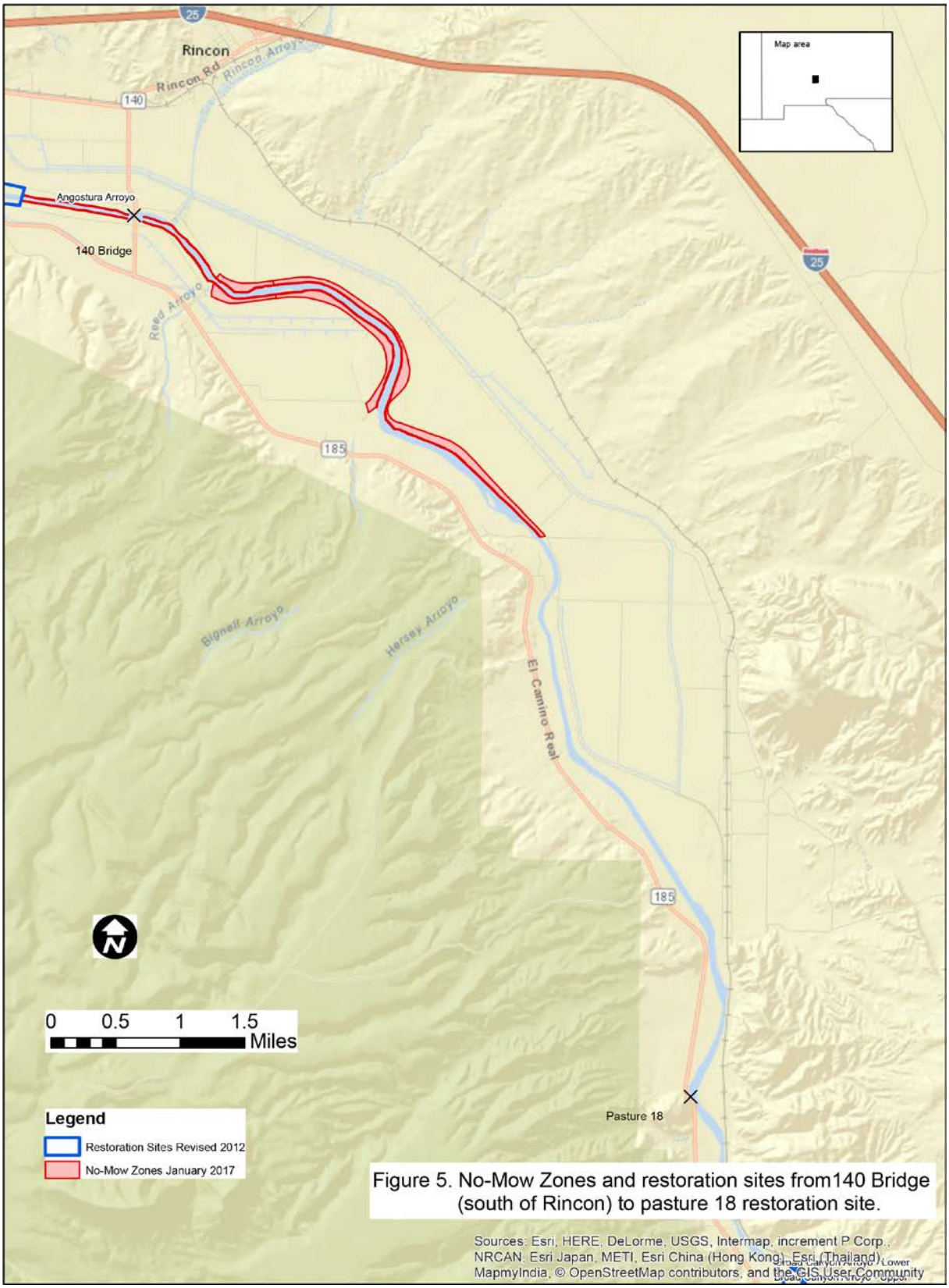


Figure 6. No-Mow Zones and Restoration Sites from Country Club Road in El Paso, TX to Sunland Park Drive Bridge in El Paso, TX

Figure 7. SWFL and YBCU Suitable Habitat from Percha to Garfield

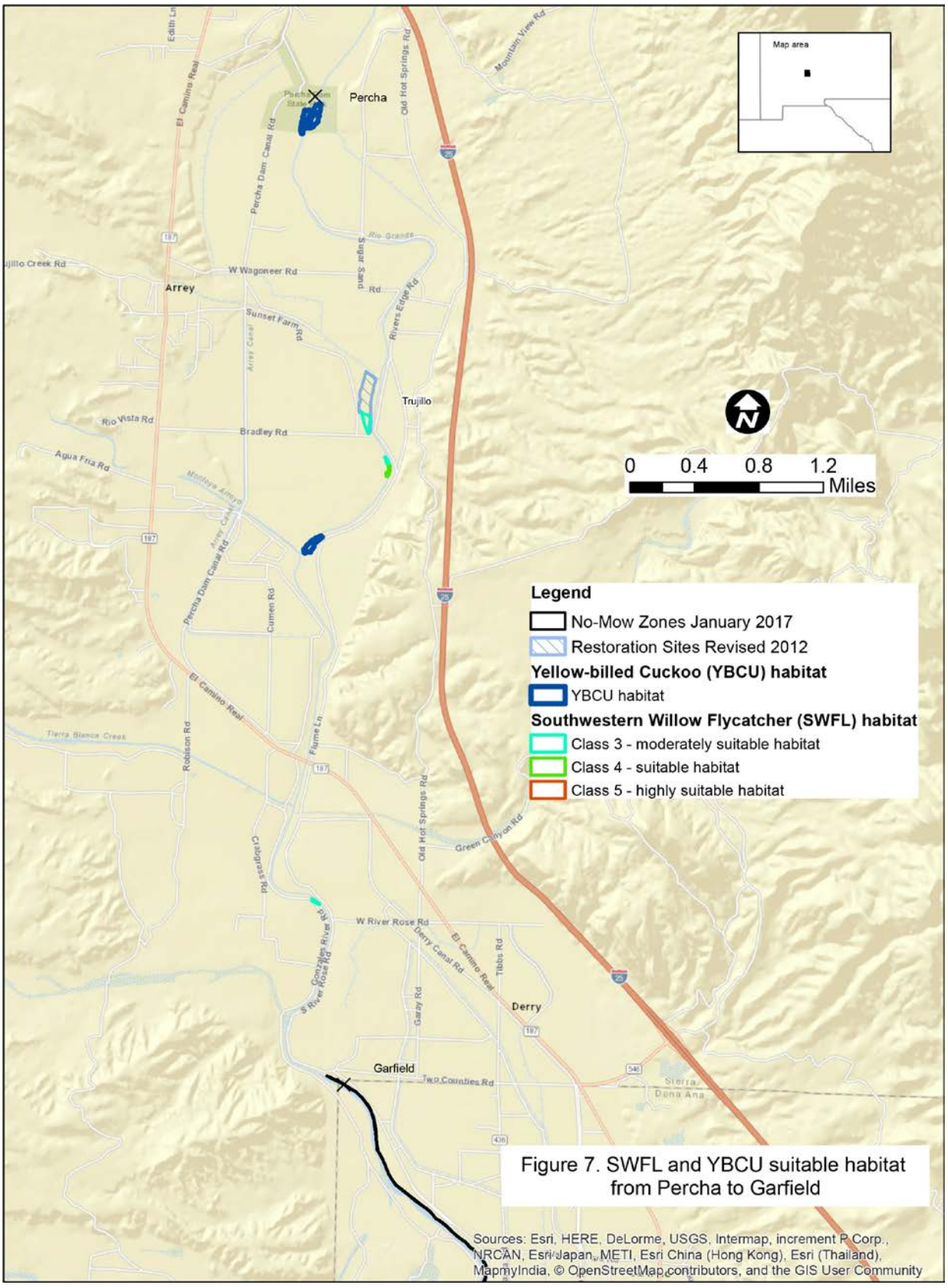


Figure 8. SWFL and YBCU Suitable Habitat within No-Mow Zones from Garfield Exit of I-25 to the 187 Bridge

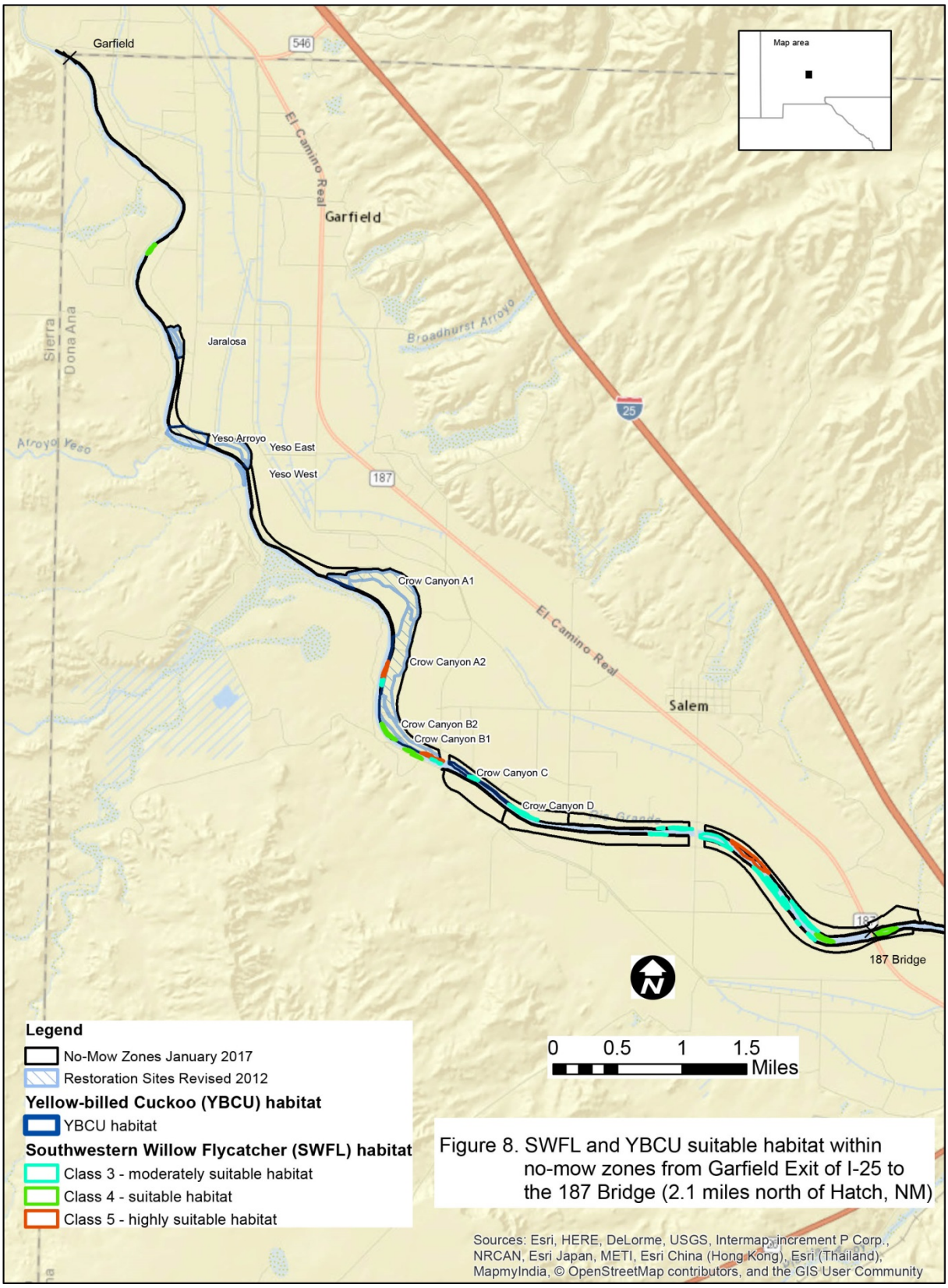


Figure 9. SWFL and YBCU Suitable Habitat within No-Mow Zones from 187 Bridge to 140 Bridge

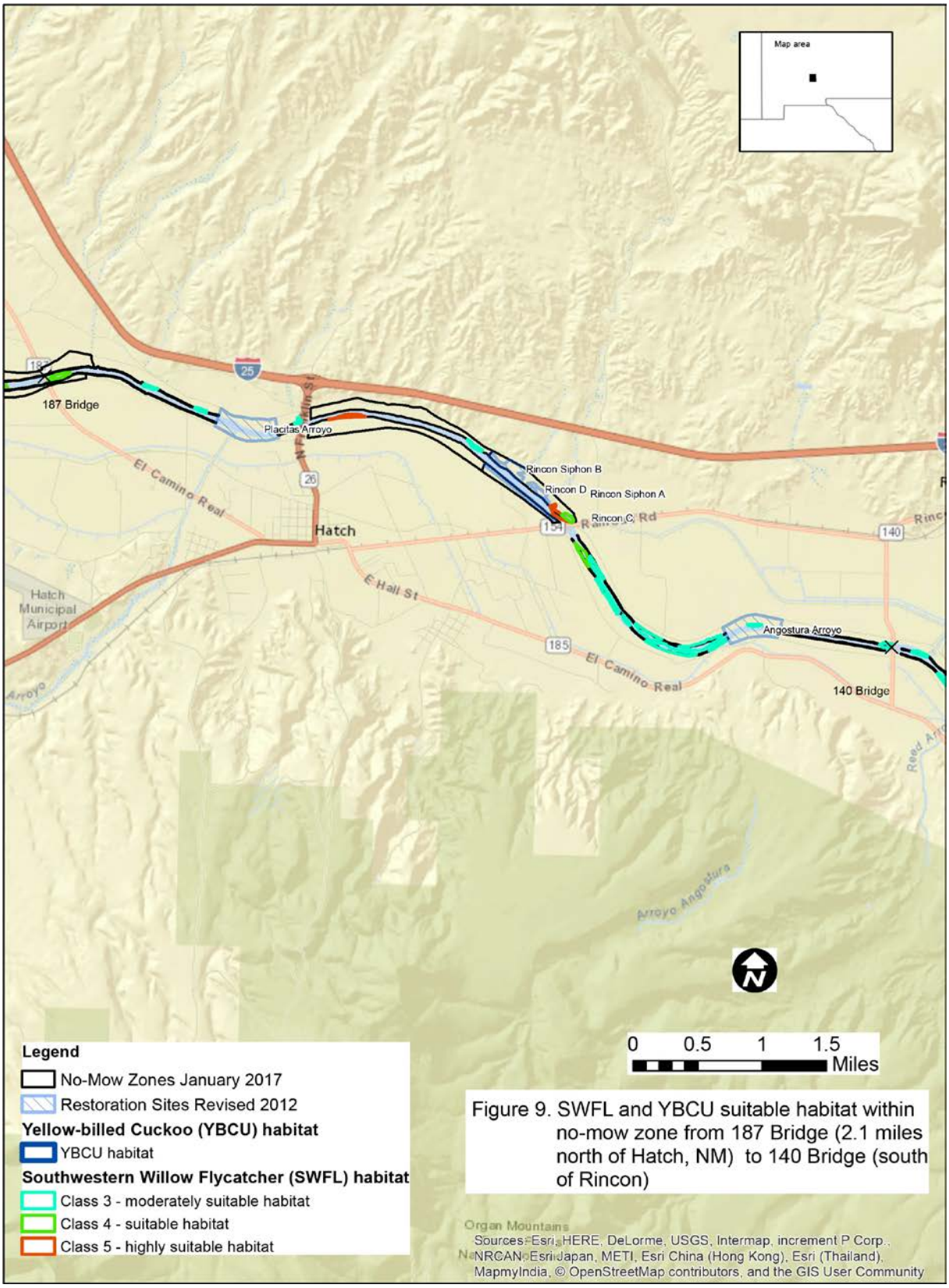


Figure 9. SWFL and YBCU suitable habitat within no-mow zone from 187 Bridge (2.1 miles north of Hatch, NM) to 140 Bridge (south of Rincon)

Figure 10. SWFL and YBCU Suitable Habitat within No-Mow Zones from 140 Bridge to Pasture 18 Restoration Site

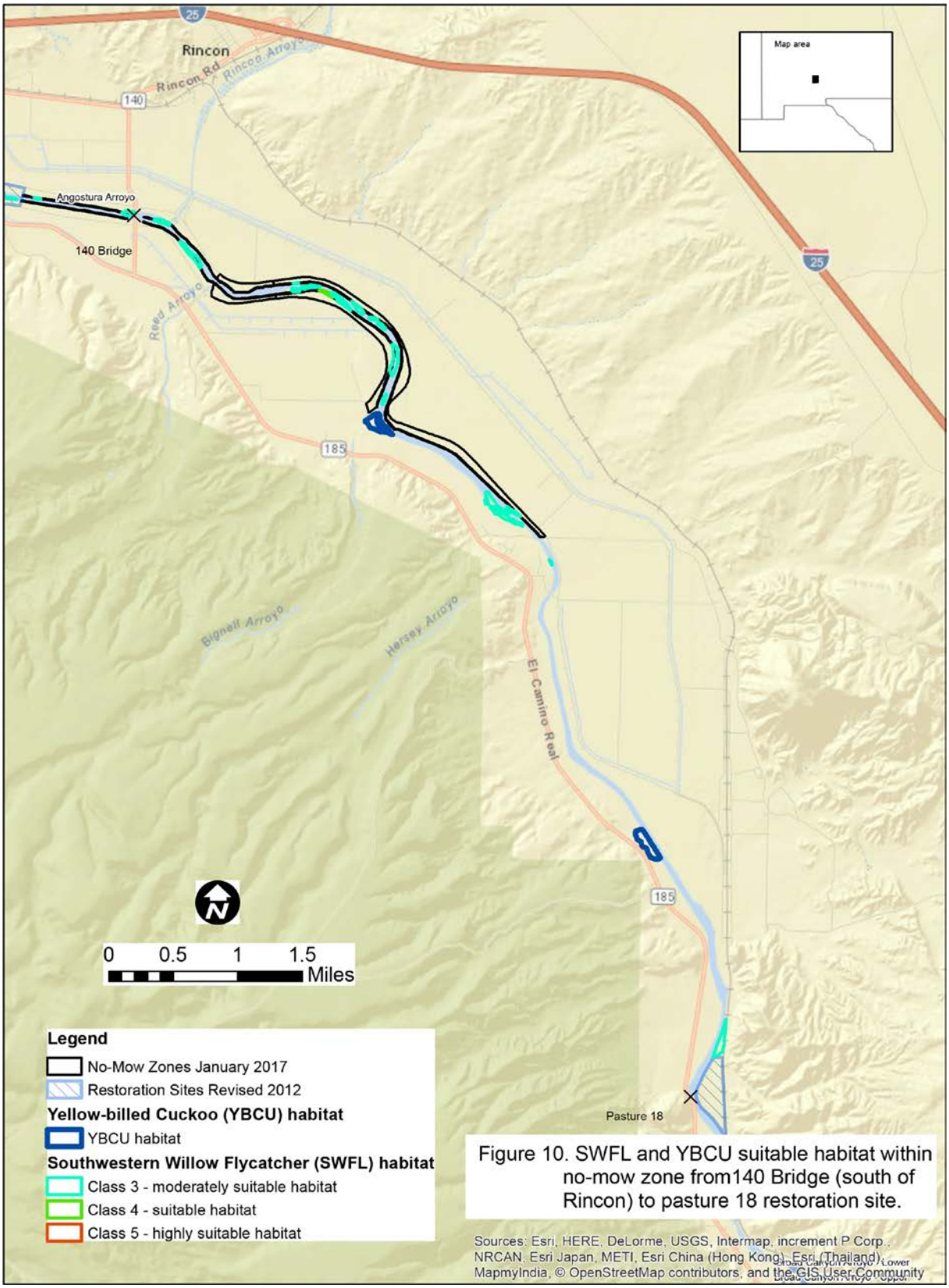


Figure 11. SWFL and YBCU Suitable Habitat from Pasture 18 to Leasburg Bridge

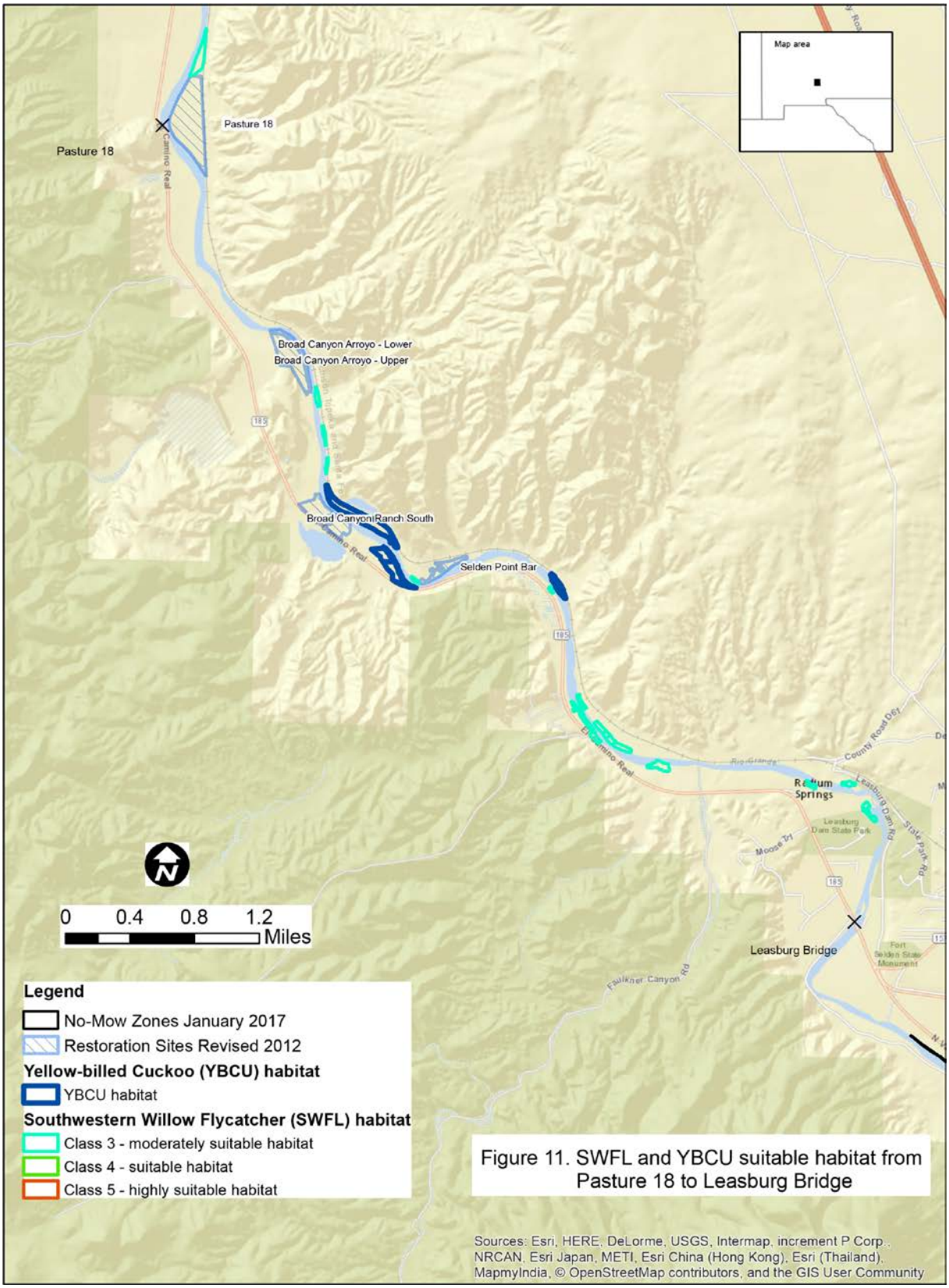


Figure 12. SWFL and YBCU Suitable Habitat within No-Mow Zones from Leasburg Bridge to Shalem Colony Bridge

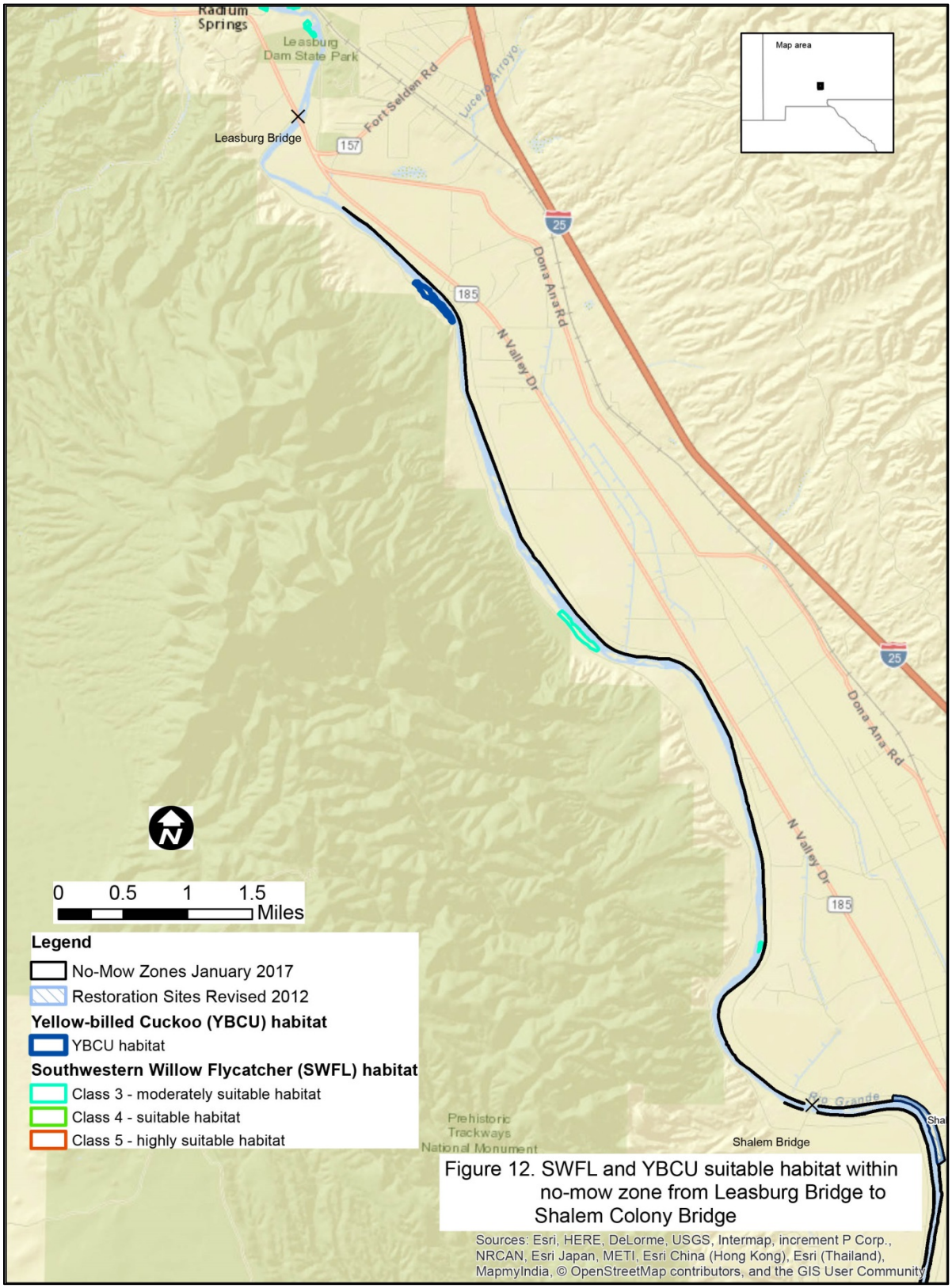


Figure 13. SWFL and YBCU Suitable Habitat within No-Mow Zones from Shalem Colony Bridge to Picacho Bridge

Figure 14. SWFL and YBCU Suitable Habitat within No-Mow Zones from Picacho Bridge to Mesilla Dam

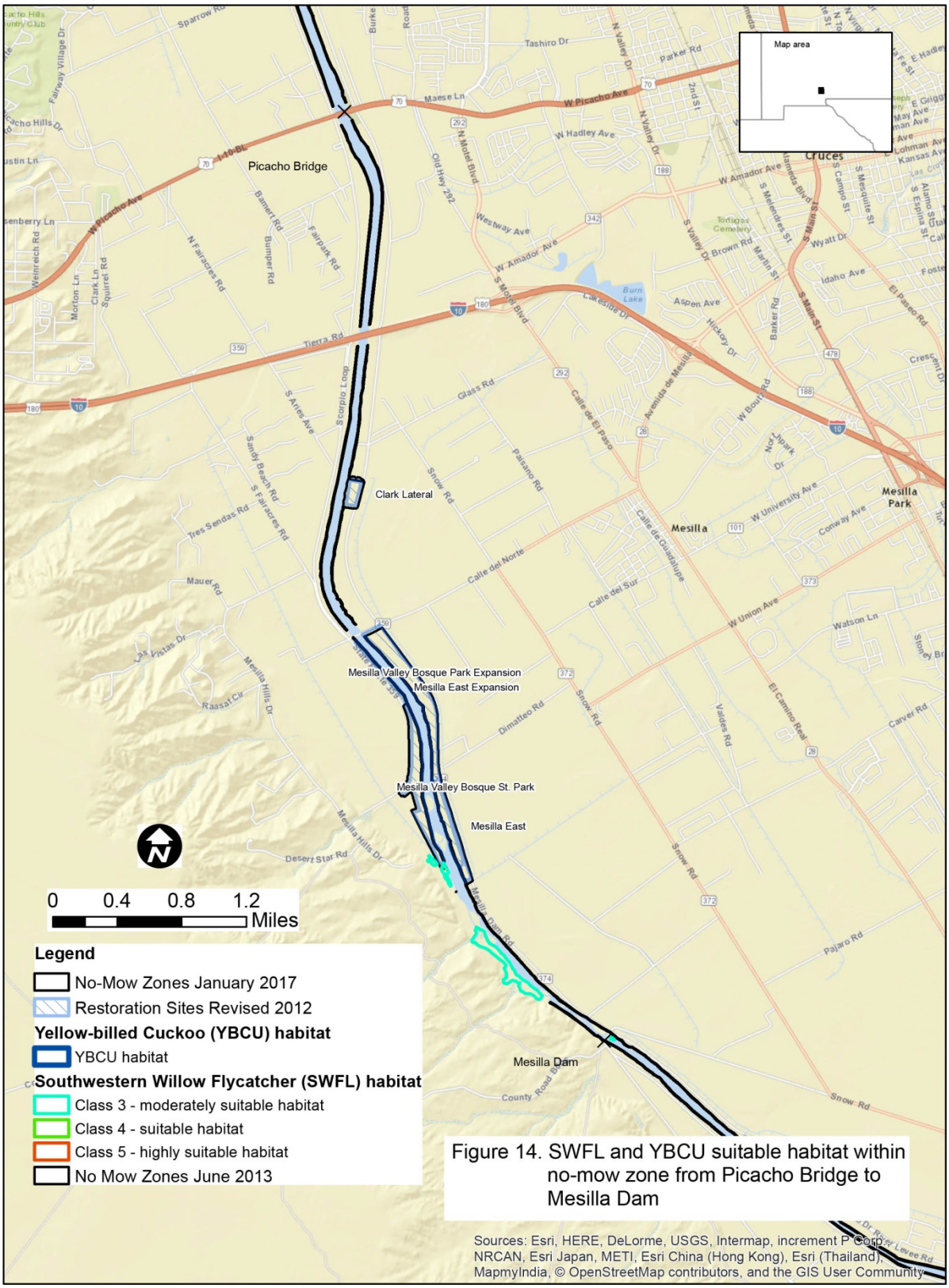


Figure 15. SWFL and YBCU Suitable Habitat within No-Mow Zones from Mesilla Dam to Country Club Road Bridge

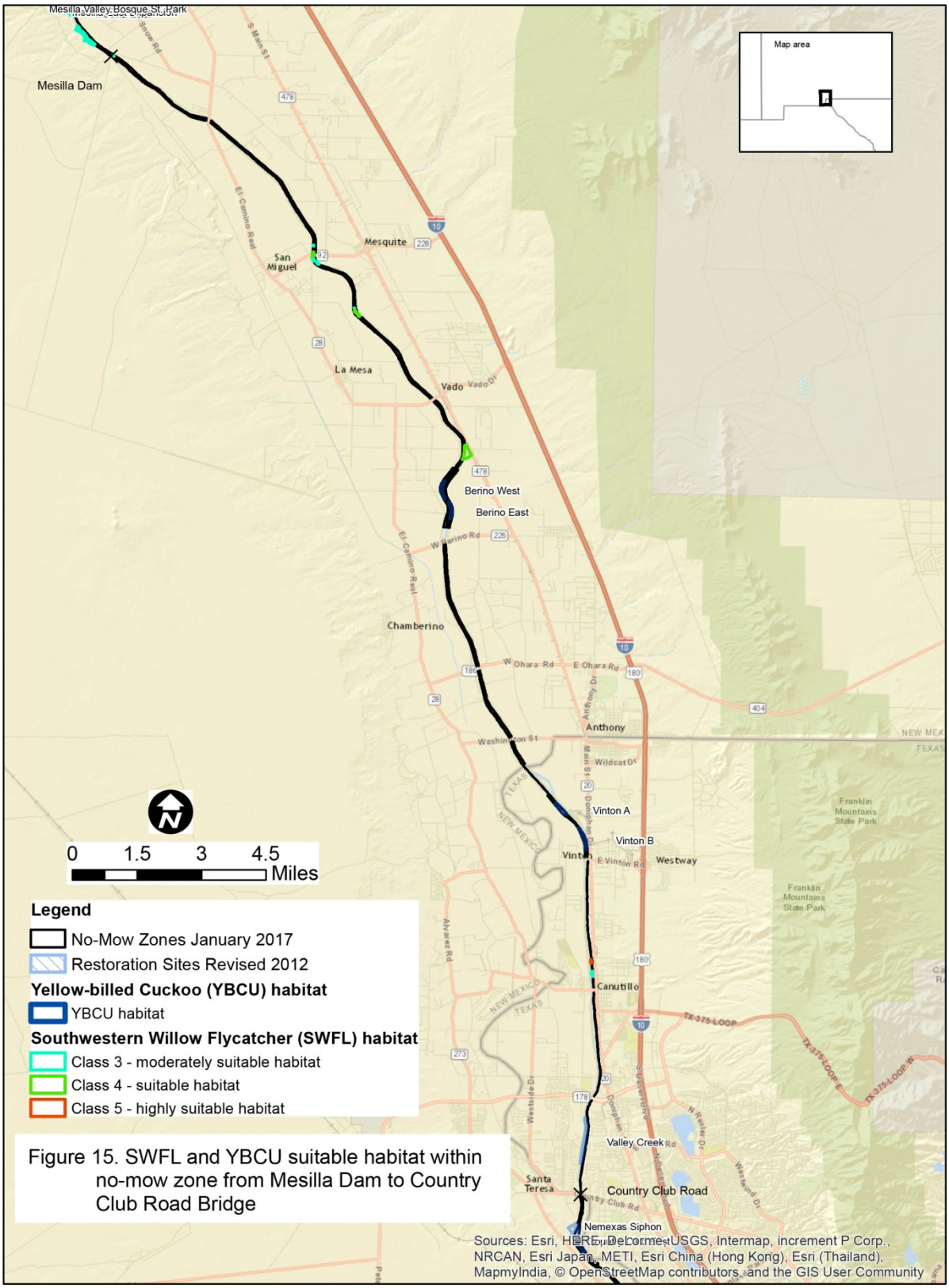
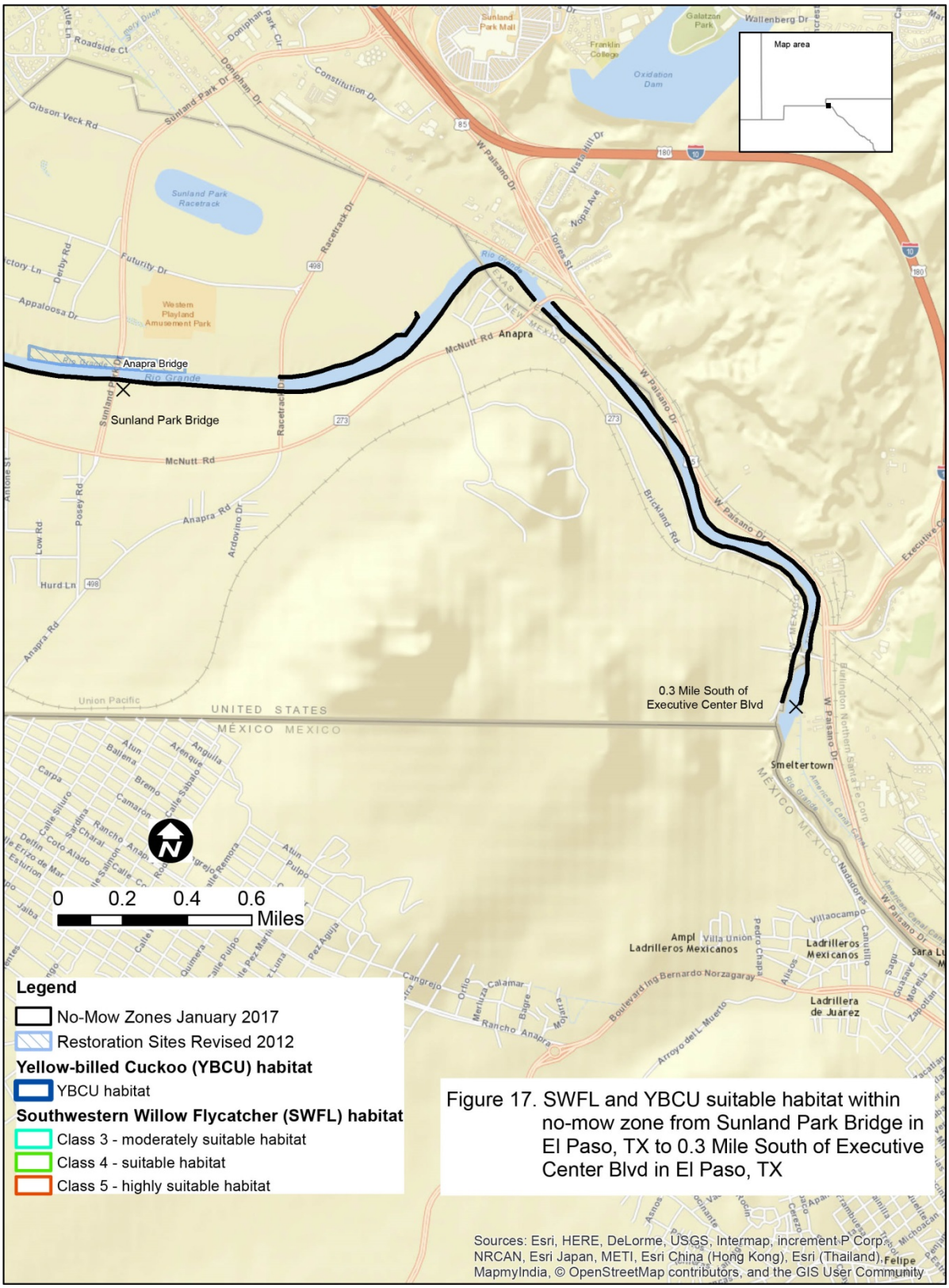


Figure 15. SWFL and YBCU suitable habitat within no-mow zone from Mesilla Dam to Country Club Road Bridge

Figure 16. SWFL and YBCU Suitable Habitat within No-Mow Zones from Country Club Road Bridge in El Paso, TX to Sunland Park Drive Bridge in El Paso, TX

Figure 16. SWFL and YBCU suitable habitat within no-mow zones from Country Club Road Bridge in El Paso, TX to Sunland Park Drive Bridge in El Paso, TX

Figure 17. SWFL and YBCU Suitable Habitat within No-Mow Zones from Sunland Park Bridge in El Paso, TX to 0.3 Mile South of Executive Center Blvd in El Paso, TX



Within the Percha reach, there are two areas identified as potential YBCU habitat. The northern most site is located within the Percha Dam State Park (Figure 7). The other area is found downstream of the Trujillo restoration site and does not overlap with a restoration site nor the No-Mow Zones. It does overlap with the Pre-ROD No Maintenance Zone an area that has not and will not be mowed. Within the Rincon Valley reach, 10.6 acres were identified as potential YBCU habitat. However, this area does not overlap with current restoration sites nor the No-Mow Zones (Figure 10). There are approximately 27 acres of potential YBCU habitat found within the Radium Springs reach (Figure 11). These all occur near the current restoration sites and outside the No-Mow Zones. Some of these areas overlap with the Pre-ROD No Maintenance Zones, areas that have not undergone any maintenance.

Within the Las Cruces reach, the only identified area with potential YBCU habitat is protected by the No-Mow Zones on the eastern side of the river. However, the western side is only covered by the Pre-ROD No Maintenance Zones (Figure 12).

4.3 Restoration Sites

Although previously discussed in the 2011 BA and subsequent 2012 BO, current management practices at the restoration sites along the RGCP are updated in this BA. USIBWC, pursuant to RPMs outlined in the 2012 BO, continues to implement 15 out of 30 restoration sites, 9 of which have a USFWS flycatcher habitat priority of 1 or 2 (USFWS 2012). Four restoration sites, two of which will target SWFL habitat, are being implemented in winter 2016-2017. Out of the 30 sites, 4 sites will not be implemented by USIBWC, some sites are being implemented by others, and other sites were added (Table 6). The other restoration sites will be implemented at later dates, some are waiting for water rights before implementation, some for further evaluation, and others for property access. The proposed prescriptions for the restoration sites were outlined in the 2011 BA and are still applicable.

The Conceptual Plan (USACE 2009) identified potential restoration sites and provided conceptual designs for river restoration sites where it would be feasible to produce enhanced cover and aquatic diversity and restore healthy riparian function to enhance natural riverine processes and improve terrestrial wildlife habitat, while protecting existing infrastructure to comply with the 2009 ROD. The Conceptual Plan was updated by the *Site Implementation Plans – Rio Grande Canalization Project River Restoration Implementation Plan* (TRC 2011). The Conceptual Plan identified 30 potential restoration sites which were described and documented in the 2011 BA. Restoration sites that have been eliminated include Lack Property, Horner, and Bailey Point Bar because USIBWC was unsuccessful in obtaining the property, as well as Pasture 18 because the Conceptual Plan did not recommend the site (USIBWC 2016c). Title issues on the NeMexas Siphon have prevented the acquisition of that property for restoration.

Currently 15 restoration sites are actively being managed and restored and include: Trujillo, Crow Canyon A and B, Rincon Siphon, Selden Point Bar, Broad Canyon Arroyo, Leasburg Extension Lateral WW 8, Mesilla East, Mesilla Valley Bosque State Park, Berino East, and Berino West. Four sites were implemented in winter 2016-2017 are Jaralosa, Yeso West, Yeso East, and Crow Canyon C. Ten other sites are currently inactive and include: Angostura Arroyo, Placitas Arroyo, Pasture 18, Shalem Colony, Vinton A, Vinton B, Valley Creek, Country Club East, Sunland Park, and Anapra Bridge. A detailed description of the sites is appended to this BA (Appendix A). Nine of the sites are being implemented by

the USFWS, San Andres National Wildlife Refuge under an Interagency Agreement with Region 2 of USFWS.

From 2011-2013, a total of 3,271 trees were planted and 322 acres of saltcedar were removed including retreatments. From 2014-2015, the number of trees planted increased with 17,210 trees added to the restoration sites as well as 1,062 longstem shrubs. Forty-four acres of saltcedar were removed and retreatments occurred on all active restoration sites. In 2016, a total of 6,951 trees were planted. In total to date, approximately 27,432 trees and 1,062 longstem shrubs have been planted and 366 acres of saltcedar have been treated or excavated (USIBWC 2016a).

In 2014, USIBWC contracted the implementation of the Berino East and West sites in Doña Ana County, NM. In 2015, the final monitoring report for the Berino sites was submitted to USIBWC which described the restoration activities and summarized the monitoring of the planting success from the habitat restoration activities. Historically both sites were mowed. After cessation of mowing per the ROD, the Berino West project area was dominated by large saltcedar stands and intermixed with very few willow patches. Restoration efforts included removal of non-native vegetation, excavation of swales, and the planting of native trees and shrubs in order to create willow (*Salix* sp.) dominated stands, a cottonwood (*Populus deltoids spp. Wislizeni*) gallery forest, and buffer areas with native riparian shrubs typical of the surrounding floodplain (SWCA 2015). Tree plantings were very successful (90-percent survival rate) at these sites and should increase the availability of habitat for the SWFLs and the YBCUs; however, survivorship of longstem shrubs was very low (10 percent). At the West Berino site, vegetation was established in 8 patches (total of 3.34 acres) along the banks and swells at 5,650 stems/acre. At the East Berino site, four patches of riparian habitat were planted along the floodplain bench at a rate of 4,750 stems/1.07 acres. As of June 2015, no new invasive species were observed in the project area following restoration (SWCA 2015).

In 2014, USIBWC signed a Memorandum of Understanding (MOU) with New Mexico Energy, Mineral and natural Resources Department, State Parks Division (IBM14A0021) to collaborate on riparian habitat restoration within Mesilla Valley Bosque State Park. USIBWC has contracted the implementation of four restoration sites totaling 19.2 acres for winter 2016-2017. Over 5,100 trees and almost 600 shrubs are anticipated to be planted across the four sites. Jaralosa and Yeso East are old river meanders and Crow Canyon C and Yeso West are inset floodplains targeting SWFL habitat.

In response to the conservation measures proposed by USFWS in the 2012 BO, USIBWC constructed a network of 55 shallow groundwater monitoring wells at 21 locations, including 19 restoration sites. USIBWC has used the groundwater data to adjust the depth required for plantings, to evaluate irrigation needs, and to assist with restoration site planning. At 21 wells USIBWC has deployed automatic pressure transducers to provide hourly data. USIBWC continues to gather both continuous and discrete data from the wells, with some wells being collected twice annually and other wells monthly.

4.4 Environmental Water Transaction Program Implementation

A critical element of the 2012 BO was the implementation of USIBWC's Environmental Water Transaction Program to acquire and deliver irrigation water to the restoration sites. Since the 2011 BA, the USIBWC and its partners have established the framework and procedures for the USIBWC to acquire water rights to irrigate the trees and vegetation at restoration sites. In 2013, the USIBWC and Elephant

Butte Irrigation District (EBID signed an MOU to work together to promote conservation and develop the Environmental Water Transaction Program (IBM13A0007). USIBWC and its partners successfully worked with the EBID, whose board passed a policy in 2013 to allow the irrigation of native trees to be considered as an agricultural beneficial use for the RGCP. In 2013 and 2014, the USIBWC acquired the first parcels of water rights, totaling 5.6 acres. The first irrigation of a restoration site occurred in June 2014 at the Leasburg Extension Lateral Wasteway #8 restoration site in Las Cruces, NM. In total, USIBWC and its partners have conducted six irrigation events at that site from 2014 to 2016 totaling 26.97 acre-feet. After the 2014 water rights acquisitions, the USIBWC temporarily halted the acquisition of water rights pending resolution of water rights litigation potentially impacting federal government real property acquisitions; however, major water litigation is being currently resolved, and USIBWC is working with stakeholders, partners and the Department of Justice to continue water rights acquisitions in compliance with the ROD. USIBWC is currently moving forward with acquisition of 41.75 acres of EBID water rights and is working with other entities for additional water rights in compliance with the ROD.

4.5 Flycatcher Management Plan

Per the BO RPM 2, the USIBWC approved and implemented a Flycatcher Management Plan on November 20, 2014 “to minimize flycatcher disturbance and quantify and manage flycatchers and their habitat.” The Flycatcher Management Plan, which is included as Part 3 of the RMP, outlines USIBWC activities to establish SWFL habitat, such as:

- the implementation of restoration sites targeting establishment of flycatcher habitat;
- the development and implementation of the Environmental Water Transaction Program;
- vegetation management discussed above;
- collaboration with USBR to conduct surveys;
- implementation of BMPs;
- evaluation of potential impacts to flycatchers when reviewing applications for license, leases, and permits;
- implementation of conservation measures recommended in the BO;
- a drought contingency plan; and
- methodologies for quantifying habitat.

Restoration sites targeted for SWFL habitat are provided in Table 7. This table includes the anticipated SWFL acres in addition to maximum acreage under optimal conditions.

The Flycatcher Management Plan also documents USIBWC’s procedures for quantifying existing habitat, per BO RPM 1.7 and 2.7. USIBWC reports these numbers to USFWS in annual progress reports, per the BO. The results show that there are many more acres of existing dense habitat throughout the RGCP than USIBWC is required to maintain. However, the methods recommended in RPM 2.7 using NDVI analysis from Landsat imagery provide dense vegetation, not necessarily suitable flycatcher habitat, and therefore the results are not included in this BA.

4.6 YBCU Restoration Sites and Protection Measures

USIBWC's RMP Subpart 3.2 discusses other listed species other than the SWFL. Section 3.2.2.1 of the RMP discusses USIBWC actions to protect the YBCU. Site visits of some No-Mow Zone areas show that there is potential for YBCU habitat in some of these unmowed floodplain areas that are developing mesquite forests. Several restoration sites have potential for YBCU habitat. For example, Rincon Siphon B and Shalem Colony have developed mesquite forests, and Sunland Park has developed mature cottonwood forest. Old river meanders such as Jaralosa and Yeso East have existing mature cottonwoods and these active restoration sites also have potential to develop riparian forest/woodland habitat. Table 8 lists the restoration sites with YBCU potential.

4.7 Sediment Excavation Activities

USIBWC has conducted sediment excavation activities under the 2013 working draft of the RMP Part 4 Channel Maintenance Plan, and under the 2016 final RMP. USIBWC has received concurrence from the USACE for excavation-only activities, under 33 CFR 363.2. This work uses scrapers, loaders, excavators, and dump trucks to remove sediment out of the river to an upland location outside of the active floodplain. Work is only conducted during low-flow or dry conditions and not during the breeding season or within 0.25 acre of flycatcher or cuckoo territories. Sediment excavation was conducted in 2013 to 2015 at specific locations with sediment accumulation, including Montoya Drain and Sunland Park, Rincon Drain near Radium Springs, and upstream of Mesilla Dam. In addition, USIBWC conducted minimal excavation work at arroyo mouths. In August 2016, USIBWC provided an updated draft of the Channel Maintenance Plan to ROD stakeholders for review. USIBWC finalized the plan in December 2016 which includes proposed sediment excavation activities for 2014 through 2019.

4.8 Critical Habitat Designation

Critical habitat for the SWFL was designated in 1997, revised in 2005, and again in 2013 (USIBWC 2016c). In the Critical Habitat Rule dated January 3, 2013, the USFWS designated approximately 1,227 stream miles as critical habitat but excluded the RGCP because of USIBWC's existing riparian habitat restoration efforts and collaborative efforts with irrigation districts and environmental groups to establish a water transaction program (USFWS 2013a). In August 2014, the USFWS proposed Critical Habitat for the YBCU; however, the RGCP was not part of the proposed critical habitat designation (USFWS 2014b).

Table 7. Restoration Sites with Target Flycatcher Breeding Habitat

Site Name	Flycatcher Habitat Acreage	Flycatcher Habitat Acreage, Maximum, under Optimal Conditions	Total Acreage of Site	Comments
ACTIVE RESTORATION SITES				
Trujillo	10	14	14	Active restoration site
Yeso West	1.7	1.7	1.7	Active restoration site
Crow Canyon B	10.6	10.6	25.6	Active restoration site
Crow Canyon C	3.4	3.4	3.4	Active restoration site
Rincon Siphon (4 parcels A, B, C, and D)	18	22.7	28	Active restoration site
Broad Canyon Arroyo	4	5.9	30	Active restoration site
Selden Point Bar	6.9	7.8	7.7	Active restoration site
Leasburg Extension Lateral WW 8	4.1	14.1	30	Active restoration site; site was expanded so more flycatcher habitat may be possible
Mesilla East	15.8	25.8	70	Active restoration site; site was expanded so more flycatcher habitat may be possible
Mesilla Valley Bosque State Park	0	4	36.3	Old mitigation bank has the potential to be flooded for flycatcher habitat
Berino West	10.3	10.3	10.3	Active restoration site
Berino East	5.0	9.5	9.5	Active restoration site
Total Active Acres	**89.8**	**129.8**	**372.5**	
INACTIVE RESTORATION SITES				
Clark Lateral	4.5	6	6	Requires supplemental irrigation; within a recreation lease area so this is not optimal SWFL habitat location
NeMexus Siphon	16.7	16.7	16.7	Title issues have prevented USIBWC acquisition
Sunland Park[1]	~ 5	5	28.8	Under lease to the City of Sunland Park through March 2017; lease will be modified to remove this site
Total Inactive Areas	**16.7**	**27.7**	**51.5**	

Adapted from Table 3-4 of the RMP
[1] This site has potential to be established as additional flycatcher habitat due to observation of migrants at the site.
USIBWC U.S. Section of the International Boundary and Water Commission

Table 8. Restoration Sites with YBCU Potential Habitat

Site Name	YBCU Potential Habitat Acreage	Total Acreage of Site	Target Habitat	Comments
Jaralosa	4.5	4.5	Open riparian woodland	Active restoration site buffered with a large No-Mow Zone; located near several other SWFL and YBCU sites; irrigation is challenging but may be required for successful restoration
Yeso East	9.7	9.7	Open riparian woodland	Active restoration site slated for irrigation in 2017; buffered with a large No-Mow Zone; located near several other SWFL and YBCU sites
Crow Canyon A	10.6	25.6	Riparian savanna and shrubland	Active restoration site; irrigation is challenging but may be required for successful restoration
Rincon Siphon B	4.5	16.3	Dense riparian shrubs and screwbean mesquite	Active restoration site; northern part of this site was a previous agricultural lease that was left fallow and has developed mature screwbean mesquite forest
Shalem Colony	14.2	14.2	Screwbean mesquite	Inactive restoration site; site already has existing mature mesquites
Vinton A	14.7	14.7	Riparian forest	Inactive restoration site; buffered with a large No-Mow Zone; located near other YBCU sites
Vinton B	20	20	Riparian woodland	Inactive restoration site buffered with a large No-Mow Zone; located near other YBCU sites
NeMexas Siphon	16.7	16.7	Dense riparian shrubs and/or riparian forest	Title issues with property; prior to a fire in 2013, site contained large cottonwoods
Country Club East	29	29	Riparian forest and woodland	Inactive restoration site buffered with a large No-Mow Zone; located near other YBCU sites
Sunland Park	28.8	70	Riparian woodland	Inactive restoration site buffered with a large No-Mow Zone; located near other YBCU sites
Total	**152.7**	**220.7**		

SWFL southwestern willow flycatcher
YBCU yellow-billed cuckoo

4.9 Summary of Current USIBWC Conservation Measures

USIBWC has implemented several conservation measures, including reasonable and prudent measures (RPM) from the 2012 BO, to ensure the protection of the SWFL. USIBWC management goals are to conduct necessary operations and maintenance activities while avoiding adverse impacts to flycatcher populations and habitat. USIBWC aims to establish a minimum of 53.5 acres (21.7 ha) of flycatcher breeding habitat by 2017, and as many as 119 acres (48 ha) by 2019, as stipulated in RPM 1 (USIBWC 2016c). To date USIBWC has worked to restore up to 129.8 acres of flycatcher habitat and has designated approximately 373 acres in restoration sites (see Table 9). Mowing has ceased on approximately 766 acres along the floodplain, 514 acres along the riparian fringe, and 558 acres within the restoration sites and buffers. USIBWC has also developed and implemented a SWFL management plan to provide management strategies for the restoration and protection of habitat and the species. Approximately 514 acres of previously mowed habitat occurs along the fringe, an important area for flycatchers. Within in the No-Mow Zones, approximately 27 acres of moderate, 7.5 acres of suitable, and 9.5 acres of highly suitable habitat occur.

Many of these conservation measures also likely benefit the cuckoo. For example, many of the 766 acres of No-Mow Zones within the floodplain are developing mesquite forests. Riparian fringe and restoration sites with native vegetation are also important areas for cuckoos, and up to 152.7 acres of restoration sites could potentially benefit the YBCU.

Table 9. Habitat Improvements Developed by USIBWC for Flycatchers

Action	Acreage
Active Restoration sites as of February 2017	373
Development of specific flycatcher habitat	Up to 129.8
Total Cessation of mowing (also known as the No-Mow Zones) ■ 766 acres along the floodplain ■ 514 acres along the riparian fringe ■ 558 acres within the restoration sites and buffers	1,838

In addition to the habitat improvements stated above, USIBWC continues to:

- Implement its Environmental Water Transaction Program, with potentially 47.35 acres of EBID surface water rights in 2017
- Implement its Flycatcher Management Plan
- Monitor groundwater levels
- Coordinate with USBR on SFWL and YCBU surveys
- Coordinate with other entities such as EBID, New Mexico State Parks Division, and other stakeholders

5.0 METHODOLOGY AND SPECIES COVERED

Species federally listed as endangered, threatened, candidate, or proposed, and nonessential experimental populations that may occur within the RGCP were compiled by generating an Information for Planning and Conservation Trust Resources Report (IPaC) obtained online through the USFWS website (https://ecos.fws.gov/ipac). This report covered the entire RGCP for New Mexico and Texas. The IPaC report was generated July 2016 to determine the most up to date species list available prior to initiating field reconnaissance for the biological survey conducted in support of this BA (Appendix A – Biological Survey Report). Official species lists were requested from the New Mexico USFWS (Consultation No. 02ENNM00-2017-SLI-0367) and the Texas USFWS (Consultation No. 02ETAU00-2017-SLI-0551) on 7 March 2017.

Additional information on distribution and specific species habitat requirements was gleaned from additional resources including the latest update of Biota Information System of New Mexico (BISON-M 2011) database and New Mexico, Partners in Flight (2016), the Rio Grande Silvery Minnow (*Hybognathus amarus*) Recovery Plan (USFWS 2010), Amphibians and Reptiles of New Mexico (Degenhardt et al. 1996), Raptors of New Mexico (Cartron 2010), and the USFWS Environmental Conservation Online System (ECOS). Recent information on SWFLs and YBCUs was obtained from survey reports for both species conducted in 2015 in the RGCP by the USBR (USBR 2015a, 2015b). Table 10 presents the species listed as threatened or endangered in Sierra and Doña Ana counties, NM, and El Paso County, TX.

New Mexico resources for the IPaC report are managed by the USFWS New Mexico Ecological Services Field Office. For El Paso County, TX, the IPaC resources report is managed by the USFWS Austin Ecological Services Field Office. Field surveys for the RGCP biological survey were conducted to assess current habitat suitability for potential species from July 31 to August 24, 2016. All federally listed species in Sierra and Doña Ana counties in New Mexico and El Paso County, TX were evaluated based on their potential to occur within the RGCP corridor. The potential for occurrence of each species was separated into three categories:

1) Known to occur—the species was documented along the RGCP corridor by a reliable observer.

2) May occur—the RGCP is within the species' currently known range, and vegetation communities, soils, water quality conditions, etc., resemble those known to be used by the species.

3) Unlikely to occur—the RGCP occurs in the same county as the species' currently known range, but vegetation communities, soils, elevation, water conditions, etc., do not meet requirements of those known to be required by the species, or the RGCP is clearly outside the species' known range.

Table 10. Species Federally Listed as Threatened and Endangered Recorded and Potentially Occurring in the RGCP Area

Common Name (Species Name)	Status[1]	Range or Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Rio Grande silvery minnow (*Hybognathus amarus*)	E	Currently found in the Middle Rio Grande, a stretch of the river extending from Cochiti Dam to the headwaters of Elephant Butte Reservoir. Experimental non-essential 10(j) population also established in December 2008 in the Big Bend region of west Texas.	Unlikely to occur	No effect in RGCP. The experimental non-essential population in the Big Bend region is over 200 river miles from the American Dam. The area of consideration for the experimental release of the 10(j) silvery minnow population begins at the upstream end of the USIBWC Boundary Preservation Project, in a reach where currently river flows are very limited. Although minnows were not released this far upstream the area considered by the USFWS is expected to experience higher flows following a peak environmental restoration flow event.
Gila trout (*Oncorhynchus gilae*)	T	Distribution includes western Sierra County. Does not occur in the Rio Grande.	Unlikely to occur	No effect
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	T	Limited to reaches of the Gila and San Francisco drainages in New Mexico.	Unlikely to occur	No effect
Chiricahua leopard frog (*Rana chiricahuaensis*)	T	Main distribution in New Mexico includes the Gila, San Francisco, and Mimbres River drainages and stock tanks and intermittent creeks in Hidalgo County; known from the Rio Grande drainage only in Alamosa Creek in Socorro County and Cuchilla Negro Creek in Sierra County.	Unlikely to occur	No effect
Least tern (*Sterna antillarum*)	E	Migratory species occurring in North America during the breeding season, when it is associated with water (e.g., lakes, reservoirs, rivers). Documented in the RGCP including at Mesilla.	Known to occur	See Section 6.2

Common Name (Species Name)	Status[1]	Range or Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Mexican spotted owl (*Strix occidentalis lucida*)	T	Not recorded along the RGCP corridor. Occurs in high-elevation montane forests. Dispersal of young possible through more open, lower-elevation habitats.	Unlikely to occur	No effect
Northern Aplomado falcon (*Falco femoralis septentrionalis*)	E and ENEP	Documented at Mesilla Valley Bosque State Park in 2010 and sporadically within RGCP.	Known to occur	See Section 6.1
Piping plover (*Charadrius melodus*)	T	Considered a rare transient in New Mexico and west Texas. Piping plovers migrate through the Great Lakes along the river systems through the Bahamas and West Indies. Occur along the Atlantic Coast from Canada to North Carolina and along the south east coast of Texas.	Unlikely to occur	No effect
Red knot (*Calidris canutus rufa*)	T	Red knots are principally a coastal marine shorebird considered accidental migratory transients in New Mexico and central/west Texas.	Unlikely to occur	No effect
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Associated with moist riparian areas throughout the year. Documented on some RGCP restoration sites.	Known to occur	See Section 6.3
Yellow-billed cuckoo (*Coccyzus americanus*)	T	Western subspecies nests preferentially in large patches of moist cottonwood-willow woodland, where it prefers high canopy closure for nesting (Laymon et al. 1997). Documented on some proposed RGCP restoration sites.	Known to occur	See Section 6.4
Gray wolf (*Canis lupus*)	E	Pine-oak woodlands, piñon-juniper woodlands, and grasslands, generally above 4,500 feet (1,372 meters). The reintroduced population of Mexican gray wolves ranges only as far east as western Sierra County.	Unlikely to occur	No effect
Sneed pincushion cactus (*Coryphantha sneedii var. sneedii*)	E	Found primarily in cracks of limestone formations in areas of broken terrain and on steep slopes usually in Chihuahuan desert scrub.	Unlikely to occur	No effect

Common Name (Species Name)	Status[1]	Range or Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Todsen's pennyroyal (*Hedeoma todsenii*)	E	Appears to be restricted to loose gypseous-limestone soils. Only known populations are from the Sacramento and San Andres mountains.	Unlikely to occur	No effect

[1] Federal (USFWS) status definitions:

E = Endangered. Any species considered by the USFWS as being in danger of extinction throughout all or a significant portion of its range. The ESA specifically prohibits the take of a species listed as endangered. Take is defined by the ESA as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

T = Threatened. Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The ESA specifically prohibits the take (see definition above) of a species listed as threatened.

ENEP = Experimental, Non-essential Population. Any reintroduced population established outside the species' current range, but within its historical distribution. For purposes of Section 7 consultation, experimental, non-essential populations are treated as proposed species (species proposed in the Federal Register for listing under Section 4 of the Endangered Species Act), except on National Wildlife Refuges and National Parks, where they are treated instead as threatened.

RGCP Rio Grande Canalization Project
USFWS U.S. Fish and Wildlife Service
USIBWC U.S. Section of the International Boundary and Water Commission

Species listed by the USFWS as endangered or threatened, and experimental, non-essential populations were assigned to one of three categories of possible effect, following USFWS recommendations. The effects determinations recommended by the USFWS include:

1) *May affect, is likely to adversely affect* – This effect determination means that the action would have an adverse effect on the species or its habitat. Any action that would result in take of an endangered or threatened species is considered an adverse effect. A combination of beneficial and adverse effects is still considered likely to adversely affect, even if the net effect is neutral or positive. Adverse effects are not considered discountable because they are expected to occur. In addition, the probability of occurrence must be extremely small to qualify as discountable effects. Likewise, an effect that can be detected in any way or that can be meaningfully articulated in a discussion of the results of the analysis is not insignificant; it is an adverse effect.

2) *May affect, is not likely to adversely affect* – Under this effect determination, all effects to the species and its critical habitat are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without adverse effects to the species (for example, effects cannot be "balancing," so that the benefits of the action would outweigh adverse effects). Insignificant effects relate to the size of the impact and should not reach the scale where take occurs. Discountable effects are considered extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects, or (2) expect discountable effects to occur. Determinations of "not likely to adversely affect, due to beneficial, insignificant, or discountable effects" require written concurrence from the USFWS.

3) *No effect* – a determination of no effect means there are absolutely no effects to the species and its critical habitat, either positive or negative. It does not include small effects or effects that are unlikely to occur. Some of the species falling under the *No effect* category include those that are considered only under special conditions such as wind energy projects (Red knot, Piping plover).

The possible effects determinations for candidate and proposed species are:

1) *Likely to jeopardize* – Expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

2) *Not likely to jeopardize* – Not expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

Of the 14 species listed as endangered, threatened, candidate, proposed, or experimental, nonessential population in Sierra and Doña Ana counties, NM, and in El Paso County, TX, four have been documented or have the potential to occur in the RGCP. They are the focus of the analysis of potential effects in Section 6.0. Besides the YBCU, two additional species considered have been listed since the 2011 BA; the red knot and narrow-headed gartersnake. With the recent ability to define the project area with the IPaC system, instead of relying on a county-wide list, several species considered in the 2011 BA are no longer defined as potentially occurring in the project area and are therefore are not considered in this BA. These species include: white sands pupfish (*Cyprinodon tularosa)*, mountain plover (*Charadrius*

montanus), Sprague's pipit (*Anthus spragueii*), whooping crane (*Grus americana*), black-footed ferret (*Mustela nigripes*), mineral creek mountain snail (*Oreohelix pilsbryi*), and Doña Ana talussnail (*Sonorella todseni*).

6.0 ANALYSIS OF POTENTIAL EFFECTS

Effects determinations are discussed below and summarized in Table 5.

6.1 Aplomado Falcon (*Falco femoralis*)

6.1.1 Habitat Requirements and Current Status

The Northern aplomado falcon (*Falco femoralis septentrionalis*) is a savannah-dwelling raptor whose range centers in Latin America and whose distribution once extended northward into grassland habitats of coastal Texas, western Texas, southern New Mexico, and southeastern Arizona (Keddy-Hector 2000). The Peregrine Fund began experimenting with breeding captive aplomado falcons and releasing them to the wild in the 1980s. Aplomado falcon chicks were produced at the World Center for Birds of Prey in Idaho and transported to Texas and New Mexico for release. A decade-long attempt at reintroduction of captive-bred falcons in New Mexico and west Texas by The Peregrine Fund failed to produce any self-sustaining populations (Hunt et al. 2013).

A fairly robust population breeds in tropical savannahs from Veracruz, Mexico, southward into Central America, with two small populations occurring north of that region. One consists of about 30 pairs restored in recent years to coastal Texas by The Peregrine Fund through captive breeding and release (Hunt et al. 2013). The other occurs in the grasslands of central Chihuahua, Mexico (Macías-Duarte et al. 2004). This native population in Chihuahua, discovered in the 1990s, is believed to be the last remnant of the desert dwelling aplomado falcons that formerly extended into the Chihuahuan Desert region of the United States (Montoya 1995, Montoya et al. 1997, Macías-Duarte et al. 2004). There are occasional sightings of wild aplomado falcons in southern New Mexico (Young et al. 2004), with several cases of successful nesting within New Mexico (Meyer and Williams 2005). Recent studies suggest a decline, almost to extirpation, of the only known breeding population of aplomado falcons in the Chihuahuan Desert (Marcias-Duarte et al. 2016).

Aplomado falcon habitat is typically comprised of open desert grasslands with scattered shrubs, yucca, or trees (Macías-Duarte et al. 2004). Nesting typically occurs from February to June. Aplomado falcons are secondary nesters that use nests constructed previously by other raptors or ravens. In New Mexico and Mexico, the nest is often in structurally complex yuccas, but they are also known to occasionally use nests in power poles. Aplomado falcons prey mainly on small birds and insects. Also included in their diet are small mammals, reptiles, and amphibians (Young and Young 2010). Factors attributed to the falcon's earlier population decline were primarily habitat degradation due to brush encroachment, and secondarily egg and specimen collecting and continued pesticide contamination (Young and Young 2010). Recent evidence suggests that large-scale agricultural practices in Mexico are contributing to the continued decline of the species in its home range (Marcias-Duarte et al. 2016).

In July 2006, the USFWS published a final ruling for the aplomado falcon under Section 10(j) classifying the species as an experimental non-essential population for all of New Mexico and Arizona (USFWS 2006). This re-classification enabled the release of captive-reared birds in an effort to re-establish viable populations of aplomado falcons in Arizona and New Mexico. A total of 115 juvenile aplomado falcons were released at locations within and adjacent to White Sands Missile Range over a 6-year period from 2007-2012 (Juergens 2015). Reintroduction efforts for the species in New Mexico and west Texas were

unsuccessful and have been terminated. The fact that the bird is currently listed as an experimental non-essential population in New Mexico means that affecting the behavior or use of an area within the RGCP in New Mexico would have no legal consequences.

6.1.2 Habitat Evaluation and Suitability

Some aplomado falcons, including reintroduced birds, have been sighted near the Rio Grande in areas that generally lack yuccas but support open vegetation (Young and Young 2010). In late February 2010, an aplomado falcon was sighted at Mesilla Valley Bosque State Park, where it remained for at least a week, occurring on both sides of the river from Mesilla Bridge south to the Visitor Center. RGCP restoration sites lack characteristics of nesting habitat as documented in southern New Mexico and Chihuahua, Mexico. No nesting attempts have been recorded in the RGCP and there is no known resident population of aplomado falcons along the RGCP corridor. Some of the restoration sites and managed grasslands support meadows and other open vegetation types that may provide foraging habitat, as indicated by the Mesilla Valley Bosque State Park record in the winter of 2010.

6.1.3 Determination of Effects

Aplomado falcon population numbers and distribution in southern New Mexico and Trans-Pecos Texas are in decline and reintroduction efforts have been deemed unsuccessful. Likewise, the native population in Chihuahua, Mexico is in decline and appears to be on its way to disappearing completely. Because the RGCP does not support any of the preferred nesting habitat of the aplomado falcon, river management practices are unlikely to have any material impact on the aplomado falcon. The presence of an aplomado falcon at Mesilla Valle Bosque State Park proves that birds may occasionally temporarily use habitats along the RGCP. It is highly unlikely that aplomado falcons will ever establish populations in southern New Mexico even in suitable habitat. Individual birds could be affected by vegetation treatment but would likely simply move to areas with more preferred and suitable habitat. The Proposed Action would have no effect on this species.

6.2 Least Tern (*Sterna antillarum*)

6.2.1 Habitat Requirements and Current Status

The least tern is a small tern with a black crown and nape, a white forehead and underside, a yellow bill with a black tip, orange legs, and a grayish back and wings. The species has a broad distribution that extends along the Pacific Coast from central California to Peru; inland along the Colorado, Red, Rio Grande, Missouri and Mississippi river systems; on the Atlantic Coast from Maine to Argentina; and along the Great Lakes in Michigan, Minnesota, Wisconsin, and Ohio.

The species winters from the Gulf Coast and Central America south to Peru and Brazil. Least terns are colonial nesters that prefer a flat, sandy substrate essentially devoid of vegetation, on which they place their nest scrapes. Such habitat provides protection from terrestrial predators and also provides a defense buffer area with an unobstructed view of the surrounding airspace. The unobstructed view is important for interception and group mobbing of avian predators (Jungemann 1988). In New Mexico, least terns breed in the vicinity of Roswell, including regularly at Bitter Lake National Wildlife Refuge, which constitutes the species' main and only regular breeding area in the state. Least terns rarely breed at Bottomless Lake

State Park and Wade's Bog. The least tern is a ground nester. In New Mexico, as in other parts of the southern Great Plains, nesting areas consist of alkali flats (NMDGF 2016). The least tern is found in migration in Eddy County and as a vagrant elsewhere, including Española, Sumner Lake (DeBaca County), Bosque del Apache National Wildlife Refuge (Socorro County), near Glenwood, Las Cruces (Doña Ana County), and Alamogordo (NMDGF 2016). The least tern has been recorded along the RGCP reach including at Mesilla Valley Bosque State Park. Interior least terns probably winter in coastal areas of Central and South America.

North America's interior population of least terns has been federally listed as endangered since 1985. Dams, reservoirs, and other changes to river systems have eliminated most historic least tern habitat. The wide channels dotted with sandbars that are preferred by the terns have been replaced by narrow forested river corridors. Recreational activities on rivers and sandbars disturb the nesting terns, causing them to abandon their nests. Least terns hover over and dive into standing or flowing water to catch small fish. From late April to August, they breed in isolated colonies, using barren to sparsely vegetated sandbars, sand or gravel pits, or lake and reservoir shorelines.

6.2.2 Habitat Evaluation and Suitability

The least tern has been documented in the RGCP, including at Mesilla during migration. However, the RGCP generally lacks tern habitat such as sandbars, alkali flats, and non-vegetated shorelines.

6.2.3 Determination of Effects

Under the Proposed Action, habitat restoration activities including removal of saltcedar may have the potential to benefit the species if more open habitats are created. Island destabilization activities including removal of vegetation may create some more open sandy habitat within the river channel. Large rain events result in ephemeral sediment deposits at major arroyo confluence zones with the river. Maintenance activities, including sediment removal associated with these ephemeral deposits allows for continuation of water flow and will not adversely impact least tern habitat. If large areas of the sandbars are removed there is a potential to reduce the amount of available preferred nesting habitat within that reach.

No-Mow Zones allow vegetation to grow taller and become denser between the river bank and levee roads. This practice will likely lessen the amount of bare ground within the RGCP and therefore reduce the already low potential for suitable habitat.

Construction activities for the channel maintenance activities during spring and fall migration would not be expected to have significant, negative impact on migrating individuals. Such individuals would likely continue to move to another area up- or downstream. Under the Proposed Action, sediment removal, vegetation maintenance, and island destabilization/removal *may affect, but are not likely to adversely affect*, migrating individual least terns. Non-sediment removal and bank stabilization actions *will not affect* least terns.

6.3 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

6.3.1 Habitat Requirements and Current Status

The SWFL is one of four currently recognized subspecies of the willow flycatcher. The subspecies typically occurs in dense riparian vegetation on moist soils near slow-moving or swampy water. In many cases, nest plants are rooted in or overhang standing water, and occupied sites are typically located along slow-moving stream reaches, at river backwaters, in swampy abandoned channels and oxbows, marshes, and at the margins of impounded water (e.g., beaver ponds, inflows of streams into reservoirs). Where flycatchers occur along moving streams, those streams tend to be of relatively low gradient, i.e., slow moving with few (or widely spaced) riffles or other cataracts. The flycatcher's riparian habitats are dependent on hydrological events such as scouring floods, sediment deposition, periodic inundation, and groundwater recharge for them to become established, developed, maintained, and ultimately recycled through disturbance (USFWS 2002). SWFLs generally arrive at their breeding grounds between early May and early June; between late July and mid-August they depart for wintering areas in Mexico, Central America, and northern South America (Sogge et al. 1997, USFWS 2002).

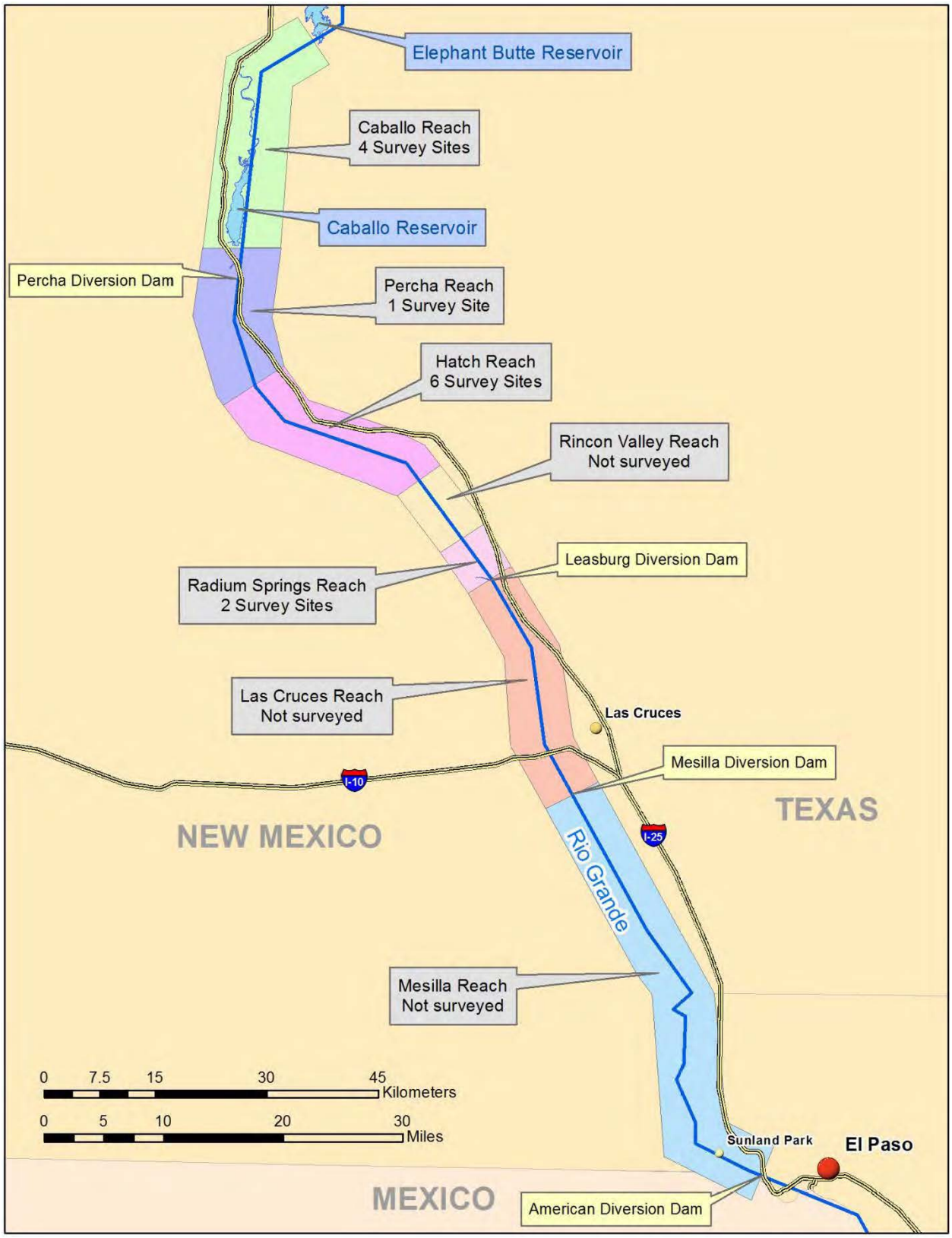
This species is a state and federally listed endangered species, with critical habitat designated since 1997. No critical habitat is currently designated within the RGCP. In October 2005, USFWS designated Critical Habitat for the SWFL along the Middle Rio Grande between the Isleta Pueblo and Elephant Butte Reservoir (USFWS 2005b). The designation was updated in January of 2013 to include the Sevilleta and Bosque del Apache National Wildlife Refuges and a portion of the Elephant Butte Reservoir conservation pool. No critical habitat was designated downstream of Elephant Butte Dam (USFWS 2013a).

6.3.2 Habitat Evaluation and Suitability

USBR personnel classified the suitability of riparian habitat for breeding SWFL within the active floodplain of the Rio Grande from Caballo Dam, NM to El Paso, TX (USBR 2013). Seven different study reaches were delineated based on geographic landmarks, habitat characteristics, and ongoing SWFL surveys (Figure 18). All ground within the active floodplain (i.e., not separated from the river channel by roads, levees, etc.) was classified based on suitability as habitat. Classification was performed either via kayak or on foot by permitted biologists intimately familiar with habitat requirements of the species. Habitat classes ranged from zero (unsuitable) to five (highly suitable) and took into consideration patch width, height, structural diversity and hydrology; classes 2 and below were considered unsuitable and classes 3 and above were considered at least moderately suitable (USBR 2013).

The RGCP portion of the Rio Grande for this BA includes the lower six reaches and does not include the northernmost reach, nor a portion of the second reach from Caballo to Percha Dam. Surveys conducted in 2015 for SWFLs within the RGCP portion of these reaches recorded 66 SWFLs with most (55) detected in the Hatch Reach. The lower two reaches, Las Cruces Reach and Mesilla Reach, were not formally surveyed for SWFLs in 2015.

Figure 18. Bureau of Reclamation Study Reaches for SWFL Surveys



For the fourth straight year, the recovery goal of 25 territories for the Lower Rio Grande Management Unit was exceeded. The USBR located 105 willow SWFLs during the 2016 survey season. Thirty of these birds were determined to be migrants based on their date of detection and lack of territorial behavior. The remaining birds comprised 50 territories including 25 pairs, 1 unpaired male and 24 resident birds for which breeding status was not determined. This represents a slight increase in territory numbers from 2015.

Habitat surveys conducted within the RGCP in July and August 2016 found an overall increase in available suitable habitat within the RGCP. Habitats classified as moderately to highly suitable increased from 94.4 acres in 2012 to 243.6 acres in 2016. The total area classified as highly suitable in the RGCP is still very limited but has increased from approximately 5.7 acres to 16.6 acres. The most downstream (and closest to the international border) reaches had the highest percentage of non-habitat in 2012 and this remained the case in 2016. The majority of highly suitable habitat was located within the vicinity of Hatch, NM. Not surprisingly, this reach was also home to the majority of resident flycatchers detected during formal surveys in 2012, 2015, and 2016 (USBR 2013, 2015a). Figure 19 and Table 11 document areas along the RGCP where SWFL suitable habitat has improved within USIBWC right of way.

During habitat classification efforts in August 2016, observers detected 25 willow flycatchers within the RGCP. Northern detections occurred in the Percha Reach and the southernmost detections were just north of Mesilla Dam (IDEALS-AGEISS 2016). The late date of detections (August) prevents saying with certainty that these detections were SWFLs, as they could have been birds in early migration heading south from breeding grounds further north. Southbound migrants (of all subspecies) in late July and August may occur where SWFLs are still breeding. Therefore, it is only during a short period of the breeding season (approximately June 15–July 20) that any willow flycatcher detected within the range of the SWFL can be assumed to be of that subspecies (USFWS 2002). Willow flycatchers of all four subspecies have similar calls. Some flycatchers continue further north in the range of the species on migration and are then considered to be one of the other three subspecies. Determination of the southwestern willow flycatcher subspecies (*Empidonax trallii extimus*) is based on location of calling during the short breeding season only. Therefore, even hearing the call of the willow flycatcher outside of the designated breeding season (June 15–July 20) is considered to be a willow flycatcher but not necessarily a southwest willow flycatcher. Description of the species and criteria for designation of subspecies can be found in “A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher” (USGS 2010).

Flycatchers are known to nest in saltcedar at many river sites including within the RGCP and in many cases use saltcedar even if native willows are also present. Nesting data from 2013–2016 documented 46.7 percent of the SWFL nests were located in saltcedar in the delta of Caballo, and 15.6 percent of the nests were found between Hatch and Leasburg Dam (Ahlers 2016). An increasing trend in the use of saltcedar compared to native *Salix* spp. has been observed even when considering the relative abundance of saltcedar within the native stands; SWFLs are selecting saltcedar for nesting substrate. Within the Elephant Butte Reservoir there is a decline in native vegetation as the dominate vegetation in SWFL territories and an increase in exotic vegetation (Ahlers 2016). This shift is pronounced in the last 5 to 6 years during the prolonged drought and reduced river flows. SWFLs have been documented occupying territories in the Hatch Reach since 2010. SWFLs within the RGCP area often occupy relatively narrow strips and patches of predominately native habitat (coyote willow) that may not be as attractive to

breeding individuals. This is likely out of necessity as opposed to preference, as these are the only patches of "suitable" riparian habitat available. Surveys conducted since 2012 documented a sizeable, and previously largely unknown, population of SWFLs that has currently met the recovery goal for the Lower Rio Grande Management Unit (USBR 2015a).

Table 11. Acreage of Improved SWFL Habitat within the USIBWC Right-of-Way

Location	Acreage of Improved Habitat	Habitat change associated with (restoration site, No-Mow Zones, Pre-ROD No Maintenance Zones)
Percha to Garfield	2.5	Pre-ROD No Maintenance
Garfield Exit of I-25 to the 187 Bridge (2.1 miles north of Hatch, NM)	0.23	Crow Canyon B restoration site/ No-Mow Zone
187 Bridge (2.1 miles north of Hatch, NM) to 140 Bridge (south of Rincon)	0	N/A
From 140 Bridge (south of Rincon) to Pasture 18 restoration site	0.78	No-Mow Zone
Pasture 18 to Leasburg Bridge	0	N/A
Leasburg Bridge to Shalem Colony Bridge	10.4	Pre-ROD No Maintenance
Shalem Colony Bridge to Picacho Bridge	0	N/A
Picacho Bridge to Mesilla Dam	10.51	None
Mesilla Dam to Country Club Road Bridge	4.88	1.4 acres within the No-Mow Zone
Country Club Road Bridge in El Paso, TX to Sunland Park Drive Bridge in El Paso, TX	0	N/A
Sunland Park Bridge in El Paso, TX to 0.3 mile south of Executive Center Blvd in El Paso, TX	0	N/A
Total Improved Habitat	**29.30**	

N/A Not Applicable
ROD Record of Decision
SWFL southwestern willow flycatcher
USIBWC U.S. Section of the International Boundary and Water Commission

Figure 19. SWFL Improved Habitat (2016 vs 2012)

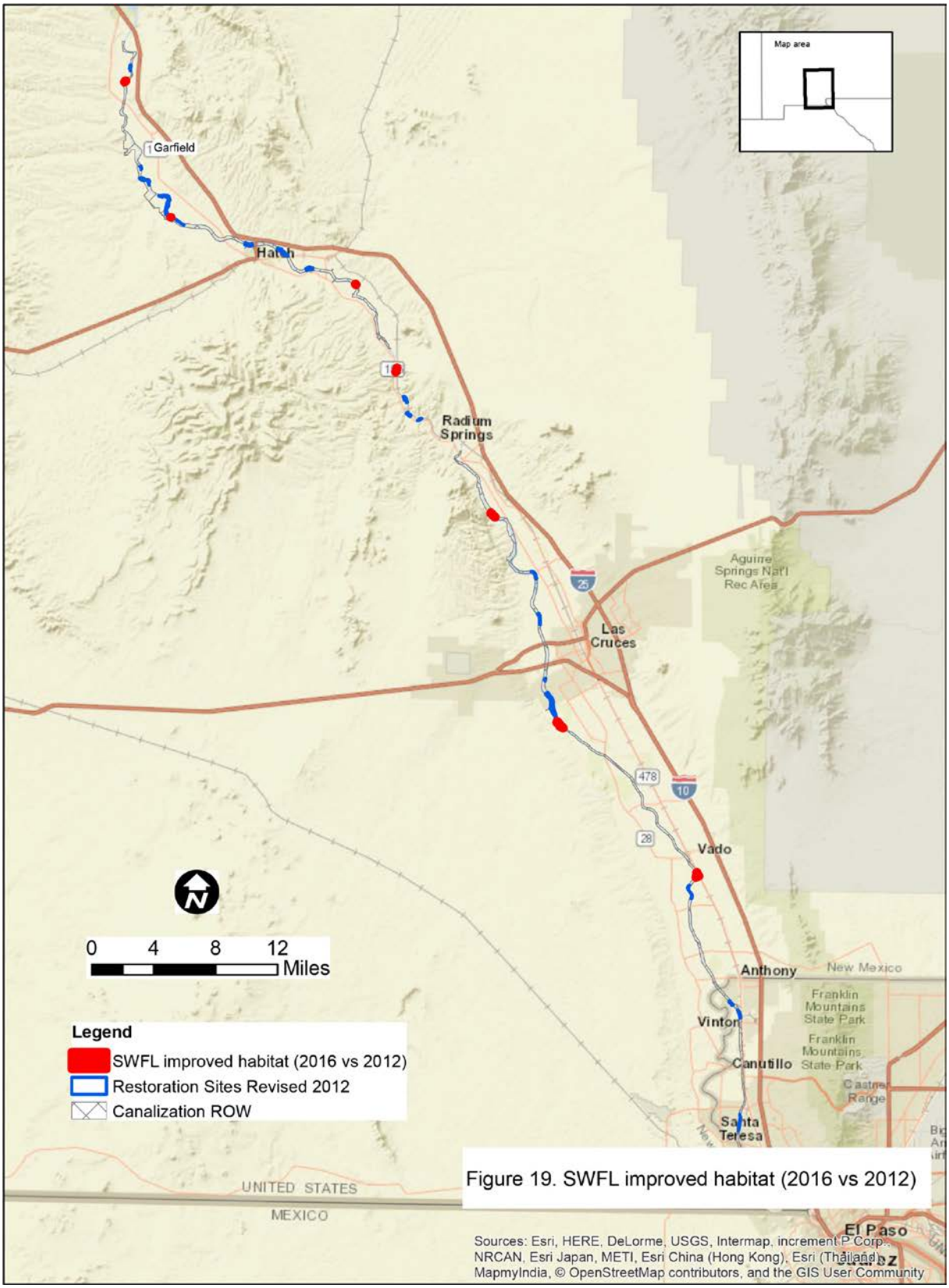


Figure 19. SWFL improved habitat (2016 vs 2012)

Suitability of SWFL habitat within the RGCP corridor is discussed in detail in the 2015 Lower Rio Grande Southwestern Willow Flycatcher Study Results (USBR 2015a), and in the Biological Survey Report for the RGCP (IDEALS-AGEISS 2016; Appendix A). The most noticeable overall changes recorded in 2016 since the 2012 habitat surveys are associated with substantial and widespread saltcedar beetle (*Diorhabda* spp) impacts throughout the RGCP. In August 2016, the majority of saltcedar trees throughout the RGCP were showing signs of stress from the beetles including moderate to severe browning and defoliation. Most of the affected saltcedar will likely green back up, for a few more growing seasons, but are likely to eventually succumb to the beetle and die off. Because of the prevalence of saltcedar throughout the RGCP the overall loss of SWFL habitat over the next 3 to 5 years may be significant. If water availability within the river channel is adequate and severe drought is avoided over the next several years, native riparian vegetation including coyote willow and screwbean mesquite may continue to rejuvenate and provide suitable habitat. Under good water regime conditions, it will take new sapling plantings of native vegetation several years to mature to adequate height and densities to provide suitable nesting habitat for SWFLs.

6.3.3 Determination of Effects

Ongoing annual flycatcher surveys within the RGCP strongly suggest that the breeding population of SWFLs is relatively stable and has exceeded the USFWS recovery goal for the Lower Rio Grande Management Unit for the past 4 consecutive years (USBR 2015a). The Lower Rio Grande Recovery Unit population target for reclassification of flycatcher as a listed species under the ESA is 25 territories.

As discussed in Section 5.3, USIBWC continues to implement restoration actions on 11 of 30 restoration sites within the RGCP. Nine of these sites have a USFWS flycatcher habitat designated as priority 1 or 2 (USFWS 2012), with an additional site, Crow Canyon C, targeting flycatcher habitat that was not included in the BO. In total to date, approximately 27,432 trees and 1,062 longstem shrubs have been planted, and 366 acres of saltcedar have been treated or excavated. In addition, the USFWS conducted prescribed burns at Broad Canyon Arroyo in 2013, Selden Point Bar in May of 2015 before irrigation season, at Trujillo in January 2016, and at Rincon in September 2016 to burn saltcedar debris piles.

Irrigation releases in 2016 began in March, 2 months earlier than release dates in 2015. Flow in the river prior to the beginning of flycatcher season would greatly assist in regenerating ailing willows along the river corridor, and support plantings at restoration sites. In August 2016, willows growing along the river banks and on islands were vigorous and showing signs of notable recent growth in response to the 4.5 months of continuous flow.

Restoration work implemented by USIBWC contractors at two restoration sites, Berino East and Berino West, targeting flycatcher habitat has been successful in establishing good patches of willows that may have future potential to provide suitable habitat as they mature and fill in. Specific habitat conditions associated with each of the restoration sites within the RGCP are presented in Section 4.3.

Together with planting of native riparian vegetation, implementation of the Environmental Water Transaction Program, and supplemental irrigation, all of these measures should increase soil moisture, acreage of lentic habitat, and the availability of flying insects for foraging. In fact, the target habitat at one-third of the total terrestrial habitat restoration sites (171 acres) would be dense riparian shrub habitat

suitable for the flycatcher. In summary, habitat restoration is expected to result in more sites along the RGCP being occupied and an overall increase in the number of breeding pairs.

Sediment and non-sediment removal: Removing sediment from the river channel improves and maintains the channel and reduces the meandering effects of a natural river system. Sediment removal and all construction activities associated with development and maintenance of sediment traps, weirs, island destabilization, and bank destabilization should all be conducted during fall and winter months when possible to avoid potential impacts to SWFLs during breeding season. Sediment excavation at certain locations, such as upstream of Hatch and Rincon Siphons, may impact SWFL habitat that has formed upstream of the structures, such as restoration sites at Crow Canyon B and Rincon Siphon C. Suitable habitat has formed and attracted flycatchers partially due to the groundwater levels upstream of the structures which act as grade control. Routine sediment excavation is not anticipated to impact SWFL habitat except for at these two locations. Channel excavation may affect SWFLs if riparian patches that are currently, or could become suitable, are diminished or removed through channel maintenance activities. Adherence to the USIBWC flycatcher management plan and established BMPs would eliminate potential impacts from channel maintenance. During the 2016 survey, suitable habitat was documented at the proposed channel maintenance areas (IDEALS-AGEISS 2016). No suitable habitat for SWFLs or YBCUs was noted at the Tierra Blanca, Green Canyon, and Sibley Arroyo sediment trap areas. Thurman I and II Arroyos currently provide little to no riparian habitat away from the river; however adjacent to the river, Thurman II has some mixed habitat that may develop into suitable SWFL habitat but not for YBCU. Vegetation at Placitas Arroyo is xeric and thin and much of the former coyote willow habitat at the river confluence has been mowed. Vegetation at the Garcia Arroyo sediment trap currently consists of a mature coyote willow stand along the river bank providing suitable habitat for SWFL (IDEALS-AGEISS 2016). Habitat at Rock Canyon arroyo sediment trap remains a wide swath of saltcedar currently suffering some signs of *Diorhabda* stress. Downstream at Horse Canyon Arroyo vegetation along both banks is mixed riparian vegetation running up the arroyo for about 328 feet. Vegetation at the sediment removal sites ranges from mixed vegetation at the Bignell Arroyo and two unnamed arroyos upstream of the Mesilla Dam to degraded saltcedar habitat at the confluence of Montoya Arroyo. Impacts to SWFLs from non-sediment and sediment removal *may affect, but is not likely to adversely affect* the species. The exception is the sediment removal in the two locations, immediately upstream of Hatch Siphon and immediately upstream of Rincon Siphon, where sediment removal *may affect and is likely to adversely affect* local residents but are not likely to affect SWFL populations.

Bank stabilization: The addition of rip rap and rock, or the planting of vegetation to stabilize banks would be conducted outside of the SWFL breeding and nesting period. These measures would protect riparian habitat occur along the bank from further erosion and will have no immediate effect on the SWFL population but may increase foraging habitats through continued establishment of riparian habitats in years to come. This action would not affect the species.

Vegetation Management: Saltcedar eradication can be detrimental to flycatchers in mixed and exotic habitats, especially in or near occupied habitat (USFWS 2002). Proposed habitat restoration along the RGCP involves removal of saltcedar. Although removal of non-native vegetation would be accompanied by the re-establishment of native plants, short-term negative effects are possible. Restoration activities would result in soil disturbance with potential negative effects, but these would be mitigated with measures such as seasonal restrictions on the timing of activities and planting of native vegetation.

Saltcedar beetle infestation over the coming years may play a very large role in altering habitat characteristics throughout the RGCP.

EBID controls over 57-percent of the total Rio Grande Project water supply and afford the only realistic and available source of water for river and habitat restoration projects in southern New Mexico. Within each district, all water users share equally in times of shortage of the surface water supply (SWCA 2011). Supplemental irrigation is used at several restoration sites to support developing riparian vegetation. USIBWC has been working on increasing water rights to certain sites to enhance the riparian habitat and promote growth. A reduction in applied water in any given year due to drought conditions can be detrimental to SWFLs who have established, or may establish breeding territories at these restoration sites. Short-term negative effects to SWFLs from reduction of water and related changes in vegetation, which may indirectly affect abundance of flying insects, are possible during low water years.

Discontinuation of mowing along the river between the levee roads and the river bank (No-Mow Zones) for multiple years is likely to increase habitat suitability in the long term. Once vegetation is allowed to grow for several years it will continue to improve in habitat quality by providing dense, mixed vegetation stands that provide improved environments for insect production and foraging areas for SWFLs. In several areas in the southern stretches of the RGCP the No-Mow Zones are very thin (less than 33 feet wide). Vegetation management, including the cessation of mowing over the last 3 to 5 years, has improved over 29 acres of SWFL habitat within the USIBWC ROW. USIBWC continued vegetation management *may affect but is not likely to adversely affect* SWFLs. The No-Mow Zones and habitat restoration sites are managed as an offset to other maintenance activities and will continue to develop improved riparian habitat for the species. Additional No-Mow Zone areas and restorations sites will be added by USIBWC to increase potential habitat. Increasing the width of riparian vegetation (primarily coyote willow) to 10 m along the river banks in the No-Mow Zones would have the potential to greatly increase the amount of habitat in the RGCP.

Island destabilization: Removal of the islands lessens river heterogeneity, decreases meander of the river, and potentially can remove riparian vegetation. Island destabilization that results in removal of islands currently populated by dense stands of coyote willow and mixed riparian habitats has an overall negative effect on natural river habitat and may directly negatively affect individual flycatchers causing them to find alternative sites. Maximum impacts to nesting habitat for SWFLs from island removal could be approximately 51 acres which includes approximately 28 acres of known SWFL territories and 23 acres of moderate to highly suitable habitat not currently occupied (see Table 4). Based on 2015 territorial data, 18-20 SWFLs could be impacted by the removal of the islands. However, because of the resources involved in island removal and destabilization, USIBWC would not impact all 51 acres in one year, and the action would be staggered over many years. Because of the amount of available habitat within the RGCP and the apparently established population of over 25 breeding pairs of SWFLs, these activities may affect individual SWFLs but are not likely to affect the SWFL population in the RGCP. Continual development of the riparian habitat in the 1,838 acres in the No-Mow Zone, increased water rights to improve riparian vegetation, and the implementation of restoration sites will help to offset impacts from this proposed action. Proposed island destabilization/removal *may affect and is likely to adversely affect* SWFLs within the RGCP.

6.4 Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

6.4.1 Habitat Requirements and Current Status

The Western YBCU is a Neotropical migratory bird that has been declining in numbers throughout the western United States due primarily to habitat loss and degradation. The YBCU has declined precipitously throughout its range in southern Canada, the United States, and northern Mexico. It is nearly extinct west of the Continental Divide having disappeared from British Columbia in the 1920s, from Washington in the 1930s, from Oregon in the 1940s, and from northern-most California in the 1950s. It is extremely rare in the interior West. The Rio Grande is considered one of the important strongholds for the YBCU, as well as a few populations in California, and five in Arizona (USBR 2015b). Surveys in the middle Rio Grande valley from Los Lunas, NM, downstream to Elephant Butte in 2015, detected 403 YBCUs with 110 breeding territories (USBR 2015a). From Elephant Butte Dam south to Leasburg Diversion Dam, 63 YBCUs were detected with 20 established territories delineated in 2015 (USBR 2015b).

In the Southwestern United States, YBCU nests in large, dense patches of riparian vegetation. A recent study found home range size in the middle Rio Grande Valley ranged from 12 to nearly 700 acres with an average of 200 acres (Sechrist et al. 2009). An important habitat component includes tall overstory, typically in the form of large cottonwood trees, and/or Goodding's willow (Ehrlich et al. 1988). A dense understory, comprised of native willow or exotic species including saltcedar (*Tamarix* spp.), and Russian olive (*Elaeagnus angustifolia*) also appears to be an important component for territory establishment (Sechrist et al. 2009). YBCUs forage for large bodied insects including cicadas, beetles, and large caterpillars (Laymon 1998).

Saltcedar comprises one of the most abundant and widespread riparian species occurring in the RGCP. During YBCU surveys in 2015, this exotic tree was recorded as a component of mixed riparian vegetation in suitable habitat in every reach surveyed (USBR 2015b). YBCUs do not seem to prefer saltcedar when stands of native vegetation provide adequate habitat structure.

It has been debated whether the Western YBCU (*C. a. occidentalis*) is a true subspecies. In 2001, the USFWS determined that the western population is a Distinct Population Segment (DPS) from the eastern population (*C. a. americanus*) with the division being the Continental Divide from Montana to central Colorado (USFWS 2009). In 2013, the USFWS published a proposed rule to list the Western DPS as threatened under the ESA, as amended (USFWS 2013b). On November 3, 2014, the Western YBCU threatened listing became effective under the ESA (USFWS 2014a). The species is also listed as threatened, endangered, or sensitive by California, Arizona, New Mexico, Colorado, and Utah.

6.4.2 Habitat Evaluation and Suitability

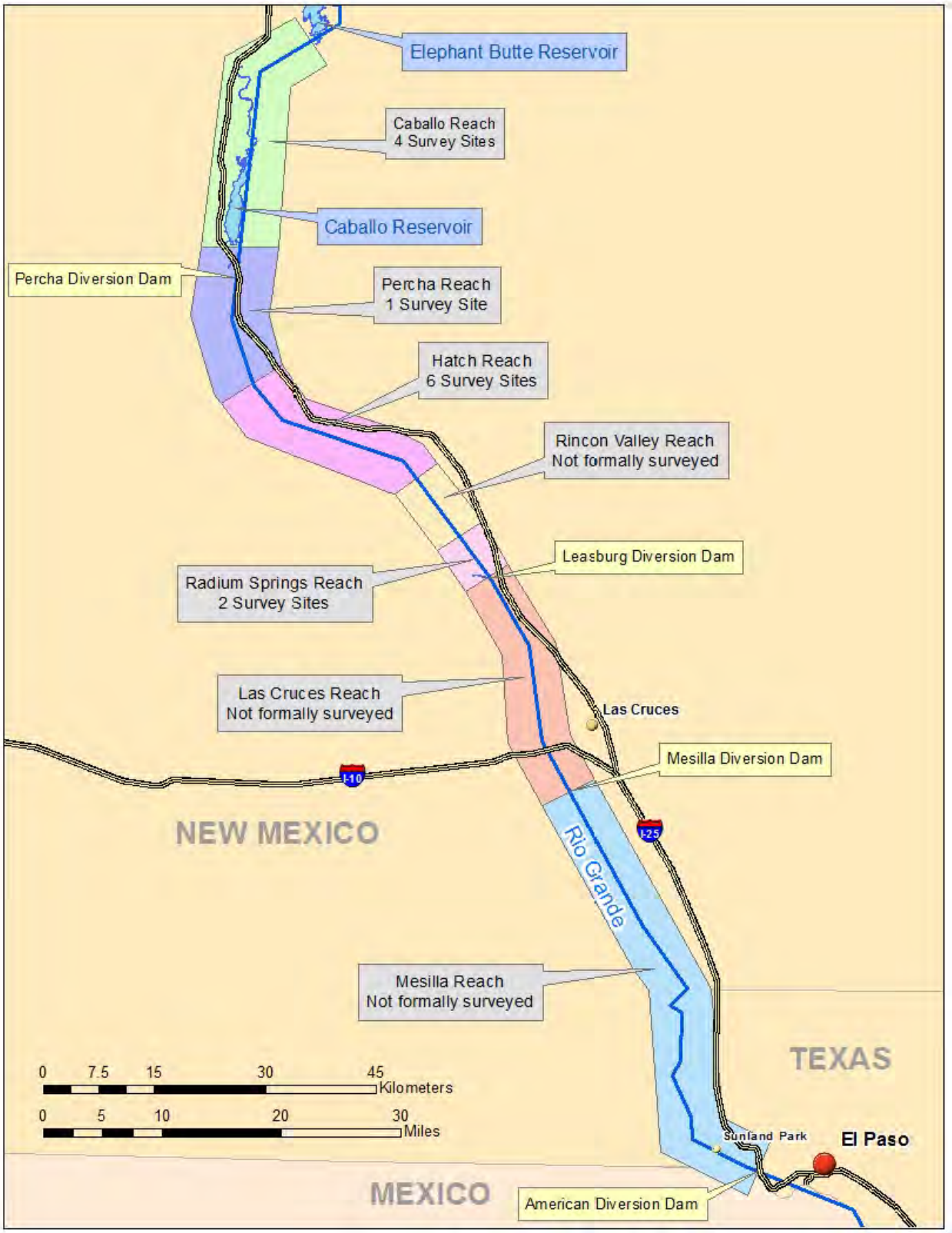
During 2012 and 2013, researchers with the USBR recorded incidental YBCU detections within the Lower Rio Grande, including within the RGCP, while conducting SWFL surveys (USBR 2015b). Beginning in 2014, USBR initiated formal presence/absence surveys within the Lower Rio Grande to determine the abundance and distribution of cuckoos (USBR 2015b). USBR biologists evaluated seven reaches from Elephant Butte Dam south to the American Diversion Dam in El Paso, TX (Figure 20). USBR selected suitable habitat to survey within four different study reaches. The USIBWC also commissioned species surveys in 2010 and 2011 of the restoration sites (USIBWC 2016c).

Lower reaches including the Rincon Valley, Las Cruces, and Mesilla reaches were determined unsuitable for YBCUs because the majority of these reaches lacked potentially suitable habitat and the small patches of habitat that were located were too isolated to warrant surveys. Habitat within each reach is discussed in detail in the 2015 YBCU report (USBR 2015b). In 2014, formal surveys conducted by the USBR documented 37 cuckoo detections which were determined to constitute 10 territories. An increase in both detections and territories was documented during 2015. The Caballo Reach and the northern portion of the Percha Reach are north of the RGCP and are not covered in the biological survey report prepared in support of this BA. Within the Caballo Reach, surveyors recorded 48 YBCUs in 2015, nearly double the number they recorded in the same reach in 2014. The Hatch and Percha reaches produced five YBCU detections, and the Radium Springs Reach produced 10 detections (USBR 2015b). In 2016, the USBR recorded 85 cuckoo detections within sites downstream of Elephant Butte Dam, which is an increase from 2015.

YBCU habitat requirements, habitat selection, and habitat use in New Mexico are not fully understood, making it difficult to identify and assess habitat suitability. Observers conducting YBCU habitat assessment surveys in the RGCP in 2016 prefer to use the term “potential” habitat suitability rather than attempting to evaluate and assign numerical ranking of “suitability.” Habitat surveys tended to corroborate conclusions from previous surveys finding patchy and limited habitat throughout the RGCP in general, but with some new potential habitat associated with previously un-surveyed stretches. Minimal acreage requirements for nesting habitat have not been established for the RGCP.

Limited YBCU habitat occurs in the Percha Reach with a single small patch located at the Percha Dam itself. Large trees at this location provide some good canopy, but much of the understory is limited to narrow strips or patches along the river bank. A few small patches of potentially suitable YBCU habitat occur within the Hatch Reach but large overstory trees are very limited. The Rincon Reach contains no habitat currently suitable for YBCUs. The Radium Springs Reach has several patches of habitat that appear to be suitable for YBCUs and two were detected in August 2016 while conducting habitat surveys in this stretch above Leasburg Dam (Appendix A). Unlike the YBCU detections made further downstream, these individuals were instead utilizing coyote willow stands adjacent to mature, dying/dead saltcedar stands.

Figure 20. U.S. Bureau of Reclamation Reaches for YBCU Surveys



The Las Cruces Reach appears to have some suitable habitat in the northern portion near the North Valley Bridge and south for a few miles. Three individuals were detected in this stretch during habitat suitability surveys (Appendix A). One YBCU was heard calling near the North Valley Bridge and the other two were observed further downstream flying from the west side of the river to pecan orchards on the east side of the river carrying food items in their beaks. This suggests that pecan orchards may provide canopy habitat for YBCUs where native cottonwood and Goodding's willow trees are lacking, but this assumption has not been confirmed by conducting formal presence/absence surveys. An additional YBCU was heard calling from pecan orchards east of the river at the Shalem Colony Bridge.

The lower part of the Las Cruces Reach provides a few limited patches of potential habitat for YBCUs and none were detected here during habitat suitability surveys. Large patches of mixed riparian vegetation, dominated by saltcedar, occur north of the Mesilla Dam at the south terminus of this reach. This area of the RGCP, including the adjacent Mesilla Valley Bosque State Park, may provide moderately suitable habitat. YBCUs are listed as an incidental casual visitor to the Park and have been incidentally observed in pecan orchards in the southern portions of this reach by observers for several years. Surveyors found very limited suitable habitat in the Mesilla Reach, from Mesilla Dam south to the American Diversion Dam in El Paso, TX (Appendix A).

6.4.3 Determination of Effects

During the past 2 years, YBCU surveys conducted by the USBR have documented a small and possibly expanding population within the Lower Rio Grande. The greatest extent of suitable habitat and the largest breeding population of cuckoos occur north of the RGCP in the Caballo Reservoir delta. The remainder of the study area contains limited suitable habitat. Future surveys will be valuable to resource managers monitoring the Lower Rio Grande as a whole and will help determine if this population continues to expand or is using additional habitats not previously surveyed.

Sediment and non-sediment removal: Suitable habitat for YBCUs at the proposed arroyo sediment traps (discussed in Section 6.3.3) was found to be limited. YBCUs were heard near the confluence of Rock Canyon Arroyo and the river. Sediment removal, in and of itself, does not have any direct effect on existing riparian vegetation, only on the river flow rate itself. Removal of the sediment speeds up the river flow and thwarts the natural process of the river changing course and meandering. This process is necessary to meet the requirements of channelization implemented by USIBWC. The development of addition native vegetation in the No-Mow Zones and habitat restoration project sites provides an offset to the potential impacts from this action. Channel maintenance activities (e.g., sediment removal, sediment traps) if conducted outside the breeding and nesting season *may affect, but is not likely to adversely affect* the YBCU.

Vegetation management: Vegetation management like mowing affects not only vegetation structure but also plant community composition. Although USIBWC would continue to mow in areas along the RGCP, mowing has stopped on 1,838 acres. The Proposed Action may have an overall beneficial effect on the YBCU in the long term (10 or more years) through reduced mowing and eventual growth of trees and understory at restoration sites. Size of trees, canopy cover and structural density will take many years to reach suitability for YBCUs in most of the RGCP restoration sites. Restoration actions conducted to date by USIBWC, including plantings and cessation of mowing in the No-Mow Zones, have begun to show

some progress in establishing more natural habitats along the river in some areas. These efforts are still relatively recent and vegetation has not developed to the point that it increases suitability for YBCUs. Large, mature, native tree overstory habitat normally associated with YBCU habitat is scant in most of the RGCP. Increasing the width of the riparian vegetation (especially coyote willow and cottonwoods) and of course, limit the timing of management activities such that they fall outside of the breeding season will reduce impacts.

Large, old growth saltcedar stands provide the majority of dense canopy structure along and adjacent to the RGCP. Removal of these trees through recent and proposed methods (mechanical, herbicide) may result in temporarily diminishing habitat that may be used by YBCUs. According to studies in Nevada, YBCU prefer cottonwood and willow riparian habitat to saltcedar thickets where both occur (GBBO undated). This study also found that sites with subcanopy dominated by saltcedar are less likely to be used by cuckoos. Conversely, YBCU have been found nesting in saltcedar in New Mexico (Sogge et. al 2008). Large-scale aerial spraying of tamarisk along the Pecos River in New Mexico resulted in the loss of tens of kilometers of riparian forest and the subsequent extirpation of breeding YBCUs from the treated areas (Livingston and Schemnitz 1996; Travis 2005). Under favorable conditions, restoration of native cottonwoods and willows to the size and structure required by riparian woodland birds can proceed relatively quickly (3 to 6 years; Kus 1998; Taylor and McDaniel 1998; Rood et al. 2003). However, abiotic and biotic conditions in many areas now occupied by tamarisk have been so altered that recolonization by native willows and cottonwoods is unlikely without intensive restoration efforts (Harms and Hiebert 2006; Shafroth et al. 2008). Given the cost and effort required for active restoration over the large areas likely to be affected by the tamarisk beetle, widespread tamarisk mortality will likely result in a net loss in riparian habitat for at least a decade or more (Paxton et.al 2011). Saltcedar beetle infestation over the coming years may play a very large role in altering habitat characteristics throughout the RGCP. The cessation of mowing and establishment of restoration sites provides for a potential increase in available habitat for the YBCU. Additionally, proposed water rights have been established at some restoration sites to improve native vegetation development and improve habitat. A reduction of applied water, as may occur during the drought season, could potential reduce available managed habitat at these sites. However, with the additional establishment of No-Mow Zones and restoration sites, vegetation maintenance activities *may affect, but is not likely to adversely affect* the YBCU.

Bank stabilization: The addition of rip rap and rock, or the planting of vegetation to stabilize banks would be conducted outside of the YBCU breeding and nesting period and would not affect YBCUs. These measures would protect riparian habitat occur along the bank from further erosion and would have no immediate effect on the YBCU population but may increase foraging habitats through continued establishment of riparian habitats in years to come.

Island destabilization/removal: Island destabilization that results in removal of islands currently populated by dense stands of coyote willow and mixed riparian habitats has an overall negative effect on natural river habitat but may not directly negatively affect YBCUs. YBCU will possibly use these habitats for foraging but they do not currently provide adequate habitat for breeding. The loss of possible foraging habitat will not likely have an overall adverse impact due to the ability of YBCU to forage in other existing riparian habitats along the banks as well as their aptitude for foraging in upland more zeric habitats. Island destabilization/removal *may affect, but is not likely to adversely affect* the YBCU.

7.0 CUMULATIVE EFFECTS

Potential cumulative effects of the Proposed Action are similar to those described in the 2011 BA and reiterated here. Recreational use of some sections of the floodway would be continued or expanded under proposed cooperative agreements with local and state organizations or other interested stakeholder groups, with potential effects on the flycatcher and the YBCU that would be mitigated. Local governments are usually the lead on any recreational project, but the USIBWC will ensure that recreational use of the floodway does not foreclose riparian restoration potential (SWCA 2011).

Effects from saltcedar beetles are likely to significantly influence the future environment within the RGCP within the next 10 years. If the beetle results in the loss of saltcedar throughout the RGCP, a great deal of current habitat being used by SWFLs and possibly by YBCUs will be lost. Native riparian growth may eventually replace this loss of structural habitat, but it is likely that avian ecology and use of these habitats will be altered significantly over the coming decade.

8.0 MITIGATION AND MONITORING

The USIBWC will implement mitigation measures, the RGCP RMP, the endangered species management plan, and RPMs and conservation measures outlined in the 2012 BO to offset or decrease the environmental effects of implementing the Proposed Action. Measures for protection of threatened and endangered species and wildlife habitat respond to requirements specified by the USFWS as part of the ESA Section 7 consultation. A summary of typical mitigation actions is presented below for implementing the Proposed Action. Mitigations by resource area are presented separately for construction activities and for vegetation treatments used to control invasive species and establish desired vegetation.

8.1 Typical Mitigation Measures for Construction Activities

Mitigation measures for construction activities based on the 2011 BA (SWCA 2011) and updated in the RMP (USIBWC 2016c) include:

Water Resources and Aquatic Habitat Protection

- During construction near the river, BMPs and spill control procedures will be used to prevent contamination and increased erosion to the river. Servicing of heavy equipment will be done out of the riparian zone.
- Sediment for restoration bank work on New Mexico restoration sites will be moved to nearby floodway locations and stabilized by revegetation during shavedowns and bank preparation. Shavedowns will be designed to promote backflow inundation and reduce the possibility of sediment entering the river.
- Proper permits or authorization are required for any river water use related to construction activities, such as water spraying for dust abatement.
- If fish are stranded when equipment is operating in the river or arroyo tributaries, they will be salvaged and put into the main river channel.
- Work in the channel should be conducted during low-flow or dry river conditions.

Soil Protection

- Temporary materials and equipment-staging areas for construction areas will be reclaimed and revegetated with suitable native woody trees and shrubs. The USIBWC will monitor performance of these environmental measures.
- Signage will indicate that riparian use and access will be limited during construction activities to limit erosion, minimize damage to vegetation, and provide refuge areas where wildlife can remain undisturbed.
- Levees will be reinforced if channel migration threatens levee protection.

Wildlife Protection

The following conservation measures to avoid adverse effects on listed species and their critical habitats are required. The action area will be analyzed by biologists for:

- All listed species' suitable habitat;
- Critical habitat for the flycatcher; and
- The nearest documented flycatcher territories.

If suitable habitat is present, USFWS-approved survey protocols (by permitted persons) will be conducted. Additional measures include:

- Construction should occur outside of the migratory bird breeding season from September 1 through February 28. If construction is necessary during the migratory bird breeding season, surveys will be conducted per Section 3 of the RMP and treatment will be selected to minimize the effect.
- No construction activities will be conducted in known habitats of listed or sensitive species. If construction activities must occur during the flycatcher breeding season and within the buffer zones, USIBWC will utilize BMPs outlined in the flycatcher endangered species management plan.
- A 0.25-mile buffer will be established around each territory.
- If work must be conducted during the SWFL breeding season, then to minimize impacts the following measures will be required:
  - No work conducted prior to 9:00 a.m.
  - Work should be reduced to shortest timeframe possible to minimize impacts.
  - Noise should be kept to a minimum.
- Licenses, permits, and leases will be reviewed for potential impacts to flycatchers.
- Regarding restoration sites, USIBWC will:
  - Stagger plantings to increase structural and age diversity
  - Not mow
  - Remove saltcedar, unless near a territory with drought-affected willows. Distance of saltcedar left standing will be determined on case-by-case basis, depending on the conditions of the willows and other vegetation at the site.
  - Consider supplemental water to support flycatcher habitat
- Buffer zones will also be established around YBCU territories. The buffers will be determined following coordination and conference with the USFWS.
- For any action not covered under the RMP, USIBWC will consult via email with the USFWS Endangered Species Division in Albuquerque to ensure minimal impacts.

8.2 Typical Mitigation Measures for Vegetation Treatments

Invasive species will be managed in the No-Mow Zones to help ensure long-term persistence of riparian habitat. Mechanical vegetation management will be conducted outside the flycatcher breeding season, which typically extends from April 15 through August 15 of each year, to avoid potential effects from human disturbance such as noise. Mitigation measures for vegetation management activities (mechanical, chemical, and prescribed burning) based on the 2011 BA (SWCA 2011) and updated in the RMP (USIBWC 2016b and 2016c) include:

Water Resources and Aquatic Habitat Protection

- Manual, rather than mechanical, removal of saltcedar will be used during maintenance on the river margin. Woody debris as a result of saltcedar reduction will be mulched, burned, or removed from the floodway.
- Herbicide will be applied directly to targeted plants in a manner to minimize runoff to surface water. All herbicides will be licensed herbicides and will be used in conformance with labeled instructions. Herbicides will not be aerially applied over open water; instead, formulations labeled for use in or near aquatic habitats will be used.
- Prescribed burns will incorporate BMPs (e.g., careful selection of fire lines and weather conditions, and avoidance of intense burns) to limit runoff into the river.

Soil Protection

- Heavy equipment used for brush reduction will minimize impacts to native brush. Crews will evaluate the least invasive equipment available to be used for each activity. Heavy equipment can be tracked, not wheeled, for less brush impact. Heavy equipment that is wheeled and not tracked may leave ruts when turning, but may also compact the soil less.
- Mechanical treatment will be conducted in weather conditions that provide for dryer soil conditions to avoid creating ruts and compacting soil.

Vegetation Protection

- Herbicides will be sprayed by hand application to targeted species, whenever feasible. Herbicides will not be aerially applied on areas where sensitive riparian vegetation such as cottonwoods, willows, and screwbean mesquite are extensively intermingled with saltcedar.
- Vegetation will be monitored (species, composition, abundance and distribution) before and after vegetation treatments. Saturated and ponded areas will be avoided during mechanical and chemical treatments.
- Prescribed burns will be conducted in accordance with techniques identified in a plan to be developed by the USIBWC with guidance from federal and state resource management agencies. Degraded or burned areas will be inter-seeded with native grasses and forbs to further enhance the establishment of desirable browse and forage species.

Wildlife Protection

- Vegetation treatments with herbicide will occur outside the nesting season (i.e., September 1 through March 1). If treatments must occur during the migratory bird-nesting season, surveys will be conducted and active nests will be marked and avoided.

For chemical treatments and prescribed burning, additional BMPs will be implemented for air quality and cultural resource protection.

- The amount of vapors will be minimized by dispensing herbicide in a vegetable oil solution limiting airborne particulates. Application of this treatment will not occur during high wind conditions.
- Smoke management techniques will be used to determine smoke dispersion prior to prescribed burns.
- USIBWC Cultural Resources Specialist will conduct pre- and post-burn site inspections for cultural resources.

8.3 Typical Mitigation Measures for Channel Maintenance Activities

The following is a list of BMPs and mitigation measures to limit environmental impacts during all channel maintenance work, both routine and non-routine:

- Work should be during non-irrigation and non-flood periods when water levels are lowest, approximately from September 15 to March 1, and preferably during dry conditions. This also corresponds to the non-nesting season (September 1–March 1) to avoid impacts to sensitive wildlife during breeding seasons.
- Channel excavation is performed with bulldozers, excavators, front end loaders and scrapers either from the channel bank or from within the channel.
- No wetlands or other waters shall be filled in during the maintenance activities.
- Spoil from channel sediment excavation will be deposited in upland locations to ensure spoil will not be re-deposited into the river. Upland deposit locations will be pre-approved by USIBWC management. Sediment will be stabilized by vegetation, where needed.
- Crews will take care to have minimal incidental fallback of excavated material into the riverbed. Water quality could decrease in terms of total suspended solids during sediment excavation, but should improve upon completion of maintenance work.
- During maintenance work within the river, BMPs and spill control procedures will be used to prevent contamination and increased erosion to the river. Servicing of heavy equipment will be performed out of the riparian zone.
- When equipment is operating in the river or arroyo tributaries, if fish are stranded, they will be salvaged and put into the main river channel.
- No maintenance activities will be conducted in known habitats of listed or sensitive species. Where maintenance will be necessary in proximity to known listed or sensitive species' habitats, USIBWC will follow recommendations laid out in Part 3 of the RMP and treatment will be selected to minimize any effect.

- No potential bald eagle winter roosting trees will be disturbed during maintenance activities. Presence/absence of bald eagles will be monitored during maintenance work in the fall and winter.
- Existing roads through the floodplain will be used to avoid impacts to vegetated areas.
- Before ground-disturbing maintenance work, a conference will be held with maintenance crews to inform them of the potential for disturbing subsurface cultural resources, and the procedures involved in the event that this occurs. Precautions will be taken to ensure that archaeological assistance is promptly available in case of a discovery.
- Dust control measures, such as sprinkling/irrigation, mulch, vegetative cover, and wind breaks, will be used in construction sites where there is the potential for air and water pollution from dust transport by high winds.
- Staging areas are located in areas that will avoid impacts to vegetated areas.

9.0 SUMMARY AND CONCLUSION

The USIBWC is proposing to implement channel maintenance activities and continue management of the No-Mow Zone areas including removal of invasive species and continual improvements at restoration sites. Four species federally listed as endangered or threatened have been documented along the RGCP or have the potential to occur on one of the proposed restoration sites: aplomado falcon (recorded at Mesilla Valley Bosque State Park), least tern (recorded at Mesilla Valley Bosque State Park), SWFL (with nesting documented along the RGCP), and YBCU (recorded on several of the proposed restoration sites). Potential widespread and severe effects of saltcedar beetles on habitat used by SWFLs and YBCUs, may impact management decisions of treatments of saltcedar in occupied, adjacent, and potential habitats of each species. Current saltcedar control techniques may be determined to be unnecessary if the saltcedar beetles are successful in killing off the majority of saltcedar trees in the RGCP. Habitat restoration along the RGCP may lead to an increase in the acreage of suitable habitat, greater habitat connectivity, and an increase in the number of occupied territories for both SWFLs and YBCUs. Breeding habitat suitability indices for YBCUs are currently being developed by the USBR based on patch size, species composition, and height/structure of vegetation. Therefore, determining the potential effects of channel maintenance activities and vegetation management are a bit more challenging. Temporary impacts from channel maintenance activities *may affect but are not likely to adversely affect* migrating least terns. The effect determination for the SWFL (*may affect, is likely to adversely affect*) reflects the possibility of a temporary, negative effect of elimination of habitat (e.g., from island destabilization) which will result in swifter river current, loss of habitat heterogeneity, an overall decrease in habitat attractiveness for a myriad of organisms, and specifically a decrease in suitability for SWFLs. USIBWC conservation measures for the SWFL exceed the acreage that would be impacted by this action (Table 12). Vegetation maintenance *may affect, is not likely to adversely affect* SWFLs from the continuation of mowing, saltcedar removal, and potential impacts to decreased supplemental water during drought years. However, the change in habitat during restoration efforts and the recovery of the No-Mow Zones has the potential to provide additional riparian habitat for the species. The effect determination for the YBCU (*may affect, is not likely to adversely affect*) reflects on the temporary impacts on habitat due to continuation of mowing in some areas, sediment removal, and island destabilization if they occur activities near occupied territories. USIBWC's restoration efforts and cessation of mowing on over 1,800 acres will in the future increase potential riparian habitat. In addition, over 27,000 native trees have been planted from 2011 to 2016 across the restoration sites, with another 10,000 anticipated in 2017.

Table 12. Summary of SWFL Habitat Impacted and Created by Proposed Action

	Acres
SWFL habitat impacted[1]	Up to 51.1
SWFL habitat developed at restoration sites[2]	Up to 129.8
SWFL habitat improved within USIBWC Right-of-Way[3]	29.3

[1]–From Table 4
[2]–From Table 7
[3]–From Table 11 (up to 0.23 acres overlaps with restoration site acreage)

10.0 REFERENCES

Ahlers. D. 2016. Flycatcher use of salt cedar. Personal communication with E. Verdecchia, USIBWC. 31 October 2016.

BISON-M (Biota Information System of New Mexico). 2011. BISON-M Homepage. Available at: http://www.bison-m.org. Accessed August 19, 2016.

Cartron, J.-L.E. (ed.). 2010. Raptors of New Mexico. University of New Mexico Press, Albuquerque.

Degenhardt et al. (Degenhardt, W., Painter, C., Price, A.). 1996. Amphibians and Reptiles of New Mexico. Albuquerque: University of New Mexico Press.

Ehrlich et al. (Ehrlich, P.R., D.S. Dobkin, and D. Wheye.). 1988. The Birder's Handbook: A Field Guide to the Natural History of North American Birds. Simon and Schuster, New York, NY.

GBBO (Great Basin Bird Observatory). undated. Yellow-billed Cuckoo. Available at: http://www.gbbodata.org/pdf/bcp/44_Yellow-billed%20Cuckoo.pdf. Accessed October 30, 2016.

Harms, R. S., and R. D. Hiebert. 2006. Vegetation response following invasive tamarisk (*Tamarix* spp.) removal and implications for riparian restoration. Restoration Ecology 14:461–472.

Hunt et al. (Hunt, W.G., J.L. Brown, T.J. Cade, J. Coffman, M. Curti, E. Gott, B. Heinrich, J.P. Jenny, P. Juergens, A. Marcias-Duarte, A.B. Montoya, B. Mutch, and C. Sandfort). 2013. Restoring Aplomado Falcons to the United States. Journal of Raptor Research 47:335–351.

IDEALS-AGEISS. 2016. Biological survey report for the Rio Grande Canalization Project. Prepared for USIBWC.

Jungemann, Peter K. 1988, December 5. Observations and Management Proposals for the Interior Tern (*Sterna antillarum athalassos*) in Southeastern New Mexico. U.S. Fish and Wildlife Service and New Mexico Department of Game and Fish.

Juergens, P. 2015 Personnel communication with D. Burkett concerning juvenile aplomado falcon release.

Keddy-Hector, D. 2000. Aplomado Falcon (*Falco femoralis*). In A. Poole [ED.], The Birds of North America online, No. 549. Cornell Lab of Ornithology, Ithaca, NY U.S.A. Available at: http://bna.birds.cornell.edu/bna/species/549, Accessed 1 January 2015.

Kus, B. E. 1998. Use of restored riparian habitat by the endangered Least Bell's Vireo (*Vireo belli pusillus*). Restoration Ecology 6:75–82.

Laymon et al. (Laymon, S.A., P.L. Williams, and M.D. Halterman). 1997. Breeding Status of the Yellow-billed Cuckoo in the South Fork Kern River Valley, Kern County, California: Summary Report 1985-1996. Administrative report, U.S. Forest Service, Sequoia National Forest, Cannell Meadow Ranger District, Challenge Cost-Share Grant No. 92-5-13.

Laymon, S. A. 1998. Yellow-billed Cuckoo (*Coccyzus americanus*). In The Riparian Bird Conservation Plan; a Strategy for Reversing the Decline of Riparian-associated Birds in California.

Livingston, M. F., and S. D. Schemnitz. 1996. Summer bird/vegetation associations in tamarisk and native habitat along the Pecos River, southeastern New Mexico, p. 171–180. *In* D. W. Shaw and D. M. Finch [tech, coords.], Desired future conditions for southwestern riparian ecosystems: bringing interests and concerns together. USDA Forest Service General Technical Report RM-GTR-272.

Marcias-Duarte et al. (Marcias-Duarte, A., B. Montoya, W.G. Hunt, A. Lafon-Terrazas, and R. Tafanelli). 2004. Reproduction, Prey, and Habitat of the Aplomado Falcon (*Falco femoralis*) in Desert Grasslands of Chihuahua, Mexico.

Marcias-Duarte et al. (Marcias-Duarte, A., A.B. Montoya, J.R. Rodriguez-Salazar, A.O. Panjabi, P.A. Calderon-Dominguez, and W.G. Hunt). 2016. The Imminent Disappearance of the Aplomado Falcon from the Chihuahuan Desert. Journal of Raptor Research 50:211-216.

Meyer, R.A. and S.O. Williams. 2005. Recent Nesting and Current Status of the Aplomado Falcon (*Falco femoralis*) in New Mexico. North American Birds 2:352–356.

Montoya, A.B. 1995. Breeding Biology of Aplomado Falcons in Desert Grasslands of Chihuahua, Mexico. M.S. thesis, New Mexico State University, Las Cruces, NM U.S.A. Chihuahua, Mexico. Auk 121:1081–1093.

Montoya et al. (Montoya, A.B., P.J. Zwank, and M. Cardenas). 1997. Breeding Biology of Aplomado Falcons in Desert Grasslands of Chihuahua, Mexico. Journal of Field Ornithology 68:135–143.

NMDGF (New Mexico Department of Fish and Game). 2016. Least tern (*Sterna antillarum*). Wildlife Notes. Available at: http://www.wildlife.state.nm.us/education/wildlife_notes/documents/leasttern.pdf. Accessed August 19, 2016.

Parsons. 2001. Alternatives Formulation Report, Rio Grande Canalization Project, March.

Partners in Flight. 2016. Species accounts. Available at: http://www.nmpartnersinflight.org/

Paxton et al. (Paxton, E. H., T.C. Theimer, and M.K.Sogge). 2011. Tamarisk biocontrol using tamarisk beetles: Potential consequences for riparian birds in the southwestern United States.

Rood et al. (Rood, S. B., C. R. Gourley, E. M. Ammon, L. G. Heki, J. R. Klotz, M. L. Morrison, D. Mosley, G. G. Scopp ettone, S. Swanson, and P. L. Wagner). 2003. Flows for floodplain forests: a successful riparian restoration. BioScience 53:647–656.

Sechrist et al. (Sechrist, J., V. Johanson, and D. Ahlers). 2009. Western Yellow-billed Cuckoo Radio Telemetry Study Results – Middle Rio Grande New Mexico – 2007-2008. U.S. Bureau of Reclamation, Technical Service Center, Denver, CO.

Shafroth et al. (Shafroth, P. B., V. B. Beauch amp, M. K. Briggs, K. Lair, M. L. Scott, and A. A. Sher). 2008. Planning riparian restoration in the context of Tamarix control in western United States. Restoration Ecology 16:97–112.

Sogge et al. (Sogge, M. K., S. J. Sferra, and E. H. Paxton). 2008. Saltcedar as habitat for birds: implications to riparian restoration in the southwestern United States. Restoration Ecology 16:146–154.

Sogge et al. (Sogge, M. K., R. M. Marshall, S. J. Sferra, and T. J. Tibbits). 1997. A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol. Technical Report NPS/NAUCPRS/NRTR-97/12.

SWCA (SWCA Environmental Consultants). 2011. Final Biological Assessment-Integrated Land Management for Long-Term River Management of the Rio Grande Canalization Project.

SWCA. 2015. Berino east and west site restoration final monitoring report. Prepared for MWH Americas, Inc. and the International Boundary and Water Commission.

Taylor, J. P., and K. C. McDaniel. 1998. Restoration of saltcedar (Tamarix sp.)-infested floodplains on the Bosque del Apache National Wildlife Refuge. Weed Technology 12:345–352.

Tetra Tech. 2015. Channel Maintenance Alternatives and Sediment-transport Studies for the Rio Grande Canalization Project.

Travis, J. R. 2005. Statewide Yellow-billed Cuckoo survey: 2004. Report to New Mexico Department of Game and Fish, Santa Fe, NM.

TRC. 2011. Site implementation plans for the Rio Grande Canalization Project restoration implementation plan.

USACE (U.S. Army Corps of Engineers). March 2009. Conceptual Restoration Plan and Cumulative Effects Analysis, Rio Grande—Caballo Dam to American Dam, New Mexico and Texas. Albuquerque, NM.

USBR (U.S. Bureau of Reclamation). 2013. D. Moore and D. Ahlers. Southwestern Willow Flycatcher Habitat Classification Lower Rio Grande from Caballo Dam, NM to El Paso, TX.

USBR. 2015a. Lower Rio Grande Southwestern Willow Flycatcher Study Results.

USBR. 2015b. Lower Rio Grande Yellow Billed Cuckoo Survey Results – 2015.

USFWS (U.S. Fish and Wildlife Service). 2002. Final Recovery Plan for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). Available at: http://ecos.fws.gov/docs/recovery_plan/020830c_combined.pdf.

USFWS. 2005a. Fish and Wildlife Coordination Act Report for the Rio Grande Canalization Project, New Mexico and Texas. U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque.

USFWS. 2005b. Designation of Critical Habitat for Southwestern Willow Flycatcher (*Empidonax traillii extimus*); Final Rule. Federal Register 70:60886-61009.

USFWS. 2006. Establishment of a Nonessential Experimental Population of Northern Aplomado Falcons in New Mexico and Arizona. 71 FR 42298 42315. Available at: https://www.gpo.gov/fdsys/pkg/FR-2006-07-26/pdf/06-6486.pdf#page=1.

USFWS. 2009. U.S. Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form, by the Sacramento Fish and Wildlife Office.

USFWS. 2010. Rio Grande Silvery Minnow (*Hybognathus amarus*) Recovery Plan, First Revision. U.S. Fish and Wildlife Service, Southwest Region. Albuquerque, New Mexico. Available at: http://ecos.fws.gov/docs/recovery_plan/022210_v2.pdf.

USFWS. 2012. Biological opinion (Opinion) on the effects of the United States Section of the International Boundary and Water Commission (IBWC) proposed action of an Integrated Land Management Alternative for Long-Term Management (Land Management Alternative) of the Rio Grande Canalization Project (RGCP) in Sierra County and Doña Ana County, New Mexico, and El Paso County, Texas. Consultation No. 02ENNM00-2012-F-0016.

USFWS. 2013a. Designation of Revised Critical Habitat for Southwestern Willow Flycatcher; Final Rule. Federal Register 78:344-534.

USFWS. 2013b. Proposed threatened status for the Western Distinct Population Segment of the Yellow-billed cuckoo (*Coccyzus americanus*); Proposed Rule. 78 FR 61621 61666. Available at: https://www.gpo.gov/fdsys/pkg/FR-2013-10-03/pdf/2013-23725.pdf.

USFWS. 2014a. Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*); final rule. Federal Register 79(192):59992-60038.

USFWS 2014b. Designation of critical habitat for the western distinct population segment of the yellow-billed cuckoo ((*Coccyzus americanus*). Federal Register 79 (158): 48548- 48652.

USGS (U.S. Geological Survey). 2010. A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher.

USIBWC (U.S. International Boundary and Water Commission). 2004. Final Environmental Impact Statement: River Management Alternatives for the Rio Grande Canalization Project. Available at: http://www.ibwc.gov/EMD/documents/Final_EIS.pdf.

USIBWC. 2009. Record of Decision River Management Alternatives for the Rio Grande Canalization Project. United States Section International Boundary and Water Commission, El Paso, Texas.

USIBWC. 2016a. Progress Report to USFWS on USIBWC Restoration Activities and Fulfillment of 2012 Biological and Conference Opinion Reasonable and Prudent Measures. Progress Report #3: March 2015–March 2016.

USIBWC. 2016b. Rio Grande Canalization Project River Management Plan, Part 4 Channel Maintenance Plan, Draft. August 22, 2016.

USIBWC. 2016c. Rio Grande Canalization Project River Management Plan.

Young et al. (Young, K.E., B.C. Thompson, A.L. Terrazas, A.B. Montoya, and R. Valdez). 2004. Aplomado Falcon Abundance and Distribution in the Northern Chihuahuan Desert of Mexico. Journal of Raptor Research 38:107–117.

Young, K., and Q. Young. 2010. Aplomado falcon (*Falco femoralis*). In Raptors of New Mexico, edited by J.-L.E Cartron, pp. 429–443. Albuquerque: University of New Mexico Press.

APPENDIX A

2016 Biological Survey Report

Biological Survey Report for the Rio Grande Canalization Project

Title:

Version: **FINAL**

Date: **September 2016**

Prepared for:

International Boundary and Water Commission
4171 N. Mesa St., Suite C310
El Paso, TX 79902

Prepared by: IDEALS - AGEISS, LLC

848 W. Hadley Ave.
Las Cruces, NM 88005

Contract Number: IBM15D0006

Task Order Number: IBM16T0016

TABLE OF CONTENTS

Section **Page**

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF APPENDICES

Appendix

LIST OF ABBREVIATIONS / ACRONYMS

BSR	Biological Survey Report
IPaC	Information for Planning and Conservation
km	kilometer(s)
m	meter(s)
PABU	Painted Bunting
PEFA	Peregrine Falcon
RGCP	Rio Grande Canalization Project area
SWFL	Southwestern Willow Flycatcher
USBR	U.S. Bureau of Reclamation
USIBWC	U.S. Section of the International Boundary and Water Commission
UTM	Universal Transverse Mercator
YBCU	Yellow Billed Cuckoo

EXECUTIVE SUMMARY

A biological survey was conducted along 169 kilometers (km) (105 miles) of the Rio Grande corridor known as the Rio Grande Canalization Project area (RGCP). This stretch runs from Percha Dam south to the American Dam in El Paso, Texas. The purpose of this biological survey was to identify current habitat conditions and to update and supplement findings from the June 2011 formal Biological Survey Report (BSR) (SWCA 2011). This survey also provides information pertaining to wildlife species occurring in the RGCP. In addition to the 169 km river corridor survey, the current habitat conditions of designated habitat restoration sites within the RGCP were also assessed. Throughout the 169 km RGCP current habitat conditions were recorded for the entire length of on both sides of the river to include no-mow zones, active and inactive restoration sites, other potential sites, arroyo sediment traps, vortex weir, and island destabilization areas.

Habitat suitability was specifically evaluated within the RGCP for the federally listed endangered Southwestern Willow Flycatcher (SWFL) and the federally listed threatened Yellow-billed Cuckoo (YBCU). Current habitat conditions were assigned a numerical category (0-5) for SWFL habitat suitability as designated by the U.S. Bureau of Reclamation (USBR) in a prior evaluation effort in 2011 (USBR 2013). Habitat suitability for YBCUs was assigned a straightforward definition of good, poor, or none based on known habitat requirements, SWFL habitat classification, the surveyors experience with YBCU surveys in New Mexico, and observations of YBCUs during this survey effort.

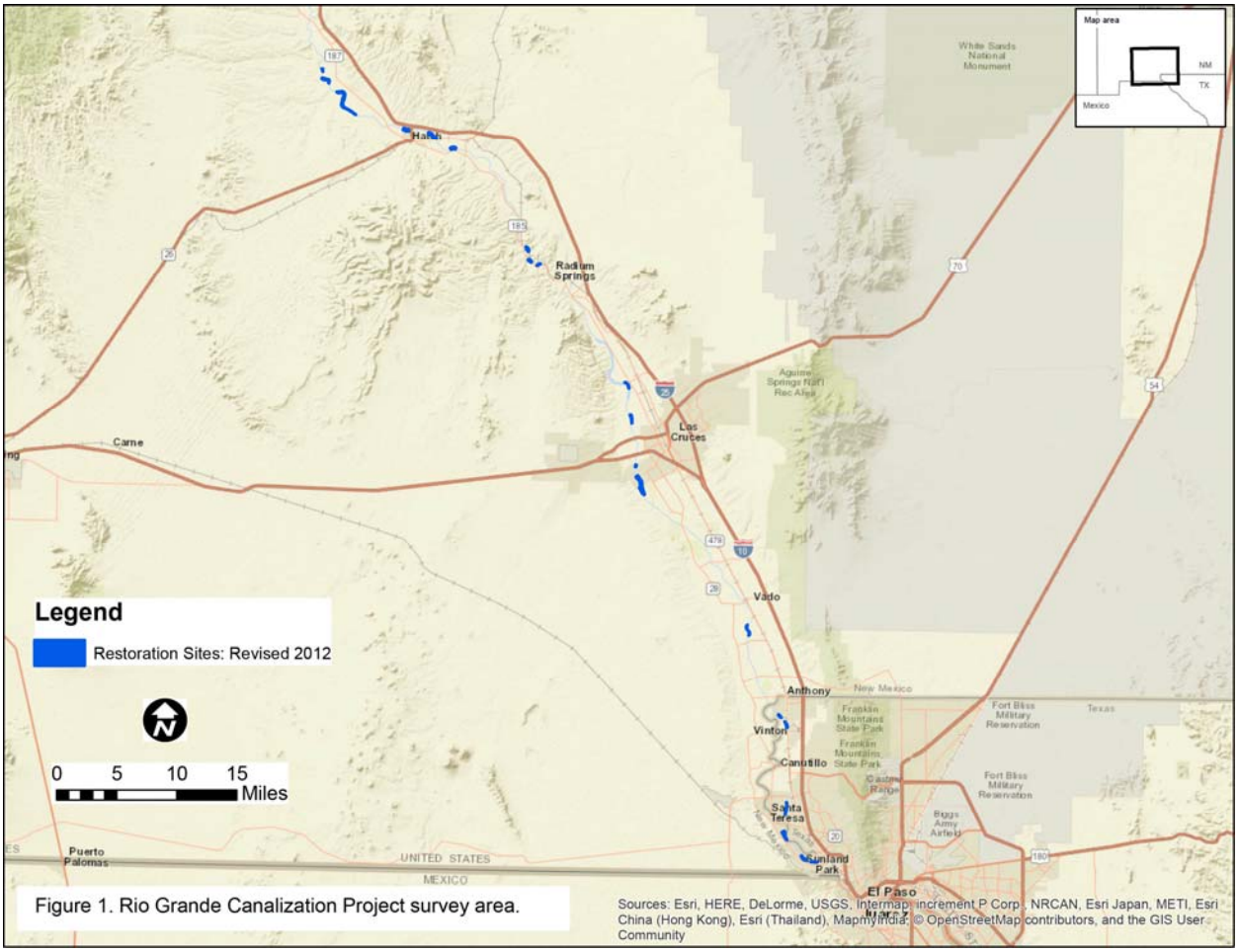
Conditions have changed significantly along many portions of the RGCP since 2012. Many stretches along the RGCP have degraded in suitability for SWFLs and YBCUs while others have improved. Several SWFLs and YBCUs were observed during the survey effort.

1.0 INTRODUCTION

In May of 2013, the U.S. Section of the International Boundary and Water Commission (USIBWC) and the USBR signed an interagency agreement to collaborate on biological surveys of the RGCP. Surveys were to specifically focus on the federally listed endangered SWFL (*Empidonax traillii extimus*) and the federally listed threatened YBCU (*Coccyzus americanus*). The USBR has conducted SWFL surveys in the RGCP since at least 2012, incidental YBCU surveys in 2013 and 2014, and formal YBCU surveys in 2015.

This biological survey effort was conducted from July 31, 2016 through August 23, 2016 in the RGCP to assess current habitat conditions, identify suitable habitat for protected species, and to provide a sound understanding of the general wildlife species occurring in the RGCP. Additionally, habitat data were recorded for restoration sites located within the RGCP (Figure 1).

Figure 1. Rio Grande Canalization Project Survey Area



2.0 METHODS

Observers conducted linear river surveys along the entire stretch of the RGCP by kayak, vehicle, and foot. During the course of the survey observers took notes on current habitat conditions and suitability for SWFL and YBCU throughout all reaches of the RGCP. Notes were taken on vegetation species and classification, general vegetation condition, wildlife species present, and general habitat condition. These data were recorded for no-mow zones, active and inactive restoration sites, other potential sites, arroyo sediment traps, vortex weir, and island destabilization areas. Notes and photographs were taken to compare to the data recorded in 2011 (SWCA 2011). While floating and walking, observers used hard copy and digital SWFL habitat classification maps developed by USBR in 2012. These maps have color-coded sections assigning habitat classification to polygons delineated along both banks of the river and island habitat within the river channel. Alphanumeric categories assigned in 2012 were based on species of vegetation present and SWFL suitability classification. For example, a coyote willow (*Salix exigua*) habitat comprising a Class 4 SWFL habitat is labeled on the map as coyote willow 4. Habitat delineations were evaluated to determine current condition and were compared with the 2012 classification. All changes were written on field maps as each stretch of river was surveyed.

Numerical habitat classifications for designating habitat suitability for SWFLs were developed and mapped for the RGCP in 2012 by USBR. Six habitat categories designated in the RGCP include:

Class 0 (Unsuitable) = Woody vegetation is absent, very sparse, or generally less than 3 meters (m) in height (i.e., bare ground, herbaceous vegetation, scoured river bars or islands).

Class 1 (Unsuitable) = Vegetation height is greater than 3 m and patch width is less than 10 m (i.e., patch width is limiting factor). Habitat of this class generally consists of narrow bands of coyote willow or saltcedar within the river channel prism.

Class 2 (Unsuitable) = Vegetation height is greater than 3 m and patch width is greater than 10 m, but vegetation lacks sufficient structure and density (i.e., patch size and vegetation height are sufficient; vegetation lacks overall structure/density; relatively dry and not subject to overbank flooding). Habitat of this class generally consists of older, drier patches of saltcedar scattered throughout the study area.

Class 3 (Moderately suitable) = Habitat meets minimum suitable vegetation height (3 m) and patch width (10 m) and has sufficient density/structure (i.e., patch size and height are moderately sufficient; vegetation density is adequate). This class is typically comprised of smaller river bars and islands with young to mid-aged vegetation coyote willow and saltcedar.

Class 4 (Suitable) = Vegetation height is between 3 m and 7 m and patch width is between 10 m and 30 m (i.e., all necessary habitat characteristics are present; overbank flooding somewhat common; relatively high water table). This class is comprised generally of coyote willow dominated patches of sufficient height and width that are seasonally flooded or with a high water table.

Class 5 (Highly suitable) = Structurally diverse vegetation between 3 m and 10 m in height with a patch width greater than 30 m (i.e., all necessary habitat characteristics are present; large patch size; high water table with backwater channels). This class has the same general characteristics as Class 4, but is more

structurally diverse and contains openings with marsh and/or backwater habitat. Patches may also be larger in aerial extent than those in Class 4.

Additional habitat categories were designated as mixed vegetation typically comprised of saltcedar and coyote willow. Other species including screwbean mesquite (*Prosopis pubescens*) and cottonwood (*Populus deltoides*), as well as pecan orchards were also recorded.

Habitat suitability for YBCUs was assigned a straightforward definition of good, poor, or none, based on known habitat requirements, SWFL habitat classification, the surveyors experience with YBCU surveys in New Mexico, and observations of YBCUs made during this survey effort.

Prior to initiation of field surveys an Information for Planning and Conservation (IPaC) Trust resources report was obtained at the IPaC link (https://ecos.fws.gov/ipac). This report generated a list of potential listed species and other species of conservation concern that may occur within the RGCP (Appendix A). All species of vertebrate fauna encountered during the surveys were recorded. Invertebrate species of interest encountered were also recorded. Universal Transverse Mercator (UTM) coordinates were recorded for all listed species and those of conservation concern that were included in the IPaC report.

Photographs were taken of representative habitats encountered along each stretch of river surveyed within the RGCP. A trip report was written for each stretch of river completed via kayak and pedestrian survey. Each trip report includes field notes, maps, photographs, and list of faunal species encountered. Specific notes were recorded for presence or absence of saltcedar leaf beetle (*Diorhabda spp.*) and current effects on saltcedar.

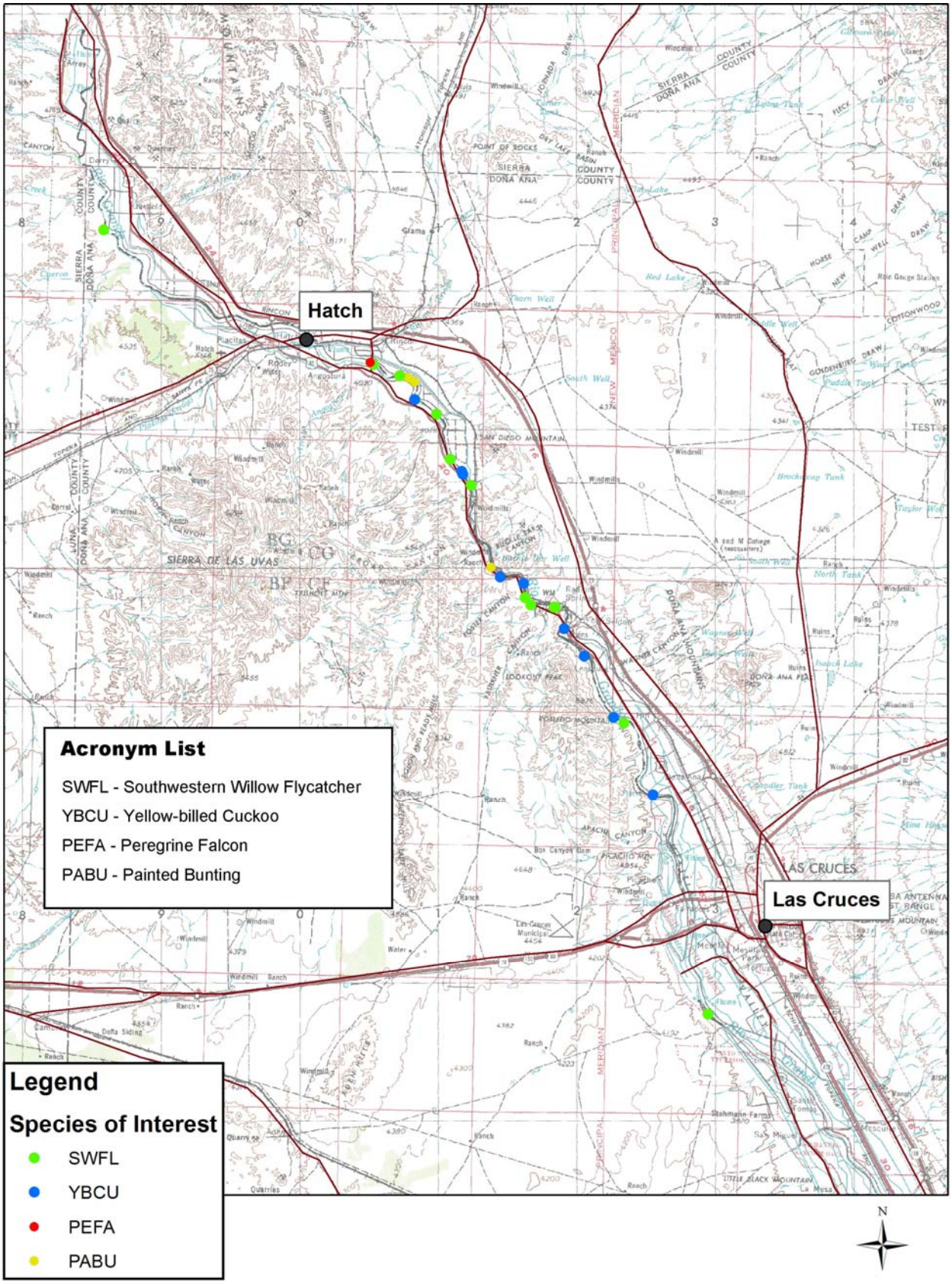
3.0 RESULTS

The IPaC report provided a list of 14 potential listed threatened and endangered species and 32 potential species of birds of conservation concern for the RGCP (Appendix A). According to the IPaC report there are currently no listed critical habitats located within the RGCP. This survey effort resulted in detection of two listed species including 21 individual SWFLs at 18 sites and nine individual YBCUs at nine sites (Figure 2). Other species of interest observed (listed as birds of conservation concern in the IPaC) included several painted buntings, and a single peregrine falcon.

3.1 Lower Rio Grande Canalization Project Habitat Assessment for Kayak and Pedestrian Surveys

A total of 13 separate kayak, vehicle, and pedestrian survey trips were completed and are listed below for 11 stretches of the Rio Grande. Length and duration of each survey were dictated by distance between logistical entrance and exit points. Observers occasionally exited the kayaks during the float trip in order to conduct short pedestrian investigations of habitat. During each survey trip data were recorded for no-mow zones, active and inactive restoration sites, other potential sites, arroyo sediment traps, vortex weir, and island destabilization areas. Specific notes for particular areas along each survey route (e.g., Bignell Arroyo, Montoya Arroyo, sediment traps) are referred to in text coinciding with each survey trip in which they were encountered. The following are individual survey reports for each kayak/pedestrian trip. Documentation and notes of changes from the 2012 USBR habitat classification were recorded on maps for each reach.

Figure 2. Map of Species of Interest Documented during Rio Grande Survey



3.1.1 Lower Rio Grande Canalization Project from Percha Dam South to Garfield Exit of I-25

Approximately 25 to 30 percent of the saltcedar in this 12.7-river-km (8.0-river-mile) stretch of the Rio Grande is suffering the effects of *Diorhabda* and is showing moderate to severe stress. Adult and larval *Diorhabda* were observed periodically throughout this stretch of river. This portion of the river currently has less overall stress from *Diorhabda* than other stretches surveyed downstream.

Overall habitat quality in this section is fairly low for SWFLs and YBCUs compared to other stretches surveyed for this effort further downstream from Seldon and Broad Canyons to Leasburg Dam. The predominant areas that do offer some habitat are the long stretches of coyote willow in classes coyote willow 1 through coyote willow 4 that occur along the banks providing marginally to suitable habitat for SWFLs and foraging habitat for YBCUs. Many of these sections are transitioning to, or have become, mixed vegetation habitat. The river here is narrow compared to downstream reaches and is moving swiftly in comparison. This factor does not necessarily reduce overall habitat quality but may be a factor to consider for future reclamation plans. A number of small areas provide moderate to good habitat for SWFLs and a few polygons are adequate for YBCUs.

No YBCUs were detected during this survey effort. Habitat polygons on the east and west of the river channel at Percha Dam provide suitable habitat for YBCUs and currently remain classified as mixed vegetation 3. Further downstream, suitable YBCU habitat exists sparingly in areas where small cottonwood groves and old age class saltcedar are present adjacent (within 200 m or less) to good foraging habitat along the river banks. Foraging habitat in this stretch is primarily in the form of coyote willow 1, coyote willow 2, saltcedar 1, saltcedar 2, mixed vegetation 1, pecan orchards and mixed vegetation 2.

Three SWFLs were detected (unsolicited) in this stretch. Each SWFL was detected audibly and was heard calling from saltcedar 1, mixed vegetation 1, and coyote willow 1, respectively. Habitat classifications from 2012 remain the same in several areas but the general trend is for saltcedar 1 to now be mixed vegetation 1 due to growth of coyote willow. Other sections have grown from Class 0 rating to coyote willow 1 or mixed vegetation 1 categories. These sites are still considered to be inadequate habitat for SWFLs but are transitioning and improving some since 2012 data were recorded.

Overall, this stretch has undergone considerable changes in habitat classification. The majority of changes have been from Class 0, saltcedar 1, and coyote willow 1 to mixed vegetation 1, but changes include a wide variety of suitability improvement and degradation. In some areas there has been degradation of habitat suitability since the 2012 evaluation (Percha Reach map 3 of 6 on west bank) degrading from mixed vegetation 3 to saltcedar 1 at the confluence of Montoya Arroyo. Montoya Arroyo is listed in the scope of work as an “other potential site” for restoration. Further west upstream from the river in Montoya Arroyo habitat improves to mixed vegetation 2 with large saltcedar and a nice strip of coyote willow. Directly across the river a large stand of mixed vegetation 2 has improved to mixed vegetation 3.

Arroyo sediment trap sites along this stretch from north to south include Tierra Blanca, Green Canyon, and Sibley arroyos. No major changes in vegetation recorded at these sites were noted during the survey. None of these sites currently provide any suitable habitat for SWFL or YBCU. Some of the coyote willow 1 habitat at Tierra Blanca has changed slightly to mixed habitat, but is still much too narrow to

provide suitable habitat. At Sibley Canyon the vegetation has changed from a mixed habitat to only coyote willow with a small patch of mixed vegetation located up the bank away from the river approximately 30 m.

A vortex water weir occurs about 650 m downstream from Tierra Blanca creek within the river channel. Vegetation at this site includes a thin mixed riparian strip on the west bank and a coyote willow 2 strip on the east bank with several large cottonwood trees in the floodplain directly behind the willows.

3.1.2 Lower Rio Grande Canalization Project from Garfield Exit of I-25 South to 187 Bridge (2.1 miles north of Hatch)

Approximately 45 to 50 percent of the saltcedar in this 18-river-km (11.2-river-mile) stretch of the Rio Grande is suffering the effects of *Diorhabda*. Saltcedar are vigorous and healthy on the upper 10.5-river-km of this stretch, begin to show signs of *Diorhabda* at the 10.5-river-km mark, and are severely stressed for the remaining 7.5-river-km.

Habitat quality in the upper portions of this river section is fairly low for SWFLs, and low to nonexistent for the entire 18-river-km stretch for YBCUs. The upper 10 km of this river section is dominated by long stretches of Class 0 with relatively small intermittent patches of low to moderate quality coyote willow, mixed vegetation, and saltcedar habitats. Many of the coyote willow patches are showing some growth since the 2012 data were recorded and are extending their length and height class. Continuing south, riparian habitats begin to expand and become more contiguous with large patches of mature coyote willow.

No YBCUs were detected along this portion of the river. Habitat polygons on the east and west of the river channel classified from coyote willow1 through coyote willow 4 and scattered saltcedar 2, to mixed vegetation 3 provide adequate YBCU foraging habitat but contain no large over story species to provide adequate canopy cover. No large pecan orchards occur adjacent to the river channel along this stretch.

Further downstream in the lower reaches (Hatch Reach map 3 of 8), very good SWFL habitat exists in the form of large patches of mature coyote willow 4 and coyote willow 5 banks and islands. Several stretches along the banks have matured from coyote willow 1 to coyote willow 2 and are in close proximity with large mature coyote willow 4 islands.

One SWFL was detected (unsolicited) in this stretch of river. The SWFL was detected audibly whitting from saltcedar 1 habitat.

Interestingly, a single adult beaver was observed. This observation is of interest due to the extended and repeated periods of completely dry river channel from Caballo Dam, south to El Paso over the past several years.

A wider no-mow zone area begins on the eastern side of the river channel between Jaralosa Arroyo and Yeso Arroyo at 6 km north of the highway 187 bridge (crossing to Salem) the no-mow zone includes both sides of the river channel and extends south to just past the 187 bridge. Throughout this stretch in the no-mow zones there is very little riparian species growth and bare ground, weedy species, grasses, and low shrubs dominate. These no-mow areas overlap with several restoration sites including Jaralosa, Yeso, and

Crow Canyon. Further description of these no-mow zones associated with the restoration sites can be found in the restoration site sections. A broad no-mow zone south of the Crow Canyon restoration sites running downstream to the 187 bridge is largely comprised of heavily disturbed open weedy species with sparse shrub component and a great deal of bare ground. A few large cottonwoods occur within this stretch but are too few to comprise YBCU habitat.

3.1.3 Lower Rio Grande Canalization Project from 187 Bridge (2.1 miles north of Hatch) to 140 Bridge (south of Ricon)

Approximately 85 percent of the saltcedar in this stretch of the Rio Grande is suffering the effects of *Diorhabda* and is showing signs of moderate to severe stress. This 12.0-river-km stretch (7.5river-mile) currently has more overall stress from *Diorhabda* than stretches surveyed upstream.

Overall habitat quality in this section is fairly low for SWFLs and very low for YBCUs. A few areas toward the end of this stretch currently provide some coyote willow 3 and coyote willow 4 habitat with flooded understory habitat for some fairly large sections (USBR 2013; Hatch Reach map 6 of 8).

No YBCUs were detected during this survey effort. None of the habitat polygons provide good habitat for YBCUs and a few polygons of broad, old growth saltcedar may provide marginal habitat. Foraging habitat in portions of this river section, primarily in the form of coyote willow 1, coyote willow 2, coyote willow 3, saltcedar 1, saltcedar 2, mixed vegetation 1, and mixed vegetation 2 currently persist, but large over story canopy is lacking throughout.

No SWFLs were detected in this stretch of river. A stretch of good to very good habitat for SWFLs currently exists for approximately 1 km in the form of coyote willow 1 through coyote willow 4 with a relatively narrow river channel between wide swaths of coyote willow (Hatch reach map 6 of 8).

Habitat classifications from 2012 remain the same for much of the upper portion of this river stretch but many polygons have undergone decreases in suitability classification, particularly toward the southern end of this section (Hatch reach maps 5 and 7 of 8). The general trend is mixed vegetation 1 and coyote willow 1 habitat now downgraded to Class 0 in many areas and for very long stretches toward the end of this river stretch. It is unclear what has led to the long stretches of vegetation no longer meeting the requirements of coyote willow 1 or mixed vegetation 1 habitat. These sections are now very thin in width, sparse in length, and often gone altogether.

Arroyo Sediment traps located within this stretch includes Thurman I, Thurman II, Placitas and Garcia Arroyo. Thurman I and Thurman II currently provide little to no riparian habitat away from the river. Adjacent to the river, Thurman II has some mixed habitat that may develop into suitable SWFL habitat but not for YBCU. Vegetation at Placitas Arroyo is xeric and thin and much of the former coyote willow habitat at the river confluence has been mowed and is now a zero. Vegetation at the Garcia Arroyo sediment trap currently consists of a mature coyote willow stand in category 4 and 5 along the river bank providing suitable habitat for SWFL. Island destabilization treatment areas in this section near the Salem Bridge (highway 391) appear to have reduced the upstream portion of the first main island treated from coyote willow category 3 down to a coyote willow 1. The downstream two-thirds of the island remain largely coyote willow 3. The next island down on the north east bank remains a large developed category

4 and 5 coyote willow patch. Both of these islands continue to provide suitable habitat for SWFLs but not for YBCUs.

The no-mow zones in this stretch begin on both sides of the river channel at the Hatch bridge (highway 26) and run downstream to the railroad crossing (railroad road to Rincon). Throughout this stretch the north and northeast side of the river has a great deal of saltcedar growth while the south and southeast side of the river has very little vegetation from the river edge to the levee road and is heavily disturbed. At the downstream end of these no-mow sections there is overlap with restoration sites at Rincon Siphon. A section of this river stretch just downstream from the 154 Bridge at Rincon is very dangerous and should be avoided by boat or kayak.

3.1.4 Lower Rio Grande Canalization Project from 140 Bridge (south of Ricon) to Pasture 18

Much of the saltcedar in this 15.4-river-km (9.5-river-mile) stretch of the Rio Grande is suffering the effects of *Diorhabda* and is severely stressed. *Diorhabda* were present in one area where both SWFLs and YBCUs were observed in an isolated patch of heavily stressed saltcedar (308333E / 3612325N). This specific location is at the confluence of Bignell Arroyo which is listed as a potential restoration site. Vegetation at this site remains a large mixed vegetation 4 patch with open mixed vegetation 3 to 4 on the north side of Bignell Arroyo. This arroyo becomes very xeric within 200 m upstream of the river. Saltcedar began to exhibit stress and severe browning from beetle infestation beginning at UTM 310319E / 3609818N. The stress and mortality of saltcedar along this stretch of the river appear to be changing the dominant vegetation component significantly. In many areas, coyote willow is now the dominant live woody vegetation along the banks with expanding stands of screwbean mesquite.

YBCU detections were associated with tall, mature stands of brown saltcedar with a significant live coyote willow component. There were combinations of pecan orchards with coyote willow and mixed vegetation; similar to those being utilized by YBCUs downstream of Leasburg Bridge. The island/bar destabilization section just up from the Rincon Arroyo has transitioned from a coyote willow 3 habitat to a mixed vegetation category 3 with coyote willow, saltcedar, and screwbean mesquite. This habitat is not suitable for YBCU but is suitable for SWFL, and one was detected in this patch while conducting surveys.

There were several patches and islands with mature coyote willow and mixes of coyote willow and saltcedar that were suitable for SWFLs. Several detections were made throughout this survey stretch (see Figure 2). Most of the habitat classifications from 2012 remain the same for this portion of the RGCP. However, with saltcedar die offs and maturation of coyote willow and screwbean mesquite, many of the areas now range from Class 0 to Class 1, and Class 1 to Class 2. Many of the saltcedar areas have transitioned to mixed vegetation. A few stretches where clearing/treatment has recently occurred were downgraded from coyote willow 1 and saltcedar 1 to Class 0. Several Painted Buntings (*Passerina ciris*) were observed utilizing small to mid-sized screwbean mesquite on both sides of the river throughout the survey area.

Habitat at Rock Canyon arroyo sediment trap remains a wide swath of saltcedar currently suffering some signs of *Diorhabda* stress. YBCUs were heard near the confluence of Rock Canyon Arroyo and the river. Downstream at Horse Canyon Arroyo vegetation along both banks has now become category 2 mixed riparian vegetation running up the arroyo for about 100 m.

In the section from bridge 140 at Rincon, downstream to Pasture 18, no-mow zones begin on both sides of the river channel at 1.35 km downstream from the 140 bridge and continues for 3.5 km. Vegetation on both sides of the river away from the riparian vegetation associated with the river bank is comprised of very little riparian species growth with bare ground, weedy species, grasses, and low shrubs dominate. In the continuation of this no-mow zone downstream for 2.5 km on the northeast side of the river only, the vegetation is the same.

3.1.5 Lower Rio Grande Canalization Project from Pasture 18/Honer Property to Leasburg Bridge

This 14-river-km section (8.6-river-mile) contains several patches of mixed vegetation, primarily comprised of coyote willow and saltcedar that provide potential habitat for YBCUs and SWFLs. Both YBCUs and SWFLs were detected during the current habitat assessment. Species often associated with SWFLs, including Bell's vireo (*Vireo bellii*), common yellowthroat (*Geothlypis trichas*), and yellow-breasted chat (*Icteria virens*) were present in several of the habitat patches.

Much of the saltcedar in this stretch of the Rio Grande is suffering the effects of *Diarhabda* and is severely stressed from pasture 18 (312300E / 3603634N) south to Selden Point Bar (Figure 3). There was one exception just upstream of Selden Point Bar where a marsh is present on the east side of the river. South of Selden Point Bar, the saltcedar begins to green up and continues to exhibit low levels of stress until downstream of Leasburg Dam. The stress (browning) becomes more apparent at that point. The saltcedar away from the river banks seem to have a higher stress level and are much browner overall.

The stress and mortality of saltcedar along this stretch of the river are already changing the dominant vegetation component significantly. In many areas, coyote willow is now the dominant live woody vegetation along the banks with vigorous screwbean mesquite growing just behind.

Unlike the YBCU detections made further downstream, these individuals did not seem to be associated with habitats adjacent to pecan orchards and were instead utilizing coyote willow stands adjacent to mature, dying/dead saltcedar stands.

Most of the habitat classifications are still correct. However, with saltcedar die offs and maturation of coyote willow and screwbean mesquite, many of the areas were upgraded from Class 0 to Class 1, and from Class 1 to Class 2. Many of the saltcedar areas are now mixed vegetation. A few areas where saltcedar clearing/treatment has occurred were reclassified to Class 0.

Figure 3. Saltcedar North of Selden Point Bar Showing Severe Stress from *Diorhabda*

3.1.6 Lower Rio Grande Canalization Project from Leasburg Bridge to Shalem Colony Bridge

Almost the entire length of the east side of this section is a thin no-mow zone area. Many of the large polygons previously designated along this 16-river-km (10-river-mile) stretch as saltcedar 1 and saltcedar 2 are now mixed vegetation 1, mixed vegetation 2, and a few mixed vegetation 3. Screwbean mesquite (*Prosopis pubescens*) is quite prevalent (sometimes over 50 percent) in several sections of habitat for this stretch of the river. Some sections have decreased from coyote willow 1 to a Class 0 classification. As with other stretches to the south toward Mesilla Dam, some of the river bank has been mowed since classifications were made in 2012. One habitat section just north of Shalem Colony Bridge previously designated a coyote willow 4 is now barely a coyote willow 1.

No contiguous habitat in this stretch of the river currently has both over story and mid story components considered suitable for YBCUs. However, adequate foraging habitat does exist in the form of long stringers of saltcedar, coyote willow, and mixed vegetation in Classes 1 through 3 that are adjacent to, or across the river channel from large old growth pecan orchards. Habitat segments within the stretch surveyed for this effort appear to provide potentially suitable YBCU nesting habitat in close proximity to adequate foraging habitat. This supposition is supported by the fact that three YBCUs were detected south of the North Main Bridge during this habitat assessment survey. There are approximately 9 km of this habitat type within this stretch of the river.

Several areas currently falling into categories of mixed vegetation 3 and screwbean mesquite 2 appear to provide habitat potentially suitable for SWFLs. This assertion is supported by the fact that four individual SWFLs were detected in the stretch during this survey effort in these habitat types. Much of the saltcedar habitat has been affected by saltcedar leaf beetles (*Diorhabda* spp.) Many stretches of saltcedar 1 and saltcedar 2 are showing obvious signs of stress. In other large stretches the saltcedar appears to be completely dead. Many of these stretches show robust growth of screwbean mesquite (Figure 4).

Figure 4. Mixed Vegetation Habitat with Saltcedar Showing Effects of *Diorhabda* and Green Screwbean Mesquite Trees South of Leesburg Dam

Also of note during this survey was the detection of Plains leopard frogs (*Lithobates blairi*) at the North Main Bridge south of Leesburg State Park (Figure 5). Several young leopard frogs were seen and two individuals were captured and photographed. This collection represents a county record for Doña Ana County, NM. Leopard frogs are very rarely encountered in the Rio Grande River system.

Figure 5. *L. blairi* Captured under the North Main Bridge Just below Leesburg Dam State Park

3.1.7 Lower Rio Grande Canalization Project from Shalem Colony Bridge to Picacho Bridge

Kayak and pedestrian surveys were conducted along this 9.0-river-km (5.6-river-mile) section. Less than 5 percent of the saltcedar in this stretch of the Rio Grande is suffering effects of *Diorhabda*. No-mow zones occur on both sides of the river through this stretch. A few saltcedar are moderately to severely stressed near the north end of this portion of river.

Overall habitat quality in this section is fairly low for SWFLs and YBCUs. One YBCU was detected during this survey effort cooing from the pecan orchard habitat at Shalem Colony Bridge. This pecan orchard is located 130 m east of the river bank. Several stretches of river bank have foraging habitat in the form of coyote willow 1 and mixed vegetation 1. The mixed vegetation in several areas at the beginning of this stretch of river is comprised of screwbean mesquite mixed with coyote willow and saltcedar. Foraging habitat along the river bank in close proximity to the pecan orchard (within 300 m) likely provides suitable habitat for YBCUs (Figure 6).

Figure 6. Thin Coyote Willow and Screwbean Mesquite Habitat along the River Bank with Large Mature Pecan Orchards in the Background

No SWFLs were detected during this habitat survey in this stretch of river. Very little habitat along this stretch of river provides good nesting habitat for SWFLs. A few reaches of coyote willow 1 are growing and changing to mixed vegetation 1 and may provide some adequate SWFL habitat within another year or two if water remains in the river for prolonged periods of time in the future.

Beginning at the Shalem Colony Bridge, long stretches of habitat have been greatly altered and degraded since the 2012 survey effort. Long stretches formerly categorized as coyote willow 1 and mixed vegetation 1 are now Class 0 with very sparse or no riparian vegetation remaining. A few of the habitat classifications from 2012 have improved from coyote willow 1 to mixed vegetation 1 and from Class 0 to coyote willow 1 and mixed vegetation 1 (Las Cruces Reach map 5 of 10). The general trend throughout this section is transition of polygons formerly categorized as mixed vegetation 1 and coyote willow 1 to

now be sparse, spotty, and thin ribbons of habitat not making the 10-m width requirement. It is unclear what has led to the long stretches of vegetation no longer meeting the requirements of coyote willow 1 or mixed vegetation 1 habitat. These sections are now very thin in width, sparse in length, and often gone altogether.

A no-mow zone exists at the Shalem Colony restoration site along this section of the survey. A portion of the coyote willow habitat north of the bridge has had some reduction of coyote willow as describe in the restoration site section. No-mow areas also occur at the Leasburg Lateral and expansion restoration sites and are further described in the restoration section below. A no-mow zone 1-km long on the east bank ends at 2 km north of the Picacho Bridge (hwy 70) currently has mostly bare ground and weedy species. Saltcedar treatment has occurred at this site and the very few that are here are young sprouts and are stressed from *Diorhabda.*

3.1.8 Lower Rio Grande Canalization Project Picacho Bridge to Mesilla Dam

Overall, this 10.5-river-km (6.5-river-mile) stretch of the RGCP currently provides fairly limited habitat for YBCUs and a few stretches of adequate habitat for SWFLs that may see improvement in the next few years if water levels remain adequate. No-mow zones occur along almost the entire stretch on both sides of the river. Much of the bank habitat in this stretch has thin stringers of coyote willow that are nearly wide enough to be coyote willow (10 m) but may need another season of growth (Figure 7). These may lack sufficient width to be considered suitable SWFL habitat.

Figure 7. Thin Strip of Coyote Willow that Barely Qualifies as Class 1

Very little habitat in this stretch of the river is currently considered suitable for YBCUs; these results are similar to those recorded in 2012. Adequate foraging habitat for YBCUs does exist in the form of long thin stringers of coyote willow and mixed vegetation in Class 1 or 2 that are adjacent to large old growth pecan orchards. These stretches may provide suitable YBCU nesting habitat in close proximity to adequate foraging habitat.

A small section south of the Interstate 10 Bridge has habitat that is considered marginally adequate for SWFLs and should be considered for future surveys. This habitat was characterized in 2012 as bank coyote willow 1 and mixed vegetation 1 on the east side, and Class 0 on the west bank. This stretch of the river channel has experienced considerable growth on several islands of coyote willow, and the banks on both sides have coyote willow 2 to coyote willow 3, and mixed vegetation 1 and mixed vegetation 2 habitats (Figure 8). The close proximity of the bank vegetation and the island vegetation combine to make this area a probable Class 3 (moderately suitable) with potential to become better with more consistent water availability.

Figure 8. Braided River Channel and Island Habitat South of Interstate 10

Most of the remainder of the river from Picacho Bridge to Mesilla Dam continues to provide Class 0, 1, and 2 habitats. Some stretches on the west side associated with the southern portion of the Mesilla Valley Bosque State Park area provide large saltcedar and mixed riparian habitat that is adequate for SWFLs and possibly YBCUs. Two large patches of mixed riparian habitat are class mixed habitat 3 and mixed habitat 4, and are associated with the confluence of two unnamed arroyos located at 0.65 and 1 mile upstream from Mesilla Dam. These sites lie south of the current Mesilla Bosque restoration site but are listed as potential sites. Several areas along the banks have improved in classification from Class 0 to Class 1, while in some stretches (near Mesilla Dam on the east bank) stretches that were formerly classified as coyote willow 1, are now Class 0 with short coyote willow that appears to have been mowed, and no longer meet the 3-m minimum height requirement for a Class 1 categorization.

No-mow zones from Picacho Bridge to Mesilla Dam overlap restoration sites including Clark Lateral, and the Mesilla Valley Park sites. Vegetation and current condition of these sites is described in the restoration site section.

3.1.9 Mesilla Dam to Country Club Road Bridge

This 51.5-river-km survey stretch (32-river-mile) covers from Mesilla Conversion Dam in Doña Ana County, New Mexico south to Country Club Road in El Paso County, Texas. No-mow zones occur on both sides of the river throughout this stretch. From Mesilla Diversion Dam south to the Mesquite exit at Bridge 192, the vast majority of the river is lined with a very narrow border of coyote willow, almost none of which is wide enough to classify as coyote willow 1. In limited areas along this stretch there are limited stands of saltcedar never comprising more than 5 percent of the habitat. Saltcedar throughout this stretch is not currently suffering obvious effects of *Diorhabda*. Several areas around bridges and islands previously designated coyote willow 4 do not currently meet the 3-m height requirement, and few exceeded the 10-m width requirement. It appears that in this stretch, mowing and brush clearing are occurring directly to the river's edge, leaving only a thin line of coyote willow. There is evidence of brush clearing away from the river behind these thin strands of coyote willow, with what is obviously old coyote willow slash. One area in this stretch stands out, an area 0.7 mile north of the bridge over Highway 178 on the east bank of the river. This area was labeled in 2012 as saltcedar 2 and still remains that classification.

From Bridge 192 south to West Berino Road at Bridge 226 almost all of the coyote willow does not meet the 10-m width requirement (and much does not meet the 3-m height requirement) to be coyote willow 1, and is more appropriately labeled as coyote willow 0. Much of the western bank is not vegetated with willow at all; and what is vegetated is barely one plant thick and typically under 2 m in height. The eastern bank is more thickly vegetated and taller, but the opposite side can be seen through most of it. Immediately south of Bridge 192, a small patch of tall previously classified as coyote willow 4 is now a coyote willow 3. About 2.9-river-km down from the bridge, a vegetated island at a western bend in the river provides a 0.4-km stretch of eastern shore formerly classified as coyote willow 1 and currently classified as coyote willow 4.

Saltcedar in this stretch comprises approximately 10 percent of the habitat showing limited effects from *Diorhabda*. Pecan orchards parallel much of the river in this stretch, typically separated from the river by the levee road and a mowed/disturbed area down to the river with some areas having pecan orchards right to the river edge. Future survey efforts to ascertain presence of YBCUs in the orchards may yield interesting results.

From West Berino Road (Bridge 226) south to Country Club Road the vast majority of river bank is lined with a narrow band of coyote willow 0. Stands of saltcedar never comprise more than 5 percent of the habitat. In this stretch of the river very little of the saltcedar are currently suffering effects of *Diorhabda*. As seen on river stretches to the north, several areas around bridges and islands previously labeled coyote willow 4 do not currently meet the 3-m height requirement, and few meet the 10-m width requirement. It appears that at least in this, and the stretches above, that mowing and brush clearing are occurring directly to the river's edge, leaving only a line of coyote willow typically less than 3-m thick.

Overall for this entire 51.5-km stretch, current habitat conditions provide less than adequate habitat for SWFLs or YBCUs. Pecan orchards may provide foraging habitat for YBCUs but this assertion should be determined following future survey efforts to determine the extent of YBCU use of pecan orchard habitat.

No-mow zones exist just north of the bridge at West Berino Road which overlaps restoration sites Berino East and Berino West. Vegetation at these sites includes pole plantings of riparian species that are still quite young but many are established and have potential to increase habitat suitability in years to come. Vegetation outside of the restoration sites is largely comprised of shrubby species and saltcedar. No-mow zones also overlap the Vinton A and B sites. All of these sites are described in more detail in the restoration sites section.

3.1.10 Lower Rio Grande Canalization Project from Country Club Road Bridge in El Paso, TX to Sunland Park Drive Bridge in El Paso, TX

Approximately 50 percent of the saltcedar in this 7.47-river-km (4.64-river-mile) stretch of the Rio Grande is brown and severely stressed from the effects of *Diorhabda* and the larvae was observed on saltcedar in this section of the river. No-mow zones occur on both sides of the river throughout the entire stretch. This area also had what looked like a fire in a large saltcedar 2 polygon, where many cottonwoods were burned with very little new cottonwood saplings emerging. The exception to this was a large patch of cottonwood saplings in the middle of the saltcedar 2 polygon. There were some single-standing cottonwood trees in the mowed area along this stretch on the east side of the river that might provide better habitat in the future if these areas were not mowed and were allowed to grow back.

The overall habitat quality in this stretch of the river was low to moderate for SWFLs and YBCUs compared to other areas much further upstream. The predominate areas that do offer some potential habitat were a large area of saltcedar 2 and a large area of coyote willow 3, that now classifies as mixed vegetation 3 as well as a small patch of coyote willow 1 that has become mixed vegetation 2.

No YBCUs were along this portion of the survey. Two habitat polygons now designated as mixed vegetation 3 and mixed vegetation 2 may be potentially utilized by YBCUs for foraging habitat. No pecan orchards were near this stretch.

In this stretch, two willow flycatchers were detected visually and appeared to be a pair in a large un-mowed habitat polygon that was changed from coyote willow 3 in 2012 to mixed vegetation 3 in 2016. With so much saltcedar being affected by the beetle in this stretch, the saltcedar 2 may become mixed vegetation 2 or coyote willow 2 in the future. A polygon of coyote willow 3 has changed into mixed vegetation 3 in this stretch, and a long stretch of coyote willow 1 is now split into mixed vegetation 2 and coyote willow 1.

Over 3.36 km (2.1 miles), nearly half of the entire stretch, has low or moderate habitat for SWFLs and YBCUs. There may be potential for improved habitat north of the SWFL sighting in the now mixed vegetation 3 polygon if this area is no longer mowed around the cottonwood trees. The trend in this stretch is more diversity in vegetation species with the coyote willow 3 turning to mixed vegetation 3, and part of a coyote willow 1 polygon turning to mixed vegetation 2. The saltcedar 2 polygon may be more diverse in the future due to so many saltcedar dying from *Diorhabda*.

In this stretch several no-mow zones overlap multiple restoration sites including, from north to south, NeMexas Siphon, Country Club East, Sunland Park and Anapra Bridge. Current conditions of these no-mow zones are addressed in the restoration sites section. No-mow zones along the banks of the river south of NeMexas Siphon and Country Club East have thin strips of riparian habitat (discussed in trip report

section). The large no-mow polygon on the east bank running south of the Country Club East restoration site are vegetated with scattered shrubs and intermittent grass cover, a few larger saltcedar and a lot of bare ground. No YBCU or SWFL habitat occurs in this no-mow zone. The large no-mow zone on the west and southwest side of the river across from the Sunland Park restoration site is heavily disturbed with sparsely scattered shrubs and a great deal of bare ground. A small section toward the north end of this no-mow zone has a narrow wooded strip of fairly large mixed vegetation growing that is currently to sparse to provide YBCU or SWFL habitat.

3.1.11 Lower Rio Grande Canalization Project from Sunland Park Drive Bridge in El Paso, TX to 0.3 Mile South of Executive Center Blvd in El Paso, TX (the survey end)

Approximately 30 percent of the saltcedar in this 4.8-river-km (3-river-mile) stretch of the Rio Grande is currently severely stressed from the effects of the *Diorhabda* and the larvae were observed on saltcedar in this section of the river. No-mow zone areas occur on both sides of the river in this stretch. The overall habitat quality in this stretch of the river is extremely low for SWFLs and YBCUs compared to other areas upstream. The areas that do offer some potential low quality habitat were two vegetated sand bars just east of the Highway 498 bridge in El Paso, TX. The two vegetated sandbars were coyote willow 2 and coyote willow 4 in 2012, but now both appear to be coyote willow 2 with saltcedar dying on both.

No YBCUs were detected during this portion of the survey. A habitat polygon about 0.5-mile north of the Sunland Park Bridge designated as coyote willow 3 in 2012 has become mixed vegetation 3 and is suitable habitat for YBCUs. Foraging habitat in this stretch is primarily the two coyote willow 2 vegetated sandbars just east of the Highway 498 bridge.

No SWFLs were detected in this stretch. A habitat polygon for mixed vegetation 3 is about 0.5-mile north of the Sunland Park Bridge and is a lower quality suitable habitat for SWFLs. The majority of this stretch is Class 0 with two vegetated sandbars east of the Highway 498 bridge designated as coyote willow 2.

Overall the vegetation in this stretch has not grown wide enough or tall enough to be considered more than a Class 0 and the saltcedar is dying due to the introduction of the saltcedar beetle. About 0.5-mile upstream the vegetation has seen positive improvements in habitat for both YBCUs and SWFLs, but this stretch for the most part has not changed since 2012. A vegetated sandbar was designated as a coyote willow 4 in 2012, but appears to be only a coyote willow 2 in 2016.

3.2 Biological Survey of Restoration Sites in the RGCP

Pedestrian and vehicular surveys were conducted at each of the restoration sites located along the RGCP. The objectives of the surveys were to update vegetation descriptions and overall habitat condition, and to determine current habitat suitability for YBCUs and SWFLs.

3.2.1 Restoration Site – *Trujillo*

The southern end of this site has thick coyote willow (Figure 9) but is currently too short for status other than Class 0. In the future, it might provide attractive habitat to SWFLs. Moving north, the habitat along the river is a Class 0 (short coyote willow). The middle and northern part of the side is open and disturbed. Where the Trujillo Arroyo flows to the river, the habitat is Class 0 at the river but with no

mowing and some water in the river may become a coyote willow 1 in a couple of years, and a mixed vegetation 1/2 (coyote willow/saltcedar) further up the arroyo (Figure 10). Flora and fauna species on the site are listed in Tables 1 and 2.

Figure 9. Southern End of Site with Thick, Short Coyote Willow

Figure 10. Where the Trujillo Arroyo Flows to the River

Table 1. Plants Observed at Trujillo Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida spp.	three-awn grasses
Ericameria nauseosus	rubber rabbitbrush
Distichlis spicata	saltgrass
Kochia scoparia	kochia
Muhlenbergia asperifolia	alkali muhly
Prosopis glandulosa	honey mesquite
Salix exigua	coyote willow
Sphoralcea coccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm
Populus deltoides	cottonwood

Table 2. Faunal Species Observed at Trujillo Restoration Site

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Carpodacus mexicanus	house finch
Crotalus atrox	western diamondback rattlesnake
Eumeces obsoletus	Great Plains skink
Ondrata zibethicus	muskrat
Sayornis nigircans	black phoebe
Spizella passerina	chipping sparrow
Zenaida asiatica	white-winged dove

3.2.2 Restoration Site – *Jaralosa*

This site is characterized as saltcedar1 along the river; however, multiple Class 0 gaps occur (Figure 11). Saltcedar along the riverbank are vigorous and not currently showing signs of *Diorhabda*. Away from the river, saltcedar are small and stressed (Figure 12). Amaranthus, mesquite, and rabbitbrush are also present on the site away from the river. There is currently no suitable YBCU nor SWFL habitats present. Flora and fauna species on the site are listed in Tables 3 and 4.

Figure 11. Jaralosa Restoration Site Showing Multiple Class 0 Gaps

Figure 12. Away from the River, Showing Small and Stressed Saltcedar

Table 3. Plants Observed at Jaralosa Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	Smooth pigweed
Ericameria nauseosus	rubber rabbitbrush
Prosopis glandulosa	honey mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Sphaeralcea coccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar

Table 4. Faunal Species Observed at Jaralosa Restoration Site

Scientific Name	Common Name
Aspidoscelis exsanguis	Chihuahuan spotted whiptail
Butorides virescens	green heron
Callipepla gambelii	Gambel's quail
Canis latrans	coyote
Cardinalis sinuatus	pyrrhuloxia
Corvus brachynchos	American crow
Petrochelidon pyrrhonota	American cliff swallow

3.2.3 Restoration Site – *Yeso Arroyo*

This site is characterized as saltcedar 1 on the east bank (Figure 13). Away from the river, vegetation is dominated by scattered, stressed saltcedar, honey mesquite, rabbitbrush and ephedra. The west bank is characterized as saltcedar 2. South of the arroyo is mature saltcedar 3 habitat with a single cottonwood (Table 5). This area, if water remains in the river, provides marginal to good SWFL habitat. No YBCU habitat is present at this site. Faunal species observed at this restoration site are listed in Table 6.

Figure 13. Eastern Portion of Site, Characterized as Saltcedar 1 on the East Bank

Table 5. Plants Observed at Yeso Arroyo Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida spp.	three-awn grasses
Ephidra torreyana	Mormon tea
Ericameria nauseosus	rubber rabbitbrush
Distichlis spicata	saltgrass
Kochia scoparia	kochia
Muhlenbergia asperifolia	alkali muhly
Populus deltoides	cottonwood
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Sphoralcea coccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar

Table 6. Faunal Species Observed at Yeso Arroyo Restoration Site

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Carpodacus mexicanus	house finch
Dendroica petechia	yellow warbler
Petrochelidon pyrrhonota	cliff swallow
Procyon lotor	raccoon
Spizella passerina	chipping sparrow

3.2.4 Restoration Site – *Yeso East*

This site is away from the river and is currently categorized as Class 0 (Figure 14). There are young, stressed saltcedar with scattered rabbitbrush. This site is currently unsuitable for either SWFLs or YBCUs (Table 7). There is a pecan orchard to the east of this site and YBCUs might occupy this orchard and fly through the site to forage along the river. A variety of wildlife was present at this restoration site (Table 8).

Figure 14. Sparsely Vegetated Yeso East, Located Away From the River

Table 7. Plants Observed at Yeso East Restoration Site

Scientific Name	Common Name
Distichlis spicata	saltgrass
Ericameria nauseosus	rubber rabbitbrush
Kochia scoparia	kochia
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Sphoralcea coccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar

Table 8. Faunal Species Observed at Yeso East Restoration Site

Scientific Name	Common Name
Cardinalis mexicana	pyrrhuloxia
Canis latrans	coyote
Dendroica petechia	yellow warbler
Geomyidae	gopher
Lepus californicus	black-tailed jackrabbit
Otospermophyilus variegatus	rock squirrel
Petrochelidon pyrrhonota	cliff swallow
Procyon lotor	raccoon
Spizella passerina	chipping sparrow
Tyrannus verticalis	western kingbird

3.2.5 Restoration Site – *Yeso West*

This site is categorized as saltcedar 2 along the river with mature screwbean mesquite behind it (Figures 15 and 16). Saltcedar at this site is vigorous and not currently showing signs of *Diorhabda*. During a wet year, this area provides moderately suitable habitat for SWFLs (Table 9). This habitat provides some YBCU foraging habitat within close proximity to a small pecan orchard on the east side of the river that could be utilized by YBCUs. Three softshell turtles were observed basking where the arroyo meets the river on the southern boundary of the site (Table 10).

Figure 15. Saltcedar 2 Habitat North of the Arroyo at Yeso West

Figure 16. Saltcedar 2 Habitat along the River at Yeso West

Table 9. Plants Observed at Yeso West Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Ericameria nauseosus	rubber rabbitbrush
Kochia scoparia	kochia
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Sphaeralcea coccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar

Table 10. Faunal Species Observed at Yeso West Restoration Site

Scientific Name	Common Name
Apalone spinifera	softshell turtle
Amphispiza bilineata	black-throated sparrow
Contopis sordidulus	western wood peewee
Egretta thula	snowy egret
Lepus californicus	black-tailed jackrabbit
Megaceryle alcyon	belted kingfisher
Plegadis chihi	white faced ibis

3.2.6 Restoration Site – *Crow Canyon*

The Crow Canyon restoration site was previously divided into Crow Canyon A and B and is now separated into several separate sites (A1, A2, B1, B2, C, D). Descriptions for each are presented separately with vegetation and faunal lists combined at the end of the section (Tables 11 and 12).

Crow Canyon A1

The northwest end of this site is comprised of saltcedar 1 along the river (Figure 17). Away from the river, the site is dominated by small honey mesquite and rabbitbrush (Figure 18). There are six cottonwoods scattered widely across this site. Overall, this site provides no suitable habitat for YBCUs or SWFLs. Habitat across the river (mixed vegetation 3) currently provides marginally suitable habitat for SWFLs.

Figure 17. Saltcedar 1 Habitat along River Bank in the Northwest Portion of the Site

Figure 18. Away from the River, Honey Mesquite, Rabbitbrush, and Bare Ground

Table 11. Plants Observed at Crow Canyon Restoration Sites

Scientific Name	Common Name
Atriplex canescens	four-wing saltbush
Bacharis salicifolia	false seepwillow
Ericameria nauseosus	rubber rabbitbrush
Distichlis spicata	saltgrass
Muhlenbergia asperifolia	alkali muhly
Populus deltoides	cottonwood
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Sporobolus airoides	alkali sacaton
Sporobolus cryptandrus	sand dropseed
Sporobolus flexuosus	mesa droposeed
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 12. Faunal Species Observed at Crow Canyon Restoration Sites

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Aspidoscelis neomexicanus	New Mexico whiptail
Carpodacus mexicanus	house finch
Nycticorax nycticorax	black-crowned night heron
Ondrata zibethicus	muskrat
Picoides scalaris	ladder-backed woodpecker
Pituophis catenifer	gophersnake
Sayornis nigircans	black phoebe
Spizella passerina	chipping sparrow
Streptopelia decaocto	Eurasian collared dove
Tyrannus verticalis	western kingbird
Zenaida macroura	mourning dove

Crow Canyon A2

This site is mostly categorized as Class 0 along the river, with some saltcedar 1 and mixed vegetation 1. Away from the river, habitat is comprised of small saltcedar, medium screwbean mesquite, rabbitbrush and mixed grasses (Figure 19). All saltcedar are severely stressed from *Diorhabda*. There is no good SWFL or YBCU habitat present within the site. Across the river is a large patch of saltcedar 3 that currently provides marginally adequate SWFL habitat (Figure 20).

Figure 19. Riverside Rabbitbrush Vegetation (Class 0) with Saltcedar 1 and Mixed Vegetation 1 in Background

Figure 20. Saltcedar 3 Habitat across River (Marginally Suitable SWFL Habitat)

Crow Canyon B1

This site currently has mixed vegetation 1 (coyote willow/saltcedar/screwbean mesquite) along the river. The screwbean mesquite is exhibiting initial stress from *Diorhabda*. Away from the river the saltcedar is maturing (Figure 21). There are also rabbitbrush, dropseed grasses, and a small cluster of cottonwoods on the western end. Away from the river a large area of bare ground and highly disturbed habitat exists with an active bee hive cluster (Figure 22). No SWFL or YBCU habitat is currently present at this site.

Figure 21. Mixed Vegetation 1 along the River with Maturing Screwbean Mesquite and Scattered Rabbitbrush Away from the River

Figure 22. View of the Saltcedar 3 from East Levee toward Western Side of the River

Crow Canyon B2

This site includes some habitat categorized as mixed vegetation 1 (saltcedar/coyote willow) with a few cottonwoods (Figures 23 and 24). Current conditions provide no SWFL or YBCU habitat. Away from the river, the site has a dense dropseed grass/saltcedar component. The saltcedar at this site is extremely stressed by *Diorhabda*, particularly away from the river.

Figure 23. Mixed Vegetation 1 (Saltcedar/Coyote Willow) Away from the River Showing Dense Grass/Young Saltcedar Component

Figure 24. Mature Cottonwoods Adjacent to Mixed Vegetation 1 along the River Bank

Crow Canyon C

This site has saltcedar 1 vegetation along the river and mixed vegetation 2 comprised of coyote willow and saltcedar at the western end just below the lateral. The lateral currently provides a small section of marginal SWFL habitat. No YBCU habitat is present at this site (Figures 25 and 26). Habitat away from the river and lateral is highly disturbed and appears to be recently and consistently manipulated.

Figure 25. Highly Disturbed Habitat Away from the River in the Eastern Portion of the Site

Figure 26. Mixed Vegetation 2 (Coyote Willow/Saltcedar) along the Lateral Confluence at the Western End of the Site

Crow Canyon D

This site is primarily Class 0 along the river but there are some saltcedar 1 (browned from *Diorhabda*) and a few scattered Siberian elm (Figure 27). Away from the river, saltcedar are small, dense, and extremely stressed by *Diorhabda*. It appears likely that these saltcedar will die within the next few years. This site also has young growth of coyote willow. No habitats at this site currently provide suitable habitat for SWFLs or YBCUs.

Figure 27. Class 0 and Saltcedar 1 along the River and Young Saltcedar Away from the River

3.2.7 Restoration Site – *Placitas Arroyo*

This site is characterized as mixed vegetation1 along the river with saltcedar and coyote willow and is highly disturbed away from the narrow riparian strip (Figure 28). Along the southern third of this site, a pecan orchard is located across the river which may increase the possibility of use by YBCUs, but not SWFLs. The northern two-thirds of the site does not have habitat suitable for SWFLs or YBCUs. Away from the river, vegetation is stunted four-wing saltbush and weed species including Russian thistle and smooth pigweed (Table 13). Wildlife observed at this site is listed in Table 14.

Figure 28. Mixed Vegetation1 Habitat Strip along River and Disturbed Habitat Away From River

Table 13. Plants Observed at Placitas Arroyo Restoration Site

Scientific Name	Common Name
Atriplex canescens	four-wing saltbush
Prosopis glandulosa	honey mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 14. Faunal Species Observed at Placitas Arroyo Restoration Site

Scientific Name	Common Name
Amphispiza bilineata	black-throated sparrow
Contopis sordidulus	western wood peewee
Corvus brachyrhynchos	American crow
Recurvirostra americana	American avocet
Megaceryle alcyon	belted kingfisher
Plegadis chihi	white faced ibis

3.2.8 Restoration Site – *Rincon Siphon D*

The eastern quarter of this site is characterized as mixed vegetation 1 (saltcedar/coyote willow/screwbean mesquite) with Class 0 gaps along the river. Away from the river, the site is dominated by alkali sacaton grass (*Sporobolus airoides*) (Table 15). The western three-quarters of the site is also mixed vegetation 1 along the river and is dominated by short and scattered saltcedar/screwbean mesquite away from the river (Figure 29). This portion may develop into suitable SWFL habitat as the woody vegetation continues to mature. Flora and fauna species are presented in Tables 15 and 16.

Figure 29. Western Portion of the Site with Mixed Vegetation 1 along the River

Table 15. Plants Observed at Rincon Siphon D Restoration Site

Scientific Name	Common Name
Aristida species	unidentified threeawn grass
Astragalus sp.	locoweed
Distichlis spicata	saltgrass
Muhlenbergia asperifolia	alkali muhly
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Sporobolus airoides	sand dropseed
Tamarix ramosissima	saltcedar
Typha latifolia	broadleaf cattail

Table 16. Faunal Species Observed at Rincon Siphon D Restoration Site

Scientific Name	Common Name
Aspidoscelis exsanguis	Chihuahuan spotted whiptail
Canis latrans	coyote
Carpodacus mexicanus	house finch
Passerina caerulea	blue grosbeak
Geococcyx californianus	greater roadrunner
Geomyidae	gopher
Geothlypis trichas	common yellowthroat
Sylvilagus audubonii	desert cottontail rabbit
Xanthocephalus xanthocephalus	yellow-headed blackbird

3.2.9 Restoration Site – *Rincon Siphon B*

This site is currently categorized as mixed vegetation 3, with dense woodland dominated by large mature saltcedar, and mature screwbean mesquite (Figure 30). The southeast portion of this site is extremely stressed by *Diorhabda*. This site currently has good habitat for SWFLs and moderate YBCU habitat (Table 17). Several avian species were noted at this site (Table 18).

Figure 30. Dense Saltcedar and Screwbean Mesquite Woodland at North End of Site

Table 17. Plants Observed at Rincon Siphon B Restoration Site

Scientific Name	Common Name
Atriplex canescens	four-wing saltbush
Bacharis salicifolia	false seepwillow
Ericameria nauseosus	rubber rabbitbrush
Distichlis spicata	saltgrass
Muhlenbergia asperifolia	alkali muhly
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Rhus trilobata	skunkbush sumac
Salix exigua	coyote willow
Sporobolus airoides	sand dropseed
Tamarix ramosissima	saltcedar
Typha latifolia	broadleaf cattail

Table 18. Faunal Species Observed at Rincon Siphon B Restoration Site

Scientific Name	Common Name
Aspidoscelis exsanguis	Chihuahuan spotted whiptail
Canis latrans	coyote
Carpodacus mexicanus	house finch
Chondestes grammacus	lark sparrow
Geococcyx californianus	greater roadrunner
Geomyidae	gopher
Geothlypis trichas	common yellowthroat
Passerina caerulea	blue grosbeak
Pheucticus melanaocephalus	black-headed grosbeak
Vireo bellii	Bell's vireo

3.2.10 Restoration Site – *Rincon Siphon A*

This site is dominated by maturing screwbean mesquite and with browning and stressed saltcedar codominant. Habitat at this site is currently mixed vegetation 2 providing marginal SWFL habitat but YBCU habitat is not present due to lack of tall canopy cover. An SWFL was heard calling from saltcedar on the southeast side of this site. Vegetation away from the river is dominated by four-wing saltbush, honey mesquite, and rubber rabbitbrush (Table 19). Fauna detected during the habitat assessment is listed in Table 20.

Table 19. Plants Observed at Rincon Siphon A Restoration Site

Scientific Name	Common Name
Atriplex canescens	four-wing saltbush
Bacharis salicifolia	false seepwillow
Ericameria nauseosus	rubber rabbitbrush
Distichlis spicata	saltgrass
Muhlenbergia asperifolia	alkali muhly
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Tamarix ramosissima	saltcedar

Table 20. Faunal Species Observed at Rincon Siphon A Restoration Site

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Aspidoscelis neomexicanus	New Mexico whiptail
Carpodacus mexicanus	house finch
Chondestes grammacus	lark sparrow
Empidonax traillii	willow flycatcher
Picoides scalaris	ladder-backed woodpecker
Sayornis nigircans	black phoebe
Spizella passerina	chipping sparrow
Tyrannus verticalis	western kingbird
Zenaida macroura	mourning dove

3.2.11 Restoration Site – *Rincon Siphon C*

This site has a small patch of coyote willow 1 along the river near the bridge. Away from the river the site is highly disturbed with scattered screwbean mesquite, honey mesquite, and weedy vegetation (Figure 31). Although flycatchers have occupied this area, the site currently does not currently provide habitat suitable for YBCUs or SWFLs. The site appears to have opened up since the original 2012 classification and habitat is currently classified as coyote willow 2. Vegetation and fauna detected are presented in Tables 21 and 22.

Figure 31. Disturbed Habitat Away from River with Coyote Willow along River

Table 21. Plants Observed at Rincon Siphon C Restoration Site

Scientific Name	Common Name
Atriplex canescens	four-wing saltbush
Distichilis spicata	saltgrass
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Tamarix ramosissima	saltcedar

Table 22. Faunal Species Observed at Rincon Siphon C Restoration Site

Scientific Name	Common Name
Actitis macularius	spotted sandpiper
Apolone spinifera	Spiny softshell turtle
Ardea herodias	great blue heron
Contopis sordidulus	western wood peewee
Plegadis chihi	white faced ibis

3.2.12 Restoration Site – *Angostura Arroyo*

Overall, this site is heavily disturbed and is categorized as Class 0 to mixed vegetation 1 (saltcedar and coyote willow) on both sides of the river (Figure 32). The saltcedar along the river banks is currently under heavy stress from *Diorhabda*. This site does not currently provide suitable habitat for SWFLs or YBCUs. Vegetation and fauna detected are presented in Tables 23 and 24.

Figure 32. Heavily Disturbed Upland with Mixed Vegetation 1 Habitat on Both Sides of the River

Table 23. Plants Observed at Angostura Arroyo Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida species	unidentified threeawn grass
Astragalus sp.	milkvetch
Atriplex canascens	fourwing saltbush
Bacharis salicifolia	false seep willow
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Tamarix ramosissima	saltcedar

Table 24. Faunal Species Observed at Angostura Arroyo Restoration Site

Scientific Name	Common Name
Agelaius phoeniceus	red-winged blackbird
Geococcyx californianus	greater roadrunner
Zenaida macroura	mourning dove

3.2.13 Restoration Site – *Pasture 18*

This site is a large wooded thicket on the northeast side of the long river bend with steep rocky slopes leading to cliffs to the north and northeast. Habitat along the river bank is comprised of broad mixed vegetation 4 (Figure 33). This mixed vegetation habitat is dominated along the river by a tall thick strip of coyote willow and grades into a broad mature stand of saltcedar, and honey mesquite with some screwbean mesquite. A few large Gooding's willow and small cottonwood are also present within the broad thicket. The saltcedar are currently showing moderate signs of *Diorhabda* stress in the southeast portion of the site becoming more prevalent at the northwest end of the site. This site currently provides good habitat for SWFLs and moderate habitat for YBCUs. Vegetation and fauna species recorded during the survey are presented in Tables 25 and 26.

Figure 33. Mixed Vegetation 4 Habitat at Pasture 18 Restoration Site

Table 25. Plants Observed at Pasture 18 Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Atriplex canascens	four-wing saltbush
Kochia scoparia	kochia
Populus deltoides	cottonwood
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix gooddingii	Gooding's willow
Salix exigua	coyote willow
Solanum elaegnifolium	silverleaf nightshade
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar

Table 26. Faunal Species Observed at Pasture 18 Restoration Site

Scientific Name	Common Name
Aix sponsa	wood duck
Anas diazi	Mexican mallard duck
Calidris minutilla	least sandpiper
Hirundo rustica	barn swallow
Mephitis mephitis	striped skunk
Petrochelidon pyrrhonota	cliff swallow
Polioptila carerulea	blue-gray gnatcatcher
Procyon lotor	raccoon
Sayornis sayi	Say's phoebe
Spizella passerina	chipping sparrow
Zenaida macroura	mourning dove

3.2.14 Restoration Sites – *Broad Canyon Arroyo A – Lower and Arroyo B – Upper*

The northern strip of this site is dominated by thick saltcedar 3 that is currently suffering from *Diorhabda* (Figure 34). Along the river, the vegetation transitions from Class 0 in the north to saltcedar 1 in the south.

Figure 34. Dense Saltcedar Strip in Northern Portion of Site

Away from the river, the vegetation is open and dominated by smooth pigweed in the north (Figure 35) and by honey mesquite (*Prosopis glandulosa*) in the south (Table 27). Habitat suitability for YBCUs is limited but the saltcedar strip in the north appears to be suitable for SWFLs, and one might have been present during this visit. Other wildlife noted during the survey is listed in Table 28.

Figure 35. Amaranthus Dominated Habitat Away from River on North Half of Site

Table 27. Plants Observed at Broad Canyon Ranch Middle Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Astragalus sp.	milkvetch
Atriplex canascens	fourwing saltbush
Bacharis salicifolia	false seep willow
Chilopsis linearus	desert willow
Distichlis spicata	saltgrass
Gutierrezia sarothrae	broom snakeweed
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Sporobolus cryptandrus	sand dropseed
Tamarix ramosissima	saltcedar

Table 28. Faunal Species Observed at Broad Canyon Ranch Middle Restoration Site

Scientific Name	Common Name
Agelaius phoeniceus	red-winged blackbird
Cathartes aura	turkey vulture
Canis latrans	coyote
Geoccocyx californianus	Greater roadrunner
Molothres ater	brown-headed cowbird
Sylvilagus audubonii	desert cottontail rabbit
Zenaida asiatica	white-winged dove

3.2.15 Restoration Site – *Broad Canyon Ranch South*

In the southern half of this site, the vegetation is classified as Class 0 to coyote willow 1 with some scattered screwbean mesquite and cottonwood along the river. Away from the river the area is mixed grass dominated with Russian thistle (Figure 36). The northern portion is a combination of mixed vegetation 1 and mixed vegetation 2 along the river with coyote willow and screwbean mesquite. Away from the river the habitat is open with scattered, medium-sized screwbean mesquite (Figure 37). Good SWFL and possibly YBCU habitat is located across the river but not within this site (Table 29). The large wetland described in the 2011 biological report is no longer present. Wildlife species were not as diverse at this site (Table 30).

Figure 36. Southern Portion of Broad Canyon Ranch South

Figure 37. Northern Portion of Broad Canyon Ranch South

Table 29. Plants Observed at Broad Canyon Ranch South Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida species	unidentified threeawn grass
Astragalus sp.	milkvetch
Atriplex canascens	fourwing saltbush
Bacharis salicifolia	false seep willow
Distichlis spicata	saltgrass
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Scirpus sp	bullrush
Solanum elaeagnifolium	silverleaf nightshade
Tamarix ramosissima	saltcedar

Table 30. Faunal Species Observed at Broad Canyon Ranch South Restoration Site

Scientific Name	Common Name
Agelaius phoeniceus	red-winged blackbird
Corvus cryptoleucus	Chihuahuan raven
Hirundo rustica	barn swallow
Petrochelidon pyrrhonota	American cliff swallow
Sylvilagus audubonii	desert cottontail rabbit

3.2.16 Restoration Site – *Selden Point Bar*

The vegetation in the southern part of this site is Class 0 with thin coyote willow and *Diorhabda* stressed saltcedar. The northern portion of the site is a mixed vegetation 3 with saltcedar and mature screwbean mesquite (Figure 38). This portion of the site provides good SWFL habitat but YBCU habitat is lacking. Wolfberry and mixed grasses dominate most of the upland portion of the site (Table 31). Faunal species detected during the survey are presented in Table 32.

Figure 38. Dense Stand of Screwbean Mesquite and Stressed Saltcedar

Table 31. Plants Observed at Selden Point Bar Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida species	unidentified threeawn grass
Astragalus sp.	milkvetch
Distichlis spicata	saltgrass
Lycium pallidum	pale wolfberry
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Scirpus sp	bullrush
Sporobolus cryptandrus	sand dropseed
Tamarix ramosissima	saltcedar
Typha latifolia	broadleaf cattail
Populus deltoides	cottonwood

Table 32. Faunal Species Observed at Selden Point Bar Restoration Site

Scientific Name	Common Name
Canis lupus familiaris	domestic dog
Canis latrans	coyote
Corvus brachyrhynchus	American crow
Geococcyx californianus	greater roadrunner
Geothlypis trichas	common yellowthroat
Lepus californicus	black-tailed jackrabbit
Petrochelidon pyrrhonota	American cliff swallow
Xanthocephalus xanthocephalus	yellow-headed blackbird

3.2.17 Restoration Site – *Shalem Colony*

The vegetation on the southern lateral at this site is bulrush and cattail with a Class 0 SWFL classification. The southern portion of the site has riparian vegetation along the river in the form of mixed vegetation 2 dominated by tall screwbean mesquite with coyote willow and saltcedar (showing the effects of *Diorhabda*). This area might be suitable for SWFLs during years with long-term river flow. The middle portion of the site has mixed vegetation 1 habitat along the bank (Figure 39). The northern portion of the site is a combination of mixed vegetation 1 dominated by tall screwbean mesquite with saltcedar.

This area is adjacent to a large pecan orchard (Figure 40) and may be suitable for YBCUs (one was heard in the vicinity during the river survey near Shalem Colony Bridge). Habitat at this site is not currently suitable for SWFLs. Upland portions of the site are disturbed with smooth pigweed, tumbleweed, mixed grasses, and forbs (Table 33). Fauna detected at the site during the visit is presented in Table 34.

This site receives a fairly high level of recreational use. The dirt road running through the site and the levy road are heavily used and there is a fair amount of trash at this site.

Figure 39. Southern Portion of Shalem Colony Restoration Site

Figure 40. Northern Portion of Shalem Colony Restoration Site with Pecan Orchard in Back

Table 33. Plants Observed at Shalem Colony Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida species	unidentified threeawn grass
Astragalus sp.	milkvetch
Bacharis salicifolia	false seep willow
Distichlis spicata	saltgrass
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Scirpus sp	bullrush
Solanum elaeagnifolium	silverleaf nightshade
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar
Typha latifolia	broadleaf cattail

Table 34. Faunal Species Observed at Shalem Colony Restoration Site

Scientific Name	Common Name
Canis lupus familiaris	domestic dog
Corvus brachyrhynchus	American crow
Geothlypis trichas	common yellowthroat
Icteria virens	yellow breasted chat
Petrochelidon pyrrhonota	American cliff swallow
Sylvilagus audubonii	desert cottontail rabbit
Xanthocephalus xanthocephalus	yellow-headed blackbird

3.2.18 Restoration Site – *Leasburg Lateral Expansion and Leasburg Extension Lateral WW 8*

This site is largely disturbed with some riparian growth along the river bank (Figure 41). The southern part of this site is characterized along the river bank as mixed vegetation 1 (coyote willow and screwbean mesquite) and several gaps of Class 0. Upland from the river toward the levee road, vegetation is comprised of mixed grasses and forbs with a few scattered screwbean mesquite. From the middle to the north of the Leasburg Lateral Expansion, habitat is sparse (Class 0), with some screwbean mesquite among mixed grasses, Russian thistle, locoweed and other forbs (Table 35). This site does not currently have habitat adequate for SFWLs or YBCUs. Fauna observed during the site visit is presented in Table 36.

Figure 41. View of Leesburg Extension from Levee Road

The Leasburg Extension Lateral WW 8 has a lot of young cottonwoods (Figure 42). It is currently not good habitat for SWFLs or YBCUs but may become suitable for both in the future. The lateral on the north side of this restoration site is currently coyote willow 1. Overall, this site does not provide suitable habitat for SWFLs or YBCUs. Vegetation and fauna species recorded during the survey are presented in Tables 35 and 36.

Figure 42. Young Rio Grande Cottonwoods in Leasburg Extension Lateral WW 8

Table 35. Plants Observed at Leasburg Lateral Expansion and WW 8 Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida purpurea	purple threeawn grass
Astragalus sp.	locoweed
Atriplex casescens	four-wing saltbush
Distichlis spicata	saltgrass
Equisetum laevigatum	smooth horsetail
Prosopis pubescens	screwbean mesquite
Rhus trilobata	three-leaf sumac
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Scirpus sp	bullrush
Solanum elaeagnifolium	silverleaf nightshade
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar
Typha latifolia	broadleaf cattail
Ulmus pumila	siberian elm
Populus deltoides	cottonwood

Table 36. Faunal Species Observed at Leasburg Lateral Expansion and WW 8 Restoration Site

Scientific Name	Common Name
Buteo jamaicnsis	red-tailed hawk
Canis lupus familiaris	domestic dog
Covus brachynchos	American crow
Geomyidae	gopher
Geothlypis trichas	common yellowthroat
Lithobates catesbeiana	bullfrog
Petrochelidon pyrrhonota	American cliff swallow
Sylvilagus audubonii	Desert cottontail rabbit
Turdis migratorius	American robin

3.2.19 Restoration Site – *Clark Lateral*

The river bank here is mixed vegetation 1 (saltcedar and coyote willow) showing some signs of *Diorhabda* stress. The saltcedar is dense and old but not extremely wide (10-12 m). A high-use public pathway runs along the river here adjacent to the saltcedar (Figure 43). This habitat, in association with coyote willow islands in the center of the river, provides modest habitat for SWFLs and foraging habitat for YBCUs that may use the mature pecan orchard located 200 to 250 m to the east.

The open portion heading east toward a large mature pecan orchard south of Clark Lateral is mostly disturbed with fairly new growth of Russian thistle, globe mallow, and four-wing saltbush (Figure 44). Flora and fauna detected at the site during the visit are presented in Tables 37 and 38.

Figure 43. Mature Saltcedar Showing Some Signs of *Diorhabda*

Figure 44. Looking South across Clark Lateral

Table 37. Plants Observed at Clark Lateral Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida spp.	mixed three-awn grasses
Atriplex canescens	four-wing saltbush
Elaeagnus angustifolia	Russian olive
Populus deltoides	cottonwood
Prosopis glandulosa	honey mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Sphaeralcea ccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 38. Faunal Species Observed at Clark Lateral Restoration Site

Scientific Name	Common Name
Butorides virescens	green heron
Canis lupus familiaris	domestic dog
Columbia livia	rock dove
Corvus brachynchos	American crow
Petrochelidon pyrrhonota	American cliff swallow
Tyrannus verticalis	western kingbird

3.2.20 Restoration Site – *Mesilla Valley Bosque State Park*

The river bank at the northern portion of this unit is all Class 0 with sparse, thin, intermittent coyote willow bands (Figure 45). This portion of the restoration site has no habitat for YBCUs or SWFLs.

Figure 45. Northern Stretch of Mesilla Valley Bosque Restoration Site

Further south this unit becomes a series of large patches of old growth saltcedar 3 and mixed vegetation 3 habitat. The saltcedar here currently shows some sign of *Diorhabda* stress. Dense coyote willow and emergent vegetation (cat tails, rushes) are thick in the large ditch running through this portion of the unit. This section has suitable habitat for SWFLs, and possibly for YBCUs especially just south (Figure 46). At least eight SWFLs were detected in this portion of the restoration site.

Figure 46. South of Mesilla Valley Bosque Restoration Site in Good Mixed Vegetation Habitat

The Mesilla Valley Bosque Park Expansion section is divided from the river channel on the east by the levee road and a broad dirt road that leads to the Bosque Park headquarters. The north end of this section is disturbed with sparse shrubs, forbs, and grasses and a few small cottonwood trees (Figure 47).

Figure 47. Looking South into Xeric Habitat at North End of Mesilla Valley Bosque Park Extension

Toward the south end of this unit, a broad alkali sacaton grassland provides thick ground cover with numerous very young cottonwood that appear to have been recently planted (Figure 48). Along the western boundary of this unit a large ditch, bordered on each side by saltcedar 1 runs intermittently for the entire length of this unit. This habitat provides marginally suitable habitat for SWFLs as long as the ditch continues to hold water during the breeding season. The effects of *Diorhabda* are currently minimal along this stretch. Plants and fauna observed at these sites are listed in Tables 39 and 40.

Figure 48. Alkali Sacaton Grassland with Newly Planted Patch of Cottonwood and Saltcedar in Background

Table 39. Plants Observed at Mesilla Valley Bosque Park and Extension Restoration Sites

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida spp.	mixed three-awn grasses
Distichlis spicata	saltgrass
Elaeagnus angustafolia	Russian olive
Kochia scoparia	kochia
Populus deltoides	cottonwood
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Scirpus spp	sedges and rushes
Sphaeralcea ccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar
Typha latifolia	cattail
Ulmus pumila	Siberian elm

Table 40. Faunal Species Observed at Mesilla Valley Bosque Park and Extension Restoration Sites

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Buteo jamaicensis	red-tailed hawk
Calamospiza melanocorys	lark bunting
Canis lupus familiaris	domestic dog
Chondestes grammacus	lark sparrow
Corvus brachynchos	American crow
Lepus californicus	black-tailed jackrabbit
Nycticorax nycticorax	black-crowned night heron
Sayornis sayi	Say's phoebe
Spizella passerina	chipping sparrow
Sturnus vulgaris	European starling
Sylvilagus auduboni	desert cottontail rabbit
Tyrannus verticalis	western kingbird

3.2.21 Restoration Site – *Mesilla East*

The river bank throughout this section is nearly all Class 0 with some small patches of coyote willow that may grow into coyote willow 1 if water flow regimes remain adequate. The area from the river east to the levee road is disturbed with tall *Amaranthus*, and a few scattered young saltcedar/cottonwood (Figure 49).

Figure 49. Scattered Young Saltcedar/Cottonwood and Small Patches of Coyote Willow along River Bank

The irrigation ditch east of the levee road provides mixed vegetation 2 habitat with dense coyote willow and common reed (*Phragmites*). This dense stand provides habitat for SWFLs and foraging habitat for YBCUs directly under a mature pecan orchard (Figure 50).

Figure 50. Mixed Vegetation 2 East of Levee Road with Pecan Orchard in Background

The Mesilla East Expansion area, beginning at Calle del Norte Bridge and running to the south, has been recently mowed and is Class 0 for several hundred meters. Continuing south along the east bank of the river this site has patchy, thin saltcedar that meets minimum saltcedar1 width requirements sparingly (Figure 51).

Figure 51. Looking South at Calle del Norte Bridge

No habitats at this site for SWFL or YBCU currently exist in this section proposed for reclamation. The irrigation ditch that runs north-south on the east side of the levee road has large old growth saltcedar that is fairly wide (15-20 m) and dense. This strip, outside of the restoration polygon, may provide adequate SWFL habitat as long as water remains in the ditch. Fauna and vegetation observed at the site are combined with data for the adjacent restoration site Mesilla East (Tables 41 and 42).

Table 41. Plants Observed at Mesilla East Expansion and Mesilla East Restoration Sites

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Aristida spp.	mixed three-awn grasses
Atriplex canescens	four-wing saltbush
Phragmites australis	common reed
Populus deltoides	cottonwood
Prosopis glandulosa	honey mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Sphaeralcea ccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 42. Faunal Species Observed at Mesilla East Expansion and Mesilla East Restoration Sites

Scientific Name	Common Name
Butorides virescens	green heron
Canis lupus familiaris	domestic dog
Columbia livia	rock dove
Corvus brachynchos	American crow
Egretta thula	snowy egret
Nycticorax nycticorax	black-crowned night heron
Spizella passerina	chipping sparrow
Tyrannus verticalis	western kingbird

3.2.22 Restoration Site – *Berino East*

This site is highly disturbed with large patches of smooth pigweed dominant on the southern end away from the river (Figure 52). Going toward the river the vegetation becomes dominated by alkali sacaton and then a thin strip of coyote willow 0 along the bank. There are a few young screwbean mesquite and cottonwoods with numerous spindly pole plantings of Gooding's willow (*Salix goodingii*) in various stages of heartiness, mostly just surviving at this point (Figure 53). The saltcedar at this site is suffering moderately from *Diorhabda.* None of this section currently provides adequate habitat for SWFLs or YBCUs. Large mature pecan orchards on both sides of the river may provide some habitat for YBCUs. Plant and faunal species encountered at Berino East and West are combined (Tables 43 and 44).

Figure 52. Large Stand of Pigweed with Alkali Sacaton in Background and Coyote Willow along River

Figure 53. Young Gooding Willow and Cottonwood Pole Plantings along River Bank

3.2.23 Restoration Site – *Berino West*

This site occurs directly east of a large old growth pecan orchard. Habitat along the river bank is comprised of a thin strip of coyote willow 0. A nice young thicket of screwbean mesquite is growing in the middle of this site but is a relatively small patch. Habitat adequate for SWFLs and YBCUs does not currently exist at this site. The large pecan orchard habitats should be taken into consideration for YBCUs.

Table 43. Plants Observed at Berino East and Berino West Restoration Sites

Scientific Name	Common Name
Amaranthus hybridus	smooth pigweed
Atriplex canascens	four-wing saltbush
Kochia scoparia	kochia
Populus deltoides	cottonwood
Phragmaites australis	common reed
Prosopis glandulosa	honey mesquite
Prosopis pubescens	screwbean mesquite
Salix gooddingii	Gooding's Willow
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Solanum elaegnifolium	silverleaf nightshade
Sphaeralcea coccinea	globemallow
Sporobolus airoides	alkali sacaton
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 44. Faunal Species Observed at Berino East and Berino West Restoration Sites

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Calamospiza melanocorys	lark bunting
Contopis sordidulus	western wood peewee
Corvus brachynchos	American crow
Falco americanus	American kestrel
Geoccocyx californianus	greater roadrunner
Haemorphus mexicanus	house finch
Nycticorax nycticorax	black-crowned night heron
Petrochelidon pyrrhonota	cliff swallow
Sayornis sayi	Say's phoebe
Spizella passerina	chipping sparrow
Zenaida asiatica	white winged dove
Zenaida macroura	mourning dove

3.2.24 Restoration Site – *Vinton A and B*

These two restoration sites are nearly contiguous along the west side of the river. Both sites are very similar with broad, non-dense mixed vegetation habitat. Dominant tree and shrub vegetation at the site consists of saltcedar, screwbean mesquite, and four-wing saltbush (Figures 54 and 55) with ground cover consisting of forbs mixed with fescue and saltgrass. Saltcedar at this site currently shows limited signs of stress from *Diorhabda*. The central portion of Vinton A has an area of mixed vegetation 3 that may be adequate for SWFLs within the next few years. YBCU habitat does not currently exist at these sites. Vegetation and fauna observed at the Vinton sites are listed in Tables 45 and 46.

Figure 54. Broad Mixed Vegetation 3 Habitat at Vinton A Restoration Site

Figure 55. Broad Mixed Vegetation 3 Habitat at Vinton B Restoration Site

Table 45. Plants Observed at Vinton A and B Restoration Sites

Scientific Name	Common Name
Amaranthus palmeri	pigweed
Atriplex canescens	four-wing saltbush
Chrysothamnus nauseosus	rubber rabbitbrush
Distichlis spicata	saltgrass
Kochia scoparia	kochia
Populus deltoides	cottonwood
Prosopis glandulosa	honey mesquite

Scientific Name	Common Name
Prosopis pubescens	screwbean mesquite
Festuca	fescue grass
Salix exigua	coyote willow
Spharlacea coccinia	globemallow
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 46. Faunal Species Observed at Vinton A and B Restoration Sites

Scientific Name	Common Name
Buteo Swainsoni	Swainson's hawk
Canis lupus familiaris	domestic dog
Cathartes aura	turkey vulture
Egretta thula	snowy egret
Lepus californicus	black-tailed jackrabbit

3.2.25 Restoration Site – *Valley Creek*

This site is adjacent to a large residential area and has pathways with permanent concrete benches running through it. It appears to be mostly fescue that is routinely maintained by mowing away from the river. The bank has grass (*Sorghum halepense*), and intermittent narrow patches of coyote willow 0 with widely scattered large cottonwood (Figure 56). Overall this entire site is Class 0 and has no suitable habitat for YBCUs or SWFLs. Vegetation and fauna observed at the site are listed in Tables 47 and 48.

Figure 56. View of Mowed Habitat at Valley Creek Restoration Site

Table 47. Plants Observed at Valley Creek Restoration Site

Scientific Name	Common Name
Distichlis spicata	saltgrass
Kochia scoparia	kochia
Polygonum	smartweed
Populus deltoides	cottonwood
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 48. Faunal Species Observed at Valley Creek Restoration Site

Scientific Name	Common Name
Buteo jamaicensis	Red-tailed hawk
Canis lupus familiaris	domestic dog
Cathartes aura	turkey vulture
Egretta thula	snowy egret

3.2.26 Restoration Site – *NeMexas Siphon*

Vegetation at this site consists of a dense narrow strip of coyote willow along the river bank. Away from the river is a broad mixed vegetation 3 to mixed vegetation 4 habitat dominated by saltcedar with screwbean mesquite and large cottonwood (Figure 57). Saltcedar at this site is suffering greatly from the effects of *Diorhabda*. At the southern end of this site the cottonwoods have all been burned and the dead trees are still standing. This sets back large over story canopy development significantly. This site currently provides marginally sufficient habitat for YBCUs and good habitat for SWFLs. Vegetation and fauna observed at the NeMexas site are listed in Tables 49 and 50.

Figure 57. Broad Mixed Vegetation 3 Habitat at NeMexas Siphon Restoration Site Taken From Across the River

Table 49. Plants Observed at NeMexas Siphon Restoration Site

Scientific Name	Common Name
Distichlis spicata	saltgrass
Kochia scoparia	kochia
Populus deltoides	cottonwood
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 50. Faunal Species Observed at NeMexas Siphon Restoration Site

Scientific Name	Common Name
Buteo swainsoni	Swainson's hawk
Canis lupus familiaris	domestic dog
Cathartes aura	turkey vulture
Spizella passerina	chipping sparrow

3.2.27 Restoration Site – *Country Club East*

The southern end of this site has some good patches of screwbean mesquite with a thin coyote willow component along the river bank and a few cottonwoods (Figure 58). Away from the river there are some mixed vegetation 1 and mixed vegetation 2 patches with scattered Siberian elm and cottonwood amongst severely stressed saltcedar (Table 51). There are some narrow islands in this stretch dominated by coyote willow and common reed (*Phragmites*). Faunal species observed in this stretch included at least six Swainson's hawks soaring above the site (Table 52).

Ground cover vegetation is dominated by alkali sacaton and fescue grasses. Habitat at this site currently provides moderately adequate SWFL habitat that may become suitable within the next few years.

Figure 58. Habitat at Country Club East Restoration Site

Table 51. Plants Observed at Country Club East Restoration Site

Scientific Name	Common Name
Distichlis spicata	saltgrass
Kochia scoparia	kochia
Populus deltoides	cottonwood
Phragmaites australis	common reed
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 52. Faunal Species Observed at Country Club East Restoration Site

Scientific Name	Common Name
Buteo swainsoni	Swainson's hawk
Canis lupus familiaris	domestic dog
Cathartes aura	turkey vulture
Dendroica petechia	yellow warbler
Egretta thula	snowy egret
Spizella passerina	chipping sparrow

3.2.28 Restoration Site – *Sunland Park*

This site has a thin row of coyote willow 1 along the river bank with patchy, diverse mixed vegetation 2 and mixed vegetation 3 habitats away from the river. The diverse mixed vegetation habitats have some large screwbean mesquite and saltcedar with larger cottonwood growing amongst them (Figure 59). The cottonwood becomes more prominent with an open gallery toward the north end of the site. Ground cover is primarily fescue grass (*Festuca*) and silver leaf nightshade. Saltcedar in this section is currently suffering from *Diorhabda*. This site currently has good SWFL habitat and marginal habitat for YBCUs. Vegetation and fauna detected during the habitat assessment are provided in Tables 53 and 54.

Figure 59. Patchy Mixed Vegetation 2 and Mixed Vegetation 3 Habitat at Sunland Park Restoration Site

Table 53. Plants Observed at Sunland Park Restoration Site

Scientific Name	Common Name
Amaranthus hybridus	Smooth pigweed
Atriplex canascens	Four-wing saltbush
Distichlis spicata	saltgrass
Eleagnus angustifolia	Russian olive
Festuca	fescue grass
Kochia scoparia	kochia
Populus deltoides	cottonwood
Phragmaites australis	common reed
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 54. Faunal Species Observed at Sunland Park Restoration Site

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Buteo swainsoni	Swainson's hawk
Canis lupus familiaris	domestic dog
Dendroica petechia	yellow warbler
Petrochelidon pyrrhonota	cliff swallow
Procyon lotor	raccoon
Spizella passerina	chipping sparrow
Tyrannus verticalis	western kingbird

3.2.29 Restoration Site – *Anapra Bridge*

The river here is adjacent to heavily disturbed, low-lying ground neighboring numerous large car lots and other industrial businesses. A thin strip of mixed vegetation 0 comprised of coyote willow, screwbean mesquite, saltcedar, and *Phragmites* runs along the bank of the river (Figure 60).

Figure 60. Thin Mixed Vegetation 0 along River Bank and Low Lying Disturbed Ground Away From the River

Further away from the river a young stand of saltcedar and screwbean mesquite is growing in what appears to be a shallow old borrow pit (Figure 61). Saltcedar in this area is showing slight stress from *Diorhabda*.

Figure 61. Saltcedar and Screwbean Mesquite in Shallow Borrow Pit

Further north (north of Sunland Park Bridge) this site has coyote willow 1 habitat along the river. Away from the river there is a relatively open stand of mixed vegetation 2 comprised of saltcedar and screwbean mesquite with a few Siberian elm and Russian olive (Figure 62). This habitat is broad but not currently dense enough to provide more suitable habitat. Within a few more years this portion of the site may provide more highly suitable habitat for SWFLs. Saltcedar at this site is stressed from *Diorhabda*. Vegetation and fauna detected at this site are listed in Tables 55 and 56.

Figure 62. Mixed Vegetation 2 Habitat North of Sunland Park Bridge

Table 55. Plants Observed at Anapra Bridge Restoration Site

Scientific Name	Common Name
Allenrolfea occidentalis	iodine bush
Amaranthus hybridus	Smooth pigweed
Atriplex canascens	Four-wing saltbush
Distichlis spicata	saltgrass
Eleagnus angustifolia	Russian olive
Kochia scoparia	kochia
Populus deltoides	cottonwood
Phragmaites australis	common reed
Prosopis pubescens	screwbean mesquite
Salix exigua	coyote willow
Salsola tragus	Russian thistle
Suaeda nigra	pickleweed
Tamarix ramosissima	saltcedar
Ulmus pumila	Siberian elm

Table 56. Faunal Species Observed at Anapra Bridge Restoration Site

Scientific Name	Common Name
Anas diazi	Mexican mallard duck
Calidris mauri	western sandpiper
Calidris minutilla	least sandpiper
Canis lupus familiaris	domestic dog
Charadrius vociferus	killdeer
Columbia livia	rock dove
Himantopis mexicanus	black-necked stilt
Petrochelidon pyrrhonota	cliff swallow
Plegadis chihi	white-faced ibis
Quiscalis mexicanus	great-tailed grackle
Spizella passerina	chipping sparrow
Tyrannus verticalis	western kingbird
Xanthocephalus xanthocephalus	yellow-headed blackbird

4.0 DISCUSSION

Current habitat conditions along the river within the RGCP are varied and within the entire 105-mile river stretch provide numerous sections of moderately to highly suitable habitat for SWFLs and some adequate sections for YBCUs. Changes since the 2012 habitat classification vary from no change, degraded, somewhat improved, and improved.

For YBCUs, the main question that has been introduced from this habitat survey is whether or not mature pecan orchards provide suitable nesting habitat for the species. This species is known to use a variety of habitats for foraging from desert scrub to thickets of riparian vegetation. In several areas along the RGCP, desert scrub habitat is far from the river corridor separated by broad swaths of agricultural fields. In these areas observers considered that minimally optimal breeding habitat along the river in the form of SWFL habitat of Class 1 to 3 and greater may provide adequate foraging habitat and, if in close proximity to pecan orchards, may provide breeding habitat as well.

5.0 LITERATURE CITED

SWCA (SWCA Environmental Consultants). 2011. Final Biological Assessment Integrated Land Management for Long-Term River Management of the Rio Grande Canalization Project.

USBR (United States Bureau of Reclamation). 2013. Southwest Willow Flycatcher Habitat Classification-Lower Rio Grande from Caballo Dam, NM to El Paso, TX.

APPENDIX A

IPaC Trust Resources Report for the RGCP

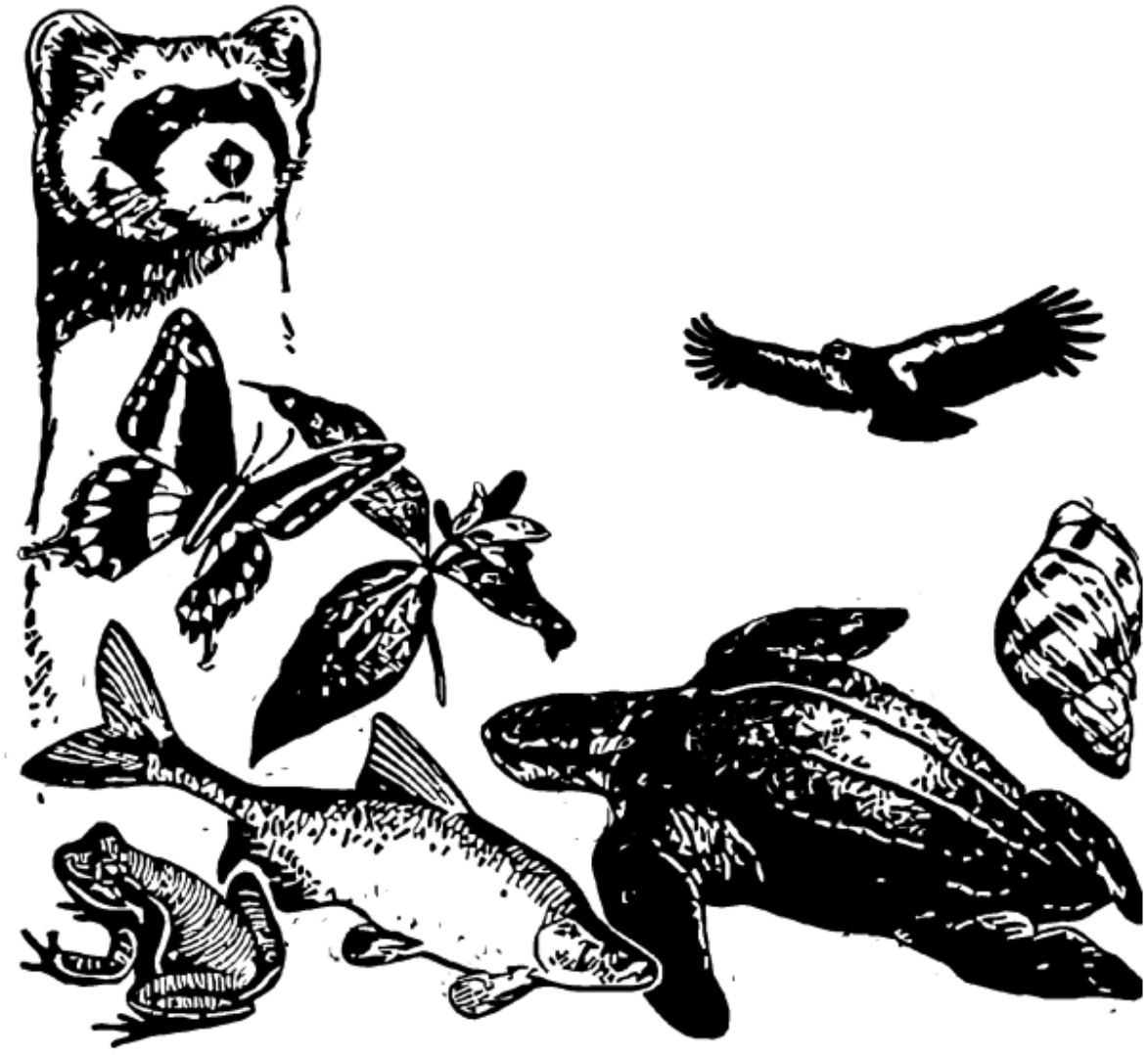
U.S. Fish & Wildlife Service

IBWC habitat survey

IPaC Trust Resources Report

Generated August 08, 2016 01:23 PM MDT, IPaC v3.0.8

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

IBWC habitat survey

LOCATION

New Mexico and Texas

IPAC LINK

https://ecos.fws.gov/ipac/project/XDKTZ-XATC5-FO3PS-N5LSE-RC76YQ

U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

New Mexico Ecological Services Field Office
2105 Osuna Road Ne
Albuquerque, NM 87113-1001
(505) 346-2525

Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
(512) 490-0057

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Amphibians

Chiricahua Leopard Frog Rana chiricahuensis — Threatened

MANAGED BY
New Mexico Ecological Services Field Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=D02F

Birds

Least Tern Sterna antillarum — Endangered

MANAGED BY
Austin Ecological Services Field Office
New Mexico Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B07N

Mexican Spotted Owl Strix occidentalis lucida — Threatened

MANAGED BY
Austin Ecological Services Field Office
New Mexico Ecological Services Field Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B074

Northern Aplomado Falcon Falco femoralis septentrionalis — Endangered

MANAGED BY
Austin Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06V

Northern Aplomado Falcon Falco femoralis septentrionalis — Experimental Population, Non-Essential

MANAGED BY
New Mexico Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06V

Piping Plover Charadrius melodus — Threatened

MANAGED BY
Austin Ecological Services Field Office

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES
Wind Energy Projects

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079

Red Knot Calidris canutus rufa

Threatened

MANAGED BY
Austin Ecological Services Field Office

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES
Wind Energy Projects

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Southwestern Willow Flycatcher Empidonax traillii extimus

Endangered

MANAGED BY
Austin Ecological Services Field Office
New Mexico Ecological Services Field Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B094

Yellow-billed Cuckoo Coccyzus americanus

Threatened

MANAGED BY
Austin Ecological Services Field Office
New Mexico Ecological Services Field Office

CRITICAL HABITAT
There is **proposed** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06R

Fishes

Gila Trout Oncorhynchus gilae

Threatened

MANAGED BY
New Mexico Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E00E

Rio Grande Silvery Minnow Hybognathus amarus

Endangered

MANAGED BY
New Mexico Ecological Services Field Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E07I

Flowering Plants

Sneed Pincushion Cactus Coryphantha sneedii var. sneedii

Endangered

MANAGED BY

Austin Ecological Services Field Office
New Mexico Ecological Services Field Office

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1UX

Todsen's Pennyroyal Hedeoma todsenii

Endangered

MANAGED BY

New Mexico Ecological Services Field Office

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q24C

Mammals

Gray Wolf Canis lupus

Endangered

MANAGED BY

New Mexico Ecological Services Field Office

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A00D

Reptiles

Narrow-headed Gartersnake Thamnophis rufipunctatus

Threatened

MANAGED BY

New Mexico Ecological Services Field Office

CRITICAL HABITAT

There is **proposed** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C051

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bell's Vireo Vireo bellii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX

Bendire's Thrasher Toxostoma bendirei — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IF

Black-chinned Sparrow Spizella atrogularis — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IR

Brewer's Sparrow Spizella breweri — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HA

Burrowing Owl Athene cunicularia — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0NC

Cassin's Sparrow Aimophila cassinii — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0K2

Chestnut-collared Longspur Calcarius ornatus — Bird of conservation concern
Season: Wintering

Elf Owl Micrathene whitneyi — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GV

Flammulated Owl Otus flammeolus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DK

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Golden Eagle Aquila chrysaetos — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DV

Grace's Warbler Dendroica graciae — Bird of conservation concern
Season: Breeding

Gray Vireo Vireo vicinior — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G5

Lark Bunting Calamospiza melanocorys — Bird of conservation concern
Season: Wintering

Lawrence's Goldfinch Carduelis lawrencei — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0J8

Lewis's Woodpecker Melanerpes lewis — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HQ

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Long-billed Curlew Numenius americanus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06S

Lucy's Warbler Vermivora luciae — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DL

Mccown's Longspur Calcarius mccownii — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HB

Painted Bunting Passerina ciris — Bird of conservation concern
Season: Breeding

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pinyon Jay Gymnorhinus cyanocephalus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0I0

Rufous-crowned Sparrow Aimophila ruficeps — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0MX

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Plover Charadrius alexandrinus — Bird of conservation concern
Season: Breeding

Sonoran Yellow Warbler Dendroica petechia ssp. sonorana — Bird of conservation concern
Seasons: Breeding, Migrating
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F7

Sprague's Pipit Anthus spragueii — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GD

Swainson's Hawk Buteo swainsoni — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B070

Virginia's Warbler Vermivora virginiae — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IL

Willow Flycatcher Empidonax traillii

Bird of conservation concern

Season: Breeding

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

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

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Freshwater Emergent Wetland

PEM1A
PEM1Ah
PEM1Ax
PEM1C
PEM1Ch
PEM1Cx

PEM1Fx

Freshwater Forested/shrub Wetland

PFO1A
PFO1Ax
PFO5Ah
PSS1A
PSS1Ah
PSS1Ax
PSS1C
PSS1Cx
PSS1J
PSS2A
PSS2Ah
PSS2Ax
PSS2C
PSS2Cx
PSS2J
PSS5Hh

Freshwater Pond

PUBFh
PUBFx
PUBHh
PUBHx
PUBKx
PUSA
PUSAh
PUSAx
PUSCh
PUSCx
PUSJh
PUSKx

Lake

L1UBHh
L1UBHx

Riverine

R2USC
R4SBA
R4SBAx
R4SBC
R4SBCx
R4SBJ
R5UBFx
R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

APPENDIX B

USFWS Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 OSUNA ROAD NE
ALBUQUERQUE, NM 87113
PHONE: (505)346-2525 FAX: (505)346-2542
URL: www.fws.gov/southwest/es/NewMexico/;
www.fws.gov/southwest/es/ES_Lists_Main2.html

Consultation Code: 02ENNM00-2017-SLI-0367 March 07, 2017
Event Code: 02ENNM00-2017-E-00673
Project Name: USIBWC Rio Grande Canalization Project

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

To Whom It May Concern:

Thank you for your recent request for information on federally listed species and important wildlife habitats that may occur in your project area. The U.S. Fish and Wildlife Service (Service) has responsibility for certain species of New Mexico wildlife under the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et seq.), the Migratory Bird Treaty Act (MBTA) as amended (16 USC 701-715), and the Bald and Golden Eagle Protection Act (BGEPA) as amended (16 USC 668-668c). We are providing the following guidance to assist you in determining which federally imperiled species may or may not occur within your project area and to recommend some conservation measures that can be included in your project design.

FEDERALLY-LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

Attached is a list of endangered, threatened, and proposed species that may occur in your project area. Your project area may not necessarily include all or any of these species. Under the ESA, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service, to make "no effect" determinations. If you determine that your proposed action will have "no effect" on threatened or endangered species or their respective critical habitat, you do not need to seek concurrence with the Service. Nevertheless, it is a violation of Federal law to harm or harass any federally-listed threatened or endangered fish or wildlife species without the appropriate permit.

If you determine that your proposed action may affect federally-listed species, consultation with the Service will be necessary. Through the consultation process, we will analyze information

contained in a biological assessment that you provide. If your proposed action is associated with Federal funding or permitting, consultation will occur with the Federal agency under section 7(a)(2) of the ESA. Otherwise, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA (also known as a habitat conservation plan) is necessary to harm or harass federally listed threatened or endangered fish or wildlife species. In either case, there is no mechanism for authorizing incidental take "after-the-fact." For more information regarding formal consultation and HCPs, please see the Service's Consultation Handbook and Habitat Conservation Plans at www.fws.gov/endangered/esa-library/index.html#consultations.

The scope of federally listed species compliance not only includes direct effects, but also any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects that may occur in the action area. The action area includes all areas to be affected, not merely the immediate area involved in the action. Large projects may have effects outside the immediate area to species not listed here that should be addressed. If your action area has suitable habitat for any of the attached species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts.

Candidate Species and Other Sensitive Species

A list of candidate and other sensitive species in your area is also attached. Candidate species and other sensitive species are species that have no legal protection under the ESA, although we recommend that candidate and other sensitive species be included in your surveys and considered for planning purposes. The Service monitors the status of these species. If significant declines occur, these species could potentially be listed. Therefore, actions that may contribute to their decline should be avoided.

Lists of sensitive species including State-listed endangered and threatened species are compiled by New Mexico state agencies. These lists, along with species information, can be found at the following websites:

Biota Information System of New Mexico (BISON-M): www.bison-m.org

New Mexico State Forestry. The New Mexico Endangered Plant Program: www.emnrd.state.nm.us/SFD/ForestMgt/Endangered.html

New Mexico Rare Plant Technical Council, New Mexico Rare Plants: nmrareplants.unm.edu

Natural Heritage New Mexico, online species database: nhnm.unm.edu

WETLANDS AND FLOODPLAINS

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. These habitats should be conserved through avoidance, or mitigated to ensure that there would be no net loss of wetlands function and value.

We encourage you to use the National Wetland Inventory (NWI) maps in conjunction with ground-truthing to identify wetlands occurring in your project area. The Service's NWI program website, www.fws.gov/wetlands/Data/Mapper.html integrates digital map data with other resource information. We also recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands.

MIGRATORY BIRDS

The MBTA prohibits the taking of migratory birds, nests, and eggs, except as permitted by the Service's Migratory Bird Office. To minimize the likelihood of adverse impacts to migratory birds, we recommend construction activities occur outside the general bird nesting season from March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until the young have fledged.

We recommend review of Birds of Conservation Concern at website www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html to fully evaluate the effects to the birds at your site. This list identifies birds that are potentially threatened by disturbance and construction.

BALD AND GOLDEN EAGLES

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the ESA on August 9, 2007. Both the bald eagle and golden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For information on bald and golden eagle management guidelines, we recommend you review information provided at www.fws.gov/midwest/eagle/guidelines/bgepa.html.

On our web site www.fws.gov/southwest/es/NewMexico/SBC_intro.cfm, we have included conservation measures that can minimize impacts to federally listed and other sensitive species. These include measures for communication towers, power line safety for raptors, road and highway improvements, spring developments and livestock watering facilities, wastewater facilities, and trenching operations.

We also suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding State fish, wildlife, and plants.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. For further consultation on your proposed activity, please call 505-346-2525 or email nmesfo@fws.gov and reference your Service Consultation Tracking Number.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: USIBWC Rio Grande Canalization Project

Official Species List

Provided by:

New Mexico Ecological Services Field Office
2105 OSUNA ROAD NE
ALBUQUERQUE, NM 87113
(505) 346-2525
http://www.fws.gov/southwest/es/NewMexico/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Expect additional Species list documents from the following office(s):

Austin Ecological Services Field Office
10711 BURNET ROAD, SUITE 200
AUSTIN, TX 78758
(512) 490-0057
http://www.fws.gov/southwest/es/AustinTexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Code: 02ENNM00-2017-SLI-0367
Event Code: 02ENNM00-2017-E-00673

Project Type: WATER SUPPLY / DELIVERY

Project Name: USIBWC Rio Grande Canalization Project
Project Description: This project will implement long-term river management actions for the Rio Grande Canalization Project (RGCP).

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Dona Ana, NM | Sierra, NM | El Paso, TX

Endangered Species Act Species List

There are a total of 12 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Amphibians	**Status**	**Has Critical Habitat**	**Condition(s)**
Chiricahua leopard frog *(Lithobates chiricahuensis)* Population: Wherever found	Threatened	Final designated	
Birds			
Least tern *(Sterna antillarum)* Population: interior pop.	Endangered		
Mexican Spotted owl *(Strix occidentalis lucida)* Population: Wherever found	Threatened	Final designated	
northern aplomado falcon *(Falco femoralis septentrionalis)* Population: U.S.A (AZ, NM)	Experimental Population, Non-Essential		
Southwestern Willow flycatcher *(Empidonax traillii extimus)* Population: Wherever found	Endangered	Final designated	
Yellow-Billed Cuckoo *(Coccyzus americanus)* Population: Western U.S. DPS	Threatened	Proposed	

Fishes			
Gila trout *(Oncorhynchus gilae)* Population: Wherever found	Threatened		
Rio Grande silvery minnow *(Hybognathus amarus)* Population: Wherever found, except where listed as an experimental population	Endangered	Final designated	
Flowering Plants			
Sneed Pincushion cactus *(Coryphantha sneedii var. sneedii)* Population: Wherever found	Endangered		
Todsen's pennyroyal *(Hedeoma todsenii)* Population: Wherever found	Endangered	Final designated	
Mammals			
Gray wolf *(Canis lupus)* Population: U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico.	Endangered		
Reptiles			
Narrow-headed gartersnake *(Thamnophis rufipunctatus)* Population: Wherever found	Threatened	Proposed	

Critical habitats that lie within your project area

There are no critical habitats within your project area.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Austin Ecological Services Field Office
10711 BURNET ROAD, SUITE 200
AUSTIN, TX 78758
PHONE: (512)490-0057 FAX: (512)490-0974
URL: www.fws.gov/southwest/es/AustinTexas/;
www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Code: 02ETAU00-2017-SLI-0551 March 07, 2017
Event Code: 02ETAU00-2017-E-00884
Project Name: USIBWC Rio Grande Canalization Project

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

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that *may* occur within the county of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Please note that new information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Also note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq*.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of federally listed as threatened or endangered species and to determine whether projects may affect these species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

While a Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment, the Federal Agency must notify the Service in writing of any such designation. The Federal agency shall also independently review and evaluate the scope and content of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by a federally funded, permitted or authorized activity, the agency is required to consult with the Service pursuant to 50 CFR 402. The following definitions are provided to assist you in reaching a determination:

- *No effect* - the proposed action will not affect federally listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.
- *May affect, but is not likely to adversely affect* - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effect. The Federal agency or the designated non-Federal representative should consult with the Service to seek written concurrence that adverse effects are not likely. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.
- *Is likely to adversely affect* - adverse effects to listed species may occur as a direct or indirect result of the proposed action. For this determination, the effect of the action is neither discountable nor insignificant. If the overall effect of the proposed action is beneficial to the listed species but the action is also likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. The analysis should consider all interrelated and interdependent actions. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal section 7 consultation with our office.

Regardless of the determination, the Service recommends that the Federal agency maintain a complete record of the evaluation, including steps leading to the determination of effect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

Migratory Birds

For projects that may affect migratory birds, the Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of these species. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Migratory birds may nest in trees, brushy areas, or other areas of suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals, nests, or eggs. If project activities must be conducted during this time, we recommend surveying for nests prior to conducting work. If a nest is found, and if possible, the Service recommends a buffer of vegetation remain around the nest until the young have fledged or the nest is abandoned.

For additional information concerning the MBTA and recommendations to reduce impacts to migratory birds please contact the U.S. Fish and Wildlife Service Migratory Birds Office, 500 Gold Ave. SW, Albuquerque, NM 87102. A list of migratory birds may be viewed at https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-spe . Guidance for minimizing impacts to migratory birds for projects including communications towers can be found at: https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-docume . Additionally, wind energy projects should follow the wind energy guidelines

https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-docume) for minimizing impacts to migratory birds and bats.

Finally, please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-docume .

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: USIBWC Rio Grande Canalization Project

Official Species List

Provided by:

Austin Ecological Services Field Office
10711 BURNET ROAD, SUITE 200
AUSTIN, TX 78758
(512) 490-0057
http://www.fws.gov/southwest/es/AustinTexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

Expect additional Species list documents from the following office(s):

New Mexico Ecological Services Field Office
2105 OSUNA ROAD NE
ALBUQUERQUE, NM 87113
(505) 346-2525
http://www.fws.gov/southwest/es/NewMexico/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Consultation Code: 02ETAU00-2017-SLI-0551
Event Code: 02ETAU00-2017-E-00884

Project Type: WATER SUPPLY / DELIVERY

Project Name: USIBWC Rio Grande Canalization Project
Project Description: This project will implement long-term river management actions for the Rio Grande Canalization Project (RGCP).

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Dona Ana, NM | Sierra, NM | El Paso, TX

Endangered Species Act Species List

There are a total of 8 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	Status	Has Critical Habitat	Condition(s)
Least tern *(Sterna antillarum)* Population: interior pop.	Endangered		
Mexican Spotted owl *(Strix occidentalis lucida)* Population: Wherever found	Threatened	Final designated	
northern aplomado falcon *(Falco femoralis septentrionalis)* Population: Wherever found, except where listed as an experimental population	Endangered		
Piping Plover *(Charadrius melodus)* Population: except Great Lakes watershed	Threatened	Final designated	Wind Energy Projects
Red Knot *(Calidris canutus rufa)* Population: Wherever found	Threatened		Wind Energy Projects
Southwestern Willow flycatcher *(Empidonax traillii extimus)* Population: Wherever found	Endangered	Final designated	
Yellow-Billed Cuckoo *(Coccyzus americanus)* Population: Western U.S. DPS	Threatened	Proposed	

Flowering Plants			
Sneed Pincushion cactus *(Coryphantha sneedii var. sneedii)* Population: Wherever found	Endangered		

Critical habitats that lie within your project area

There are no critical habitats within your project area.