FINAL BIOLOGICAL ASSESSMENT

INTEGRATED LAND MANAGEMENT FOR LONG-TERM RIVER MANAGEMENT OF THE RIO GRANDE CANALIZATION PROJECT

Prepared for:
UNITED STATES SECTION
INTERNATIONAL BOUNDARY AND WATER COMMISSION

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1.0 INTRODUCTION

The purpose of this biological assessment (BA) is to determine all likely effects on threatened, endangered, and proposed species resulting from the implementation of long-term river management actions set forth in the Integrated Land Management Alternative described in the 2009 Record of Decision (ROD) for management of the Rio Grande Canalization Project (RGCP). The RGCP is a reach of the Rio Grande extending from the Percha Diversion Dam in New Mexico to near the American Diversion Dam in Texas. The proposed long-term river management actions in the Integrated Land Management Alternative include:

- 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;
- Channel and irrigation facilities management, with debris removal and channel protection in addition to American Dam maintenance; and
- Sediment management (control and removal).

An important element of the Integrated Land Management Alternative consists 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 U.S. Section of the International Boundary and Water Commission (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 proposes restoration of aquatic habitat at three of the 30 sites and restoration of a mosaic of native plant communities—grasslands, riparian woodlands, riparian forests, and dense riparian shrub. The Conceptual Plan (USIBWC 2009) includes the following components:

- Identification of the restoration sites;
- Specification of site-specific restoration prescriptions (e.g., removing riprap, destabilizing and lowering the riverbank opposite the arroyo mouth, and ceasing channel dredging for aquatic habitat restoration);
- A water budget for each site comprising an offset for an increase in depletions or an allocation for supplemental irrigation; and
- An estimated average water budget of 9,000 acre-feet for a periodic (once every three to five years) environmental peak release of 3,500 cubic feet per second (cfs) from Caballo Lake between April 24 and June 7 to enhance river floodplain hydrologic connectivity at 12 of the 30 sites, including eight sites targeted for restoration of dense riparian shrub habitat.

Transfer of Rio Grande Project water rights as proposed under the Proposed Action will occur within the following framework (hereafter "environmental water transfer framework"):

- Project water will be donated, leased or acquired from willing water rights holders;
- Habitat restoration sites will be located within Elephant Butte Irrigation District (EBID) or El Paso County Water Improvement District No. 1 (EPCWID) irrigation district service boundaries;
- Irrigation district service boundaries may be expanded through an EBID and/or EPCWID board-approved boundary realignment process to include habitat restoration sites and comply with existing contracts which specify limits on total project and district acreage;
- Project water will be leased or water rights permanently acquired and transferred through a EBID or EPCWID board-approved leasing, voluntary suspension and transfer or reclassification process;
- The use of Rio Grande Project water for enhancement and establishment of riparian and wetland habitat will be considered an agricultural use;
- Within a district, all water users receive an equal allocation per acre with water users sharing equally in times of water shortage. This policy will apply to all district constituents including any entity who owns or leases water rights for habitat restoration sites; and
- The use of Rio Grande Project water for an environmental peak release could be considered a miscellaneous use subject to the requirements set forth under the federal Miscellaneous Purposes Act at 41 Stat. 451.

Section 7 of the Endangered Species Act (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 must be prepared for federal actions that entail major construction activities (also defined as a project significantly affecting the quality of the human environment as defined under the National Environmental Policy Act [NEPA]) to evaluate the potential effects on listed or proposed species.

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

- 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.

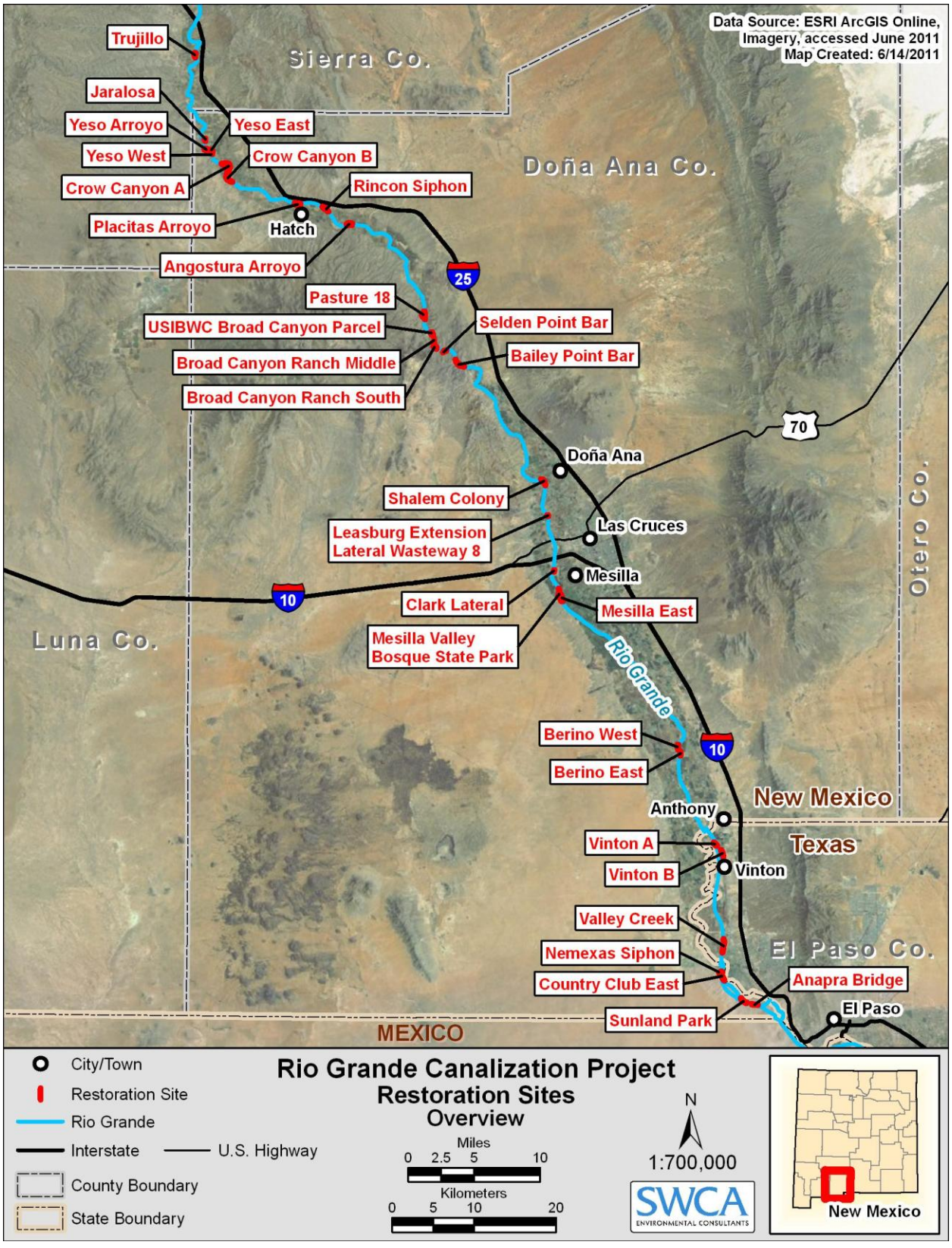

Figure 1. Rio Grande Canalization Project restoration sites.

2.0 PURPOSE AND NEED FOR THE PROJECT

2.1 RGCP LOCATION AND OPERATION

The RGCP extends for 169.6 km (105.4 miles) from the Percha Diversion Dam—just downstream of Caballo Dam in Sierra County, New Mexico, to near the American Diversion Dam in El Paso County, Texas. The RGCP consists of the river channel and adjoining right-of-way land under the jurisdiction of the USIBWC.

Following an Act of Congress authorizing the project, the RGCP was engineered between 1938 and 1943 to facilitate compliance with the 1906 Convention between the United States and Mexico on the equitable distribution of the waters of the Rio Grande. The RGCP was intended to facilitate compliance with the 1906 treaty and properly regulate and control, to the fullest extent possible, the water supply for use in the two countries, as provided in the treaty. Improvement in the river channel conveyance efficiency was required to deliver irrigation waters not just to Mexico but also to the United States. The U.S. Bureau of Reclamation (Reclamation) Rio Grande Project in the Las Cruces and El Paso region is a regional water initiative that provides irrigation water for about 178,000 acres of land and electric power for communities and industries in south-central New Mexico and west Texas. Implementation of the Rio Grande Project was authorized by the Secretary of the Interior on December 2, 1905, under the provisions of the Reclamation Act, and funds were allocated to initiate construction of the first diversion unit. The Reclamation Act was extended to the entire State of Texas on June 12, 1906, following a partial extension for Engle (Elephant Butte) Dam in 1905. Elephant Butte Reservoir, constructed from 1912 to 1916, provides most of the storage for the Rio Grande Project, while three diversion dams route stored water to the irrigation canals: Leasburg Dam, completed in 1908, and Percha and Mesilla dams, constructed between 1914 and 1919 (Reclamation 2002).

Key elements to the construction of the RGCP were identified in the Engineering Record Plan of December 14, 1935. Those elements included 1) acquisition of right-of-way for the river channel and adjoining floodways, 2) improvement of the alignment and efficiency of the river channel conveyance for water delivery, and 3) flood control measures extending through the Rincon and Mesilla valleys of New Mexico and the El Paso Valley in Texas. As part of the implementation of the canalization plan, a deeper main channel was dredged for a length of 153 km (95 miles) to facilitate water deliveries for irrigation. It resulted in the removal of river meanders, reducing the overall length of the reach by 16 km (10 miles) due to river cutoffs (Baker 1943). The RGCP reach is also now characterized by a width that varies from 53 to 91 m (175–300 feet) and a depth of 0.6 to 0.9 m (2–3 feet) in the lower reaches and 2.1 to 3 m (7–10 feet) in the upper reaches. Sections of the river banks are armored with rock revetment to reduce erosion and help maintain a consistent channel alignment.

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 riprap; 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.

2.2 NEW RIVER MANAGEMENT ALTERNATIVES, 1999–PRESENT

In 1998 the Southwest Environmental Center (SWEC), an environmental advocacy organization based in Las Cruces, New Mexico, stated its belief that an updated, comprehensive Environmental Impact Statement (EIS) was required for continued operation and maintenance of the RGCP, and to address alleged violations of the ESA and NEPA in correspondence addressed to the USIBWC Commissioner, the U.S. Secretary of State, and the U.S. Secretary of the Interior. On March 22, 1999, the USIBWC and SWEC signed a Memorandum of Understanding (MOU) that established the terms for the preparation of the EIS and called for continued flood control while improving the environmental quality of the RGCP. The MOU also established provisional green zones where mowing would be minimized, a limited tree-planting program, and the Rio Grande Citizens' Forum, a quarterly public meeting that provides interested stakeholders with the opportunity to learn and discuss EIS developments.

The USIBWC, in coordination with the USACE Albuquerque District, also evaluated the RGCP flood containment capacity in 1996 and subsequently in 2005. These studies identified a number of potential levee deficiencies along the RGCP on the basis of hydraulic modeling of the 100-year storm. The modeling indicated that an increase in levee height would be required to meet design criteria for flood protection. After Hurricane Katrina in August 2005, levees became a major concern to the general public. Created by Congress in response to the rising cost of disaster relief for flood victims, the National Flood Insurance Program (NFIP) is managed by the Federal Emergency Management Agency's (FEMA's) Federal Insurance and Mitigation Administration. To be recognized as providing a 1% annual chance level of flood protection on the modernized NFIP maps, called Digital Flood Insurance Rate Maps (DFIRMs), levee systems must now meet *and continue to meet* the minimum design, operation, and maintenance standards (44 Code of Federal Regulations [CFR] Section 65.10). For the purposes of the NFIP, FEMA has established levee design criteria for freeboard, closures, embankment protection, embankment and foundation stability, settlement, interior drainage, and other design criteria. Freeboard is a factor of safety usually expressed in feet above the Base Flood Elevation (BFE), or the level that water is anticipated to rise to during a 100-year flood. Freeboard is a useful concept for floodplain management. It is designed to anticipate the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as the hydrological effect of urbanization of a watershed.

For riverine levees, design criteria set forth in 44 CFR Section 65.10 include:

- A minimum freeboard of 0.9 m (3 feet) above the BFE;
- An additional 0.3 m (1 foot) above the minimum is required within 30.5 m (100 feet) on either side of structures (e.g., bridges) riverward of the levee or wherever the flow is constricted; and
- An additional 0.15 m (0.5 foot) above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.

Levees without 0.9 m (3 feet) of freeboard do not meet federal requirements and the structures behind them are considered to be in a flood zone. Without levee accreditation, local properties are mapped within the Special Flood Hazards Area (within the 1% or 100-year floodplain), and homeowners may be required to purchase flood insurance, as decertification of the levee system will place thousands of property owners into the floodplain. FEMA certification of RGCP levees in El Paso County, Texas, and Doña Ana and Sierra counties, New Mexico, cannot occur until the existing levees are rehabilitated to meet certification standards. Recent preliminary DFIRMs released by FEMA indicate increased newly designated Special Flood Hazard Areas along the Rio Grande.

In the EIS (Draft EIS released in December 2003, Final EIS released in June 2004), the USIBWC examined potential environmental impacts of four long-term river management alternatives, the No Action Alternative and three action alternatives. The Preferred Alternative, integrated land management, proposed the continuation of the same operation and maintenance activities for flood protection and water delivery, the continuation of channel maintenance and flood-control improvements, modification of the grazing lease program to improve erosion control, partial changes in floodplain maintenance, environmental measures within the USIBWC's right-of-way, the development of a riparian corridor for bank stabilization, and stream bank reconfiguration for overbank flows.

Following the release of the Final EIS, signing of the ROD was delayed at the request of Governor Richardson, Senators Bingaman and Domenici, and stakeholders, pending further investigations and stakeholder collaboration. In April 2005, the World Wildlife Fund (WWF), Environmental Defense, and EBID submitted a proposal to examine the feasibility of targeted habitat enhancement within a water rights framework, with safeguards recognized under the ESA for water rights provided through the districts. Namely, the proposal—and part of the Proposed Action examined in this BA—aims at the following two elements: 1) restoring habitat at select sites along the RGCP and 2) securing water rights consistent with the environmental water transfer framework and ESA safeguards for water rights provided through the districts. Also in 2005, the USACE completed FLO-2D modeling of the RGCP to predict floodplain inundation, water surface elevation and levee inundation or overtopping associated with flood wave attenuation of return period flood events. An updated version of the FLO-2D model of the RGCP was used to estimate baseline hydraulic conditions in the RGCP, including the amount of overbank restoration flows up to 5,000 cfs, to assist in evaluating restoration potential along the reach. The results of this study were released as the 2009 Conceptual Plan. The Conceptual Plan presents 30 potential restoration sites totaling 565 acres that have been identified for restoration of aquatic habitat and a mosaic of native plant communities—grasslands, riparian woodlands, riparian forests, and dense riparian shrub.

In August 2006, the USIBWC entered into an agreement with EBID to formulate an administrative framework to transfer surface water to restoration projects and evaluate legal options under the ESA should restoration result in an increase in the distribution and population of southwestern willow flycatcher (*Empidonax traillii extimus*; flycatcher). In 2006, Reclamation entered into a cooperative agreement with EBID under the authority of the Fish and Wildlife Coordination Act to fund complementary studies in partnership with the WWF on enhancement of breeding habitat for the flycatcher in the RGCP and legal options under the ESA.

On June 4, 2009, USIBWC Commissioner C.W. Ruth signed the ROD for river management alternatives for the RGCP. The ROD completed an eight-year consultation period with many key stakeholders.

Compared to the Final EIS, the Integrated Land Management Alternative set forth in the 2009 ROD incorporates proposed habitat restoration as evaluated in the 2009 Conceptual Plan and complemented by flycatcher surveys, soils surveys, evaluation of channel maintenance practices, and legal options under the ESA. An increase in flood containment capacity will be achieved primarily by raising sections of the existing levees to meet the 0.9-m (3-foot) freeboard design criteria required by FEMA. New levees would be constructed in unconfined areas where flood levels could extend past the right-of-way boundary. With funding from the American Recovery and Reinvestment Act of 2009, the USIBWC is currently rehabilitating approximately 169 km (105 miles) of its levees. Current work targets the following critical RGCP areas:

- Hatch West levee: Salem Bridge to Bignell Arroyo (21.9 km [13.6 miles]);
- Mesilla Phase 1 Project area: west levee from Shalem Bridge to Rio Bosque Park, east levee from Mesilla Dam to Vado Bridge, and west levee from Mesilla Dam to Vado Bridge (53.75 km [33.4 miles]);
- Mesilla Phase 2 Project area: east levee from Radium Springs to Mesilla Dam (31.5 km [19.6 miles]);
- Canutillo Phase 1 Project area (under construction): east levee from Vado Bridge to Vinton Bridge, west levee from Vado Bridge to Borderland Bridge (30.7 km [19.1 miles]); and
- Sunland Project area: east levee from Borderland Bridge to the El Paso Electric Company power plant (19.2 km [11.9 miles]).

Thus, while retaining multiple operation and maintenance measures currently conducted for efficient water delivery and flood control within an adaptive management framework, the Integrated Land Management Alternative provides for habitat restoration and for increasing flood containment capacity. It also improves soil erosion protection practices. As part of this alternative, the existing grazing lease management program will also be modified to protect water quality by reducing erosion and runoff of sediment, E. coli, and other potential pollutants and to promote bank stabilization. The modified program includes a ban on issuing new grazing leases to new lessees and a ban on renewing existing leases that expire during the term of this management plan. If any grazing leases remain in effect during the term of this management plan, the USIBWC will work with the lessee to implement a variety of vegetation treatments, construct fencing and infrastructure on existing lease areas to increase vegetation cover and streamside buffering, control saltcedar (*Tamarix* spp.), exclude river access, and develop watering alternatives. Recreational use of some sections of the floodway will be continued or expanded under proposed cooperative agreements with local and state organizations or other interested stakeholder groups. The USIBWC will ensure that recreational use of the floodway does not foreclose riparian restoration potential. Finally, under the Integrated Land Management Alternative, the USIBWC will continue to perform routine maintenance of roads and facilities, as well as of its levees, new and rehabilitated.

3.0 CONSULTATION HISTORY

Several of the measures proposed under the Integrated Land Management Alternative have the potential to affect the flycatcher and other listed, proposed, or candidate species. A small population of the federally and state endangered flycatcher is now known to breed within the 169-km (105-mile) reach of the RGCP including on some of the proposed restoration sites. The Conceptual Plan identified up to 192 acres for restoration of dense riparian shrub suitable for breeding flycatchers. An increase in the distribution and population of flycatchers could help New Mexico satisfy the Lower Rio Grande recovery target and contribute to efforts to delist the species. Farmers, however, are concerned that delivery of project water to these sites could give rise to potential liability under the ESA and restrict water deliveries for crop irrigation especially during low water years. Revegetation at some of the proposed restoration sites could increase evapotranspiration rates or require irrigation. Where restoration of flycatcher habitat will require EBID or EPCWID board-approved water transfers, it will be necessary for stakeholders to obtain water rights consistent with the environmental water transfer framework. The analysis of likely effects presented in this BA focuses on both the proposed habitat restoration within its environmental water transfer framework and other proposed measures including continued routine maintenance of roads, levees, and facilities, continued sediment management, modifications of the grazing lease management program, and levee rehabilitation and construction.

Since project planning began in 1999, the U.S. Fish and Wildlife Service (USFWS) has attended meetings and field trips with the USIBWC and others to discuss project features, design, and construction methods. Additional biological data and background information were derived through review of relevant literature and personal communications. The USIBWC provided the USFWS with technical and background information on the project area, much of which was prepared by Parsons Engineering, Inc. (Parsons). Parsons performed an extensive literature review and inventory of the fish, wildlife, vegetation, and habitat for the RGCP in 2000 and 2001. Parsons also developed a qualitative wildlife habitat rating system (Wildlife Habitat Appraisal Procedure) to assess wildlife habitat value in the RGCP (Parsons 2003). The USFWS also reviewed baseline fish and wildlife information collected in the project area by its own agency staff, CH2M Hill, and Geo-Marine, Inc., for the El Paso-Las Cruces Regional Sustainable Water Project.

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.

On August 31, 2009, after the ROD had been signed, the USIBWC again requested consultation with 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 requested new consultation, safeguards recognized under the ESA are sought for the environmental water transfer framework.

4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 OVERVIEW OF THE RGCP, PAST AND CURRENT CONDITIONS

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 3,034 km (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 323 km (200 miles) along the Rio Grande to Fort Quitman, Texas. The drainage basin above Elephant Butte Reservoir is 67,195 km² (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.

Project water storage is provided primarily in Elephant Butte Reservoir. Caballo Reservoir is used for flood control and seasonal water storage (USIBWC 2004). The maximum combined storage for the two reservoirs is 2,396,520 acre-feet. The normal annual release from the reservoirs, including Mexico's 60,000 acre-foot allotment, totals 790,000 acre-feet (USIBWC 2004).

The regulated flows in the Rio Grande downstream of Elephant Butte Reservoir modify the historical natural hydrograph following a pattern of sustained moderately high irrigation flows during late spring and summer and low flows during fall and winter months, with additional high flows from summer thunderstorms. An average annual hydrograph (U.S. Geological Survey [USGS] Gage at Station 08362500) for the river below Caballo Dam shows that the seasonal peak releases usually occur in June and July. Average monthly discharges range from approximately 48 to 1,895 cfs). The average winter base flow of approximately 107 cfs usually persists from November through February, and average flows during the irrigation season (March–October) are typically 1,318 cfs (USIBWS 2004) (Figure 2).

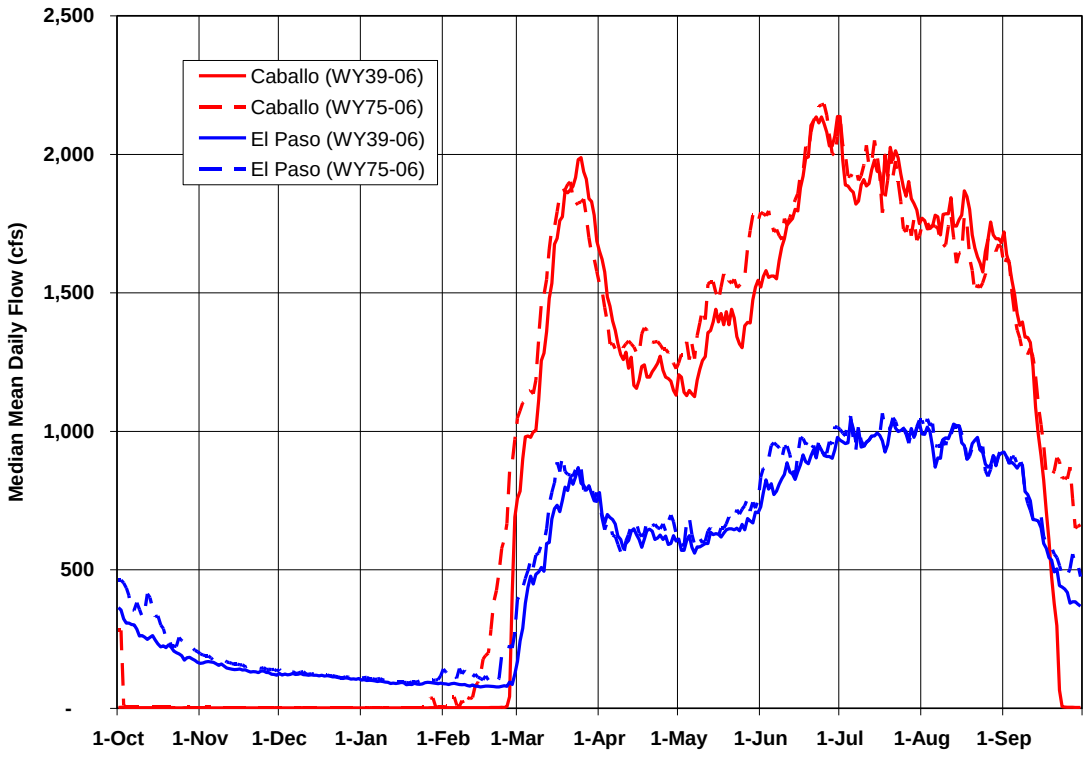

Figure 2. **Median mean daily flows at Rio Grande at Caballo gage (USGS Gage No. 08362500) and the Rio Grande at El Paso gage (EBID gage) for the periods from WY1938 through WY2006 and WY1975 through WY2006. Reproduced with permission from USIBWC 2009.**

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 2005). 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 (mentioned earlier) on the river.

There are four mainstem diversions (Percha, Leasburg, Mesilla, and American), and more than 1,609 km (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 section, 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.

The environmental consequences of channelization activities include the severance of the river from its floodplain; the straightening, narrowing, and incising of the river channel; the curtailment of the meandering process that formed oxbows and backwaters; and the loss of

native wetland and riparian vegetation (USFWS 2005). The incised channel and dam operations prevent overbank flows and periodic scouring of floodplain areas. Most of the floodplain of the Rio Grande has been replaced by row crops and orchards. Except for a few locations upstream of Selden Canyon, the river is now confined to a single channel that ranges in width from about 46 to 91 m (150–300 feet). A few gravel riffles occur upstream of Hatch, New Mexico, near the mouth of arroyos and immediately downstream of Leasburg Dam. These riffles provide unique habitat for longnose dace (*Rhinichthys cataractae*). Aside from these areas, the streambed consists almost entirely of sand, which actively shifts and moves downstream even at moderate flows. The changed hydrology and current management practices largely preclude natural regeneration of native cottonwoods and willows and promotes the growth of non-native vegetation such as saltcedar and Russian olive (*Elaeagnus angustifolia*). These two non-natives, primarily saltcedar, have largely replaced the native cottonwood/willow that occurred originally along the RGCP. Cumulatively, all the changes resulting from water diversion and dams have significantly reduced the complexity of aquatic and riparian habitats and their ability to support healthy fish and wildlife populations (USFWS 2005).

4.2 PROPOSED SOUTHWESTERN WILLOW FLYCATCHER CRITICAL HABITAT RE-DESIGNATION

The USFWS is proposing to revise critical habitat for the flycatcher under the ESA of 1973, as amended (USFWS 2011d). In total, approximately 3,364 stream km (2,090 stream miles) are being proposed for designation as critical habitat. These areas are being proposed as stream segments, with the lateral extent including the riparian areas and streams that occur within the 100-year floodplain or flood-prone areas. The proposed critical habitat is located on a combination of federal, state, tribal, and private lands in California, Nevada, Utah, Colorado, Arizona, and New Mexico. In New Mexico, critical habitat is proposed for Catron, Cibola, Doña Ana, Grant, Hidalgo, McKinley, Mora, Rio Arriba, Santa Fe, San Juan, Sierra, Socorro, Taos, and Valencia counties (Figure 3). Some of the proposed critical habitat is situated along the RGCP south to Leasburg Dam (Figure 4 and Figure 5). Currently there is no flycatcher critical habitat along the RGCP.

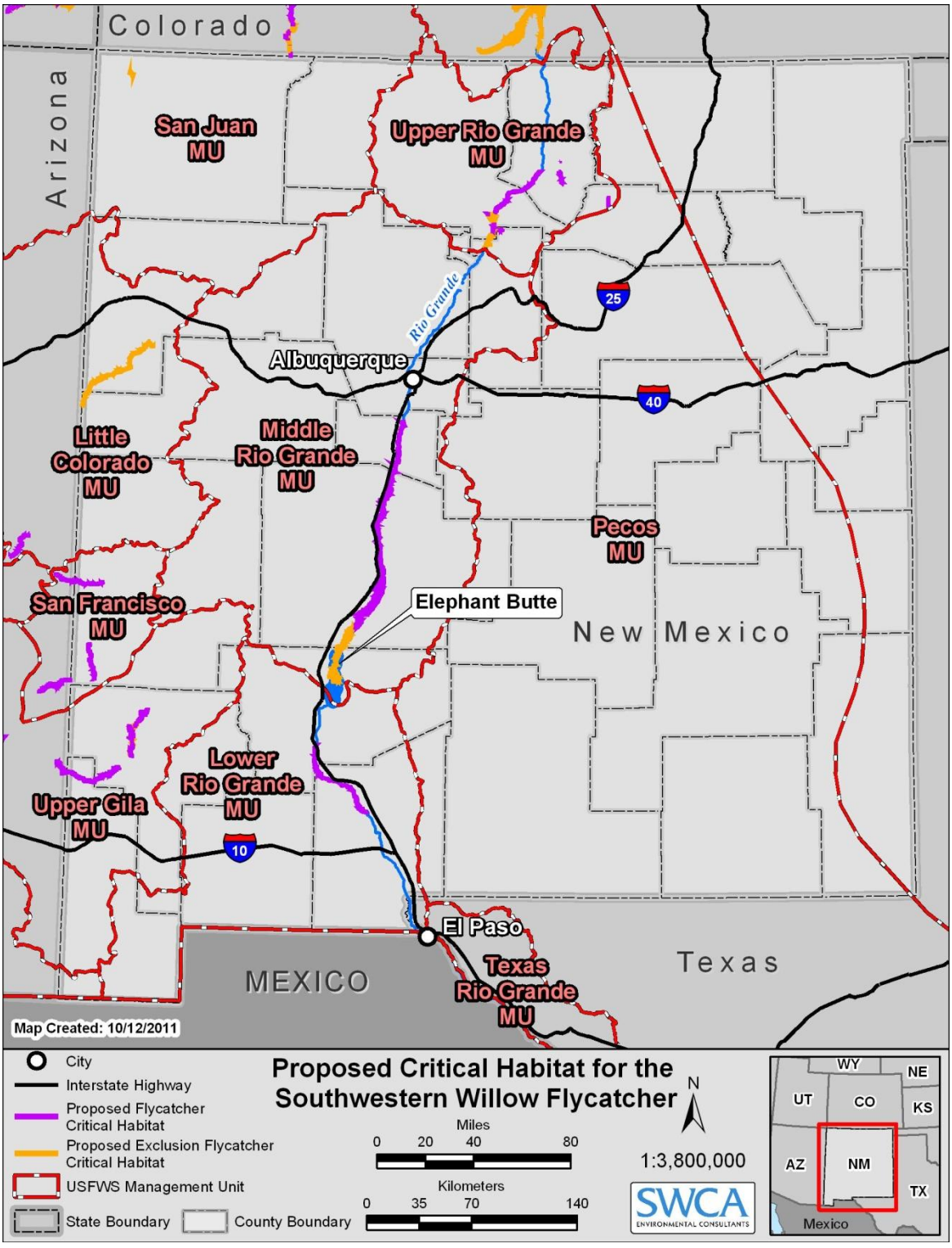

Figure 3. Proposed critical habitat designation for the flycatcher in New Mexico (USFWS 2007). Note that some of the proposed critical habitat is being considered for exclusion, none of which is in the RGCP.

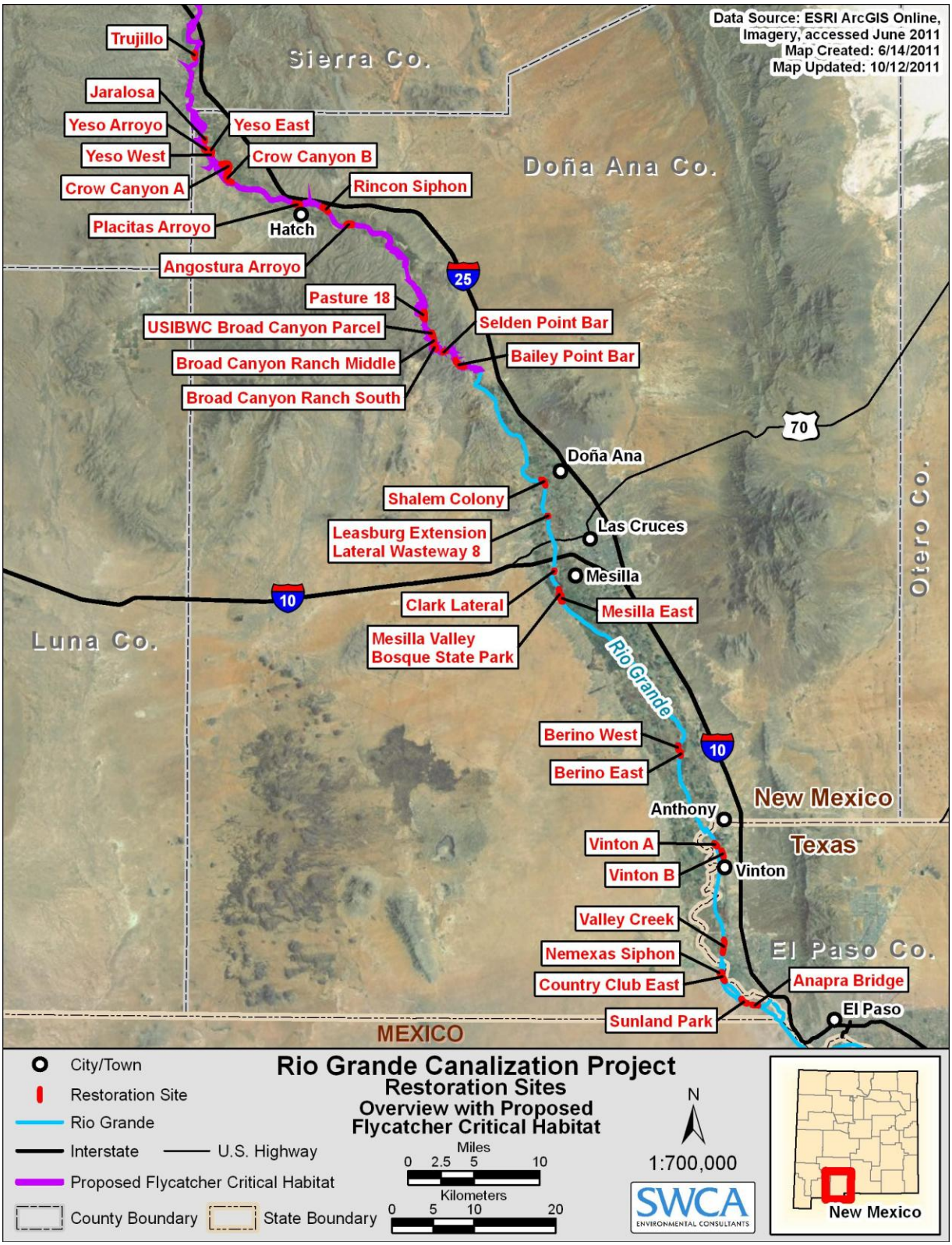

Figure 4. Extent of proposed flycatcher critical habitat along the RGCP.

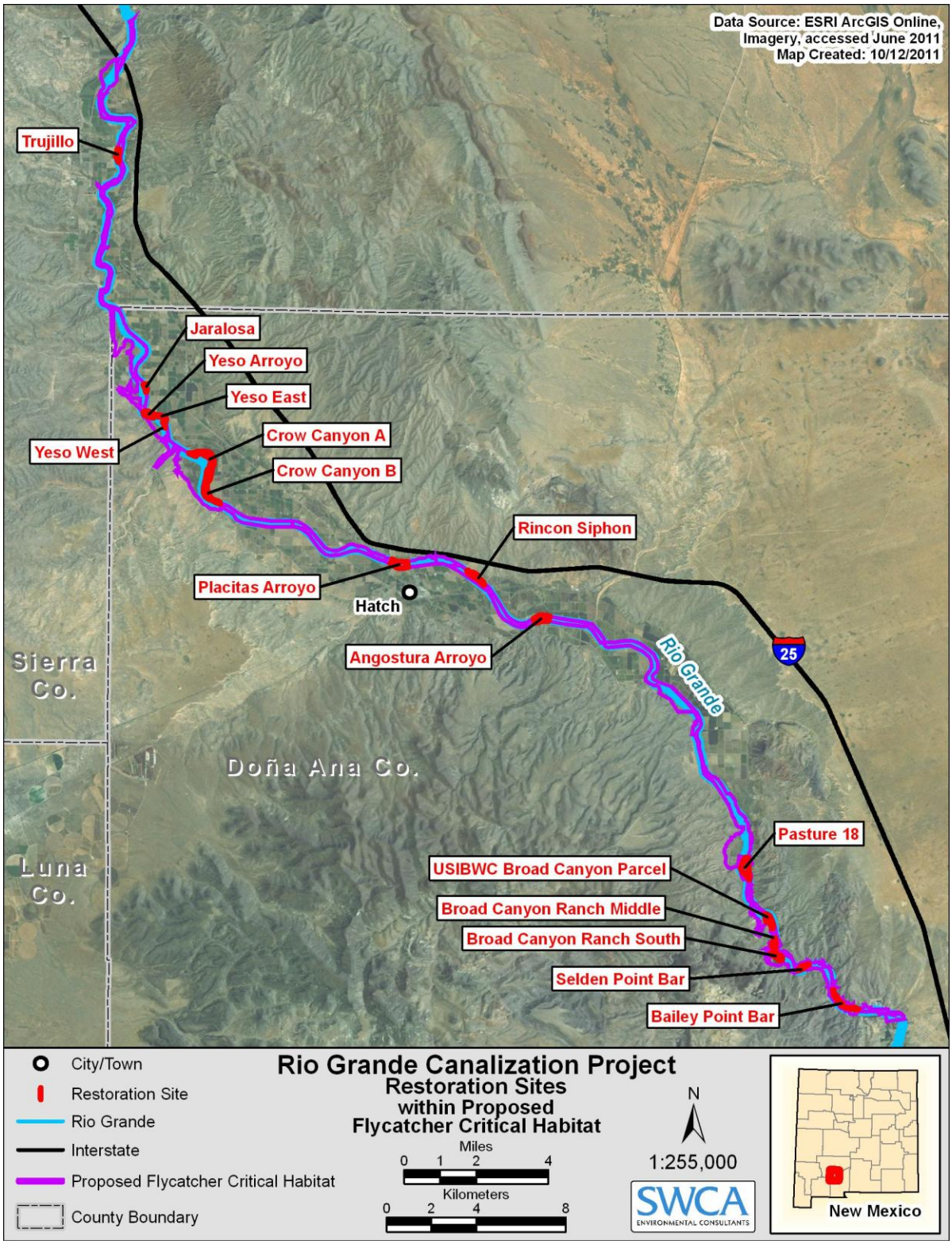

Figure 5. Restoration sites within proposed flycatcher critical habitat along the RGCP.

4.3 SELECTED RESTORATION SITES

The Proposed Action includes habitat restoration at 30 sites along the RGCP, along with continued implementation of measures identified in the 2009 ROD for management of the RGCP and further refined based on additional site-specific data (USIBWC 2011). These additional site-specific data were obtained from soil surveys, an examination of groundwater depths, cultural resources surveys, and flycatcher and yellow-billed cuckoo (*Coccyzus americanus*) surveys.

The 30 sites are described in the 2009 Conceptual Plan, and summary information regarding their location, size, and ownership status is presented in Table 1. The sites were selected based on their potential for achieving the restoration objectives of enhancing ecological diversity, improving riparian and channel functionality, and expanding native habitat in a manner that does not jeopardize water delivery requirements and public safety (USIBWC 2009). One of the 30 sites, Lack Property, has since been removed from the list due to ownership-related issues. Another site referred to here as the USIBWC Broad Canyon Parcel was added as a new restoration site.

Information on geomorphology, vegetation, and management history is presented in Table 2, based on the description of the sites in the Conceptual Plan, as updated during biological surveys conducted by SWCA Environmental Consultants (SWCA) from June 6 to 9, 2011. A detailed description of the sites (SWCA 2011) is appended to this Draft BA (Appendix A). Sites 1 through 16 fall within the stretch of the RGCP proposed for critical habitat designation (USFWS 2011d).

Table 1. Location, Size (acreage), and Ownership of the 30 Sites Proposed for Habitat Restoration along the RGCP Reach

Site Number	Site Name	River Mile	Acreage	Side of the River	Ownership / Management	Proposed Critical Habitat for Flycatcher
1	Trujillo	103	14.0	West	USIBWC	Yes
2	Jaralosa	94.9	4.5	East	USIBWC	Yes
3	Yeso Arroyo	94	10.6	East and west	USIBWC	Yes
4	Yeso East	93.7	9.7	East	USIBWC	Yes
5	Yeso West	93.5	2.5	West	USIBWC	Yes
6	Crow Canyon A	92	90.0	East	USIBWC	Yes
7	Crow Canyon B	90.5	25.6	East	USIBWC	Yes
8	Placitas Arroyo	85	21.8	East and west	USIBWC	Yes
9	Rincon Siphon (2 parcels)	82.5	16.3	East	USIBWC	Yes
10	Angostura Arroyo	80	15.4	East and west	USIBWC	Yes
New	USIBWC Broad Canyon Parcel (Site added in replacement of #11, Lack Property)	67.7	25.8	West	USIBWC	Yes
12	Pasture 18	69.5	52.0	East	New Mexico State University	Yes
13	Broad Canyon Ranch Middle	67	13.8	West	New Mexico State Parks	Yes
14	Broad Canyon Ranch South	66.8	20.6	West	New Mexico State Parks	Yes
15	Selden Point Bar	66	7.8	East	USIBWC	Yes
16	Bailey Point Bar	64	16.6	East	Private property	Yes
17	Shalem Colony	50.5	14.2	East	USIBWC	No
18	Leasburg Extension Lateral Wasteway 8	47.8	4.1	East	USIBWC	No
19	Clark Lateral	43.5	6.0	East	USIBWC	No
20	Mesilla Valley Bosque State Park	41.5	31.8	West	USIBWC/State of New Mexico	No
21	Mesilla East	41	15.8	East	USIBWC	No
22	Berino West	25.5	10.3	West	USIBWC	No
23	Berino East	24.8	9.5	East	USIBWC	No
24	Vinton A	17	14.7	West	USIBWC	No

Site Number	Site Name	River Mile	Acreage	Side of the River	Ownership / Management	Proposed Critical Habitat for Flycatcher
25	Vinton B	16	20.0	West	USIBWC	No
26	Valley Creek	9	22.0	West	USIBWC	No
27	Nemexas Siphon	7	16.7	West	USIBWC	No
28	Country Club East	6.8	29.0	East	USIBWC	No
29	Sunland Park	4	28.8	East	USIBWC	No
30	Anapra Bridge	3	11.0	East	USIBWC	No

Site numbering follows that of the Conceptual Plan. Site # 11 was removed from the original list of restoration sites. A new site was added in replacement of Site # 11.

Table 2. Geomorphologic and Vegetation Characteristics of the 30 RGCP Sites Proposed for Habitat Restoration

Site Number	Site Name	Geomorphology	Dominant Existing Vegetation	Management History
1	Trujillo	Alluvial terrace (overbank)	Mixed stands of coyote willow, saltcedar, and arrowweed and native grassland.	Arroyo mouth realignment and channel revetment. No mowing and no dredging. No levees.
2	Jaralosa	Abandoned meander bend	Native and non-native herbaceous vegetation, arrowweed, scattered saltcedar, and a few senescent cottonwood trees.	Periodic mowing
3	Yeso Arroyo	Arroyo inlet	River banks lined with 4- to 5-m-tall (13- to 16-foot-tall) saltcedar. There are few Rio Grande cottonwoods.	Periodic mowing
4	Yeso East	Shallow depression (likely a former channel meander)	Non-native weeds (mostly amaranth), and alkali sacaton, aster, and arrowweed.	Periodic mowing
5	Yeso West	Small, inset floodplain just upstream from the mouth of a small arroyo	Grass along the edge of the water and bordered by a dense strip of saltcedar.	–
6	Crow Canyon A (2 parcels)	Large former river meander opposite the mouth of the outlet wash channel from Crow Canyon Dam	First parcel: alkali sacaton with several remnant cottonwoods; second parcel: alkali sacaton, saltgrass, and sprouts of screwbean mesquite and arrowweed. Some resprouting saltcedar in both parcels.	Periodic mowing
7	Crow Canyon B	Meander depression	Meadow with alkali sacaton and saltgrass, plus scattered clumps of arrowweed, rush, bulrush, and cattail; coyote willows and especially saltcedar along the bank.	Periodic mowing
8	Placitas Arroyo	Arroyo inlet	Site highly disturbed by mowing, levee repair work, and dumping of garbage. Along the banks is a thin strip of coyote willow with also some southern cattail.	Periodic mowing; levee repair
9	Rincon Siphon (2 parcels)	Overbank	Saltcedar in monotypic stands and screwbean mesquite, willow, and/or arrowweed associations.	Periodic mowing
10	Angostura Arroyo	Arroyo inlet	Large, open field dominated by sapling saltcedar.	Periodic mowing
New	USIBWC Broad Canyon Parcel	Overbank	Dominated by tall saltcedar with some honey mesquite	-

Site Number	Site Name	Geomorphology	Dominant Existing Vegetation	Management History
12	Pasture 18	Overbank	Screwbean mesquite associations, wolfberry associations, alkali meadow.	Most of the site was burned in spring 2007
13	Broad Canyon Ranch Middle	–	Some open areas created from saltcedar removal, with remaining patches of screwbean mesquite and a ground cover of weeds and shrubs. Mature mesquite grows along the river's edge, though no longer forming a thick corridor of trees. A wetland occurs in the north-central part of the site.	Vegetation treatments have been conducted since 2009, including mechanical removal of saltcedar, chipping of the debris, pile burning, spraying of herbicide (Garlon), and extensive plantings of native vegetation including coyote and Goodding's willow. Resprouting saltcedar is treated with herbicide on an annual basis.
14	Broad Canyon Ranch South	–	Open areas created from saltcedar removal. The only remaining mature saltcedar is present along the edge of the river. Large wetlands occur toward the northern end of the site, while the southern end has more barren ground from the occurrence of flooding.	Saltcedar removal mostly in 2009 and pole planting of native vegetation including coyote and Goodding's willow. Resprouting saltcedar is treated with herbicide on an annual basis.
15	Selden Point Bar	–	Monotypic saltcedar stands, wet meadow with saltcedar, small emergent.	–
16	Bailey Point Bar	–	Monotypic saltcedar stands, saltcedar/willow associations, screwbean mesquite, wet meadow.	–
17	Shalem Colony	–	5-acre stand of maturing screwbean mesquite trees with a ground cover of alkali sacaton, saltgrass, and spike dropseed. Same ground cover elsewhere throughout the site; resprouting coyote willow in mowed areas.	Periodic mowing; levee construction
18	Leasburg Extension Lateral Wasteway 8	Overbank	Mowed grassland with scattered resprouting saltcedar.	Periodic mowing
19	Clark Lateral	Overbank	Mowed grassland with scattered resprouting saltcedar.	Periodic mowing

Site Number	Site Name	Geomorphology	Dominant Existing Vegetation	Management History
20	Mesilla Valley Bosque State Park	Overbank	Mixture of mowed grassland and wet meadow, robust coyote willow bordering the bankline, scattered cottonwoods, and, in the downstream portion, saltcedar.	Periodic mowing
21	Mesilla East	Overbank	Regularly mowed grasses with minor saltcedar resprouting and a few native shrubs.	Periodic mowing
22	Berino West	Overbank	Regularly mowed grasses and native and exotic herbaceous vegetation.	Periodic mowing
23	Berino East	–	Regularly mowed grasses and native and exotic herbaceous vegetation.	Periodic mowing
24	Vinton A	–	Regularly mowed grasses and native and exotic herbaceous vegetation, with scattered resprouting saltcedar and some willows.	Periodic mowing
25	Vinton B	–	Regularly mowed grasses and native and exotic herbaceous vegetation, with scattered resprouting saltcedar and some willows.	Periodic mowing
26	Valley Creek	–	Regularly mowed grasses and native and exotic herbaceous vegetation, with scattered resprouting saltcedar and some willows.	Periodic mowing
27	Nemexas Siphon	–	Dense stand of saltcedar with several mature cottonwoods and small patches of coyote willows.	–
28	Country Club East	–	Mowed grassland with scattered resprouting saltcedar.	Periodic mowing
29	Sunland Park	Overbank	Relatively dense grasses (primarily saltgrass) and scattered cottonwoods and shrubs, with minor saltcedar resprouting.	Periodic mowing; paved recreational trail recently constructed adjacent to this site
30	Anapra Bridge	Overbank	Grasses (primarily saltgrass) and mature cottonwoods, coyote willow, and screwbean mesquite.	Periodic mowing; paved recreational trail recently constructed adjacent to this site

5.0 ALTERNATIVES INCLUDING THE NO ACTION ALTERNATIVE

Potential environmental effects of river management alternatives were evaluated in a Draft EIS released for agency and public review on December 18, 2003, and completed in final form on June 29, 2004. River management alternatives consisted of the No Action Alternative and three action alternatives: the Flood Control Improvement Alternative, the Integrated Land Management Alternative, and the Targeted River Restoration Alternative. These alternatives were developed to enhance and partially restore the riparian ecosystem and floodplain function while maintaining the flood control and water delivery requirements of the RGCP. 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 vegetation and diversification of aquatic habitats along the RGCP. Alternatives formulation was the result of an eight-year public consultation process that included regulatory agencies, irrigation districts, and environmental organizations. Alternatives were described in detail in a Reformulation of Alternatives Report completed in August 2003 (Parsons 2003) and further refined in the Conceptual Plan completed in March 2009. Additional studies including flycatcher surveys, soils surveys, evaluation of channel maintenance practices, and legal options under the ESA were also completed in December 2008.

During preparation of the Draft EIS, an administrative decision was made not to select a Preferred Alternative. In making this decision, the USIBWC considered that a review of environmental effects and public comment were needed as key elements in selecting a river management alternative for the RGCP. Following evaluation of environmental effects, and comments received on the Draft EIS, the USIBWC concluded that the Integrated Land Management Alternative provided the best balance of flood control, water delivery, and habitat enhancement. This alternative was, therefore, selected as the agency's preferred approach, or Proposed Action, for long-term management of the RGCP. The Targeted River Restoration alternative was not selected for future RGCP management because a number of proposed measures extended beyond the USIBWC's jurisdiction, its implementation had a potential for a significant increase in water use, and it conflicted with the RGCP water delivery mission. Costs of the Targeted River Restoration Alternative were also considered prohibitively high. However, in the Final EIS and 2009 Conceptual Plan, many of the measures proposed as part of the Targeted River Restoration alternative were integrated as part of the Preferred Alternative as reflected in the ROD.

5.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the USIBWC would continue RGCP operation and maintenance activities as currently conducted. Those activities are directed toward flood protection and water delivery, with some activities involving environmental improvements. Key features of this alternative are management of the levee system, floodway maintenance through mowing, grazing leases and recreational areas, maintenance of pilot channel and irrigation facilities, and sediment control and disposal. Mowing of the floodway is conducted annually over an area totaling 4,657 acres, or as circumstances warrant, to control weeds, brush, and tree growth, including saltcedar. The USIBWC administers a land lease program that covers approximately 43% of the RGCP floodway. Pilot channel maintenance is performed during non-

irrigation periods when water levels are lowest by removing debris and deposits, including sand bars. The agency conducts dredging at the mouth of arroyos to maintain grade of the channel bed and ensure the channel conveys irrigation deliveries.

5.2 PROPOSED ACTION (SELECTED ALTERNATIVE): INTEGRATED LAND MANAGEMENT ALTERNATIVE

While the USIBWC currently implements operation and maintenance procedures that enhance ecosystem functions within the RGCP, the river and floodway will remain highly altered from events predating RGCP construction. Thus, the USIBWC recognizes the need and opportunity to better integrate flood control, water delivery, and operation and maintenance activities in a manner that enhances or restores the riparian ecosystem. At the same time, the rising cost of disaster relief for flood victims and the general public's increased concern for the ability of levees to control flood have resulted in FEMA developing riverine levee design criteria that include a 0.9 (3-foot) freeboard above the BFE. To address these design criteria and earn levee accreditation from FEMA, the USIBWC has begun work on approximately 169 km (105 miles) of its levees under the American Recovery and Reinvestment Act of 2009. The Integrated Land Management Alternative is the action selected by the USIBWC for long-term maintenance and operation of the RGCP. Some measures will be implemented directly by the USIBWC. A number of measures will be conducted through cooperative agreements with federal, state, and local agencies, as well as other organizations.

The Proposed Action is essentially the same as the Integrated Land Management Alternative described above, with the exception of select projects that will require separate consultation. Specifically, the Proposed Action consists of the following main elements:

Levee Maintenance, Rehabilitation, and Construction

Levee work included as part of the Proposed Action consists of both levee maintenance along the entire RGCP and construction or rehabilitation work at select sites listed below. Levee maintenance equipment consists of water trucks, maintainers and rollers for levee surface, and slope grading and blading activities. Levees are inspected regularly at the beginning of each flood season and immediately after each flood event. Maintenance includes encouraging grass growth on the levee slopes for erosion control, cutting brush and tall weeds from the slopes, and repairing levee slopes. Levee slopes are mowed to prevent growth of brush and trees that could obstruct flows, or cause root damage to the structure itself. Levee roadways are generally unpaved gravel roads designed for passage of operations and maintenance personnel and equipment. Levee maintenance includes road grading and resurfacing with gravel as needed. The entire levee road system for RGCP is resurfaced within a 20-year cycle. No bulldozers are used as part of levee maintenance activities.

As previously stated, the USIBWC is currently rehabilitating approximately 169 km (105 miles) of its levees. Current work targets the following critical RGCP areas:

- Hatch West levee: Salem Bridge to Bignell Arroyo (21.9 km [13.6 miles]);

- Mesilla Phase 1 Project area: west levee from Shalem Bridge to Rio Bosque Park, east levee from Mesilla Dam to Vado Bridge, and west levee from Mesilla Dam to Vado Bridge (53.75 km [33.4 miles]);
- Mesilla Phase 2 Project area: east levee from Radium Springs to Mesilla Dam (31.5 km [19.6 miles]);
- Canutillo Phase 1 Project area (under construction): east levee from Vado Bridge to Vinton Bridge, west levee from Vado Bridge to Borderland Bridge (30.7 km [19.1 miles]); and
- Sunland Project area: east levee from Borderland Bridge to the El Paso Electric Company power plant (19.2 km [11.9 miles]).

Additionally, levee construction and rehabilitation work is planned at the following locations and is included as part of the Proposed Action. These levee projects are currently in various phases of design.

Vado Reach: A section of the east levee does not exist in the project area, and a railroad embankment is currently used as the flood protection measure. In addition, the channel of the Rio Grande has migrated eastward in the project area and is partially located outside the USIBWC right-of-way. Current engineering recommendations to improve flood management practices in the project area include the enhancement of the existing levee, construction of a floodwall, and the realignment of the river channel (westward). The project also includes the rehabilitation of an existing irrigation structure at the Del Rio Drain, which is owned and operated by EBID. The project area extends over a distance of 1.7 km (1.1 miles).

Courchesne Reach: The project area extends along the east and west sides of the Rio Grande within the USIBWC right-of-way from approximately 76 m (250 feet) north of the American Diversion Dam upstream to the El Paso Electric Plant near the Montoya Drain, over a distance of 5.5 km (3.4 miles). The entire east side of the river in the project area requires levee improvements, drainage structure rehabilitation or replacement, and the construction of levee and floodwalls. The levee improvements, drainage structure improvements or replacement, and construction of levee and floodwalls will likely impact the Rio Grande and associated wetlands and drains. The west side requires existing earthen levee and drainage structure improvements.

Nemexas Reach: The Nemexas Drain Reach Project is a USIBWC Recovery Act project on the west levee of the Rio Grande downstream of the Country Club Bridge (New Mexico Highway 260) in Doña Ana County, New Mexico. The project area is on the west levee extending from the second USIBWC gate (downstream from Country Club Bridge) to the terminus of the spur levee near the Santa Teresa Middle School. The project reach extends from latitude 31° 50’ 17.28” N and longitude 106° 36’ 22.40” W to latitude 31° 50’ 05.15” N and longitude 106° 36’ 38.68” W, or a distance of 0.6 km (0.4 mile). The approximate center of the project area is at latitude 31° 50’ 09” N and longitude 106° 36’ 31” W. The Randals Pond wetland is adjacent to the existing levee on its west side near the north end of the project area, and an impounded channel exists adjacent to the existing levee on its northwest side to the south of the Nemexas Drain. The channel continues to the southwest from the Nemexas Drain towards Santa Teresa Middle School. Additional wetland habitats occur along the east and southeast sides of the

existing levee in the project area. Necessary levee improvements in the project area may impact existing wetlands and other waters of the U.S. in the project area.

Canutillo Reach: The project limits are wholly within the Canutillo town limits, whereby modeling studies show significant deficiencies in the 100-year flood capacity design. Current engineering considerations consist of constructing an earthen levee on the east side of the river for approximately 2.50 km (1.55 miles) at the beginning the project near the Anthony East drain (upstream of the Vado Bridge) and a concrete floodwall for the remaining 3.94 km (2.45 miles) downstream to the Borderland Bridge. This project is anticipated to be designed and constructed in phases as funding permits.

Dredging

The Proposed Action encompasses continued dredging at two locations. Dredging just upstream of Mesilla Dam is non-routine and conducted on an as-needed basis. Dredging last occurred at that location in December 2005. Dredging also occurs just upstream of the American Dam. Dredging at this last location is routine, conducted every two to three years. Dredging was last conducted at American Dam in December 2010 for a safety of dams inspection.

Excluded from the Proposed Action are potential non-routine dredging projects at some locations that include Tonuco Drain, Montoya Drain, and Rincon Arroyo. Any such dredging project will require site-specific coordination and consultation and will be based on the results of individual studies. It should also be noted that the USIBWC does not dredge at Leasburg Dam, which is maintained by EBID.

Grazing Lease Program

The grazing lease program is currently being phased out. One lease remains, approximately one mile downstream of Mesilla Dam on the east side of the river and extends to the Santo Tomas Highway Bridge. The lease, to Mr. James E. Knight, indicates a 3-m (10-foot) buffer along the riverbank that contains an electric fence along the entire length. Proposed actions to increase long-term range conditions for this tract involve the lessee allowing the tract to rest during the growing season and grazes during the dormant season. Stocking density is unknown. The lease is approximately 80 river km (50 river miles) south of Crow Canyon sites and 53 river km (33 river miles) downstream to the Nemexas and Sunland Park sites. Records show the lease was issued on February 1, 2009, and expires January 31, 2014; however, records show that notice was given to Mr. Knight that as a result of the June 2009 ROD, grazing leases were going to be phased out. Records also note that Mr. Knight had subleased the property to Mr. John Fowler, which is not allowed in the lease agreement.

General Vegetation Treatments

Historically, the USIBWC has not been conducting any mowing within the reach from the Percha Diversion Dam downstream to the beginning of the east levee near the Sierra and Doña Ana county line. This reach has become an unofficial permanent "no-mow" zone and offers future habitat restoration opportunities within the river channel. Otherwise, vegetation treatments will continue to be implemented by both the Operations and Maintenance Division and the Environmental Management Division of the USIBWC. They will include annual mowing of

2,674 acres within the 169-km (105-mile) flood control project corridor. Also included are selected and targeted vegetation treatments anticipated within 3,053 acres. Per the ROD, the 3,053 acres are to be targeted as:

- 1,983 acres managed native grasslands;
- 149 acres targeted for flycatcher habitat;
- 553 acres native riparian vegetation enhancements; and
- 368 acres of managed restoration sites.

Mowing of the floodway outside the main channel but between the flood control levees is maintained to remove obstructions. Mowing of the floodway controls weed, brush, and tree growth, and is conducted at least once each year prior to July 15. Farm tractors with 5-m (16-foot) rotary slope mowers are generally used to mow the floodways. Slope mowers are used for vegetation maintenance on the channel banks. Some areas with dense vegetation require a second late summer mowing. No bulldozers are used for vegetation treatments. Cut-stump treatment occurs at select restoration sites (see Restoration below).

Best management practices and buffers around flycatcher nests are also described in Section 9.0, Mitigation and Monitoring. All herbicide products will be stored, mixed, applied, and disposed of in compliance with material safety data sheets and label instructions. Herbicides will not be applied during windy conditions exceeding 24 km (15 miles) per hour or when rain is forecast within three days. Spray equipment will be properly maintained and calibrated to ensure accurate application according to manufacturer's and label instructions. For all application methods, no treatment with a non-aquatic label herbicide will be made within 9 m (30 feet) of water to avoid the possibility of spray drift. Other best management practices are specifically described in the EIS documentation.

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. If any flycatcher territories are present, a 0.4-km (0.25-mile) buffer will be established around each territory. Project activity will be excluded from within the buffer zone. 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.

Buffer zones will also be established around yellow-billed cuckoo nests. The buffers will be determined following coordination and conference with the USFWS. At the USIBWC Broad Canyon Parcel, vegetation clearing is currently planned with a minimal vegetated buffer near yellow-billed cuckoo sightings.

Site Restoration

Site-specific prescriptions and description of techniques and equipment to be used for habitat restoration are based on the 2009 Conceptual Plan, as refined in a 2011 draft report based on the latest site-specific studies and surveys (USIBWC 2011). The 12 sites targeted for restoration of flycatcher habitat are 1-Trujillo, 7-Crow Canyon B, 9-Rincon Siphon, 11-USIBWC Broad Canyon Parcel, 15-Selden Point Bar, 16-Bailey Point Bar, 18-Leasburg Extension, 19-Clark Lateral, 21-Mesilla East, 22-Berino West, 23-Berino West, and 27-Nemexas Siphon. Of those 12 sites, the first six (Trujillo, Crow Canyon B, Rincon Siphon, USIBWC Broad Canyon Parcel, Selden Point Bar, and Bailey Point Bar) are located within proposed critical habitat for the flycatcher. Trujillo is located within the reach of the RGCP downstream to approximately the Sierra and Doña Ana county line where historically no mowing has been conducted; no levees were built and none are needed.

Prescription treatments for the 30 selected restoration sites are outlined in Table 3. Bank destabilization (to promote lateral river migration) involves shaving the bank with a 4:1 slope over 8 m (25 feet), or a drop of about 1.8 m (6 feet) over 8 m (25 feet). Bank shaving will be conducted with use of a bulldozer or excavator, and bank riprap, if present, will be removed. Where bank destabilization is prescribed, bank vegetation may be removed manually but in some cases may require mechanical treatment (USIBWC 2009; see below).

Manual treatment methods are prescribed for small monotypic stands of invasive trees/shrubs (e.g., saltcedar) and some stands with mixed native shrubs. Manual treatment involves manual cutting with a chainsaw and must be followed by cut-stump herbicidal treatment to kill the root system (USIBWC 2009). Mechanical invasive species treatment may consist of extraction or mastication. Extraction is performed with a clasping thumb attachment fitted on an excavator, front-end loader, or backhoe. The thumb attachment grasps the plant at or below the root crown and extracts the plant and its roots from the soil. The extracted debris can be placed immediately in piles or trucks to be hauled away (USIBWC 2009), or else it may be windrowed and masticated on-site. The extraction method is useful in areas where desirable native shrub and herbaceous vegetation would not be disturbed. It is especially useful in controlling saltcedar, whose taproot structure minimizes disturbance and resprouting. The mastication technique is based on the use of a mastication head—essentially a wood chipper or grinder—mounted on a tracked vehicle. Typically the mastication head has carbide teeth that break up the vegetation by grinding it. Mastication can be conducted with an excavator equipped with a flail mower attachment.

Herbicides to be used consist of Garlon 4 and Habitat. Garlon 4 is a formulation of triclopyr; Habitat is an isopropylamine salt of Imazapyr. Garlon 4 would be used as needed throughout most of the project sites, except within a 9-m (30-foot) buffer of the river channel and seasonal ponds. Habitat is approved for aquatic use and would be applied within this buffer area where needed. Triclopyr is the preferred herbicide for control of saltcedar, as it is effective year-round outside the "green-up" period (time period when saltcedar emerges from winter dormancy until after first flower), affects only woody broad-leaved plants (not grasses), and has limited mobility in soil. Basal bark and cut-stump techniques can be done at any time of year except for the green-up period. Basal bark herbicidal treatment involves application of the herbicide together with an oil penetrant to the lower 30 to 45 cm (12–18 inches) of the trunk or stem. Cut-stump

herbicidal treatment is performed by applying the herbicide directly on the stump. The herbicide is absorbed by the plant and is translocated to the entire root system, which it kills. Best management practices ensure that both Garlon 4 and Habitat would be applied in a targeted fashion (spot spraying) using low-pressure application methods and only when there is little or no hazard of spray drift to ensure that the minimum to no amount of herbicide contacts non-target vegetation, soil, or water. Garlon 4, to the extent that it comes into contact with soil, adheres tightly to soil particles; the potential to leach from soil into groundwater is minimal. Imazapyr is a non-selective herbicide used for the control of a broad range of weeds, including terrestrial annual and perennial grasses and broadleaved herbs, woody species, and riparian and emergent aquatic species.

Table 3. Proposed Prescription for the 30 Selected Restoration Sites along the RGCP

Site	Proposed Prescription[1]
1-Trujillo[2, 3, 4]	1) Saltcedar removal using mechanical extraction (3 acres); selective manual removal and cut-stump herbicidal treatment of 7 acres where saltcedar is mixed with coyote willow. 2) Bank destabilization: bank to be graded with a 4:1 slope over 8 m (25 feet), or a drop of about 1.8 m (6 feet) over 8 m (25 feet). Bank vegetation can be removed by extraction or grubbing. 3) No supplemental irrigation (groundwater is shallow enough to support vegetation). 4) Native vegetation plantings, including coyote willow whips and tree poles. 5) Water rights acquisition (from willing sellers or lease water rights).
2-Jaralosa[4]	1) Bank destabilization (downstream of historic bridge): bank to be graded with a 4:1 slope over 8 m (25 feet), or a drop of about 1.8 m (6 feet) over 8 m (25 feet). Bank vegetation can be removed by extraction or grubbing. 2) Placement of bank cut-down material along toe of levee to avoid placing in river. 3) Saltcedar removal through mechanical extraction. 4) No supplemental irrigation (groundwater is shallow enough to support vegetation). 5) Native vegetation plantings, including Goodding's willow. 6) Water rights acquisition (from willing sellers or lease water rights).
3-Yeso Arroyo[4]	1) Bank destabilization. bank to be graded with a 4:1 slope over 8 m (25 feet), or a drop of about 1.8 m (6 feet) over 8 m (25 feet). Saltcedar along the bank can be removed during excavation. Disposal of the riprap and bank destabilization material to be along the levee. 2) Saltcedar removal by mechanical extraction.
4-Yeso East[4]	1) Bank destabilization and placement of bank cut-down material along toe of levee to avoid placing in the river. 2) Saltcedar removal by mechanical extraction along the bank. 3) Discontinuation of mowing. 4) Native vegetation planting, including coyote willow whips and cottonwood poles. 5) No supplemental irrigation (groundwater is shallow enough to support vegetation) and no site excavation (proposed earlier in anticipation of supplemental irrigation). 6) Water rights acquisition (from willing sellers or lease water rights).
5-Yeso West[4]	1) Excavation (6,500 cubic yards) to construct an inset floodplain along 335 m (1,100 feet) on the west bank. 2) Bank vegetation removal with use of a bulldozer.
6-Crow Canyon A[4]	1) Discontinuation of mowing. 2) Saltcedar removal through herbicides. 3) Planting of long-stem riparian shrubs and cottonwood poles.

Site	Proposed Prescription[1]
7-Crow Canyon B1[3, 4]	1) Excavation of a portion of the east bank on parcel B1 (to permit inundation during release restoration flows). 2) Saltcedar removal and control through mechanical, manual, and herbicidal techniques. 3) Native vegetation planting including cottonwood and Goodding's willow poles and coyote willow whips. 4) Discontinuation of mowing.
8-Placitas Arroyo[4]	1) Bank destabilization with placement of bank cut-down materials along the toe of the levee to avoid placing in the river. 2) Saltcedar removal through mechanical extraction.
9-Rincon Siphon [2, 3, 4]	1) Excavation of a small area (37 cubic yards) to permit inundation. 2) Saltcedar removal by a scraper or a bulldozer. 3) Native vegetation planting with coyote willows and some Goodding's willows and cottonwood poles (with the objective of creating flycatcher habitat). 4) Discontinuation of mowing.
10-Angostura Arroyo[4]	1) Bank destabilization with placement of destabilization material along toe of levee to avoid placement in the river. 2) Saltcedar removal through mechanical extraction.
New-USIBWC Broad Canyon Parcel[3, 4]	1) Saltcedar removal. 2) Planting of native vegetation, including Goodding's willow, cottonwood, coyote willow, screwbean mesquite, and alkali sacaton.
12-Pasture 18[4]	1) Establishment of a floodplain connection through bank cut, channel excavation (4,148 cubic yards), and placement of a gated weir at the inlet. 2) Saltcedar removal by mechanical extraction at the lowered bank. 3) Grubbing in excavated channel.
13-Broad Canyon Ranch Middle[4]	1) Excavation of two channels (200 cubic yards). 2) Saltcedar removal by mechanical extraction along the river bank and herbicidal treatment of resprouts. 3) Grubbing. 4) Grass planting.
14-Broad Canyon Ranch South[4]	1) Bank cut and excavation of two channels (200 cubic yards). 2) Saltcedar removal by mechanical techniques, air-curtain burner, and herbicidal treatment. 3) Planting of grasses.
15-Selden Point Bar[3, 4]	1) Bank cut to enhance river floodplain hydrological connectivity. 2) Saltcedar removal through mechanical extraction and with an air-curtain burner. 3) Native vegetation planting including coyote willow whips, Goodding's willow, and cottonwood poles. 4) River crossing with six 152-cm-diameter (60-inch-diameter) culverts.

Site	Proposed Prescription[1]
16-Bailey Point Bar[2, 3, 4]	1) Bank cut. 2) Saltcedar removal through mechanical removal and with air-curtain burner 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
17-Shalem Colony	1) Discontinuation of mowing (except in a 5- to 8-m-wide [15-to 25-foot-wide] strip adjacent to the riverward toe of the levee (to avoid encroachment by woody vegetation).
18-Leasburg Extension Lateral[3]	1) Grubbing and grading of the site. 2) Irrigation. 3) Acquisition of water rights. 4) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
19-Clark Lateral[3]	1) Grubbing and grading of the site. 2) Irrigation. 3) Acquisition of water rights. 4) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
20-Mesilla Valley Bosque State Park	1) Discontinuation of mowing. 2) Saltcedar removal through mechanical extraction and herbicidal treatment. 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
21-Mesilla East[3]	1) No excavation (revised from Conceptual Plan). 2) Planting of native vegetation including cottonwood poles (to recreate grassland savanna with cottonwoods).
22-Berino West[3]	1) No excavation (revised from Conceptual Plan). 2) Selective extraction of saltcedar along the bankline. 3) Grubbing of entire site to remove saltcedar sprouts and noxious weeds. 4) Planting of grasses and forbs, in addition to Goodding's willow and cottonwood poles; no coyote willow (revised from Conceptual Plan).
23-Berino East[3]	1) No excavation (revised from Conceptual Plan). 2) Selective extraction of saltcedar along the bankline. 3) Planting of native vegetation including coyote willow ships and Goodding's willow poles (for flycatcher habitat) and cottonwood poles (for 4.5 acres of cottonwood forest).
24-Vinton A	1) Discontinuation of mowing. 2) Saltcedar removal through mechanical extraction. 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
25-Vinton B	1) Discontinuation of mowing. 2) Saltcedar removal through mechanical extraction. 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.

Site	Proposed Prescription[1]
26-Valley Creek	1) Discontinuation of mowing. 2) Saltcedar removal through mechanical extraction. 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
27-Nemexas Siphon [2, 3]	1) Bank cut and excavation of two channels (75 cubic yards). 2) Saltcedar treatment through mechanical removal and root-plowing and with use of an air-curtain burner. 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
28-Country Club East	1) Discontinuation of mowing. 2) Excavation of two channels (83 cubic yards); extraction material to be placed at toe of levee. 3) Saltcedar removal through mechanical extraction. 4) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
29-Sunland Park[2]	1) Discontinuation of mowing. 2) Saltcedar removal through mechanical extraction. 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.
30-Anapra Bridge	1) Discontinuation of mowing. 2) Saltcedar removal through mechanical extraction. 3) Planting of native vegetation including coyote willow whips and Goodding's willow and cottonwood poles.

[1]Based on the 2009 Conceptual Plan, as refined by the latest site-specific studies and surveys (USIBWC 2011). However, prescriptions may not be limited to those listed in the 2009 Conceptual Plan. On Page 10, the 2009 ROD states that "supplemental irrigation in the amount of 227 ac-ft per year is recommended for at least six (6) proposed restoration sites and may be advisable at an additional nineteen (19) proposed restoration sites especially if future periodic restoration peak flows are deemed not feasible".
[2] With seasonal restrictions on activities due to documented presence of flycatcher or yellow-billed cuckoo habitat.
[3] Site targeted for restoration of flycatcher habitat
[4] Site within proposed flycatcher critical habitat.

Environmental Water Transfer Framework

Transfer of Rio Grande Project water rights as proposed under the Proposed Action will occur within the following framework (hereafter "environmental water transfer framework"):

- Project water will be donated, leased or acquired from willing water rights holders;
- Habitat restoration sites will be located within EBID or EPCWID irrigation district service boundaries;
- Irrigation district service boundaries may be expanded through an EBID and/or EPCWID board-approved boundary realignment process to include habitat restoration sites and comply with existing contracts which specify limits on total project and district acreage;
- Project water will be leased or water rights permanently acquired and transferred through a EBID or EPCWID board-approved leasing, voluntary suspension and transfer or reclassification process;

- The use of Rio Grande Project water for enhancement and establishment of riparian and wetland habitat will be considered an agricultural use;
- Within a district, all water users receive an equal allocation per acre with water users sharing equally in times of water shortage. This policy will apply to all district constituents including any entity who owns or leases water rights for habitat restoration sites; and
- The use of Rio Grande Project water for an environmental peak release could be considered a miscellaneous use subject to the requirements set forth under the federal Miscellaneous Purposes Act at 41 Stat. 451.

5.3 TIMELINE FOR THE IMPLEMENTATION OF THE PROPOSED ACTION

A 10-year time frame was selected for implementation of the Proposed Action, the Integrated Land Management Alternative. The following milestones are envisioned during the first five years of the project:

- On-site data collection;
- Breeding surveys for flycatcher and yellow-billed cuckoo during the initial two years;
- Development and funding of implementation plans;
- Formalization of agreements for interagency and irrigation district cooperation;
- Submittal of applications to expand irrigation district service boundaries;
- Establishment of voluntary land transactions with willing landowners;
- Development of a water transaction program consistent with the environmental water transfer framework;
- Implementation and monitoring of pilot projects; and
- Identification and implementation of priority projects and additional water transactions.

The remaining projects will be completed during the final five-year phase of the project's implementation. An adaptive management strategy will be used in implementing river management alternatives. Adaptive management is a science-based decision process that leads to better management through a systematic process of prediction, application, monitoring, feedback, and improvement. It is envisioned that adaptive management will be implemented through coordination with stakeholders, including EBID and the EPCWID. The adaptive management strategy will help guide selection, planning, and implementation of environmental measures and channel maintenance activities. The USIBWC may, at its discretion, create technical workgroups or enter into public-private partnerships to further assist with project planning, selection, and implementation. Public input and information sharing for future project needs and measures will be provided at the regular meetings of the Rio Grande Citizen's Forum. Because a number of environmental measures under consideration will result in water consumption, water rights acquisition and cooperation with the irrigation districts are critical elements in the viability and long-term sustainability of environmental measures. After additional consideration, stakeholders and, in particular, EBID determined that water transfers would need to satisfy the conditions set forth in the environmental water transfer framework.

The estimated completion of ongoing levee improvement and reseeding projects is estimated as follows:

- Mesilla Phases 1 and 2, east and west levees (Shalem Bridge to Vado Bridge) – Approximately 2012;
- Canutillo Phase 1, east and west levees (Vado Bridge to Borderland Bridge, excluding east levee-floodwall segment from Vinton Bridge to Borderland Bridge) – May 2012; and
- Sunland Park, east and west levees (Borderland Bridge to Rio Grande Power Plant, excluding 0.6 km (0.4 mile) of the west levee between Country Club Bridge and the end of the spur levee near Santa Teresa Middle School) – July 2012.

At this point, there is no specific timeline for planned levee/floodwall construction. These projects are dependent upon future appropriations.

6.0 METHODOLOGY AND SPECIES COVERED

Lists of species federally listed as endangered, threatened, candidate, or proposed, and non-essential experimental populations were compiled using the New Mexico Ecological Field Office's database of listed and sensitive species searchable online by county, with updates (USFWS 2011a). For El Paso County, Texas, a preliminary list was obtained from the Southwest Region Ecological Services website (USFWS 2011b). That preliminary list was sent for review to the Corpus Christi Ecological Services Field Office. Comments and supplemental information were received on July 15, 2011 from Dr. Larisa Ford, Co-acting USFWS Southern Border Coordinator at the Corpus Christi Ecological Services Field Office (USFWS 2011c).

All of the species federally listed in Sierra and Doña Ana counties in New Mexico and El Paso County in Texas were first evaluated based on their potential to occur along the RGCP corridor. The potential for occurrence of a species was identified using the following categories:

- *Known to occur*—the species was documented along the RGCP corridor by a reliable observer.
- *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.
- *Unlikely to occur*—the RGCP is within the species' currently known range, but vegetation communities, soils, water quality conditions, etc., do not resemble those known to be used by the species, or the RGCP is clearly outside the species' currently known range.

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:

- *May affect, is likely to adversely affect*—This effect determination means that the action would have an adverse effect on the species or its critical 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 affect.
- *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, there cannot be "balancing," so that the benefits of the action would outweigh the 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.

- *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.

The possible effects determinations for candidate and proposed species are:

- *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.
- *Not 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.

The possible effects determinations for proposed critical habitat are:

- *Will likely result in the destruction or adverse modification of proposed critical habitat*— Destruction or adverse modification" means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.
- *Will likely not result in the destruction or adverse modification of proposed critical habitat*

Information on distribution and habitat requirements is mainly from the Biota Information System of New Mexico (BISON-M 2011) database and New Mexico Partners in Flight (2011), complemented by the *Rio Grande Silvery Minnow (*Hybognathus amarus*) Recovery Plan, First Revision* (USFWS 2010), *Amphibians and Reptiles of New Mexico* (Degenhardt et al. 1996), and the *Raptors of New Mexico* (Cartron 2010). Table 4 presents the species listed as threatened or endangered in Sierra and Doña counties, New Mexico, and El Paso County, Texas.

As stated above, the USFWS recently proposed a re-designation of critical habitat for the flycatcher that affects the RGCP and the USIBWC. Potential effects of the Proposed Action on the proposed critical habitat are examined in Section 7.0.

Of the 18 species listed as endangered, threatened, candidate, proposed, or experimental, non-essential population in Sierra and Doña Ana counties, New Mexico, and in El Paso County, Texas, only five have been documented or have the potential to occur in the RGCP Reach. They are the focus of Section 7.0, *Analysis of Potential Effects*.

Table 4. Species Federally Listed as Threatened and Endangered Recorded and Potentially Occurring in Sierra and Doña Ana Counties, New Mexico, and El Paso County, Texas

Common Name (Species Name)	Status*	County where Species Occurs and/or Listing Applies	Range or Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Rio Grande silvery minnow (*Hybognathus amarus*)	E	Sierra and Doña Ana counties	Currently found in the Middle Rio Grande, a stretch of the river extending from Cochiti Dam to the headwaters of Elephant Butte Reservoir. Non-essential experimental (10[J]) population also established in December 2008 in the Big Bend region of west Texas.	Unlikely to occur	No effect in RGCP reach. The non-essential experimental population in the Big Bend region is over 320 river km (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	Sierra County	Distribution includes western Sierra County. Does not occur in the Rio Grande	Unlikely to occur	No effect
White Sands pupfish (*Cyprinodon tularosa*)	Under Review	Sierra County	Found in only two springs and a small stream on White Sands Missile Range and another smaller stream on Holloman Air Force Base in southern New Mexico. Not found in the Rio Grande.	Unlikely to occur	No effect
Chiricahua leopard frog (*Rana chiricahuaensis*)	T	Sierra County	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
Aplomado falcon (*Falco femoralis septentrionalis*)	E	Sierra and Doña Ana counties, El Paso County	Documented at Mesilla Valley Bosque State Park in 2010 (Albuquerque Journal 2010).	Known to occur	See Section 7.1 of BA

Common Name (Species Name)	Status*	County where Species Occurs and/or Listing Applies	Range or Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Mountain plover (*Charadrius montanus*)	P	Sierra County	Prefers large, flat grassland expanses with sparse, short vegetation and bare ground. Strongly associated with prairie dog towns	Unlikely to occur	No effect
Least tern (*Sterna antillarum*)	E	Sierra and Doña Ana counties	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 7.2 of BA
Mexican spotted owl (*Strix occidentalis lucida*)	T	Sierra County (with critical habitat present) and El Paso County	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
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Sierra and Doña Ana counties, El Paso County	Associated with moist riparian areas throughout the year. Documented on some RGCP restoration sites.	Known to occur	See Section 7.3 of BA
Yellow-billed cuckoo (*Coccyzus americanus*)	C	Sierra and Doña Ana counties, El Paso County	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; one active nest found at Crow Canyon B in 2010	See Section 7.4 of BA
Sprague's pipit (*Anthus spragueii*)	C	Sierra County	Within New Mexico migrates in the northeast and winters in the southeast and occasionally in the southwest. Uses grasslands of intermediate height and sparse to intermediate vegetation density; prefers native prairies.	May occur	See Section 7.5 of BA
Whooping crane (*Grus americana*)	ENEP	Sierra and Doña Ana counties	Extirpated from New Mexico. No whooping crane survives from the experimental population that wintered at the Bosque del Apache National Wildlife Refuge.	Unlikely to occur	No effect
Black-footed ferret (*Mustela nigripes*)	E	Sierra County	Found only in association with prairie dog towns or complexes of sufficient size. Reintroduced on Vermejo Park Ranch in New Mexico. Otherwise extirpated in New Mexico.	Unlikely to occur	No effect
Mexican gray wolf (*Canis lupus baileyi*)	E	Sierra County	Pine-oak woodlands, piñon-juniper woodlands, and grasslands, generally above 1,372 m (4,500 feet). The reintroduced population of Mexican gray wolves ranges only as far east as western Sierra County.	Unlikely to occur	No effect

Common Name (Species Name)	Status*	County where Species Occurs and/or Listing Applies	Range or Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Mineral Creek mountainsnail (*Oreohelix pilsbryi*)	Under Review	Sierra County	Endemic to the Black Range in southwestern New Mexico. Known to occur only in an area along Mineral Creek known as "Oliver's Mine," which is 8 to 10 km (5–6 miles) west of Chloride, New Mexico.	Unlikely to occur	No effect
Doña Ana talussnail (*Sonorella todseni*)	Under Review	Doña Ana County	Endemic to the Doña Ana Mountains of central-southern New Mexico. This snail is known only from the northwestern slope of Doña Ana Peak, which is key habitat.	Unlikely to occur	No effect
Sneed's pincushion cactus (*Coryphantha* or *Escobaria sneedii* var. *sneedii*)	E	Doña Ana County and El Paso County	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
Todsen's pennyroyal (*Hedeoma todsenii* Irving)	E	Sierra County (with critical habitat present)	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

* 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.

P = Proposed. Any species of fish, wildlife, or plant that is proposed in the *Federal Register* to be listed under Section 4 of the ESA. This could be either proposed for endangered or threatened status.

C = Candidate. Candidate species are those for which the USFWS has sufficient information on biological vulnerability and threats to support proposals to list as endangered or threatened under the ESA. However, proposed rules have not yet been issued because they are precluded by other listing activity that is a higher priority. This listing category has no legal protection.

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.

Under Review. Any species under review by the USFWS, to determine whether the status of the species meets the definition of threatened or endangered.

7.0 ANALYSIS OF POTENTIAL EFFECTS

7.1 APLOMADO FALCON (*FALCO FEMORALIS*)

Habitat and Range Requirements

The aplomado falcon is a Neotropical falcon with a boldly marked head, a gray back, and a long, banded tail. It occurs from the southwestern United States south through Mexico and Central and South America to southern Argentina. The northernmost subspecies, the northern aplomado falcon (*F. f. septentrionalis*), is a resident of savannas and grasslands from the southwestern United States south to Nicaragua in Central America.

After a range contraction and population decline attributed to habitat degradation, the aplomado falcon was listed as endangered under the ESA in 1986. It is also listed as endangered by both the states of New Mexico and Texas, and it has been extirpated in Arizona since the early twentieth century. Historically, the aplomado falcon occurred in southeastern Arizona, southern New Mexico, and in two distinctly different and widely separated ecological regions in Texas (Young and Young 2010; Texas Parks and Wildlife 2011). In western (Trans-Pecos) Texas, it was associated with open desert grasslands with scattered yuccas, mesquite, and other shrubs, or oak woodlands and gallery forests surrounded by or intermingled with desert grasslands. In southern Texas, the species was found in coastal prairie and marsh habitats that supported small islands of trees and shrubs or that interfaced with woodlands along freshwater drainages and estuaries. In Arizona, this species most likely occurred in desert grasslands (at relatively low elevations) adjacent to shrubby habitats. In New Mexico, the aplomado falcon is associated with Chihuahuan Desert grassland with a sparse canopy of woody vegetation consisting of scattered yucca (*Yucca* spp.), mesquite (*Prosopis* spp.), and cacti (*Opuntia* spp.) (Young and Young 2010). In Mexico, the aplomado falcon is found in a broad range of semi-open tropical and subtropical habitat settings, including coastal prairies, wetlands, savannas, and shrublands; cut-over rain forests; cleared pastureland and farmland; dry deciduous woodlands; upland pine woodlands; and open desert grasslands (Texas Parks and Wildlife 2010).

Aplomado falcon habitat almost always contains an open grassland component with either scattered islands of shrubs or trees or woodland and forest borders (Texas Parks and Wildlife 2010). Nesting occurs from February to June. Aplomado falcons are secondary nesters that use nests constructed previously by other raptors or by ravens. In New Mexico and Mexico, the nest is typically in structurally complex yuccas, though a pair once nested on a power pole on the Armendaris Ranch. 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).

Habitat Evaluation and Suitability

The aplomado falcon has been reintroduced in New Mexico since 2006, first on the Armendaris Ranch in Socorro and Sierra counties and subsequently also on lands administered or owned by the Bureau of Land Management, White Sands Missile Range, and the New Mexico State Land

Office (Young and Young 2010). The species has also been reintroduced since 1987 in southern and western Texas since 2002. In addition, a small, naturally occurring population of aplomado falcons might be expanding its distribution in extreme southern New Mexico—primarily in Hidalgo, Doña Ana, and Otero counties—as well as western Texas. The source of that population appears to be in Chihuahua, Mexico (Young and Young 2010). Some aplomado falcons—including reintroduced birds—have been sighted near the Rio Grande in areas that generally lack yuccas but support open vegetation (e.g., 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. There is no known resident population of aplomado falcons along the RGCP corridor, but some of the restoration sites support meadows and other open vegetation that would be suitable for temporary use by the species, as indicated by the Mesilla Valley Bosque State Park recent record.

Determination of Effect

Aplomado falcon population numbers and distribution in southern New Mexico and Trans-Pecos Texas are likely to be influenced primarily by the success of the ongoing reintroduction effort and by any northward expansion of the aplomado falcon population originating from Chihuahua, Mexico. These in turn will likely reflect the availability and quality of yucca grassland habitat available to the species. Because the RGCP does not support any of the preferred 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 means that an individual bird could be affected by vegetation treatment but would likely simply move to an adjacent area with similar habitat. The proposed project may affect, but is not likely to adversely affect, the aplomado falcon.

7.2 LEAST TERN (*STERNA ANTILLARUM*)

Habitat and Range Requirements

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. 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 found in migration in Eddy County and as a vagrant elsewhere, including Española, Sumner Lake (De Baca County), Bosque del Apache National Wildlife Refuge (Socorro County), and near Glenwood, Las Cruces (Doña Ana County), and Alamogordo (New Mexico Department of Game and Fish 2011). 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. 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 (New Mexico Department of Game and Fish 2011). The nest is a shallow scrape, in which the dotted and splotched, buffy eggs are laid. Seven clutches documented at Bitter Lake National Wildlife Refuge ranged in size from one to three eggs, with the average being two.

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.

Determination of Effects

Under the no-action alternative, there would be no effect on the species, though the RGCP would continue to support little suitable habitat for the species. Under the Preferred Alternative, habitat restoration, including bank destabilization, has the potential to benefit the species. Any construction activities during spring and fall migration would not be expected to have any significant, negative impact on migrating individuals. Such individuals would likely simply move to another area up- or downstream.

The proposed project may affect, but is not likely to adversely affect, the least tern.

7.3 SOUTHWESTERN WILLOW FLYCATCHER (*EMPIDONAX TRAILLII EXTIMUS*)

Habitat and Range Requirements

The southwestern willow flycatcher is one of four currently recognized subspecies of the willow flycatcher. It is a small songbird approximately 14 cm (5.5 inches) long and weighing about 0.42 ounces. It sports a grayish-green back, whitish throat and wings, and a pale yellow belly. The flycatcher has been federally listed as endangered since 1995, with critical habitat designated since 1997.

The flycatcher is found in gallery forests and dense thickets along rivers, streams, and wetland edges throughout the American Southwest. The species migrates to Mexico and Central America in the winter and returns to willow, saltcedar, and cottonwood thickets each spring to nest and raise its young. Loss and degradation of riparian (streamside) habitat and removal of water from streams and groundwater have greatly reduced the amount of habitat available to the flycatcher.

Approximately 900 to 1,000 pairs of flycatchers remain, scattered in portions of California, Nevada, Arizona, New Mexico, Utah, Colorado, and possibly Texas (USFWS 2002).

Biologists have documented a small (one to eight territories) but somewhat stable population of breeding flycatchers at two sites along the RGCP reach: Selden Canyon and Radium Springs (Reclamation 2009). In 2010 and 2011, TRC biologists conducted flycatcher surveys at some of the RGCP proposed restoration sites. In 2010, TRC (2010) confirmed the presence of flycatchers at Crow Canyon B (May 26, June 12, and July 13) and Bailey Point Bar (June 15). One active nest was discovered on July 13 at Crow Canyon B, which also harbored an estimated three additional breeding pairs (TRC 2010). In 2011, flycatchers were detected at Bailey Point Bar (May 21 and June 19), Crow Canyon B (May 18, June 15, and July 7), Rincon Siphon A (May 23), Rincon Siphon B (May 23 and June 16), and Sunland Park (May 17 and June 13). During the 2011 TRC surveys, Crow Canyon B harbored an estimated four active territories and two pairs. Results of recent surveys are summarized in Table 5 below.

Table 5. RGCP Restoration Sites with Recent Southwestern Willow Flycatcher Detections[1]

Site	Flycatcher 2010			Flycatcher 2011		
	Resident	Nest	Migrant	Resident	Nest[2]	Migrant
7-Crow Canyon B	7	1	0	5	0	1
9-Rincon Siphon A	0	0	0	0	0	1
9-Rincon Siphon B	0	0	0	0	0	3
16-Bailey Point Bar	1	0	0	1	0	5
29-Sunland Park	–	–	–	0	0	4

[1] Source: USIBWC (2011).
[2] Surveys were conducted for the purpose of detecting breeding territories, not nests.

Flycatchers spend only three to four months on their breeding grounds. They typically arrive between early May and early June, although a few individuals may establish territories in very late April. Because arrival dates vary geographically and annually, northbound migrant willow flycatchers (of all subspecies) pass through areas where *E.t. extimus* have already begun nesting. Similarly, southbound migrants (of all subspecies) in late July and August may occur where southwestern willow flycatchers 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 southwest willow flycatcher can be assumed to be of that subspecies (USFWS 2002).

The subspecies *E. t. extimus* 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).

The flycatcher builds a small open cup nest, constructed of leaves, grass, fibers, feathers, and animal hair; coarser material is used in the nest base and body, and finer materials in the nest cup. Nests are approximately 8 cm (3 inches) high and wide (outside dimensions), and have 2 to 15 cm (1–6 inches) of loose material dangling from the bottom (or none in saltcedar-dominated habitats). Females build the nest over a period of four to seven days, with little or no assistance from the male. Most nests are used only once, although females will often use some fibers and materials (particularly the lining) from the original nest when constructing a subsequent nest during the same season (USFWS 2002).

The flycatcher is an insectivore. It catches insects while flying, hovers to glean them from foliage, and occasionally captures insects on the ground. Flycatchers forage within and above the canopy, along the patch edge, in openings within the territory, above water, and glean from tall trees as well as herbaceous ground cover (USFWS 2002). Flycatchers employ a "sit and wait" foraging tactic, with foraging bouts interspersed with longer periods of perching. Foraging rates are highest early and late in the day, and during the nestling period. All North American *Empidonax* flycatchers appear to have generally similar diets during the breeding season, consisting of small to medium-sized insects (Beal 1912). The flycatcher is somewhat of a generalist. Wasps and bees (Hymenoptera) are common food items, as are flies (Diptera), beetles (Coleoptera), butterflies/moths and caterpillars (Lepidoptera), and spittlebugs (Homoptera). Plant foods such as small fruits have been reported but are not a significant food during the breeding season. Diet studies of adult flycatchers found a wide range of prey taken. Major prey items were small (flying ants) to large (dragonflies) flying insects, with Hymenoptera, Diptera, and Hemiptera (true bugs) comprising half of the prey items. Flycatchers also took non-flying species, particularly Lepidoptera larvae. Plant material was again negligible.

Habitat Evaluation and Suitability

Although the historical breeding habitat of flycatcher habitat likely consisted of cottonwood-willow gallery forest and willow thickets, 47% of flycatcher territories now occur in mixed native/exotic habitat (> 10% exotic) and 25% are at sites where saltcedar is dominant (USFWS 2002). Flycatchers nest in saltcedar at many river sites, and in many cases, use saltcedar even if native willows are present. Flycatchers nest in saltcedar at sites along the Colorado, Verde, Gila, San Pedro, Salt, Bill Williams, Santa Maria, and Big Sandy rivers in Arizona; Tonto Creek in Arizona, the Rio Grande and Gila River in New Mexico; the San Dieguito, lower San Luis Rey, and Sweetwater rivers in California; and Meadow Valley Wash and Virgin River in Nevada. Range wide, 86% of nests were in saltcedar in mixed and exotic habitats. In Arizona, 93% of the 758 nests documented from 1993 to 1999 in mixed and exotic habitats were in saltcedar. This distribution is similar on an annual basis in Arizona, where in 1999, 92% of the 303 nests in mixed and exotic habitats were in saltcedar (USFWS 2002).

Flycatchers have been documented on several of the proposed restoration sites (Table 5), including on USIBWC land. Crow Canyon B in particular harbored one documented active nest and a total of four pairs in 2010 (TRC 2010). The vegetation at that site was described as a mix of native and mostly exotic vegetation, with saltcedar as the most dominant species, followed by

willows. Flycatchers at the site were primarily associated with areas dominated by willows, though the active nest was in saltcedar (TRC 2010). In 2011, flycatchers were detected again primarily in areas of the site dominated by willows (TRC 2011). Other sites where flycatchers were detected in 2010 and/or 2011 were characterized similarly with a mix of exotic and native vegetation, with saltcedar being the dominant plant species. This was true in particular at Bailey Point Bar where several flycatchers were detected in association with mature saltcedar and willows.

Determination of Effects

Flycatcher surveys strongly suggest that a small breeding population occurs on USIBWC land along the RGCP, in association with a mix of exotic and native vegetation dominated primarily by saltcedar. Proposed habitat restoration under the Integrated Land Management Alternative is expected to have an overall positive effect on the flycatcher through reduced grazing and through habitat restoration. The proposed prescription for many of the sites includes measures that aim at raising the water table or restoring over bank flooding: overbank lowering, bank cuts, natural levee breeches, secondary channels, bank destabilization and construction of inset floodplains. Together with planting of native riparian vegetation 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. The first sites documented as being occupied by breeding flycatchers in the RGCP reach—Selden Canyon and Radium Springs (Reclamation 2009)—are small patches significantly less than 62 acres each and about 4 km (2.5 miles) apart from one another. Almost 75 acres of dense riparian habitat are proposed for restoration in the Conceptual Plan for the 14.5-km (9-mile) river canyon where the breeding territories reported by Reclamation (2009) occur. Over 100 acres of habitat restoration are proposed for the Crow Canyon proposed restoration sites where breeding territories are now known to also occur. With flycatchers documented at additional sites (Bailey Point Bar, Rincon Siphon A, Rincon Siphon B, Sunland Park), the size and location of all the proposed restoration could therefore significantly contribute to metapopulation stability in what corresponds to the subspecies' Lower Rio Grande Management Unit (Rio Grande Recovery Unit). In summary, habitat restoration is expected to result in more sites along the RGCP reach being occupied and an overall increase in the number of breeding pairs. The Lower Rio Grande Recovery Unit population target for reclassification of flycatcher as a listed species under the ESA is 25 territories.

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 reach involves some removal of non-native vegetation. Although removal of non-native vegetation will be accompanied by the re-establishment of native plants of equal or higher functional value under suitable site conditions, short-term, negative effects are possible. Some sites (e.g., Crow Canyon B) where flycatchers have been recorded will be the focus of bank destabilization work with use of a bulldozer or an excavator and mechanical extraction of saltcedar. Thus, restoration activities will result in soil disturbance with potential negative effects, but these will be mitigated with measures such as seasonal restrictions on the timing of activities and planting of native vegetation.

EBID controls over 57% of the total Rio Grande Project water supply and the EPCWID controls the remainder. EBID's and the EPCWID's large and senior water rights 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. No district constituent can exert any right to take a full supply, or more (proportionally) than any other owner. Transfer of Rio Grande Project water rights for habitat restoration or periodic pulse flow as proposed under the Proposed Action is subject to the terms and conditions set out in the environmental water transfer framework. That framework provides that habitat restoration sites would receive less than their full allotment during low water years. This reduction in applied water in any given year can be detrimental to flycatchers, which currently have or may establish breeding territories at these restoration sites. Nest site selection and hydrology are positively correlated. Middle Rio Grande studies indicate that flycatchers prefer nest sites with saturated soils (Moore and Ahlers 2006; Smith and Johnson 2007). Presence of saturated soils over the growing season promotes the establishment and maintenance of willow-dominated habitats including more vigorous plant growth and denser foliage. Short-term negative effects to flycatchers from reduction of saturated soils and related changes in vegetation, site humidity, and abundance of flying insects are possible during low water years.

Under the Integrated Land Management Alternative, channel and other maintenance activities could also adversely affect flycatcher habitat within occupied reaches or sites due to changes in channel geomorphology and associated depth to groundwater within the active floodplain or river-floodplain hydrologic connectivity. Vegetation management like mowing affects not only vegetation structure but also plant community composition. While the 2009 ROD calls for cessation of mowing at restoration sites, the USIBWC may continue limited targeted mowing at restoration sites to assist with noxious weed control. The agency currently has one active grazing lease on its floodplain right-of-way, which also results in vegetation disturbance and/or trespassing cattle. Construction work to rehabilitate the levees according to the NFIP's design criteria is likely to represent an additional source of noise, though only temporarily.

The proposed project may affect, is likely to adversely affect, the southwestern willow flycatcher.

7.4 YELLOW-BILLED CUCKOO (*COCCYZUS AMERICANUS*)

Habitat and Range Requirements

The yellow-billed cuckoo is a secretive bird with a body length of 26 to 32 cm (10.5–12.5 inches) and a wingspan of 43 cm (17 inches). The lower mandible (bill) is yellow, while the upper bill is black and curves slightly downward. The head, neck, back, and upper wings are brown; the chin, breast, and belly are white. The long tail sports large, white spots along the edges, and the wings have rufous patches.

The yellow-billed cuckoo is a Neotropical migrant with a historical breeding distribution that once included much of continental North America and the Greater Antilles (Wiggins 2005). The species bred throughout the United States, as well as portions of eastern and western Canada, and northern and central Mexico. The species is now extirpated in western Canada, Washington, and Oregon, and rare and patchily distributed throughout most of the historical range in the United

States west of the Rocky Mountains. The yellow-billed cuckoo winters in South America primarily east of the Andes. Yellow-billed cuckoos along the Rio Grande can be seen primarily from late April through early September. The species is one of the latest summer residents to arrive, typically in mid-May.

In 2010, TRC (2010) detected yellow-billed cuckoos at Nemexas Siphon (7/9), Rincon Siphon B (6/11), and Trujillo (6/12), as well as across the river from Crow Canyon B (5/26). In 2011, TRC (2011) documented yellow-billed cuckoos at four of the RGCP proposed restoration sites: Broad Canyon (7/11), Nemexas Siphon (7/5 and 7/6), Rincon Siphon B (6/16), and Sunland Park (7/5). Other cuckoos were detected across the river from proposed restoration sites (TRC 2011).

The American Ornithologist's Union recognizes two subspecies of yellow-billed cuckoos in North America: the western (*C. a. occidentalis*) and the eastern (*C. a. americanus*).The two subspecies are geographically split in their summer breeding range by the Rocky Mountains, south along the Pecos River to the confluence with the Rio Grande. The eastern is locally common (though now declining) throughout its range, while the range of the western has been drastically reduced and is now found only in small, isolated populations. The validity of the taxonomic split between eastern and western subspecies remains unclear (Wiggins 2005).

Yellow-billed cuckoos prefer to nest in open woodlands with an understory of dense vegetation, especially near water (Wiggins 2005). On the Great Plains, the favored nesting habitats are well-wooded river valleys and associated deciduous forests. In the desert Southwest, nesting habitat is invariably riparian woodlands, particularly those with an intact (i.e., ungrazed) understory. Yellow-billed cuckoos also occasionally nest in orchards and other riparian-associated woodlands. The nests are typically placed in dense patches of broad-leaved deciduous trees, usually with a relatively thick understory. In western portions of the range, nests are often situated close to water, likely because of the lack of dense vegetation in the uplands.

Nesting habitat has been particularly well documented in California. In most areas of California (excluding the Colorado River, preferred nesting sites are areas with:

- At least 37 acres of deciduous, riparian forest;
- At least 7 acres of closed canopy;
- A canopy height of 5 to 30 m (16–98 feet); and
- A vegetation understory averaging 1 to 6 m (3–20 feet) high.

In California, Laymon (1998) noted a statistically significant, positive relationship between habitat patch size and occupancy by cuckoos. Thus, although yellow-billed cuckoos have been found breeding in patch sizes as small as 10 acres along the Colorado River in southern California, the typical patch size is 49 acres or greater, and the likelihood of occupancy increases strongly with increasing patch size.

Habitat requirements have not been studied along the RGCP, but TRC (2011) detected yellow-billed cuckoos in two pecan orchards, one across the river from Berino East, the other across the river from Berino West. Among the yellow-billed cuckoos detected in 2011 at proposed

restoration sites, some occurred in habitat described as the interior patch of saltcedar (TRC 2011).

Yellow-billed cuckoos feed primarily on slow-moving insects, including Orthopterans (grasshoppers, crickets, and katydids), Lepidoptera (primarily caterpillars and various bugs (Hemiptera), and beetles (Coleoptera) (Wiggins 2005). Foraging habitat is similar to that used for nesting. Foraging areas during the breeding season averaged 48.4 acres in California, and a healthy forest understory is likely a critical component of cuckoo foraging areas, as most nests are placed in or near such areas.

Yellow-billed cuckoos are typically monogamous. Clutch size varies from one to five eggs, with a mean of two to three, with a mean clutch size of 3.1 eggs in Kansas and 2.95 eggs along the Kern River in California. Both cuckoo parents incubate the eggs, sharing the duties equally during the day, with the male typically incubating during the night. The incubation period is unusually short, lasting nine to 12 days. Yellow-billed cuckoo nestlings have one of the fastest growth rates among altricial birds, hatching at 8 to 9 grams and fledging seven to nine days later at 32 to 38 grams (Wiggins 2005). Young "fledge" well before they can fly by creeping along tree branches and hiding in vegetation. At 10 days of age, the fledglings are capable of flying about 20 m (66 feet) (Wiggins 2005).

In western North America, yellow-billed cuckoos have undergone catastrophic declines while the eastern subspecies has undergone less rapid declines in most areas since approximately 1980 (Wiggins 2005). Direct loss and degradation of low-elevation riparian woodland habitats are widely believed to be the primary causes for the declines in yellow-billed cuckoos in the western portion of the range. Factors contributing to habitat loss and degradation include alteration of flow regimes in rivers and streams; diversion of water for agricultural and municipal purposes; urban expansion; livestock grazing, which affects understory vegetation and cottonwood/willow recruitment; and pesticide applications, which decrease local food supplies and potentially induce toxic accumulations in cuckoos.

Habitat Evaluation and Suitability

None of the restoration sites currently support preferred yellow-billed cuckoo nesting habitat (i.e., patches of broad-leaf riparian woodland or forest with a dense understory). Proposed riparian restoration, particularly planting of cottonwoods and willows in association with overbank lowering, bank cuts, natural levee breeches, secondary channels, bank destabilization, and construction of inset floodplains, has the potential to significantly benefit the yellow-billed cuckoo along the RGCP reach.

Yellow-billed cuckoos have been recorded at several of the proposed restoration sites (e.g., Trujillo, USIBWC Broad Canyon Parcel). However, those sites likely represent only marginal habitat. Any yellow-billed cuckoo on a site where construction activities occur would likely simply move to an adjacent riparian area with similar vegetation.

Determination of Effects

Yellow-billed cuckoo surveys suggest that a small breeding population may occur on USIBWC and other lands along the RGCP, in association with orchards and with a mix of exotic and native

riparian vegetation dominated primarily by saltcedar. The Proposed Action would likely have an overall beneficial effect on the yellow-billed cuckoo through reduced grazing and through long-term restoration of some stands of riparian woodlands. Suitable nesting habitat has not been characterized within the RGCP, and though use of saltcedar has been documented, it is likely that restoration of native mature vegetation would be beneficial to the species. Given that the species has been documented on USIBWC land characterized by a mix of saltcedar and native vegetation, cessation of mowing would likely also be beneficial, as would be reduced grazing.

The proposed water rights framework provides that habitat restoration sites would receive less than their full allotment during low water years. This reduction in applied water in any given year could be detrimental to yellow-billed cuckoos to the extent that they currently have or may establish breeding territories at the restoration sites. Presence of saturated soils over the growing season promotes the establishment and maintenance of willow dominated habitats including more vigorous plant growth, and denser foliage. Short-term negative effects to yellow-billed cuckoos from reduction of saturated soils and related changes in vegetation, as well as reduced abundance of insects are possible during low-water years. Some sites where yellow-billed cuckoos have been recorded will also be the focus of both bank destabilization work with use of a bulldozer or an excavator and mechanical extraction of saltcedar. This is true, for example, at the Trujillo site, where the yellow-billed cuckoo was detected in 2010. Mechanical extraction of saltcedar will be conducted over a 3-acre area at that site, together with bank destabilization work. Such activities will result in ground disturbance, with again some potential short-term negative effects on the yellow-billed cuckoo.

Under the Integrated Land Management Alternative, channel and other maintenance activities could also adversely affect yellow-billed cuckoo habitat within occupied reaches or sites due to changes in channel geomorphology and associated depth to groundwater within the active floodplain or river-floodplain hydrologic connectivity. Vegetation management like mowing affects not only vegetation structure but also plant community composition. While the 2009 ROD calls for cessation of mowing at restoration sites, the USIBWC may continue limited mowing at restoration sites to assist with noxious weed control. The agency currently has one remaining active grazing lease on its floodplain right-of-way, with associated vegetation disturbance. However, the leasing program is being phased out, so that any negative effect of grazing on the yellow-billed cuckoo and its habitat should not continue in the long-term. Construction work to rehabilitate the levees according to the NFIP's design criteria is likely to represent an additional source of noise, though only temporarily.

The proposed project is not likely to jeopardize the yellow-billed cuckoo.

7.5 SPRAGUE'S PIPIT (*ANTHUS SPRAGUEII*)

Habitat and Range Requirements

The adult Sprague's pipit is a pale, slender, sparrow-sized bird with white outer tail feathers, a thin bill, pale legs, and a heavily streaked back. Adults reach a length of 16.5 cm (6.5 inches), with a wingspan of 25.4 cm (10 inches), and a weight of 23.7 to 24.0 grams. The sexes are alike.

The entire world population of Sprague's pipit is confined to North America (National Audubon Society 2011). The species currently breeds in the native prairie of the Great Plains, including the southern portions of Alberta, Saskatchewan, and Manitoba in Canada, and Montana, North and South Dakota, and Minnesota in the United States. The Sprague's pipit winters in Arizona, New Mexico, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and northern Mexico south to Michoacan, Puebla, Veracruz, and possibly Guerrero. A small wintering population occurs in grasslands of southern New Mexico (New Mexico Partners in Flight 2011).

Sprague's pipit is federally listed as a candidate species as a result of its range contraction and population decline since the late nineteenth century. Most of this species' decline occurred in the late nineteenth and early twentieth centuries as the short- and mid-grass plains were converted to agricultural use (National Audubon Society 2011). Agriculture and overgrazing remain the leading causes for decline of Sprague's pipit in both its summer and wintering grounds. The introduction of exotic grasses also degrades summer habitat for the pipit as they are much more abundant on fields with native grasses. Overgrazing also leads to encroachment of woody trees and shrubs in the wintering grounds rendering the habitat unsuitable. Sprague's Pipit is parasitized by brown-headed cowbird (*Molothrus ater*), but at lower rates than most other grassland birds. During severe drought, this pipit is limited by the presence of grass.

Sprague's pipit leaves its wintering grounds in April, arriving on breeding grounds from late April to mid-May (National Audubon Society 2011). It leaves its breeding grounds anywhere from September through November and will arrive on wintering grounds over the same period. It prefers well-drained areas of open grassland with native grasses of intermediate height and thickness with moderate litter depths. The species is a ground feeder that eats mainly arthropods, though it also occasionally seeds during migration and on wintering grounds.

Habitat Evaluation and Suitability

Although Sprague's pipits appear to tolerate disturbed grasslands, they are strongly tied to native prairie (land that has never been plowed) throughout their life cycle and are rarely observed in croplands or on land in the Conservation Reserve Program, aimed at converting marginal farmland back to grassland (USFWS 2010). The species may also occur in alkaline meadows and in wet meadow zones around alkali and freshwater lakes.

Sprague's pipit occurs in grassland areas adjacent to the RGCP reach (e.g., Fort Bliss, White Sands Missile Range) and thus it has the potential to occur in the project area at proposed restoration sites that consist of open, grassy fields. Although unknown, the potential for Sprague's pipit to occur on any of the restoration sites appears low compared to remaining tracts of grassland areas in the uplands. Any pipit present locally during restoration activities would likely move to adjacent habitat dominated by grasses.

Determination of Effects

The status of the Sprague's pipit in southern New Mexico is unlikely to be strongly affected by any management practices in the RGCP. The proposed project may affect, but is not likely to adversely affect, the Sprague's pipit.

7.6 PROPOSED CRITICAL HABITAT FOR THE SOUTHWESTERN WILLOW FLYCATCHER

Significant projects upstream of Leasburg where critical habitat is being proposed by the USFWS (2011) consists of the following elements of the Proposed Action:

- No new levee construction is anticipated. Levee rehabilitation work is being currently being conducted in Hatch. The project specifically involves rehabilitation of the Hatch West levee, from Salem Bridge to Bignell Arroyo (21.9 km [13.6 miles]). The Hatch and Mesilla project levees are being raised and/or plated with new material, which varies between 0.15 and 1.1 m (0.5 feet–3.5 feet). Levee armoring is anticipated per the Conceptual Plan, whereby the levee toe will be armored with riprap material to allow channel meandering within the floodplain.
- No new levees will be built; only rehabilitation of the existing west levee upstream of Leasburg is underway. Estimated completion of improvements and reseeding is estimated in May/June 2012.
- No active grazing leases (the active grazing lease is downstream of Mesilla Dam) are ongoing and no dredging is planned. At this point, the USIBWC cannot determine if additional dredging is needed until a cross-sectional survey is conducted and a hydraulic model is run and updated. The results of the hydraulic model will identify if, and where, dredging is needed. These results are expected in January/February 2012. Therefore, project-specific coordination with resource agencies will be conducted as needed.
- General vegetation management is planned (see Section 5.2).
- Habitat restoration is planned at all sites selected upstream of Leasburg Dam: Trujillo, Jaralosa, Yeso Arroyo, Yeso East, Yeso West, Crow Canyon A, Crow Canyon B, Placitas Arroyo, Rincon Siphon, Angostura Arroyo, USIBWC Broad Canyon Parcel, Pasture 18, Broad Canyon Ranch Middle, Broad Canyon South, Selden Point Bar, and Bailey Point Bar (see Section 5.2).

The full range of planned restoration techniques to be used at any of the 16 sites within proposed critical habitat are:

- Saltcedar removal using mechanical extraction (with excavators or skid steer loaders), mastication, selective manual removal with chain saws and/or cut-stump herbicidal treatment;
- Bank destabilization: bank to be graded with a 4:1 slope over 8 m (25 feet), or a drop of about 1.8 (6 feet) over 8 m (25 feet). Bank vegetation can be removed by extraction or grubbing. Bank shaving will involve use of a bulldozer or excavator;
- Native vegetation plantings, including coyote willow whips and tree poles (e.g., cottonwood, Goodding's willow);
- Water rights acquisition (from willing sellers or lease water rights);
- Ground excavation to construct an inset floodplain or channels;

- Grubbing;
- Bank vegetation removal with use of a bulldozer;
- Discontinuation of mowing; and
- River crossing with six 152-cm-diameter (60-inch-diameter) culverts (at Selden Point Bar).

While these activities will lead to ground disturbance, they will be staggered to minimize the amount of habitat experiencing the initial, negative impacts from use of mechanized equipment for bank destabilization and mechanized extraction of saltcedar. All removal of saltcedar will be followed by planting of native vegetation. In the long term, the habitat restoration is aimed at increasing the amount of suitable flycatcher habitat, even with the restrictions imposed by the environmental water transactions program. Thus the Proposed Action should have a beneficial effect on any proposed critical habitat along the RGCP. The Proposed Action will likely not result in the destruction or adverse modification of proposed critical habitat.

8.0 CUMULATIVE EFFECTS

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 yellow-billed cuckoo 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.

9.0 MITIGATION AND MONITORING

The USIBWC will implement the mitigation measures, and the Conceptual Plan, to offset or decrease the environmental effects of implementing the Integrated Land Management Alternative. 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. These requirements were specified in a June 28, 2004, letter provided by the USFWS in response to the USIBWC submittal of the RGCP BA. The USFWS also completed a Fish and Wildlife Coordination Act Report in April 2005, which includes management actions to improve riparian habitats and diversify aquatic habitats while maintaining water delivery efficiencies and expanding flood control capacity. A summary of typical mitigation actions is presented below for implementing the Integrated Land Management Alternative. Mitigations by resource area are presented separately for construction activities and for vegetation treatments used to control invasive species and establish desired vegetation. Several of these mitigations have been included in the design of individual projects incorporated in the 2004 USIBWC RMP (Parsons 2004) and will be updated prior to implementation. All practical means of avoiding environmental harm from the selected alternative have been adopted.

9.1 TYPICAL MITIGATION MEASURES FOR CONSTRUCTION ACTIVITIES

Relevant mitigation measures are listed below.

Water Resources Protection

- During construction near the river, best management practices 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 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.
- The USIBWC will coordinate with irrigation districts to develop an accounting system to quantify water removal from the river as a result of environmental measures.

Soil Protection

- For bank destabilization activities that enhance channel migration, levees will be reinforced if channel migration threatens levee 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.

Threatened and Endangered Species Protection

- No construction activities will be conducted in known habitats of listed or sensitive species. Where construction will be necessary in proximity to known listed species' habitats, construction will occur during the period from September 1 through February 28, or outside the breeding season and treatment will be selected to minimize the effect.
- A 0.4-km (0.25-mile) buffer zone will continue to be established around flycatcher territories. Buffer zones will also be established for the yellow-billed cuckoo under the guidance of the USFWS.

Aquatic Habitat Protection

- During construction near the river, best management practices and spill control procedures will be used to prevent contamination and discharge of suspended sediments into the Rio Grande. 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.

9.2 TYPICAL MITIGATION MEASURES FOR VEGETATION TREATMENTS

Relevant mitigation measures are listed below. As stated above, herbicides to be used consist of Garlon 4 and Habitat. Garlon 4 would be used as needed throughout most of the project sites, except within a 9-m (30-foot) buffer of the river channel and seasonal pond.

Water Resources Protection

- 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 best management practices (e.g., careful selection of fire lines and weather conditions, avoid intense burns) to limit runoff into the river. Manual, rather than mechanical, removal of saltcedar will be used during maintenance or fuel reduction on the river margin. Woody debris as a result of saltcedar reduction will be mulched, burned, or removed from the floodway.

Soil Protection

- Heavy equipment used for brush reduction will typically be wheeled and not tracked. Mechanical treatment will be conducted in the late summer and fall, which typically provide for dryer soil conditions.
- 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 remain undisturbed.

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

10.0 SUMMARY AND CONCLUSION

The USIBWC is proposing to implement the Integrated Land Management Alternative set forth in the final EIS, "River Management Alternatives for the Rio Grande Canalization Project," as refined in the 2009 ROD based on the recommendations of the 2009 Conceptual Plans. As part of this alternative, aquatic and terrestrial habitat restoration is to occur at 30 sites along the RGCP within a water rights framework that would, under the ESA, safeguard landowners' rights and EBID river management and operation. Five species federally listed as endangered, threatened, proposed, or candidate 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), flycatcher (with nesting documented at Selden Canyon, Radium Springs, and Crow Canyon), yellow-billed cuckoo (recorded on several of the proposed restoration sites), and Sprague's pipit (possible along the RGCP on sites consisting of open, grassy fields). Of those five species, three are primarily associated with water and/or riparian areas in the Southwest, and stand to benefit from habitat restoration along the RGCP reach. This is true in particular for the southwestern willow flycatcher, for which 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. The effect determination for the southwestern willow flycatcher (*may affect, is likely to adversely affect*) reflects only the possibility of a temporary, negative effect of habitat restoration on sites near occupied territories; and of some of the other proposed actions (e.g., restrictions imposed by the environmental water transaction framework) on occupied sites.

11.0 REFERENCES

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APPENDIX A
SITE DESCRIPTIONS

TRUJILLO

Trujillo was surveyed on June 6, 2011. It is an alluvial terrace located along the west side of the Rio Grande at RM 103. It covers approximately 14 acres and it is characterized by a history of sediment dredging and recent mowing. A road lies along the eastern boundary of the site's southern half. Farther north, the road turns to the northwest, crossing the site at an angle and reaching its northwestern corner. The northern third of the Trujillo site is characterized by gravel and short vegetation (Figure A 1). At the river's edge is a 5-m-wide (16-foot-wide) belt of vegetation consisting of 3- to 4-m-tall (10- to 13-foot-tall) saltcedar (*Tamarix ramosissima*) and 2- to 3-m-tall (6.6- to 10-m-tall) coyote willow (*Salix exigua*). In the center of the southern portion of the site the soil is sandy cobblestone and the vegetation is dominated by 1- to 2-m-tall (3.3- to 6.6-foot-tall) coyote willow, weeds, and shrubs. Along the western boundary are 2- to 3-m-tall (6.6- to 10-m-tall) coyote willow with some saltcedar.

Figure A 1. Trujillo site, northern section.

Dominant plant species: *Salix exigua*, coyote willow

Subdominant: *Tamarix ramosissima*, saltcedar; *Bassia scoparia*, burningbush

Others present:

Scientific Name	Common Name
Atriplex canescens	Fourwing saltbush
Helianthus annus	Common sunflower
Melilotus alba (*Melilotus officinalis*)	White sweetclover
Populus deltoides	Rio Grande cottonwood
Prosopis glandulosa	Honey mesquite
Solanum elaeagnifolium	Silverleaf nightshade
Sporobolus airoides	Alkali sacaton

Wildlife observed on the site consisted of red-winged blackbird (*Agelaius phoeniceus*), mourning dove (*Zenaida macroura*), blue grosbeak (*Passerina caerulea*), northern mockingbird (*Mimus polyglottos*), tree swallow (*Tachycineta bicolor*), great-tailed grackle (*Quiscalus mexicanus*), and yellow-breasted chat (*Icteria virens*). Yellow-billed cuckoo is known to have inhabited the site in the past (D. Borunda, IBWC, pers. comm. to T. Thompson and A. Kuenzi, June 6, 2011).

JARALOSA

This 4.5-acre site on the east side of the river was surveyed June 6, 2011. It is an abandoned meander bend characterized by sandy cobblestone soils and its vegetation consists mainly of grasses and shrubs (Figure A 2). This site was last mowed in the fall of 2010 and is inhabited by weeds in the area of disturbance. Saltcedar has been mowed and is resprouting. A few, large Rio Grande cottonwoods (*Populus deltoides*) are present on the site. They are infested with mistletoe, and some of them appear to be dying.

Figure A 2. River bank on the Jaralosa site.

Dominant plant species: *Tamarix ramosissima*, saltcedar (resprouting)

Subdominant: *Sporobolus airoides*, alkali sacaton

Others present:

Scientific Name	Common Name
Atriplex canescens	Fourwing saltbush
Bassia scoparia (Kochia scoparia)	Burningbush
Cynodon dactylon	Bermudagrass
Dasyochloa pulchella	Low woollygrass
Distichlis spicata	Saltgrass
Lycium torreyi	Torrey's wolfberry
Menzelia sp.	Blazingstar
Oenothera caespitosa	Tufted evening primrose

Scientific Name	Common Name
Populus deltoides (few)	Rio Grande cottonwood
Prosopis glandulosa	Honey mesquite
Salix exigua	Coyote willow
Salsola tragus	Russian thistle
Solanum elaeagnifolium	Silverleaf nightshade
Sporobolus airoides	Alkali sacaton
Suaeda moquinii	Mojave seablite

Wildlife recorded on the site during the survey included seven species of birds: Chihuahuan raven (*Corvus cryptoleucus*), northern mockingbird, barn swallow (*Hirunda rustica*), Bullock's oriole (*Icterus bullockii*), yellow-breasted chat, Say's phoebe (*Sayornis saya*), and western kingbird (*Tyrannus verticalis*). Beaver (*Castor canadensis*) slapping in the river was also documented at this site, together with an unidentified fence lizard (*Sceloporus* sp.).

YESO ARROYO

This 10.6-acre site is divided into two portions facing each other across the river, the mouth of Yeso Arroyo being located along the west bank. Yeso Arroyo was surveyed on June 6, 2011. It was last mowed in fall 2010. The east side of the river (Figure A 3) is less dense than the west side. On both sides the river banks are lined with 4- to 5-m-tall (13- to 16-foot-tall) saltcedar. There are few Rio Grande cottonwoods present.

Figure A 3. East bank portion of Yeso Arroyo.

Dominant plant species: *Tamarix ramosissima*, saltcedar and *Prosopis glandulosa*, honey mesquite

Subdominant: *Baccharis* sp., baccharis

Others present:

Scientific Name	Common Name
Atriplex canescens	Fourwing saltbush
Bassia scoparia (Kochia scoparia)	Burningbush
Cynodon dactylon	Bermudagrass
Dasyochloa pulchella	Low woollygrass
Distichlis spicata	Saltgrass
Fraxinus velutina	Velvet ash
Lycium torreyi	Torrey's wolfberry
Opuntia sp.	Pricklypear
Populus deltoides	Rio Grande cottonwood
Salix exigua	Coyote willow
Solanum elaeagnifolium	Silverleaf nightshade
Sphaeralcea sp.	Globemallow
Sporobolus airoides	Alkali sacaton
Stephanomeria sp.	Wirelettuce

Wildlife documented on the site consisted of European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), vermilion flycatcher (*Pyrocephalus rubinus*), Say's phoebe, mourning dove, northern mockingbird, red-winged blackbird, turkey vulture (*Cathartes aura*), black-headed grosbeak (*Pheuctitus melanocephalus*). An oriole nest was located in a velvet ash (*Fraxinus velutina*) tree, and mule deer (*Odocoileus hemonius*) scat was detected on the ground.

YESO EAST

This 9.7-acre site along the east side of the river was surveyed on June 6, 2011. It consists of a shallow depression, likely a former channel meander, with sandy cobblestone soils. It is a weedy and shrubby, open field without any large trees. It was last mowed in fall 2010 and is inhabited by weeds in the area of disturbance. Saltcedar and coyote willow have been mowed and are resprouting. The ground is covered in debris leftover from mowing.

Figure A 4. Yeso East, view from the north of the site facing south.

Dominant plant species: *Tamarix ramosissima*, saltcedar (resprouting)

Subdominant: *Sporobolus airoides*, alkali sacaton

Others present:

Scientific Name	Common Name
Bassia scoparia (Kochia scoparia)	Burningbush
Cynodon dactylon	Bermudagrass
Dasyochloa pulchella	Low woollygrass
Datura wrightii	Sacred thorn-apple
Distichlis spicata	Saltgrass
Lycium torreyi	Torrey's wolfberry
Menzelia sp.	Blazingstar
Oenothera caespitosa	Tufted evening primrose
Populus deltoides (few)	Rio Grande cottonwood
Salix exigua	Coyote willow
Salsola tragus	Russian thistle
Solanum elaeagnifolium	Silverleaf nightshade
Sporobolus airoides	Alkali sacaton
Suaeda moquinii	Mojave seablite

The only wildlife detected during the survey of the site consisted of house finch.

YESO WEST

This 2.5-acre site on the west side of the river was surveyed only by observing it from across the river on June 6, 2011 (Figure A 5). It is a small, inset floodplain just upstream from the mouth of a small arroyo and is characterized by grass along the edge of the water and a dense strip of saltcedar.

Figure A 5. View of Yeso West from across the river facing upstream.

Dominant plant species: *Tamarix ramosissima*, saltcedar

Subdominant: *Baccharis* sp., baccharis

Wildlife observed consisted of a juvenile red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), barn swallow, house finch, mallard (*Anas platyrhynchos*), an unidentified hummingbird, and an *Empidonax* flycatcher.

CROW CANYON A

Crow Canyon is a large (90 acres) site on the east side of the river. The two parcels comprising the site (A1 and A2) were surveyed on June 6, 2011. Last mowed in fall 2010, A1 consists of a large, open field with gravelly and sandy soils and a few Rio Grande cottonwoods all heavily infested with mistletoe (Figure A 6). The vegetation is dominated by young saltcedar and coyote willow, with also grasses and weeds. The northwestern portion of the parcel along the river supports a strip of mature saltcedar. The parcel A2 is a large field with sandy and gravelly soils supporting shrubs and grasses and no large trees. A road stretches through the southern end of the parcel.

Figure A 6. View of Crow Canyon A1 facing north.

Dominant plant species: *Tamarix ramosissima*, saltcedar; *Salix exigua*, coyote willow (these are coming back densely, presently seedlings/saplings)

Subdominant: *Sporobolus airoides*, alkali sacaton

Others present:

Scientific Name	Common Name
Bassia scoparia (Kochia scoparia)	Burningbush
Cynodon dactylon	Bermudagrass
Dasyochloa pulchella	Low woollygrass
Distichlis spicata	Saltgrass

Scientific Name	Common Name
Glycyrrhiza lepidota	Wild licorice
Lycium torreyi	Torrey's wolfberry
Malva neglecta	Cheeseweed
Menzelia sp.	Blazingstar
Populus deltoides	Rio Grande cottonwood
Prosopis glandulosa	Honey mesquite
Salix exigua	Coyote willow
Salsola tragus	Russian thistle
Solanum elaeagnifolium	Silverleaf nightshade
Sphaeralcea sp.	Globemallow
Sporobolus airoides	Alkali sacaton
Stephanomeria sp.	Wirelettuce
Suaeda moquinii	Mojave seablite
Thelesperma megapotamicum	Hopi tea greenthread

The only wildlife observed during the survey of A1 consisted of a house finch. Also observed were small mammal burrows and coyote scat. A northern mockingbird and Chihuahuan raven were observed on the parcel A2.

CROW CANYON B

This 25.6-acre site, surveyed on June 6, 2011, consists of two parcels B1 and B2 located on the east side of the river and last mowed in fall 2010 (Figure A 7). It is a meander depression with gravelly and sandy soils in parcel B1 and silty sand/alluvial deposits in parcel B2. Parcel B1 is a large open field with a few immature Rio Grande cottonwoods, and one large mature one, all infested with mistletoe. At the southern end of that first parcel, saltcedar thins out and the river bank is open. A wetland area is present with 4- to 5-m-tall (13- to 16-foot-tall) willows (*Salix* sp.). On parcel B2, saltcedar grows in a narrow strip along the riverbank's edge. The grass cover is dense on the site, with resprouting willow and saltcedar.

Figure A 7. Southern end of Crow Canyon B1.

Dominant plant species: *Tamarix ramosissima*, saltcedar; *Salix exigua*, coyote willow (these are coming back densely, presently seedlings/saplings)

Subdominant: *Sporobolus airoides,* alkali sacaton

Others present:

Scientific Name	Common Name
Baccharis sp.	Baccharis
Bassia scoparia (Kochia scoparia)	Burningbush
Cynodon dactylon	Bermudagrass
Dasyochloa pulchella	Low woollygrass
Distichlis spicata	Saltgrass
Glycyrrhiza lepidota	Wild licorice
Hordeum jubatum	Foxtail barley
Lycium torreyi	Torrey's wolfberry
Malva neglecta	Cheeseweed
Menzelia sp.	Blazingstar
Opuntia sp.	Pricklypear
Populus deltoides	Rio Grande cottonwood
Prosopis glandulosa	Honey mesquite
Salix exigua	Coyote willow
Salsola tragus	Russian thistle
Senna bauhinioides	Two-leaf senna
Solanum elaeagnifolium	Silverleaf nightshade
Sphaeralcea sp.	Globemallow
Sporobolus airoides	Alkali sacaton
Stephanomeria sp.	Wirelettuce
Suaeda moquinii	Mojave seablite
Thelesperma megapotamicum	Hopi tea greenthread

Wildlife detected on this site included barn swallow, common yellowthroat (*Geothlypis trichas*), American robin (*Turdus migratorius*), mourning dove, yellow-breasted chat, house finch, and red-winged blackbird. Also recorded on the site were American bullfrog (*Rana catesbeiana*), pocket gopher (Geomyidae) mounds, coyote scat, and harvester ants (*Pogonomyrmex* sp.). Southwestern willow flycatchers have been recorded breeding in the wetland on parcel B1 in the last few years.

PLACITAS ARROYO

Surveyed on June 6, 2011, this 21.8-acre site – divided into two portions facing each other across the river – is characterized by sandy soils highly disturbed by mowing, levee repair work, and garbage dumping. Along the banks is a thin strip of coyote willow with also some southern cattail (*Typha dominguensis*) (Figure A 8). Where repair work occurred on the levee, seedling saltcedar grows in high densities and are about 1 m (3 feet) high. The Russian thistle (*Salsola tragus*) is dense in this area of the site.

Figure A 8. Mouth of Placitas Arroyo (western side).

Dominant plant species: *Salix exigua*, coyote willow

Subdominant: *Cynodon dactylon,* Bermudagrass

Others present:

Scientific Name	Common Name
Cucubita foetidissima	Buffalo gourd
Cynodon dactylon	Bermudagrass
Datura wrightii	Sacred thorn-apple
Distichlis spicata	Saltgrass
Glycyrrhiza lepidota	Wild licorice
Helianthus annus	Common sunflower
Salix exigua	Coyote willow
Salsola tragus	Russian thistle
Solanum elaeagnifolium	Silverleaf nightshade
Tamarix ramosissima	Saltcedar
Typha dominguensis	Southern cattail

Wildlife observed at Placitas Arroyo included red-winged blackbird, turkey vulture, barn swallow, European starling, killdeer (*Charadrius vociferus*), and mourning dove.

RINCON SIPHON

This 16.3-acre site, which was surveyed on June 7, 2011, consists of two parcels (A and B) on the east side of the river that have not been mowed or grazed. The southern parcel, Rincon Siphon A, is characterized by silty soils, saltcedar intermixed with mesquite (*Prosopis* sp.), and several wetlands along the bankline and in the interior of the site (Figure A 9). The northern parcel, Rincon Siphon B, is dense in the interior with screwbean mesquite (*Prosopis pubescens*) growing in a near 100% canopy monoculture. However, closer to the river the vegetation is a

mixture, dominated by saltcedar, willow, and others. Right at the water's edge is a small stand of southern cattail, which appears to be a small wetland.

Figure A 9. Rincon Siphon A.

Dominant plant species along the river: *Tamarix ramosissima,* saltcedar

Subdominant along the river: *Baccharis* sp., baccharis; *Prosopis pubescens,* screwbean mesquite; *Prosopis glandulosa,* honey mesquite; *Salix exigua,* coyote willow; *Distichlis spicata,* saltgrass

Dominant species in the interior: *Prosopis pubescens,* screwbean mesquite

Subdominant: *Muhlenbergia asperifolia,* scratchgrass

Others present:

Scientific Name	Common Name
Baccharis sp.	Baccharis
Carex sp.	sedges
Distichlis spicata	Saltgrass
Muhlenbergia asperifolia	Scratchgrass
Prosopis glandulosa	Honey mesquite
Prosopis pubescens	Screwbean mesquite
Rhus trilobata	Skunkbush sumac
Salix exigua	Coyote willow
Typha dominguensis	Southern cattail
Ulmus pumila	Siberian elm

House finch, red-winged blackbird, blue grosbeak, and Gambel's quail (*Callipepla gambelii*) were observed on Rincon Siphon A, together with pocket gopher holes. Birds observed on Rincon Siphon B consisted of northern mockingbird, house finch, Gambel's quail, red-winged blackbird, yellow-breasted chat, mourning dove, barn swallow, brown-headed cowbird

(*Molothrus ater*), black-headed grosbeak, MacGillivray's warbler (*Oporornis tomiei*), and Bell's vireo (*Vireo bellii*). Also recorded were coyote scat and a New Mexico whiptail lizard (*Cnemidophorus neomexicanus*). Suitable southwestern willow flycatcher habitat may be present on Rincon Siphon B where saltcedar patches grow for 20 to 30 m (66–98 feet) from the river's edge toward the interior of the site. However, this habitat is patchy.

ANGOSTURA ARROYO

This 15.4-acre site was surveyed on June 7, 2011. Last mowed in the fall of 2010, Angostura Arroyo consists of two portions facing each other across the river. Both portions are large, open fields overall with silty soils and dominated by sapling saltcedar (Figure A 10). The west (south at that location) side of the river stands 2.3 m (7.5 feet) above the water, and along that side of the site are two Rio Grande cottonwoods both heavily infested with mistletoe. One is dead, the other senescent. Also along the west side of the river is a southern cattail wetland. A wetland at the mouth of the arroyo in the center of the site represents suitable southwestern willow flycatcher habitat. It consists of a coyote willow thicket stretching approximately 100 m (328 feet) long and 30 m (98 feet) wide along the river. Mature saltcedar grows elsewhere along the banks of the river.

Figure A 10. View of Angostura Arroyo from the levee road.

Dominant plant species on the west bank (looked across): *Tamarix ramosissima*, saltcedar
Subdominant on the west bank: *Salix exigua,* coyote
Dominant plant species on the east bank: *Tamarix ramosissima; Salix exigua,* coyote willow
Subdominant on the east bank: *Bassia scoparia,* burningbush
Others present:

Scientific Name	Common Name

Scientific Name	Common Name
Baccharis sp.	Baccharis
Chloracantha spinosa	Spiny chloracantha
Distichlis spicata	Saltgrass
Populus deltoides	Rio Grande cottonwood
Prosopis glandulosa	Honey mesquite
Prosopis pubescens	Screwbean mesquite
Salix exigua	Coyote willow
Suaeda moquinii	Mojave seablite
Typha dominguensis	Southern cattail

A spiny softshell turtle (*Apalone spinifera*) was recorded in the river adjacent to the site. Wildlife observed at Angostura Arroyo consisted of warbling vireo (*Vireo gilvus*)—found nesting during the survey—together with red-winged blackbird, mourning dove, and northern mockingbird.

PASTURE 18

This 52-acre site on the east side of the river was surveyed on June 7, 2011, only from across the river. Pasture 18 burned in 2007 and is dense with saltcedar resprouts about 2 to 3 m (6.6–10 feet) tall. Along the water's edge is a strip of coyote willow, and it appears to have a saltgrass (*Distichlis spicata*) understory.

Figure A 11. Pasture 18, view from across the river.

Dominant plant species: *Tamarix ramosissima*, saltcedar

Subdominant: *Salix exigua*, coyote willow

Northern mockingbird, Gambel's quail, barn swallow, and Say's phoebe were all observed during the survey of the site.

IBWC BROAD CANYON PARCEL

This site, which was surveyed on June 7, 2011, has not been mowed. Nearly 100% of the canopy cover is large, mature saltcedar, except for the road. Also present on the site is some mesquite. The understory vegetation is limited to the areas along the roads where light gets through. This site is known to have harbored both southwestern willow flycatcher and yellow-billed cuckoo (D. Borunda, IBWC, pers. comm. to T. Thompson and A. Kuenzi, June 7, 2011).

Figure A 12. IBWC Broad Canyon Parcel.

Dominant plant species: *Tamarix ramosissima*, saltcedar

Subdominant: *Prosopis glandulosa*, honey mesquite

Others present:

Scientific Name	Common Name
Baccharis sp.	Baccharis
Chilopsis linearis	Desert willow
Datura wrightii	Sacred thorn-apple
Distichlis spicata	Saltgrass
Ephedra sp.	Ephedra
Gutierrezia sarothrae	Broom snakeweed
Helianthus annus	Common sunflower
Menzelia sp.	Blazingstar
Opuntia sp.	Pricklypear
Prosopis glandulosa	Honey mesquite
Prosopis pubescens	Screwbean mesquite
Salix exigua	Coyote willow
Salix gooddingii (one large tree)	Goodding's willow
Solanum elaeagnifolium	Silverleaf nightshade
Suaeda moquinii	Mojave seablite
Typha dominguensis	Southern cattail

Wildlife observed on the site consisted of black-headed grosbeak, mourning dove, house finch, yellow-breasted chat, and American crow (*Corvus brachyrhynchos*).

BROAD CANYON RANCH MIDDLE

Surveyed on June 7, 2011, Broad Canyon Ranch Middle is a 13.8-acre site located along the west side of the river (Figure A 13). Both Broad Canyon Ranch Middle and Broad Canyon South have undergone significant restoration efforts. Treatments have been conducted since 2009, including mechanical removal of saltcedar, chipping of the debris, pile burning, and spraying of herbicide (Garlon). In some areas, there are thick piles of chipped saltcedar where vegetation cannot grow. Plantings of native vegetation have also occurred, including extensive planting of coyote willow. Other planted species include yerba mansa (*Anemopsis californica*), false indigo (*Amorpha fruticosa*), fourwing saltbush (*Atriplex canescens*), and Goodding's willow (*Salix gooddingii*). There are several small wetlands within the two sites, with attending vegetation not reflected in the overview species list for both sites combined (see Broad Canyon Ranch South below).

On Broad Canyon Middle are some open areas created from saltcedar removal, with remaining patches of screwbean mesquite and a ground cover of weeds and shrubs. Mature mesquite grows along the river's edge, though no longer forming a thick corridor of trees. A wetland occurs in the north-central part of the site. Soils are largely silty.

Figure A 13. Interior of Broad Canyon Ranch Middle.

Wildlife recorded on the site included northern mockingbird, turkey vulture, pyrrhuloxia (*Pyrrhuloxia nitens*), house finch, house sparrow (*Passer domesticus*), and Chihuahuan raven. Also observed on Broad Canyon Ranch Middle were mule deer scat and small mammal burrows.

BROAD CANYON RANCH SOUTH

Broad Canyon Ranch South is a 20.6-acre site along the west side of the river. Most of the saltcedar was removed from this site in 2009, creating open areas as a result. The only remaining mature saltcedar is present along the edge of the river. Large wetlands occur toward the northern end of the site (Figure A 14), while the southern end has more barren ground from the occurrence of flooding. Soils are silty and sandy. Restoration activities have included pole plantings of coyote willows. Other planted species include *Anemopsis californica* (yerba mansa), *Amorpha fruticosa* (false indigo), *Atriplex canescens* (fourwing saltbush), and *Salix gooddingii* (Goodding's willow)

Figure A 14. Wetland on Broad Canyon Ranch South.

Dominant plant species (for both Broad Canyon Middle and South combined): *Prosopis pubescens,* screwbean mesquite; *Salix exigua,* coyote willow; *Tamarix ramosissima,* saltcedar

Subdominant: *Trianthemum portulacastrum,* desert horse-purslane

Others present:

Scientific Name	Common Name
Amorpha fruticosa	False indigo
Anemopsis californica	Yerba mansa
Atriplex canescens	Fourwing saltbush
Baccharis sp.	Baccharis
Baileya multiradiata	Desert marigold
Bassia scoparia (Kochia scoparia)	Burningbush
Caesalpinia gilliesii	Bird-of-paradise bush
Chilopsis linearis	Desert willow
Cressa truxillensis	Alkaliweed
Cynodon dactylon	Bermudagrass
Datura wrightii	Sacred thorn-apple

Scientific Name	Common Name
Distichlis spicata	Saltgrass
Echinochloa crus-galli	Barnyardgrass
Ephedra sp.	Ephedra
Gutierrezia sarothrae	Broom snakeweed
Helianthus annus	Common sunflower
Juncus mexicanus	Mexican rush
Juncus torreyi	Torrey's rush
Lycium torreyi	Torrey's wolfberry
Malvella leprosa	Alkali mallow
Menzelia sp.	Blazingstar
Muhlenbergia asperifolia	Scratchgrass
Opuntia sp.	Pricklypear
Polypogon monspeliensis	Rabbitfootgrass
Prosopis glandulosa	Honey mesquite
Prosopis pubescens	Screwbean mesquite
Salix exigua	Coyote willow
Salix gooddingii	Goodding's willow
Schoenoplectus sp.	Bulrush
Setaria leucopila	Plains bristlegrass
Solanum elaeagnifolium	Silverleaf nightshade
Sphaeralcea sp.	Globemallow
Suaeda moquinii	Mojave seablite
Trianthemum portulacastrum	desert horse-purslane
Typha dominguensis	Southern cattail

Wildlife recorded on Broad Canyon Ranch South consists of red-winged blackbird, mourning dove, brown-headed cowbird, killdeer, and turkey vulture. Also noted was coyote scat.

SELDEN POINT BAR

Selden Point Bar is a 6.9-acre site located along the east side of the river. It was surveyed on June 9, 2011. Soils are sandy and silty, and ground disturbance occurs from grazing and railroad tracks. Saltcedar is dominant on the site; other notable shrubs consist of mesquite and wolfberry (*Lycium* sp.). The ground cover is largely composed of saltgrass and sand dropseed (*Sporobolus cryptandrus*). Potential southwestern willow flycatcher habitat is present in the form of saltcedar thickets along the shoreline, and two pairs with nests were detected in Selden Canyon in 2008 (Reclamation 2009). The riverbank is also lined with mature coyote willow.

Figure A 15. Center of Selden Point Bar viewed from the railroad tracks.

Dominant plant species: *Tamarix ramosissima,* saltcedar; *Salix exigua,* coyote willow; *Lycium* sp., wolfberry; *Sporobolus cryptandrus,* sand dropseed

Others present

Scientific Name	Common Name
Prosopis pubescens	Screwbean mesquite
Distichlis spicata	Saltgrass

Wildlife recorded on the site included mourning dove, white-winged dove (*Zenaida asiatica*), yellow-breasted chat, warbling vireo, northern flicker (*Colaptes auratus*), Gambel's quail, blue grosbeak, western kingbird, northern mockingbird, house finch, and spotted towhee (*Pipilo maculatus*).

BAILEY POINT BAR

Bailey Point Bar is a privately owned, 16.6-acre site on the east side of the river (Figure A 16). Surveyed on June 9, 2011, the site supports a dense saltcedar grove approximately 30 to 40 m (98–131 feet) wide at the southern end of the site. It is narrower toward the center of the site (approximately 10–15 m [33–49 feet]) then widens again to more than 40 m (131 feet) northward. Wolfberry is the dominant shrub just outside the saltcedar grove. Other shrubs include velvet mesquite (*Prosopis velutina*). The ground cover consists mainly of saltgrass with also some yerba mansa and sand dropseed. Large, mature coyote willows are found at the northern end of the site along the river, while a grove of dead coyote willow can be observed in the center of the site. Site disturbance includes grazing and railroad tracks. Potential southwestern willow flycatcher habitat is present on the site.

Figure A 16. Center of the Bailey Point Bar site characterized by yerba mansa and screwbean mesquite.

Dominant plant species: *Tamarix ramosissima,* saltcedar; *Lycium* sp., wolfberry; *Distichlis spicata,* saltgrass; *Sporobolus cryptandrus,* sand dropseed

Others present:

Scientific Name	Common Name
Prosopis pubescens	Screwbean mesquite
Prosopis velutina	Velvet mesquite
Elaeagnus angustifolia	Russian olive
Salix exigua	Coyote willow
Anemopsis californica	Yerba mansa

Wildlife at Bailey Point Bar included brown-headed cowbird, yellow-breasted chat, mourning dove, killdeer, house finch, blue grosbeak, Gambel's quail, northern mockingbird, white-winged dove, red-winged blackbird, black-headed grosbeak, spotted towhee, and warbling vireo. American bullfrogs were also noted on the site.

SHALEM COLONY

Shalem Colony is a long and narrow, 14.2-acre site located along a bend of the river on the east bank. The site was surveyed on June 7, 2011. Soils are primarily silty. The site had been mowed recently, and construction on the levee was underway at the time of the survey. The co-dominant plant species have an open canopy structure. There is a two-track road that runs through the middle of this site. The interior area away from the river and closer to the road is dominated by screwbean mesquite. The northern end of the site is characterized by a very sparse ground cover of grass, with also some low coyote willow and mesquite. At the southern end of the site are some saltcedar and mature mesquite (Figure A 17).

Figure A 17. Southern end of Shalem Colony.

Dominant plant species: *Tamarix ramosissima,* saltcedar; *Salix exigua,* coyote willow; *Prosopis pubescens,* screwbean mesquite

Others present:

Scientific Name	Common Name
Chloracantha spinosa	Spiny chloracantha
Distichlis spicata	Saltgrass
Prosopis pubescens	Screwbean mesquite
Salix exigua	Coyote willow
Salsola tragus	Russian thistle
Sporobolus airoides	Alkali sacaton

Phainopepla (*Phainopepla nitens*), yellow-breasted chat, and turkey vulture were observed on the site, as were verdin (*Auriparus flaviceps*) nests.

LEASBURG LATERAL EXTENSION

Surveyed on June 7, 2011, this 4.1-acre site on the east side of the river is an open field that was recently mowed (Figure A 18). Soils are silty and sandy. The site harbors one cottonwood tree, and saltcedar is resprouting. The vegetation is more diverse along a canal that stretches through the site. The site is disturbed from mowing and nearby construction activities.

Figure A 18. View of Leasburg Extension from the levee road.

Dominant plant species: *Tamarix ramosissima,* saltcedar (resprouting)*; Distichlis spicata,* saltgrass

Others present:

Scientific Name	Common Name
Amaranthus sp. (*hybridus*?)	Amaranth
Amorpha fruticosa	False indigo
Anemopsis californica	Yerba mansa
Astragalus sp. (very abundant)	Milkvetch
Celtis reticulata	Netleaf hackberry
Distichlis spicata	Saltgrass
Equisetum laevigatum	Smooth horsetail
Melilotus alba (*Melilotus officinalis*)	White sweetclover
Prosopis glandulosa	Honey mesquite
Salix exigua	Coyote willow
Solanum elaeagnifolium	Silverleaf nightshade
Sporobolus airoides	Alkali sacaton
Ulmus pumila	Siberian elm

Red-winged blackbird, northern mockingbird, western meadowlark (*Sturnella neglecta*), mourning dove, and a hummingbird species were all observed on the site, as were gopher burrows and coyote scat.

CLARK LATERAL

Surveyed on June 7, 2011, this 6-acre site located on the east side of the river is a large, mowed field (Figure A 19). It is characterized by sandy soils and is adjacent to a paved trail. Growing on the site are some Rio Grande cottonwoods, both large trees and seedlings. The saltcedar resprouts are about 1.5 m (5 feet) tall. There is much bare ground on the site, which harbors a bat box installed on some poles.

Figure A 19. South-facing view of Clark Lateral.

Dominant plant species: *Tamarix ramosissima,* saltcedar (resprouting)*; Chloracantha spinosa,* spiny chloracantha

Others present:

Scientific Name	Common Name
Amaranthus sp.	Amaranth
Chloracantha spinosa	Spiny chloracantha
Populus deltoides	Rio Grande cottonwood
Proboscidea parviflora	Devil's claw
Salsola tragus	Russian thistle
Solanum elaeagnifolium	Silverleaf nightshade

Barn swallow, northern mockingbird, and mourning dove were all observed on the Clark Lateral site.

MESILLA VALLEY BOSQUE STATE PARK

Surveyed on June 7, 2011 mainly from across the river, this 31.8-acre site along the west bank of the Rio Grande is a large, open field with sandy soils and saltgrass and weeds, in addition to a few shrubby saltcedar trees (Figure A 20). In the southern portion of the site is a mature willow thicket occurring in a thin strip. The site is disturbed from the presence of a levee road, another road along the river, and mowing.

Figure A 20. Northern end of the Mesilla Valley Bosque State Park site.

Dominant plant species: *Tamarix ramosissima,* saltcedar; *Distichlis spicata*, saltgrass

Others present:

Scientific Name	Common Name
Baccharis sp.	Baccharis
Distichlis spicata	Saltgrass
Melilotus alba (*Melilotus officinalis*)	White sweetclover
Populus deltoides	Rio Grande cottonwood
Salix exigua	Coyote willow
Schoenoplectus sp.	Bulrush
Typha dominguensis	Southern cattail

Wildlife recorded at Mesilla Valley Bosque State Park included barn swallow and mourning dove. On a river island between Mesilla East and Mesilla Valley Bosque State Park were an American avocet (*Recurvirostra americana*) and a killdeer. Also observed were gopher burrows.

MESILLA EAST

Surveyed on June 7, 2011, this 15.8-acre site on the east side of the river is a large, open field with sandy soils and saltgrass and weeds, in addition to a few shrubby saltcedar trees. The site is bisected by a two-track road and is disturbed from mowing and use of that road (Figure A 21). The resprouting saltcedar is approximately 1.2 m (4 feet) tall. The edge of the water is not densely vegetated, with only sparse coyote willow and an occasional strip of wetland vegetation.

Figure A 21. South-facing view of Mesilla East.

Dominant plant species: *Tamarix ramosissima,* saltcedar; *Distichlis spicata*, saltgrass

Others present:

Scientific Name	Common Name
Asclepias sp.	Milkweed
Baccharis sp.	Baccharis
Carex sp.	Sedge
Chloracantha spinosa	Spiny chloracantha
Cynodon dactylon	Bermudagrass
Distichlis spicata	Saltgrass
Machaeranthera gracilis	Slender goldenweed
Melilotus alba (*Melilotus officinalis*)	White sweetclover
Populus deltoides	Rio Grande cottonwood
Rumex sp.	Dock
Salix exigua	Coyote willow
Schoenoplectus sp.	Bulrush
Solanum elaeagnifolium	Silverleaf nightshade
Typha dominguensis	Southern cattail

Wildlife recorded at Mesilla East included barn swallow and mourning dove. On an island between Mesilla East and Mesilla Valley Bosque State Park were an American avocet and a killdeer. Also observed were coyote scat and gopher burrows.

BERINO WEST

Surveyed on June 8, 2011, this 10.3-acre site on the west side of the river is characterized by recent mowing of the vegetation and the presence of a small retired drainage stretching through the center of the site (Figure A 22). Cattails (*Typha* sp.) grow along that drainage. The rest of the site is essentially identical to Berino East. It is a large grassy field with some saltcedar shrubs.

Figure A 22. Southern portion of Berino West viewed from the center of the site.

Dominant plant species: *Tamarix ramosissima,* saltcedar (resprouting); *Sporobolus airoides,* alkali sacaton

Subdominant: *Amaranthus* sp. (*hybridus*?), amaranth

Others present:

Scientific Name	Common Name
Amaranthus sp. (*hybridus*?)	Amaranth
Cressa truxillensis	Alkaliweed
Typha dominguensis	Southern cattail
Prosopis pubescens	Screwbean mesquite
Sporobolus airoides	Alkali sacaton
Tamarix ramosissima	Saltcedar

Wildlife recorded collectively at Berino East and Berino West consisted of western kingbird, red-winged blackbird, northern mockingbird, mourning dove, mallard, common yellowthroat, and a hummingbird species. Also observed were gopher burrows and coyote scat.

BERINO EAST

Surveyed on June 8, 2011, this 9.5-acre site located on the east side of the river is a large grassy field that was mowed recently. The resprouting saltcedar is approximately 1.2 to 1.5 m (4–5 feet) tall. Coyote willows grow in a narrow strip along the water's edge. Soils are sandy.

Figure A 23. Northern section of Berino East viewed from the center of the site.

Dominant plant species: *Amaranthus* sp. (*hybridus*?), amaranth; *Cressa truxillensis,* alkaliweed; *Sporobolus airoides,* alkali sacaton

Others present:

Scientific Name	Common Name
Amaranthus sp.	Amaranth
Cressa truxillensis	Alkaliweed
Distichlis spicata	Saltgrass
Glycyrrhiza lepidota	Wild licorice
Lycium sp.	Wolfberry
Salix exigua	Coyote willow
Schoenoplectus sp.	Bulrush
Solanum elaeagnifolium	Silverleaf nightshade
Sporobolus airoides	Alkali sacaton
Tamarix ramosissima	Saltcedar

Wildlife recorded collectively at Berino East and Berino West consisted of western kingbird, red-winged blackbird, northern mockingbird, mourning dove, mallard, common yellowthroat, and a hummingbird species.

VINTON A

Surveyed on June 8, 2011, Vinton A is a 14.7-acre site located along the west side of the river. It is a large field with grass and weeds that was last mowed in February 2011. Most of the ground is covered with debris from the mowing, and not much vegetation is growing in this area (Figure A 24). The resprouting saltcedar is 1 to 1.2 m (3–4 feet) tall. No tall vegetation occurs along the river bank.

Figure A 24. Southern portion of Vinton A viewed from the center of the site.

Dominant plant species: *Tamarix ramosissima,* saltcedar (resprouting); *Alhagi maurorum,* camelthorn

Others present:

Scientific Name	Common Name
Alhagi maurorum (*Alhagi pseudalhagi*)	Camelthorn
Amaranthus sp. (*hybridus*?)	Amaranth
Cressa truxillensis	Alkaliweed
Cynodon dactylon	Bermudagrass
Prosopis pubescens	Screwbean mesquite
Solanum elaeagnifolium	Silverleaf nightshade
Tamarix ramosissima	Saltcedar

Observed on the site was a green heron (*Butorides virescens*) and a snowy egret (*Egretta thula*), in addition to western meadowlark, killdeer, red-winged blackbird, mourning dove, mallard, house finch, and western wood-pewee (*Contopus sordidulus*). Gopher burrows were also documented.

VINTON B

Surveyed on June 8, 2011, this 20-acre site on the west side of the river is a weedy field that was last mowed in February 2011 (Figure A 25). Present on the site are a few tall saltcedar, baccharis, and screwbean mesquite, about 4.6 m (15 feet) tall that were not mowed because they host nests. These occur in just a few patches on the site.

Figure A 25. Northern portion of Vinton B viewed from the center of the site.

Dominant plant species: *Alhagi maurorum,* camelthorn

Subdominant: *Distichlis spicata,* saltgrass

Others present:

Scientific Name	Common Name
Alhagi maurorum	Camelthorn
Baccharis sp.	Baccharis
Cressa truxillensis	Alkaliweed
Malvella leprosa	Alkali mallow
Prosopis pubescens	Screwbean mesquite
Tamarix ramosissima	Saltcedar

Red-winged blackbird, northern mockingbird, Say's phoebe, warbling vireo, mourning dove, and western meadowlark were recorded during the survey of the site, as were cottontail (*Sylvilagus* sp.) scat and tarantula wasps (*Pepsis* sp.).

VALLEY CREEK PARK

Surveyed on June 8, 2011, this 22-acre site on the west side of the river is a city park with a paved trail (Figure A 26). It is mowed frequently by the city of El Paso. There is a delivery channel that flows into the river here (leftover irrigation water). The canal flows through the

center of the site and is lined with coyote willow and saltcedar. Elsewhere, the site is essentially a lawn with a few taller plants right at the water's edge. The area along the levee is completely devoid of vegetation, and it is currently under construction. Valley Creek Park is the focus of a corridor enhancement plan involving the planting of willows and trees.

Figure A 26. Valley Creek Park, viewed from the center of the site toward the river.

Dominant plant species: *Distichlis spicata,* saltgrass

Subdominant: *Astragalus* sp., milkvetch

Others present:

Scientific Name	Common Name
Astragalus sp.	Milkvetch
Baccharis sp.	Baccharis
Chloracantha spinosa	Spiny chloracantha
Distichlis spicata	Saltgrass
Equisetum laevigatum	Smooth horsetail
Gaura sp.	Beeblossom
Melilotus alba (*Melilotus officinalis*)	White sweetclover
Oenothera caespitosa	Tufted evening primrose
Salix exigua	Coyote willow
Sporobolus airoides	Alkali sacaton
Tamarix ramosissima	Saltcedar

Among the wildlife recorded on the site were northern mockingbird, house finch, red-winged blackbird, mourning dove, turkey vulture, great-tailed grackle, mallard, white-winged dove, black-chinned hummingbird (*Archilochus alexandri*), and black phoebe (*Sayornis nigricans*). Gopher burrows were also observed on the site.

NEMEXAS SIPHON

Surveyed on June 8, 2011, this 16.7-acre site on the west side of the river is characterized by a very dense cover of saltcedar, with almost no understory (Figure A 27). A few, very large, mature Rio Grande cottonwoods grow on the site. The river's edge is dense with coyote willows and baccharis.

Figure A 27. Northern end of Nemexas Siphon.

Dominant plant species: *Tamarix ramosissima,* saltcedar

Others present:

Scientific Name	Common Name
Baccharis sp.	Baccharis
Populus deltoides (few)	Rio Grande cottonwood
Salix exigua	Coyote willow

White-winged dove, red-winged blackbird, northern mockingbird, turkey vulture, Gambel's quail, house finch, Swainson's hawk (*Buteo swainsoni*), Say's phoebe, and a belted kingfisher (*Megaceryle alcyon*) were all recorded on the site during the biological survey, as were a bullfrog in a pond and coyote scat.

COUNTRY CLUB EAST

Surveyed on June 8, 2011, this 29-acre site on the east side of the river is a large, grassy and weedy field last mowed in September 2010. Soils are primarily silty. The resprouting saltcedar are approximately 1 m (3 feet) tall. The coyote willows along the bank are approximately 1.8 m (6 feet) tall.

Figure A 28. Northern section of Country Club East viewed from the center of the site.

Dominant plant species: *Distichlis spicata,* saltgrass

Subdominant: *Glycyrrhiza lepidota,* wild licorice; *Cressa truxillensis,* alkaliweed

Others present:

Scientific Name	Common Name
Asclepias sp.	Milkweed
Astragalus sp.	Milkvetch
Carex sp.	Sedges
Cressa truxillensis	Alkaliweed
Cynodon dactylon	Bermudagrass
Distichlis spicata	Saltgrass
Glycyrrhiza lepidota	Wild licorice
Salix exigua	Coyote willow
Solanum elaeagnifolium	Silverleaf nightshade
Sporobolus airoides	Alkali sacaton
Tamarix ramosissima	Saltcedar
Trianthemum portulacastrum	desert horse-purslane

Wildlife recorded at Country Club East consisted of five bird species: yellow-breasted chat, red-winged blackbird, common yellowthroat, barn swallow, and mourning dove.

SUNLAND PARK

This 28.8-acre site on the east side of the river was surveyed on June 8, 2011. The City of Sunland Park paved trail is adjacent to this site. There is resprouting saltcedar throughout and mature tall saltcedar along the river bank. Dense, wide stands of 9-m-tall (30-foot-tall) coyote willow grow along the river bank. Also present on the site are a few large, mature Rio Grande cottonwoods all infested with mistletoe. Southwestern willow flycatchers have been reported

from the site, and management efforts focus on habitat enhancement for the species (D. Borunda, IBWC, pers. comm. to T. Thompson and A. Kuenzi, June 8, 2011).

Figure A 29. Sunland Park.

Dominant plant species: *Salix exigua*, coyote willow; *Tamarix ramosissima*, saltcedar

Others present:

Scientific Name	Common Name
Astragalus sp.	Milkvetch
Baccharis sp.	Baccharis
Glycyrrhiza lepidota	Wild licorice
Cressa truxillensis	Alkaliweed
Cynodon dactylon	Bermudagrass
Distichlis spicata	Saltgrass
Melilotus alba (*Melilotus officinalis*)	White sweetclover
Populus deltoides (very few)	Rio Grande cottonwood
Prosopis pubescens	Screwbean mesquite
Salix exigua	Coyote willow
Sporobolus airoides	Alkali sacaton
Tamarix ramosissima	Saltcedar
Muhlenbergia asperifolia	Scratchgrass

Wildlife recorded at the site included western kingbird, common yellowthroat, northern mockingbird, white-winged dove, house sparrow, American kestrel (*Falco sparverius*), western wood-pewee, mourning dove, cliff swallow (*Petrochelidon pyrrhonota*), northern flicker, and warbling vireo.

ANAPRA BRIDGE

An 11-acre site located on the east side of the river, Anapra Bridge was surveyed on June 8, 2011. It is a field with sandy soils adjacent to the City of Sunland Park paved trail. Shrubby vegetation dominates, including resprouting saltcedar. The bankline supports some mature saltcedar, mesquite, and coyote willow. There are dense 9-m-tall (30-foot-tall) coyote willows along the river bank, in wide stands. A few Russian olives (*Elaeagnus angustifolia*) occur throughout the site, including one very large dead one. Southwestern willow flycatchers are known to inhabit the willow grove along the river (Figure A 30). Management efforts at the site include tree planting to locally recreate bosque-like conditions (D. Borunda, IBWC, pers. comm. to T. Thompson and A. Kuenzi, June 8, 2011).

Figure A 30. Large willow grove along the river bank at Anapra Bridge.

Dominant plant species: *Salix exigua*, coyote willow; *Distichlis spicata*, saltgrass

Subdominant: *Tamarix ramosissima*, saltcedar

Others present:

Scientific Name	Common Name
Apocynum cannabinum	Indian hemp
Baccharis sp.	Baccharis
Carex sp.	Sedges
Cressa truxillensis	Alkaliweed
Cynodon dactylon	Bermudagrass
Distichlis spicata	Saltgrass
Elaeagnus angustifolia	Russian olive
Melilotus alba (*Melilotus officinalis*)	White sweetclover
Prosopis pubescens	Screwbean mesquite
Salix exigua	Coyote willow
Sporobolus airoides	Alkali sacaton
Tamarix ramosissima	Saltcedar
Trianthemum portulacastrum	desert horse-purslane

Local wildlife recorded during SWCA's biological survey consisted mostly of birds: barn swallow, mourning dove, western tanager (*Piranga ludoviciana*), great-tailed grackles, house sparrow, cliff swallows, and rock pigeons (*Columba livia*). Also observed on the site were gopher burrows.

NOXIOUS WEEDS

Federally listed noxious weeds are identified by the U.S. Department of Agriculture (USDA) PLANTS database (USDA 2011). Noxious weeds listed by the state of New Mexico are identified in a memorandum issued by the New Mexico Department of Agriculture (2009). In the New Mexico Department of Agriculture list, noxious weeds are divided into three categories. Class A species are those that have limited distribution; preventing new infestations represents the highest priority. Class B species are limited to portions of the state; in areas with severe infestations, management should be designed to contain the infestation and stop any further spread. Class C species are widespread with management decisions determined at the local level based on the feasibility of control and level of infestation. Noxious weeds identified by the state of Texas are identified by the Texas Department of Agriculture (2007) in the Texas Administrative Code, Title 4, Part I, Chapter 19, Subchapter T, Rule §19.300.

No federally listed noxious weeds were observed during the surveys. State-listed noxious weeds that were observed are listed in the table below. Camelthorn (*Alhagi maurorum*) is listed by both the states of New Mexico and Texas but was identified during the surveys only on sites in Texas.

Scientific Name	Common Name	Status
Alhagi maurorum (Alhagi pseudalhagi)	Camelthorn	Class A species (New Mexico) Texas noxious weed
Elaeagnus angustifolia	Russian olive	Class C species (New Mexico)
Tamarix ramosissima	Saltcedar	Class C species (New Mexico) Texas noxious weed
Ulmus pumila	Siberian elm	Class C species (New Mexico)

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