RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Perennial Rio Grande Silvery Minnow Refugia at Drain Outfalls

U.S. Department of the Interior
Bureau of Reclamation
Albuquerque Area Office

November 2006

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Front Cover Photo: Peralta Wasteway near Belen, New Mexico.

TABLE OF CONTENTS

ACRONYMS and ABBREVIATIONS vii

CHAPTER 1 PURPOSE AND NEED FOR ACTION 2

1.1 Introduction 2

1.2 Background 3
1.2.1 Role of Large Woody Debris in River Systems 3
1.2.2 Pool Formation 3
1.2.3 Role in Creating Refugia in Drying Rivers 4
1.2.4 Fine Woody Debris Accumulation & Predation 4
1.2.5 Substrate for Benthos 4

1.3 Proposed Action 6

1.4 Purpose and Need for the Action 6

1.5 Relevant Statutes, Regulations, and Other Plans 8

CHAPTER 2 ALTERNATIVES 8

2.1 Introduction 8

2.2 Description of the Alternatives 9

2.2.1 Alternative A: No Action 9
2.2.2 Alternative B: Proposed Action 9
2.2.2.1 Los Chavez Wasteway 10
2.2.2.2 Peralta Main Canal Wasteway 14
2.2.2.3 Lower Peralta Drain #1 17
2.2.3 Operation of Drain Outfalls/Wasteways 20
2.2.3.1 Peralta Main Wasteway 21
2.2.3.2 Lower Peralta Drain Outfall #1 21
2.2.3.3 Los Chavez Wasteway 22
2.2.4 Enhanced Monitoring of Refugial Pools 22
2.2.4.1 Habitat Quality Assessment 23
2.2.4.2 Water Quality Characteristics 23
2.2.5 Equipment, Staging, and Access 23

2.3 Alternatives Considered but Eliminated from Detailed Analysis 24

CHAPTER 3 AFFECTED ENVIRONMENT 24

3.1 Introduction 24

3.2 Geomorphology and Soils 25

3.3 Water Resources **25**
3.3.1 Hydrology 25
3.3.2 Water Quality 26
3.3.3 Net Depletions 26

3.4 Vegetation **26**

3.5 Wildlife **26**

3.6 Fish **28**

3.7 Threatened, Endangered Species and Special Status Species **28**
3.7.1 Rio Grande Silvery Minnow 28
3.7.2 Southwestern Willow Flycatcher (*Empidonax trailii extimus*) 30
3.7.3 Bald Eagle (*Haliaeetus leucocephalus*) 31
3.7.4 Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) 31
3.7.5 Common Black-Hawk (*Buteogallus anthracinus*) 31
3.7.6 New Mexican Jumping Mouse (*Zapus hudsonius luteus*) 31

3.8 Cultural Resources **32**

3.9 Socioeconomics and Environmental Justice **32**

3.10 Indian Trust Assets **33**

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES **33**

4.1 Introduction **33**

4.2 Geomorphology and Soils **33**
No Action 33
Proposed Action 33

Table 2. Summary of Impacts **34**

4.3 Water Resources **34**
No Action 34
Proposed Action 35

4.4 Vegetation **35**
No Action 35
Proposed Action 35

4.5 Wildlife **35**
No Action 35
Proposed Action 35

4.6 Fish **36**
No Action 36
Proposed Action 36

4.7 Threatened, Endangered and Special Status Species **36**
4.7.1 Rio Grande Silvery Minnow 36
No Action 36

Proposed Action 36
4.7.2 Southwestern Willow Flycatcher 37
No Action 37
Proposed Action 37
4.7.3 Bald Eagle 38
No Action 38
Proposed Action 38
4.7.4 Western Yellow-billed Cuckoo 38
No Action 38
Proposed Action 39
4.7.5 Common Black-Hawk 39
No Action 39
Proposed Action 39
4.7.6 New Mexican Jumping Mouse 39
No Action 39
Proposed Action 39

4.8 Cultural Resources 39
No Action 39
Proposed Action 39

4.9 Socioeconomics and Environmental Justice 39
No Action 39
Proposed Action 40

4.10 Indian Trust Assets 40
No Action 40
Proposed Action 40

4.11 Irretrievable Commitment of Resources 40

4.12 Cumulative Effects 40

CHAPTER 5 ENVIRONMENTAL COMMITMENTS 41

CHAPTER 6 CONSULTATION & COORDINATION 42

CHAPTER 7 LIST OF PREPARERS 42

CHAPTER 8 REFERENCES 42

FIGURE 1. PROJECT AREA MAP. THREE PROPOSED DRAIN OUTFALLS SELECTED FOR HABITAT ENHANCEMENT ARE HIGHLIGHTED IN YELLOW. 5
FIGURE 2. CONCEPTUAL ENGINEERING DRAWING OF LARGE COTTONWOOD SNAG ANCHORED ON THE RIVER BANK. 10
FIGURE 3. AERIAL VIEW OF THE LOS CHAVEZ WASTEWAY DRAIN OUTFALL SHOWING THE ACCESS POINT, STAGING AREA AND OUTFALL AREA WHERE THE HABITAT ENHANCEMENT WOULD OCCUR. 11
FIGURE 4. SITE PLAN FOR THE LOS CHAVEZ DRAIN OUTFALL. 12
FIGURE 5. CLOSEUP OF THE STAGING AREA FOR THE LOS CHAVEZ WASTEWAY OUTFALL. 13

FIGURE 6. ACCESS ROAD TO THE LOS CHAVEZ WASTEWAY DRAIN OUTFALL. 13
FIGURE 7. AERIAL VIEW OF THE PERALTA WASTEWAY DRAIN OUTFALL. 14
FIGURE 8. SITE PLAN FOR THE PERALTA WASTEWAY DRAIN OUTFALL. 15
FIGURE 9. ACCESS POINT AND STAGING FOR THE PERALTA WASTEWAY DRAIN OUTFALL. 16
FIGURE 10. PERALTA WASTEWAY SHOWING THE HEAVILY IMPACTED ROAD AREA PROPOSED FOR THE STAGING AREA. A PORTION OF THE STAGING IS IN THE FOREGROUND, OUT OF THE PHOTO. APPROXIMATE DIMENSIONS ARE 100 FT LONG BY 50 FT. WIDE. 17
FIGURE 11. LOWER PERALTA #1. 18
FIGURE 12. SITE PLAN FOR LOWER PERALTA #1. 19
FIGURE 13. LOCATION OF THE ACCESS ROAD AND STAGING AREA FOR THE LOWER PERALTA #1 DRAIN. 20
FIGURE 14. RELATIONSHIP OF LOG DIAMETER TO HEAD AND SCOUR DEPTH. 43

ACRONYMS and ABBREVIATIONS

cfs	cubic feet per second
cm	centimeter
Collaborative Program	Endangered Species Act Collaborative Program
CWA	Clean Water Act
FR	Federal Register
ft	foot
ITA	Indian Trust Assets
km	kilometer
m	meter
min	minute
MRG	Middle Rio Grande
MRGCD	Middle Rio Grande Conservancy District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
Reclamation	Bureau of Reclamation
RGSM	Rio Grande silvery minnow
RM	river mile
sec	second
SHPO	State Historic Preservation Officer
USACE	U. S. Army Corps of Engineers
USC	United States Code
USFWS	U. S. Fish and Wildlife Service
USGS	U.S. Geological Service

CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Middle Rio Grande Conservancy District (MRGCD) along with its project partners HabiTech in Laramie, Wyoming; New Mexico State University in Las Cruces, New Mexico; and the Bureau of Reclamation Denver Technical Service Center, are proposing to implement habitat enhancement measures in three drain outfalls in the upper Isleta Reach of the Middle Rio Grande (MRG) (Fig. 1). These features will create and/or improve perennial refugia habitat for the endangered Rio Grande silvery minnow. The proposed project is funded by, and is under the oversight of, the Middle Rio Grande Endangered Species Act Collaborative Program (Collaborative Program). The Isleta Reach is bounded upstream by Isleta Diversion Dam and downstream by San Acacia Diversion Dam.

Rio Grande silvery minnows (*Hybognathus amarus*, RGSM) have recently been found using drains in the Middle Rio Grande Project between Belen and Corrales, New Mexico. During the summer of 2004, 122 silvery minnows were collected in the outfall from the irrigation drainage system into the dry bed of the Rio Grande in the upper Isleta Reach of the Middle Rio Grande (MRG) (Ford 2004). The US Fish & Wildlife Service (USFWS), Albuquerque, sampled from 800 to 1,000 silvery minnows in the Peralta Drain in the Isleta Reach and in 2005 found numerous minnows in the drain's outfall when river flows receded (Hatch, pers. comm.). These observations indicate that drains and their outfalls into the MRG are functioning as refugia for silvery minnow during periods of river channel dewatering and as important rearing habitat for species conservation. Drains intercept underground flows and can remain wet year round even when the MRG goes dry (Tetra Tech 2004).

The Habitat Restoration Plan for the Middle Rio Grande (Tetra Tech 2004) provides guidance for the ESA Collaborative Program. The Restoration Plan emphasizes the importance of large woody debris in restoring habitat for the silvery minnow and has listed placement of large woody debris as a restoration tool. The Restoration Plan indicates that the historic channel of the Rio Grande probably contained appreciable amounts of large woody debris resulting from channel avulsions and bank failures. However past channelization and river maintenance activities reduced habitat complexity along the MRG. River maintenance activities included the removal of logs and trees to prevent the obstruction or deflection of river flows (USBR 1993); as well as mowing, root plowing, and herbicide treatments of bank and bar vegetation which reduced the amount of woody debris in the river. Snagging of standing trees was frequently practiced after high flow events, which commonly caused bank erosion and undermined trees (USBR 1993). These past activities limited the extent of woody debris, as well as islands and ephemeral side channels in the MRG and reduced complex, low velocity habitats (TetraTech 2004).

1.2 Background

1.2.1 Role of Large Woody Debris in River Systems

In addition to the new information on the potential of drains to serve as perennial wetted habitats for silvery minnow, there is an extensive body of literature available on the function of woody debris in providing aquatic habitat and increasing fish survival from which to draw inferences and design guidance for this project (Lassettre 1999; Bryant and Sedell, 1995; Harmon et al., 1986). Research on sand bed rivers in the southeastern U.S. provide insight on how large woody debris may interact on sandy channels of the MRG. For example, Wallace and Burke (1984) demonstrated that snags and other woody habitats are the major stable substrate in sandy-bottomed streams of the Southeast, providing substrate for macroinvertebrates and habitat and cover for fish. Adding large woody debris to streams is a common restoration tool for enhancing fish habitat and survival (Talmage et al. 2002; Reeves et al. 1991; Hilderbrand et al. 1998; and Wesche 1985).

A significant amount of research in North America has been done in determining the role of woody debris in providing habitat for fish in general and covers study areas in the Pacific Northwest, the Southeast, the Midwest, as well as Australia. Such research, while not conducted in rivers of the desert Southwest, does provide a general understanding of how large woody debris functions in creating habitat, and how various fish species use such habitat. Research in large, complex, highly modified desert rivers such as the Rio Grande in New Mexico, is just beginning. The work done to date suggests a strong linkage between woody debris and RGSM relative abundance. Dudley and Platania (1996) found the majority (70%) of RGSM associated with debris piles during the winter, despite the rarity of such habitats in the MRG. Dudley and Platania (1997) also noted a dramatic shift from pool and backwater habitat use in summer to habitats having instream debris piles during the winter. Broderick (2000) found relatively large numbers of silvery minnow wintering beneath debris piles at the lower end of the Low Flow Conveyance Channel, but none were found in any other habitat type during January sampling.

1.2.2 Pool Formation

One of the most important functions of large woody debris is the creation and enlargement of scour pools (Abbe et al. 2003). Large wood creates complex channel structure and strongly influences the formation of pools. Pool volume has been found to be directly related to the amount of woody debris in a stream (Carlson et al. 1990; Fausch and Northcote 1992). Stable instream wood accumulations can also increase pool frequency. In some sand-bed channels, virtually all pools can be attributed to either the direct or indirect control of wood (Brooks and Brierley 2002; Webb and Erskine 2003). Tetra Tech (2004) acknowledges that large woody debris may also cause downstream scour forming plunge pools that could be deep-water habitat for silvery minnows. At the scale of channel reaches, wood debris has a strong control on the frequency of pools and bars and can create significant hydraulic roughness, influencing flow velocity, discharge, shear stress, bed load transport rates and reach-average surface grain size (Montgomery 2003).

Scour depths around a snag or log-jam in a sand-bed channel are significantly greater than in unconstrained alluvial channels. Once a rootwad becomes partially embedded in the channel bed it becomes more difficult to move (Abbe et al. 2003). A sediment buttress downstream of a root wad can form in situ by accumulation of sediment in the leeward eddy. Field observations show that sediment commonly accumulates downstream of the eddy created by the root wad and buries part or all of the tree bole. A key concern among many designers in regard to using wood structures is the longevity of wood as a material. How long wood lasts depends on factors such as the type of wood the environment in which it is located, its size and the age of tree at death. If wood remains saturated in freshwater, it can last almost indefinitely (Abbe et al. 2003).

1.2.3 Role in Creating Refugia in Drying Rivers

Pools formed by snags in the channel are particularly important for wildlife, especially in streams with low or no summer flow. When flow ceases, these pools provide the only habitat available for aquatic species, and are a source of recruitment for re-colonization when normal flow returns (Treadwell 1999).

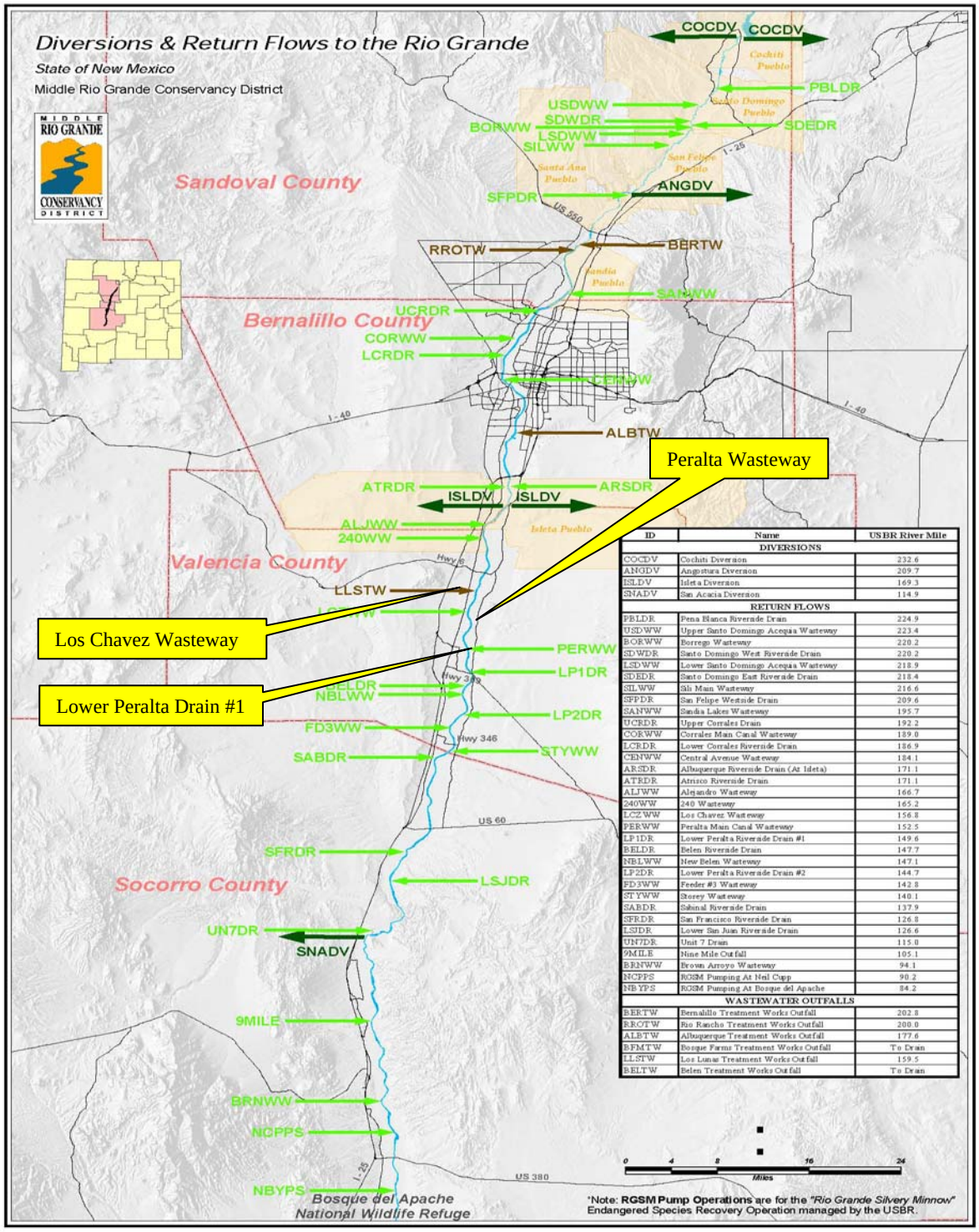
1.2.4 Fine Woody Debris Accumulation & Predation

Large woody debris accumulations such as fallen trees, root wads and other mid-channel snags provide structure for periphyton (algal) growth and the retention of drifting organic matter (Treadwell 1999). Additionally smaller pieces of woody debris such as branches, sticks and twigs on the fallen trees or captured from stream drift create sieve-like accumulation structures that can be highly effective in trapping additional drifting materials (Gregory et al. 1991). As water levels recede, fish may become trapped and stranded, much as they do on the floodplain during flood recession. At low water levels exposure of boulders, root masses and large woody debris, and decreasing depth of scour holes, can reduce the range of sheltered places where fish can rest and forage, or conceal themselves from predators, lurk in ambush and launch attacks on prey. Habitat structure (especially structurally complex habitat such as submerged branches, leaf litter and aquatic vegetation) influences fish-assemblage structure (Kennard 1995; Welcomme 2001). Fine woody debris has been found to provide structurally complex habitats that act as refugia from predators and as sites from which foraging forays can be staged (Arthington et al. 2005). Adding fine woody debris to a stream can increase carrying capacity for trout fry and adult population density may increase as a result (Culp et al. 1996).

1.2.5 Substrate for Benthos

The general lack of channel structure in the MRG that provides stable substrates for algae and invertebrates suggests that introducing snags would enhance overall aquatic productivity and increase food sources for silvery minnows. Treadwell (1999) indicates that the more numerous and complex the array of structures, the greater the likelihood of increasing the aquatic productivity.

The historic channel of the Rio Grande likely contained appreciable amounts of large woody debris (Tetra Tech 2004). Channelization and subsequent maintenance activities along the MRG have reduced the complexity of the channel low velocity habitat. These activities have removed the diversity of flow-impeding channel structures, such as woody debris and islands.



ID	Name	USBR River Mile
DIVERSIONS		
COCDV	Cochiti Diversion	232.6
ANGDV	Angostura Diversion	209.7
ISLDV	Isleta Diversion	169.3
SNADV	San Acacia Diversion	114.9
RETURN FLOWS		
PBLDR	Pena Blanca Riverside Drain	224.9
USDWW	Upper Santo Domingo Acequia Wasteway	223.4
BORWW	Borrego Wasteway	220.2
SDWDR	Santo Domingo West Riverside Drain	220.2
LSDWW	Lower Santo Domingo Acequia Wasteway	218.9
SDEDR	Santo Domingo East Riverside Drain	218.4
SILWW	Sili Main Wasteway	216.6
SFPDR	San Felipe Westside Drain	209.6
SANWW	Sandia Lakes Wasteway	195.7
UCRDR	Upper Corrales Drain	192.2
CORWW	Corrales Main Canal Wasteway	189.0
LCRDR	Lower Corrales Riverside Drain	186.9
CENWW	Central Avenue Wasteway	184.1
ARSDR	Albuquerque Riverside Drain (At Isleta)	171.1
ATRDR	Atrisco Riverside Drain	171.1
ALJWW	Alejandro Wasteway	166.7
240WW	240 Wasteway	165.2
LCZWW	Los Chavez Wasteway	156.8
PERWW	Peralta Main Canal Wasteway	152.5
LP1DR	Lower Peralta Riverside Drain #1	149.6
BELDR	Belen Riverside Drain	147.7
NBLWW	New Belen Wasteway	147.1
LP2DR	Lower Peralta Riverside Drain #2	144.7
FD3WW	Feeder #3 Wasteway	142.8
STYWW	Storey Wasteway	140.1
SABDR	Sabinal Riverside Drain	137.9
SFRDR	San Francisco Riverside Drain	126.8
LSJDR	Lower San Juan Riverside Drain	126.6
UN7DR	Unit 7 Drain	115.0
9MILE	Nine Mile Outfall	105.1
BRNWW	Brown Arroyo Wasteway	94.1
NCPPS	RGSM Pumping At Neil Cupp	90.2
NBYPS	RGSM Pumping At Bosque del Apache	84.2
WASTEWATER OUTFALLS		
BERTW	Bernalillo Treatment Works Outfall	202.8
RROTW	Rio Rancho Treatment Works Outfall	200.0
ALBTW	Albuquerque Treatment Works Outfall	177.6
BFMTW	Bosque Farms Treatment Works Outfall	To Drain
LLSTW	Los Lunas Treatment Works Outfall	159.5
BELTW	Belen Treatment Works Outfall	To Drain

l ed in yellow.

1.3 Proposed Action

The federal action associated with this project includes Reclamation's funding of the work through the Collaborative Program. The Proposed Action involves habitat construction that is anticipated to contribute to the enhancement and recovery of RGSM in the Isleta Reach of the Middle Rio Grande (MRG). The proposed projects are located at the Los Chavez Drain Wasteway; Peralta Wasteway and the Lower Peralta Drain #1. These drains are located upstream of the Highway 309 bridge near Belen, New Mexico.

The project consists of anchoring from three to eight habitat enhancement structures comprised of large cottonwood snags in the MRG channel at each outfall of three drains as they enter the river channel. Such placement provides several advantages. It will take advantage of persistent drain flows to provide refugia at critical times, while not impairing the function of the drains. Such placement should also assure fish access to the river channel when flow conditions allow, and at times of high flow in the MRG, will likely facilitate the scour of main channel pools to further enhance such habitats. The MRG Project irrigation system can be operated in a manner to ensure adequate flows are present at critical times in selected drain outfalls as long as water is available. The presence of large woody debris is anticipated to create slack water and slow water habitats, thus improving adult habitat. The project is proposed for construction during low flow period in the early spring of 2007.

1.4 Purpose and Need for the Action

With the exception of the Albuquerque Reach, the MRG has experienced channel dewatering on a relatively frequent basis. This is a significant source of mortality for the RGSM. Most recently, the USFWS (2006) documented 2005 RGSM rescue and salvage efforts. Over the course of the 2005 irrigation season surface water in the main channel of the Isleta Reach was reduced to isolated pools in a 2 mile section of river just downstream of the Los Chavez Wasteway. This reach was bracketed by a total of 4 river miles in which the river entirely dried out on numerous occasions. In the Socorro Reach a total of 24.5 miles became dry. Perennial surface water in the form of isolated pools persisted over an additional 5 main channel miles of this predominately dry segment of river.

Rescue operations (which consisted of seining pools as flow in the MRG became discontinuous) began in main channel habitats on July 19, 2005 and continued intermittently through September 28, 2005. Seining efforts in the adjacent floodplain habitats began on June 20 and continued through September 26. A total of 80,556 silvery minnow were rescued from the main channel of the Isleta Reach, and 289,860 were rescued from adjacent floodplain habitats. Of the silvery minnows rescued during the 2005 irrigation season, 59% of the estimated total number from both the main channel and floodplain habitats were captured in the Isleta Reach upstream of Belen (USFWS 2006). The frequency of dewatering events and the large numbers of silvery minnows present in the Isleta Reach were two of the primary reasons that the three drain outfall sites were selected for habitat enhancement.

Guidance for the development of the Proposed Action stems from three sources: Reasonable and Prudent Alternative (RPA) Element S and Conservation Recommendation 22 in the 2003

Biological Opinion and the Habitat Restoration and Improvement Focus Area in the Collaborative Program. In 2003, the U.S. Fish & Wildlife Service (USFWS) issued its Biological Opinion on the Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operations, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico (USFWS 2003). Reasonable and Prudent Alternative (RPA) Element S directs the agencies to conduct habitat restoration projects as follows:

> In consultation with the Service and appropriate Pueblos and in coordination with parties to the consultation, action agencies shall conduct habitat/ecosystem restoration projects in the Middle Rio Grande to increase backwaters and oxbows, widen the river channel, and/or lower river banks to produce shallow water habitats, overbank flooding, and regenerating stands of willows and cottonwood to benefit the silvery minnow, the flycatcher, or their habitats. Projects should be examined for depletions. It is the Service's understanding that the objective of the action agencies and parties to the consultation is to develop projects that are depletion neutral. By 2013, additional restoration totaling 1,600 acres (648 hectares) will be completed in the action area. In the short term (5 years or less), the emphasis for silvery minnow habitat restoration projects shall be placed on river reaches north of the San Acacia Diversion Dam. This restoration will be distributed throughout the action area. Habitat restoration projects fulfilling RPA element J, from the June 29, 2001, biological opinion, shall be completed. The action agencies and parties to the consultation, in coordination with the Service, shall develop time tables and prioritize areas for restoration. Projects should result in the restoration/creation of blocks of habitat 24 hectares (60 acres) or larger. Consultation with the Service for each site will tier to this biological opinion.
>
> Monitoring will be conducted for each project annually for 10 years in order to assess whether created habitats are self-sustaining, successfully regenerating, and are supporting the flycatcher and silvery minnow. Monitoring reports will be provided to the Service by January 31 of each year. Adaptive management principles will be used, if necessary, to obtain successful restoration of silvery minnow and flycatcher habitats. The environmental evaluation process for two projects should begin within 30 days of issuance of this biological opinion and construction should begin no later than twelve months from that date.
>
> *Rationale – Creation of riparian habitat will help distribute and stabilize sediment and provide the low velocity, backwater habitats needed by the silvery minnow and flycatcher. Overbank flooding is necessary to sustain the native riparian vegetation and wetlands that the flycatcher requires for shelter, feeding, and breeding. The project size is derived from a flycatcher site on the Middle Rio Grande that has contained several nesting pairs in recent breeding seasons. Element S will help alleviate jeopardy to the continued existence of the species by improving existing habitat and increasing the total amount of habitat for silvery minnows. Low velocity habitat and silt and sand substrates provide food, shelter, and sites for reproduction, and are essential for the survival and reproduction of silvery minnow. This element will help alleviate adverse modification to silvery minnow critical habitat by providing for the necessary habitat components of primary constituent elements 1 and 2.*

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Conservation Recommendation No. 22 (USFWS 2003) is relevant to the proposed action and is stated as follows:

> Reclamation should, when possible, cooperate with parties to the consultation to use drains and other works in a manner likely to provide temporary or permanent refugia in the river for the silvery minnow. Potential works will be determined in coordination with the Service and other agencies.

The Habitat Restoration and Improvement Focus Area described in the 2005 and 2006 requests for proposals for the Collaborative Program places emphasis on projects that aid in the prevention of silvery minnow extinction as well as on significant short term measures that include habitat restoration that will benefit silvery minnow populations. The projects expected to benefit silvery minnow include those that establish still or slow-water aquatic habitat in and adjacent to the river channel, and those measures that increase aquatic habitat diversity, specifically through the use of woody debris in the river channels. Additionally, the Collaborative Program identifies habitat restoration in the Isleta Reach as high priority. The proposed action will aid in the prevention of extinction of silvery minnow by creating and enhancing perennial wetted habitat in drain outfalls. The proposed action would further benefit silvery minnow by increasing aquatic habitat diversity through the placement of woody debris in the river channel, in this case at the mouth of drain outfalls in the MRG channel.

1.5 Relevant Statutes, Regulations, and Other Plans

The proposed action does not conflict with any known State or local planning or zoning ordinances. The proposed action would also be required to conform to the provisions of Section 7 of the Endangered Species Act and the Migratory Bird Treaty Act as administered by the U.S. Fish and Wildlife Service and Section 106 of the National Historic Preservation Act (NHPA) as administered by the New Mexico State Historic Preservation Officer (SHPO). Section 401 and 404 Permits will be obtained to meet the requirements of the Clean Water Act.

CHAPTER 2 ALTERNATIVES

2.1 Introduction

This chapter describes the two alternatives analyzed in this EA, the No Action Alternative and the Proposed Action. Seven other drain outfall sites were evaluated but were not selected for habitat enhancement due to the configuration of the drain outfall and/or lack of reliable flows in the drains, and were eliminated from further analysis.

2.2 Description of the Alternatives

2.2.1 Alternative A: No Action

The No Action alternative is "the future without the federal project or activity." No habitat enhancement measures would be constructed at the mouth of drain outfalls in the Isleta Reach of the MRG. There would be little change from the current condition and trends. Channel drying resulting in RGSM mortalities would continue, while some level of use by RGSM would continue at the mouths of drain outfalls. Poor habitat diversity at the mouth of drain outfalls for the RGSM would continue.

2.2.2 Alternative B: Proposed Action

The Proposed Action consists of three components. The first component is the enhancement of perennial RGSM refugia habitat at the mouths of three drain outfalls in the Isleta Reach of the MRG through the addition of large woody debris. The second component consists of proposed operations of the MRG Project drain outfall/wasteways that would support the created refugia as much as possible without affecting water deliveries. The third component consists of an enhanced monitoring program of the refugial pools.

The proposed project is located at the outfalls of the following: (1) Los Chavez Drain Wasteway; (2) Peralta Wasteway; and (3) the Lower Peralta Drain #1 (Figure 1). These drains are located upstream of the Highway 309 bridge near Belen, New Mexico. The river in the upper Isleta Reach is a relatively narrow, confined channel with very little sinuosity. Some braiding is occurring and several islands are present in the channel. Vegetation has encroached along the banks, further confining the flows. The MRG has often experienced zero flow conditions in this section.

From three to eight large cottonwood snags would be anchored at the mouths of the three drain outfalls as shown in the general conceptual engineering drawing (Fig. 2). About 0.5 to 1.0 acres of improved wetted habitat will be created at each of the three selected sites. The total amount of habitat created in terms of number of acres however, is not the most critical measure because perennially wetted habitats such as these are disproportionately important to silvery minnows.

Habitat and survey data was collected at each of the proposed three drain outfall sites in November 2005. Habitat data collected included stream flow, water depth and velocity distribution, cover availability, substrate composition, water temperature, and water quality (pH, DO, conductivity, and nutrients) .

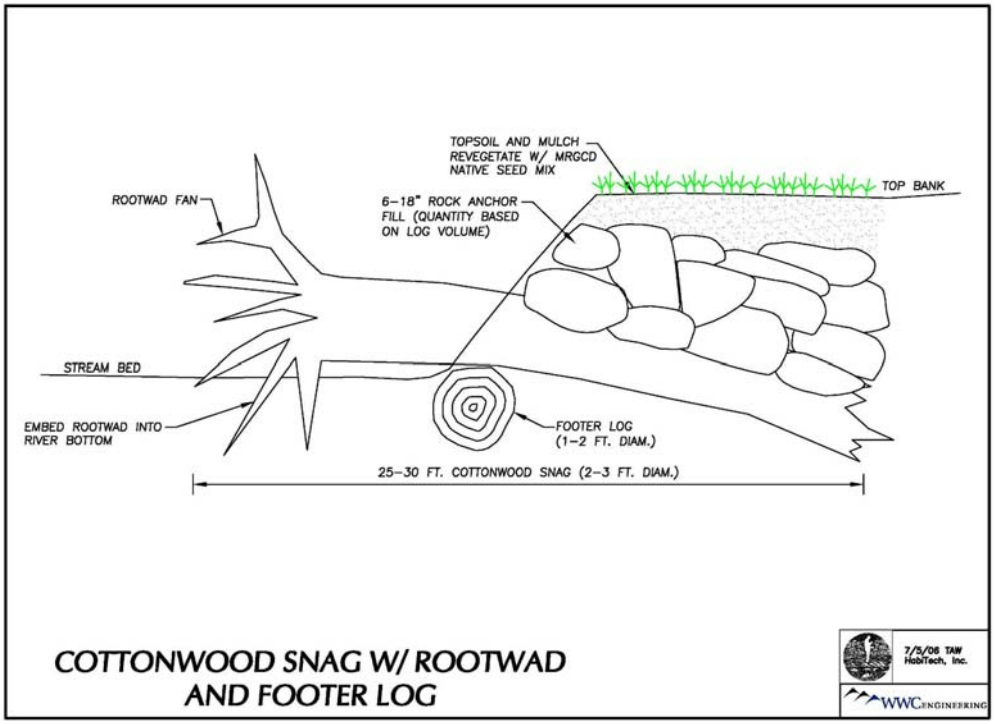


Figure 2. Conceptual engineering drawing of large cottonwood snag anchored on the river bank.

2.2.2.1 Los Chavez Wasteway

An aerial view of the Los Chavez Wasteway located at river mile (RM) 156.8, shows the relationship of the drain outfall to the main river channel, the general access point and the staging area (Fig. 3).

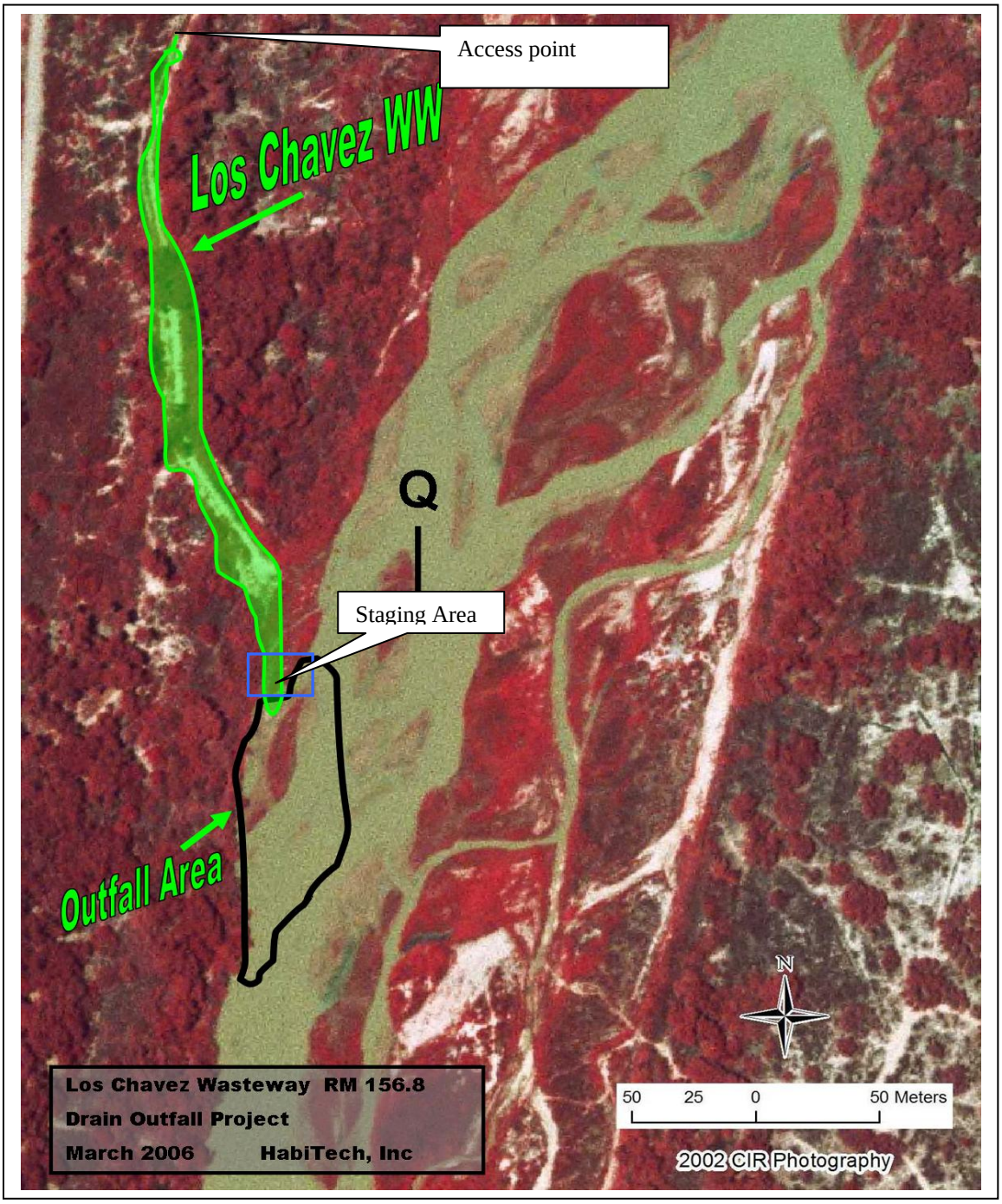


Figure 3. Aerial view of the Los Chavez Wasteway drain outfall showing the access point, staging area and outfall area where the habitat enhancement would occur.

Large cottonwood snags would be anchored in the mouth of the drain outfall and slightly downstream of the outfall as shown in Figure 4. A small staging area will be located at the end of the road, approximately 100 ft. in length by approximately 50 ft. wide (Fig. 5). No vegetation clearing will be required. A number of large standing dead cottonwood snags are available from

50 to 100 ft. from the roadway. A small amount of Russian olive and saltcedar would be disturbed; however no native vegetation is present in this immediate area. Priority will be given to utilizing already downed cottonwood snags from the Middle Rio Grande Conservancy District (MRGCD) or BOR maintenance activities if available within an economically practical distance.

Figure 4. Site plan for the Los Chavez drain outfall.

Access to the Los Chavez Wasteway is via an existing road (Fig. 6). Recreational and river management activities have kept the road clear of brush and debris and no vegetation removal will be required.

Figure 5. Closeup of the staging area for the Los Chavez Wasteway outfall.

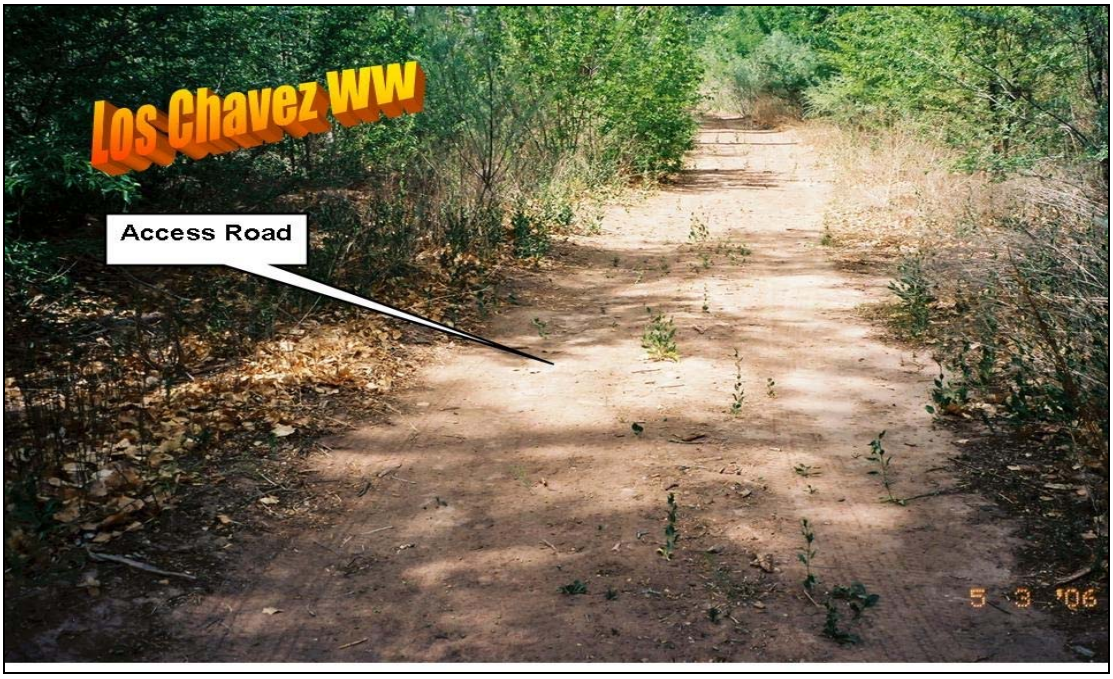


Figure 6. Access road to the Los Chavez Wasteway drain outfall.

A portion of the jetty jacks in the immediate vicinity of the bank where the cottonwood logs would be anchored will be removed to allow installation of the logs. Any required removal of the jetty jacks would be coordinated with the Corps of Engineers.

2.2.2.2 Peralta Main Canal Wasteway

An aerial photo of the Peralta Wasteway Main Canal Wasteway (Peralta Wasteway) located at RM 152.5, shows the relationship of the wasteway to the main river channel, as well as the access point and the staging area (Fig. 7).

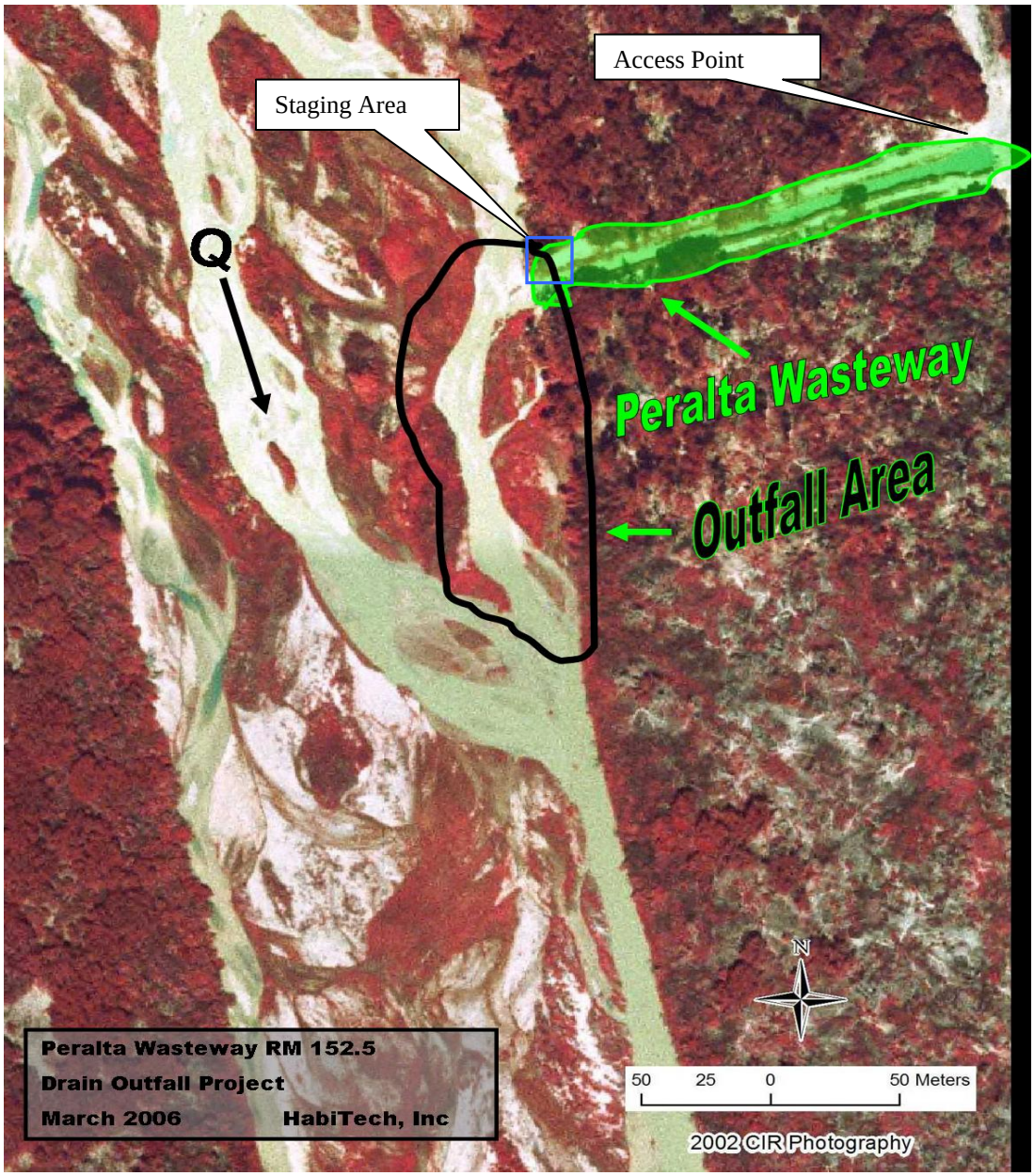


Figure 7. Aerial view of the Peralta Wasteway drain outfall.

Figure 8 is the site plan for anchoring large cottonwood snags in the mouth of the drain outfall and slightly downstream.

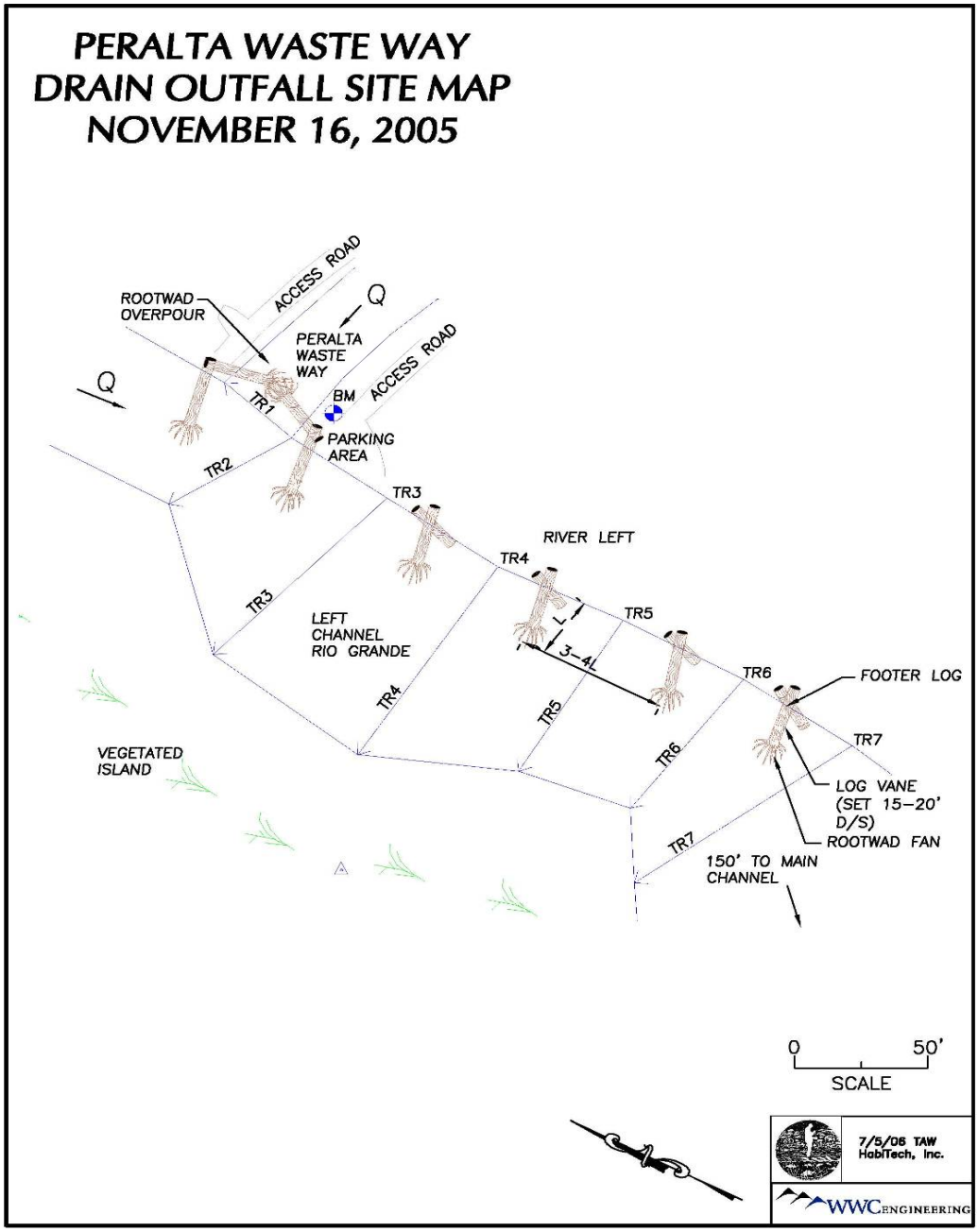


Figure 8. Site Plan for the Peralta Wasteway Drain Outfall.

The Peralta Wasteway is accessible by a well developed dirt road used primarily for recreation use and water management activities (Fig. 9). A small staging area will be sited at the drain in already-existing cleared area near the drain outfall (Fig 10). The staging area will be approximately 100 feet long by 50 feet wide. Priority will be given to utilizing already downed cottonwood snags from MRGCD or BOR maintenance activities if available within an economically practical distance. If not available, cottonwood snags would be obtained from the

cleared area adjacent to the access road (on the right side of the road in Fig. 10). An excavator will be used to dig out the root wad and tip over the standing snag. The snag would either be dragged or lifted and carried to the site using a front end loader. No vegetation will be disturbed as existing roadways and cleared areas will be used. The areas where the snags would be obtained adjacent to the drains have been mechanically cleared of non-native vegetation.

Depending on the individual treatment, the large cottonwood snags would be installed either in the bank or in the channel. For bank installation, a trench would be dug out and the log/root wad set in, backfilled with rock and soil, and revegetated. In-channel placements would require anchoring similar to the method originally described for the cottonwood snags placed in the Albuquerque Reach described in Wesche et al. (2004) and as shown in the general schematic (Fig. 2).

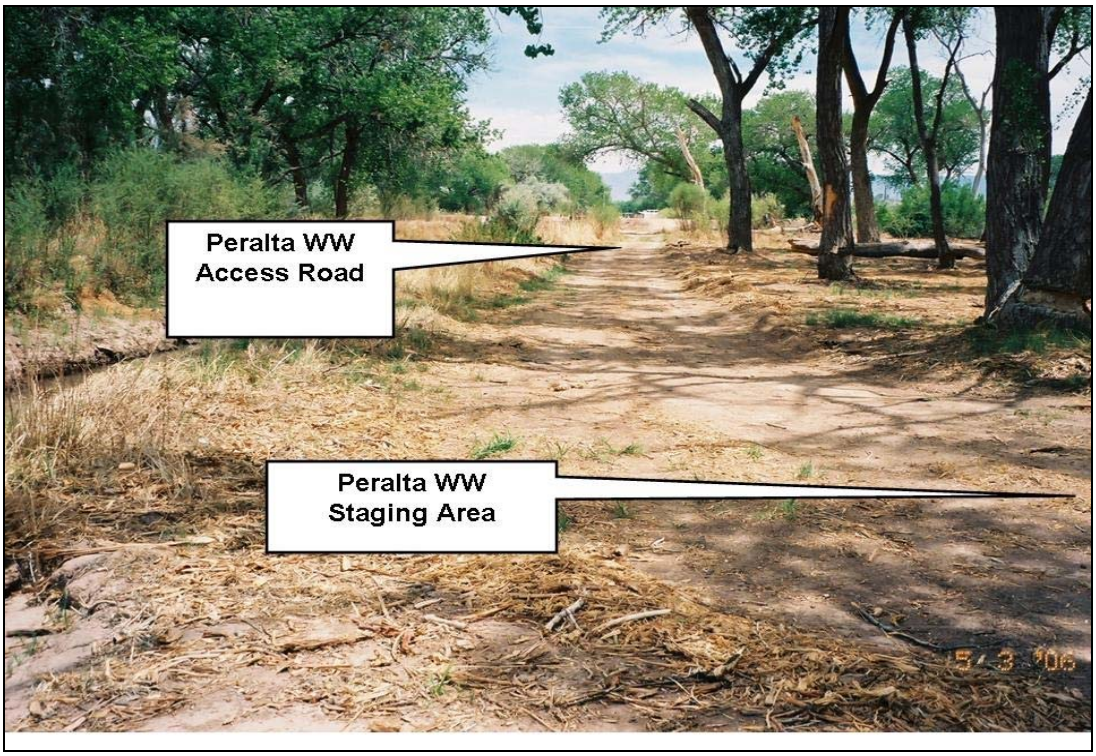


Figure 9. Access point and staging for the Peralta Wasteway Drain Outfall.

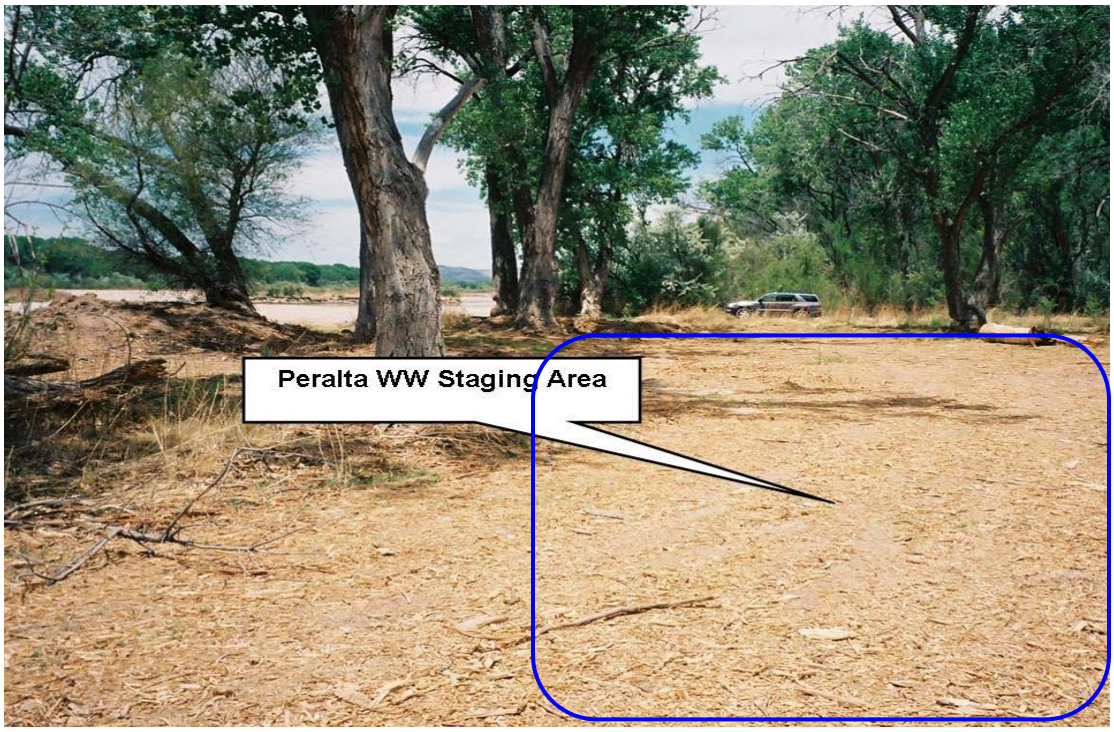


Figure 10. Peralta Wasteway showing the heavily impacted road area proposed for the staging area. A portion of the staging is in the foreground, out of the photo. Approximate dimensions are 100 ft long by 50 ft. wide.

2.2.2.3 Lower Peralta Drain #1

The relationship of the drain outfall to the main river channel, as well as the location of the access road and staging is shown in an aerial view (Fig. 11). The site plan showing the approximate location of cottonwood log placement is shown in Fig. 12. The Lower Peralta Drain #1 is accessible by a well developed dirt road used primarily for recreation use and water management activities. A small staging area will be sited near the drain in already-existing cleared areas.

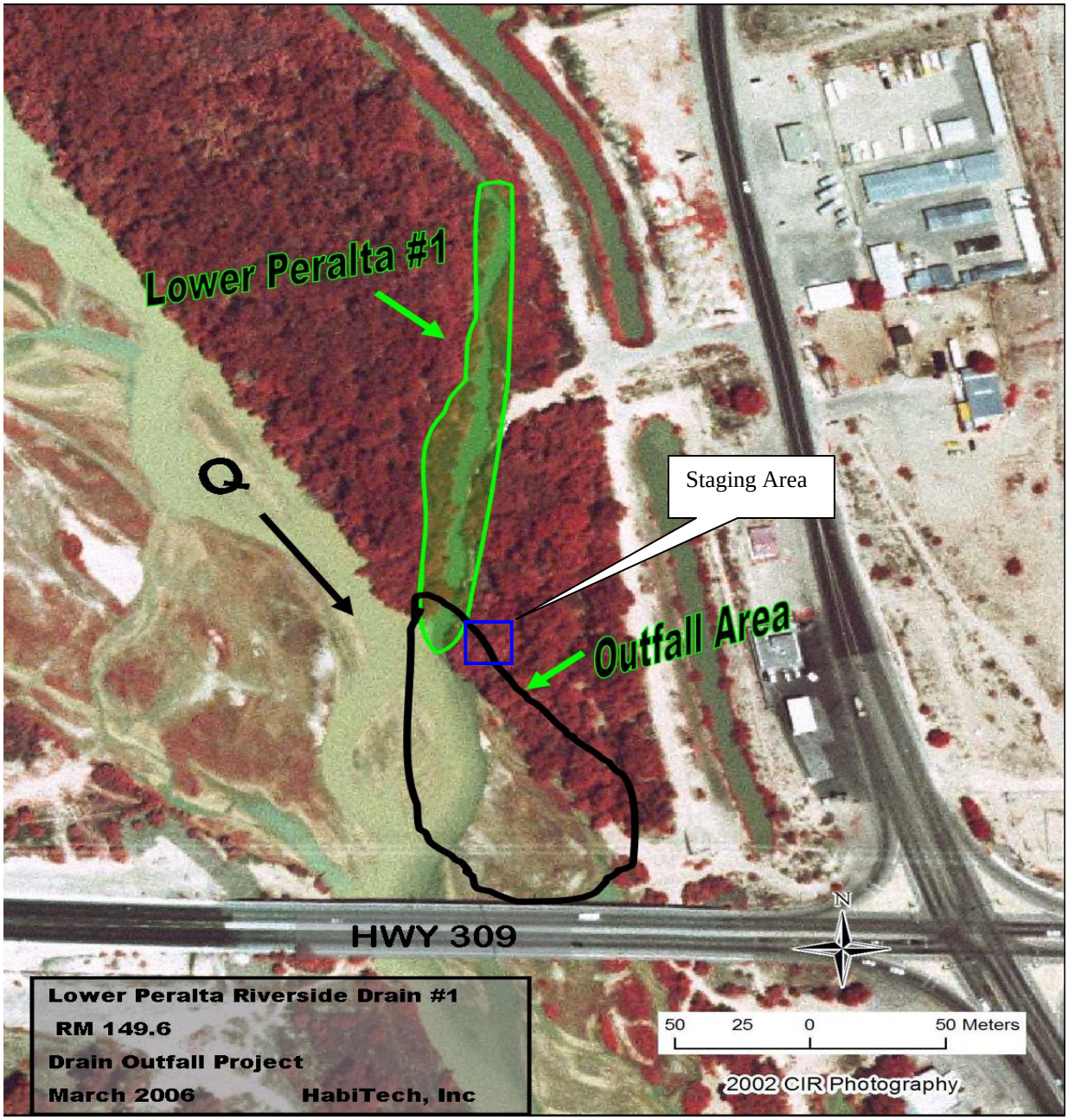


Figure 11. Lower Peralta #1.

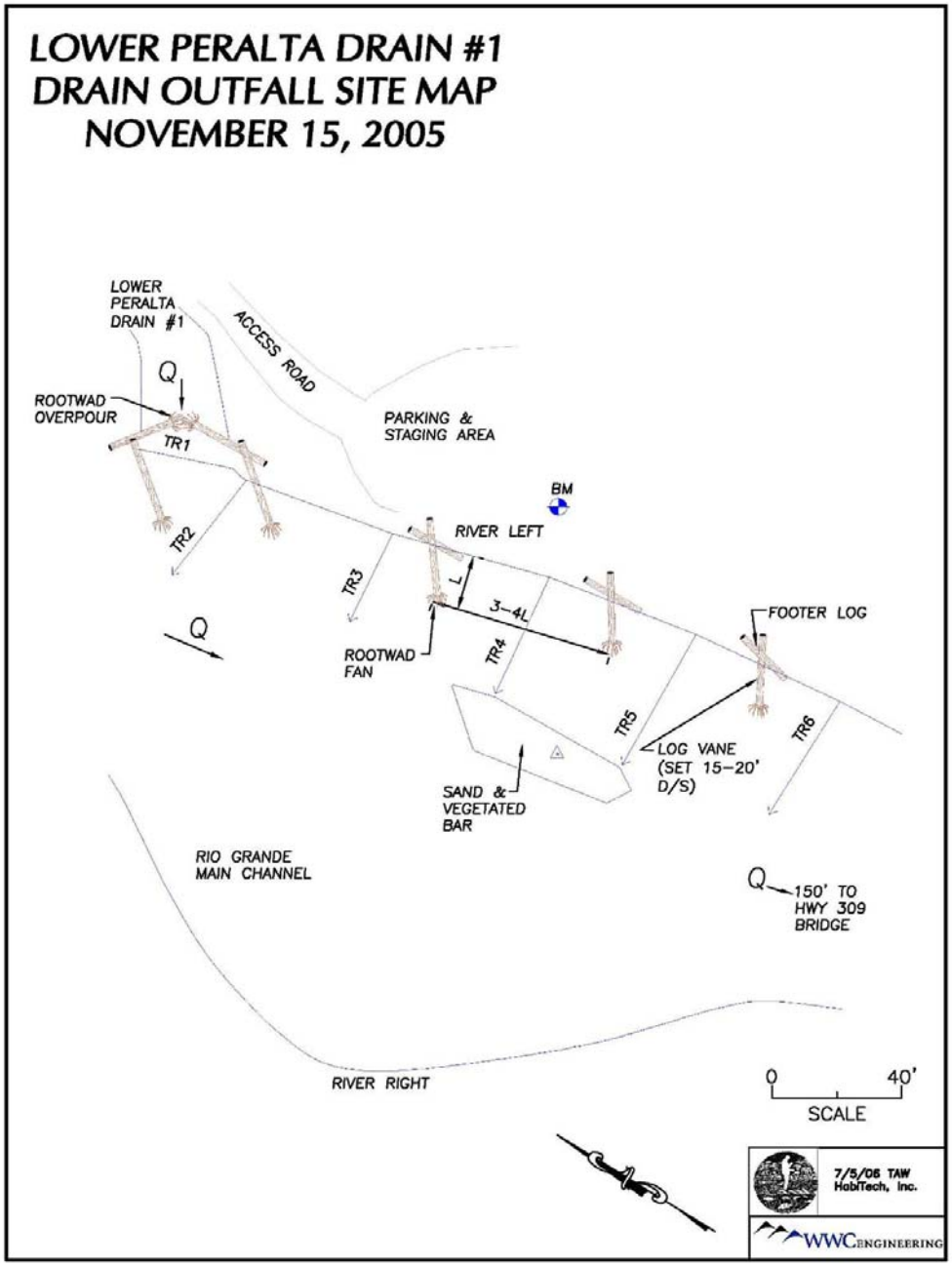


Figure 12. Site Plan for Lower Peralta #1.

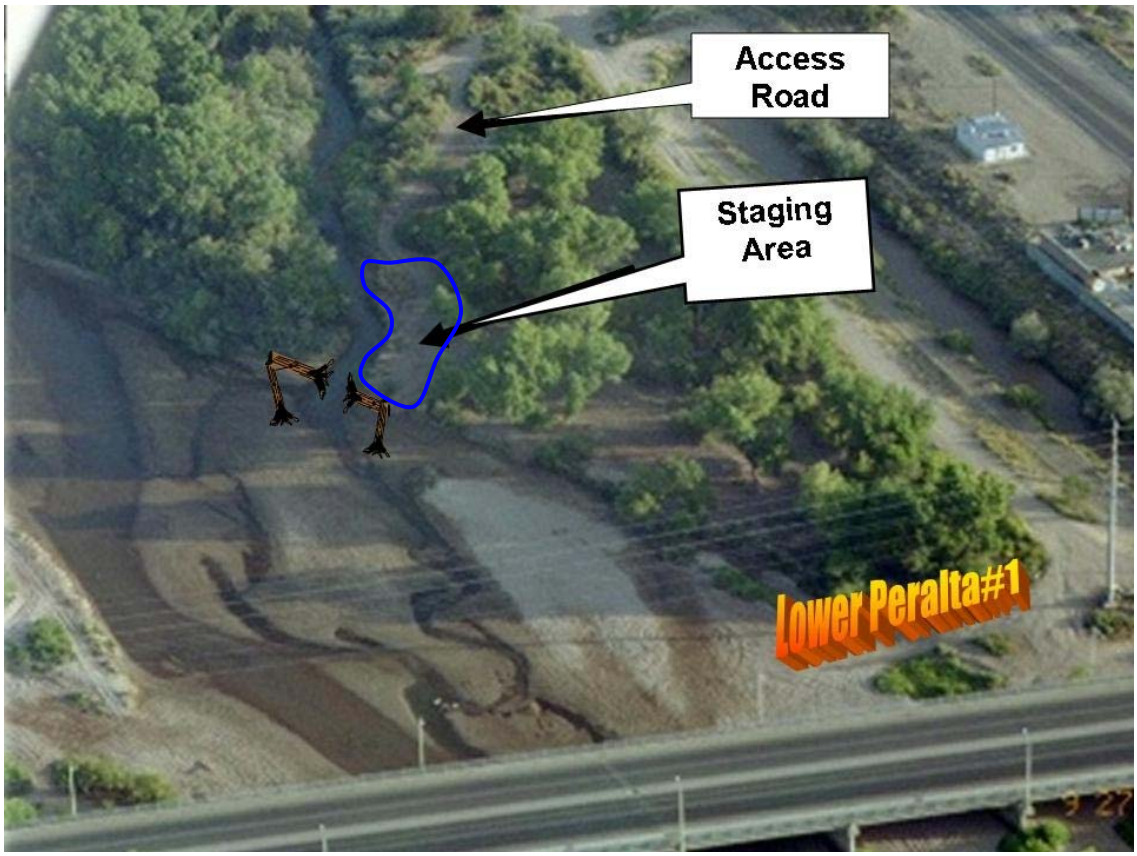


Figure 13. Location of the access road and staging area for the Lower Peralta #1 Drain.

Depending on the individual treatment, the large cottonwood snags would be installed either in the bank or in the channel. For bank installation, a trench would be dug out and the log/root wad set in, backfilled with rock and soil, and revegetated. In-channel placements would require anchoring similar to the method originally described for the cottonwood snags placed in the Albuquerque Reach described in Wesche et al. (2004).

2.2.3 Operation of Drain Outfalls/Wasteways

As much as feasible, the MRGCD will operate the drain outfalls/wasteways to support the refugia created at the three sites. However it is essential to understand that there will be no changes to water deliveries, nor will any more water be consumed as a result of these changes. There will be no net depletions. Water deliveries will continue to be made as in the past. The number of zero flow days in the Peralta Wasteway and Lower Peralta #1 Drain will likely be similar to that observed for 2003 through 2005 (summarized in Table 1). The changes in operations involve small improvements in efficiency that result in small increments of water that can be released through these three drain outfalls. Such small improvements result in focusing more water in these drains rather than spreading out releases among many drain outfalls as has been done in the past.

Drain	Average Q (cfs) March-October	Peak Q (cfs) March -October	Number Zero Q Days July-September	Consecutive Zero Q Days July-September
Peralta Wasteway				
2003	12.0	84	76	52
2004	21.7	155	55	21
2005	60.6	157	17	13
Lower Peralta #1 Drain				
2003	5.9	79	51	10
2004	3.6	40	48	10
2005[1]	12.8	93	13	6

Table 1. Drain flow analysis for Peralta Wasteway and Lower Peralta #1 Drain for average flow, peak flow and number of zero flow days for 2003 through 2005. Los Chavez is not gaged.

The following sections describe the operations for each of the three drain outfalls proposed for enhancement.

2.2.3.1 Peralta Main Wasteway

This site is located at the tail-end of the Peralta Main Canal. Small volumes of water are generally, but not always, available at this location. These small volumes of water are normally directed through a side gate off the wasteway into the Peralta Drain. The side gate is located about 30 feet upstream of the point where the wasteway discharges to the river. Discharge to the river (and the proposed habitat area) now occurs only when larger volumes of water (estimated greater than 40 cfs) go through the wasteway. The side gate is normally fully open, but cannot fully divert the flow, so the excess spills over the measuring weir and into the river.

The proposed operation would replace the manually operated slide in the side gate to the drain with an automatic gate. This gate has already been purchased by MRGCD, and will be installed sometime this season (2006). The gate will be set to maintain a fixed water surface elevation in the wasteway channel, sufficient that the desired discharge to the habitat area falls over the measurement weir. Most water will still go through the side gate to the drain, but a small and relatively constant flow will be maintained to the habitat area. Normally, this would be a small flow, perhaps 2 to 4 cfs. Flows through the wasteway in excess of side gate capacity will also go to the river and the habitat area, providing some range of variability. Since this facility is fed solely from an MRG Project canal, it is also possible that flow to the habitat area could be zero. If MRGCD were not diverting, or if all water on the canal were being used, none would be available for the habitat area.

2.2.3.2 Lower Peralta Drain Outfall #1

This site is located about three miles south of the Peralta Main Wasteway. It is an outfall from the drain which is fed from the side gate on the Peralta Wasteway. The drain also receives significant tail water returns from other canals in the area, in addition to groundwater returns from irrigated lands. There is also some component of flow which originates as groundwater

[1] Record through August 19, 2005

leakage from the river. In the wintertime, base-flows of 40 to 60 cfs are typically seen in this drain. In the summer, groundwater base-flows may be much reduced, but are more than offset by increased irrigation returns. It is common for this drain to be carrying as much as 150 cfs at times during the irrigation season. At the outfall point, an automatic gate is currently used to control level. Normally, this gate is raised partly or completely, so that all water in the drain is retained, and only a small amount of gate leakage finds it way to the river through outfall #1. Only at times of great excess in the drain does water discharge over the gate to the outfall point.

The proposed operation would use the existing automated gate to maintain a small steady flow (estimated 2 to 4 cfs) over the gate to the outfall and the habitat area. This would entail only a simple programming change, and would have little impact to other operations at the site. Excess flows would still be released to the outfall and habitat area when necessary to prevent flooding or damage to the drain. These periodic increases in flow would also introduce some degree of hydrologic variability to the habitat area. It is unlikely that the drain would ever be completely dry, although it is possible for the water surface elevation in the drain to drop to a point where it could no longer pass over the top of the automatic control gate in the outfall. Fortunately, there is a check structure in the drain, just downstream of Outfall #1, which could be operated when necessary to increase the water surface elevation.

2.2.3.3 Los Chavez Wasteway

This site is a few miles north of the Peralta Main Wasteway, on the opposite (west) side of the river. It is a currently abandoned wasteway from the Belen Riverside Drain. The drain in this area functions as a part of the conveyance system for getting water to Socorro division via the Unit 7 Drain. It receives only scant groundwater inflows, and minor tail-water returns. However, the heading of the drain can, and generally is, fed water from the Belen High Line canal via the 240 Feeder. A gate at the end of the 240 Feeder allows up to about 80 cfs to be diverted into the drain. This water currently may supply Unit 7, be routed in to several small canals north of Belen, or be released to the river just south of Belen.

The proposed change would reactivate the abandoned wasteway (done temporarily in 2005). MRGCD would install an automatic gate in an existing check structure in the drain. The gate would maintain a constant water level in the drain, regardless of discharge. An overflow weir would be constructed at the heading of the wasteway with appropriate dimensions to maintain the desired discharge (estimated 2 to 4 cfs) to the river and habitat area. Changes to flow would be accomplished by changing the water level in the drain. It is not expected that flows would vary through the wasteway, so hydrologic variability of the habitat area would only result from water moving naturally through the river. It is possible, though not probable, that flows in the drain could naturally drop to the point that the desired discharge in the wasteway could no longer be met.

2.2.4 Enhanced Monitoring of Refugial Pools

Enhanced monitoring of the habitat created by the proposed installation of cottonwood logs at the Peralta Wasteway, Lower Peralta #1 Drain and Los Chavez Wasteway is covered under a project funded by the Collaborative Program entitled Evaluation of Perennial Wetted Instream Habitat Use by the Rio Grande Silvery Minnow in the Middle Rio Grande. This monitoring

would include the three proposed structures described in this document and three proposed additional sites in the Isleta Pueblo. The elements of the monitoring that would be conducted include habitat quality assessment, fish abundance and population structure, fish health monitoring and water quality characteristics. Fish population structure and fish health monitoring are specific to the research and monitoring work within the "Enhanced Monitoring" project and are not discussed here. Habitat and water quality assessment components are described below.

2.2.4.1 Habitat Quality Assessment

This component measures baseline and post-construction depths below and downstream of the structures continuously to determine whether placing woody structures in the river channel can be used to create deep low velocity aquatic habitat or extend existing pools already developed due to previous irrigation discharges. The following activities would occur: (1) permanent benchmark would be established as a consistent point of reference; (2) conduct engineering surveys to develop detail three-dimensional maps; (3) measure mean water depths, maximum water depths, residual depths, water velocities, substrate composition and volume of accumulated wood debris; (4) use permanent photo points to document structure condition and stability; and (5) periodic observation of structures during low or zero river flow. Post construction monitoring of habitat quality would be done at quarterly intervals.

2.2.4.2 Water Quality Characteristics

Baseline water quality characteristics at all three sites will be assessed using datasondes (Hydrolab DS5X Extended Deployment, HACH Environmental). These units will obtain data on conductivity, dissolved oxygen, pH, temperature and turbidity at 30 to 60 minute intervals. Weekly water samples will be collected and analyzed for total ammonia. Additional water samples will be collected monthly for analysis of common anions and cations, suspended sediments and turbidity, major/minor/trace elements, nutrients, carbons and selected pesticides.

2.2.5 Equipment, Staging, and Access

Equipment proposed for construction of the habitat enhancement structures will include an excavator, dump truck and a front end loader. Equipment will not operate in the wetted river and silt fences will be installed along the banks when excavation will be along the bank line at or near the current water level. The construction contractor will be held to the following specifications:

- Prior to leaving contractor facilities, all equipment will be thoroughly inspected, and any leaky or damaged hydraulic hoses will be replaced.
- To avoid any potential impacts to RGSM critical habitat or southwestern willow flycatcher proposed critical habitat, all fueling activities will take place outside of the active floodplain.
- An environmental specialist trained in spill prevention and spill clean-up will be onsite during all construction activities.

- All equipment will be steam-cleaned before arriving and departing the job site.
- A spill kit will be maintained on every piece of motorized equipment in the river, with spill pans, containment diapers, oil booms, absorbent pads, oil mats, plastic bags, gloves, and goggles.
- Steel-mesh guards will cover all external hydraulic lines.
- Each individual operator will be briefed on and will sign off on local environmental considerations specific to the project tasks.
- Access and staging areas for the three drain outfalls would utilize existing access roads and disturbed areas. Heavy recreational use has resulted in large areas of disturbance. The drains and river channel can be accessed from the existing access roads and no access ramps will be cut into the floodplain.
- Construction will occur between August 15 and April 15 after migratory bird and southwestern willow flycatcher breeding season restrictions have been lifted August 15.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

Seven other drain outfall sites were considered for enhancement in both the Albuquerque and Isleta Reaches, but were eliminated because of lack of flows, lack of drain flow management flexibility, discontinuous drain channel, poor access, or lack of readily accessible large cottonwood snags. These sites included:

Upper Corrales Drain	UCRDR
Corrales Main Canal Wasteway	CORWW
Lower Corrales Riverside Drain	LCRDR
Central Avenue Wasteway	CENWW
Lower Peralta Riverside Drain #2	LP2DR
Feeder # 3 Wasteway	FD3WW
Storey Wasteway	STYWW

Refer to Figure 1 for a map of the location of these sites.

CHAPTER 3 AFFECTED ENVIRONMENT

3.1 Introduction

This section describes the current condition of resources in the project site that may be affected by the Proposed Action. Resources and related topics presented include geomorphology and soils, hydrology, water quality, net depletions, vegetation, wildlife, fish, threatened, endangered and special status species, cultural resources, environmental justice, and Indian trust assets.

The affected environment is within the Isleta Reach of the Middle Rio Grande. This area has been identified by Reclamation and the Interstate Stream Commission, as well as the

Collaborative Program, as being a reach of the Rio Grande where habitat/ecosystem restoration projects would be highly beneficial to all life stages of the RGSM.

3.2 Geomorphology and Soils

The Rio Grande in this reach is predominantly a sand bed river with low, sandy banks. The river channel tends to be straighter and more uniformly wide in these reaches than in the other reaches. There are numerous sandbars. At less than bank-to-bank flows, the river is establishing a sinuous configuration within the cleared floodway. The soils are generally derived from recent alluvial deposits, characterized by sand, loamy sand or sandy loam.

A 600-ft. wide floodway created by Kellner jetties exists throughout most of the river between the Isleta Diversion Dam and the confluence of the Rio Puerco (referred to as the Belen Reach in the 2001 Biological Opinion (USFWS 2001). Riverbanks in the Belen reach have been stabilized by extensive jetty jack fields. The river is narrowing to an average width of less than 600 feet because of reduced sediment supplies and lower peak flows. The installation of woody debris snags is listed among the likely river restoration/maintenance activities for this reach (USFWS 2001).

3.3 Water Resources

3.3.1 Hydrology

The MRG is the portion of the Rio Grande from the Colorado/New Mexico state line southward to the headwaters of Elephant Butte Reservoir, and includes the Rio Chama watershed. Most of the annual flow and discharge of the Rio Grande that reaches the MRG is generated in the headwaters of the river basin in Colorado and in the Rio Chama in northern New Mexico. Most of the discharge volume of the Rio Grande is late spring snowmelt. Late summer monsoon events produce runoff and briefly alter the hydrograph of the river. These summer flows typically carry high sediment loads; however, the operations of Cochiti Dam since 1973 have greatly reduced the total supply of sediment throughout the reaches downstream of the dam.

The operation of upstream dams (Heron, El Vado, and Abiquiu Reservoirs on the Rio Chama, Jemez Dam on the Jemez River, and Cochiti Dam on the Rio Grande) affects flows in the river by storing and releasing water in a manner that generally decreases the spring flood peaks and alters the timing of the annual hydrograph. Of the 100 greatest daily discharges since 1942 at the Central Gage (8330000), all have occurred prior to the construction of Abiquiu and Cochiti dams (USGS 2003). However, these operations do not cause significant changes in the annual flow volume. According to USGS gage data, average daily flow for the Central Gage from 1942-1974 was 1042.70 cubic feet per second (cfs), while average daily flow from 1975 - 2002 was 1395.75 cfs. Downstream effects of Cochiti Dam include the narrowing of the river channel and degradation of the riverbanks and concurrent reduction in over bank flows. In addition the diversion dams have the capability of drying up the river channel completely by diverting all flows into the irrigation system.

3.3.2 Water Quality

Overall, water quality in the Isleta Reach is good. The State of New Mexico's Clean Water Act Section 303(d)/Section 305(b) report for 2004 to 2006 indicates that designated uses including irrigation, limited warmwater fishery and wildlife habitat are fully supported in the MRG through the project area.

3.3.3 Net Depletions

The Rio Grande Compact, in effect, limits the amount of surface water that can be depleted in the MRG based upon the natural flow of the river measured at the Otowi gage near Los Alamos. In addition, the New Mexico State Engineer has determined the MRG is fully appropriated. Any increase in water use in one sector must be offset by a reduction in use in another sector to ensure that senior water rights or New Mexico's ability to meet its downstream delivery obligations are not impaired. Also, the New Mexico State Water Plan (OSE/NMISC 2003) states that habitat restoration projects should not increase net water depletions, or should depletions occur they are to be offset through a permitting process established by the State Engineer.

3.4 Vegetation

The riverbank community along the MRG consists of a narrow band of herbaceous wetland plants dominated by inland saltgrass (*Distichlis spicata*) and Baltic rush (*Juncus balticus*). Also present is a sparse growth of young cottonwood (*Populus deltoides)*, coyote willow (*Salix exigua*, tamarisk (*Tamarix* sp.), and a variety of annual forbs. These riverbank communities are subject to frequent disturbance from erosion and flood events. Other species that occur in the floodplain include isolated stands of rabbitbrush (*Ericameria nauseosa*), common mullein (*Verbascum thapsus*), coyote willow, Russian olive (*Elaeagnus angustifolia*), and tamarisk. Dominant plant species found in the bosque are Rio Grande cottonwood (*P. deltoides wislizenii*) and oneseed juniper (*Juniperus monosperma*).

3.5 Wildlife

Changes in the river elevation relative to the floodplain and the hydrologic and sediment regime as well as the introduction of predatory species (game fish) have affected the fauna of the Rio Grande. Historically, the riparian corridor of the MRG supported a wide diversity of terrestrial species. Prior to increased human activities, the river system periodically contributed water and nutrients to the floodplain and supported a number of aquatic species that have been extirpated.

In the most intensive biological survey of the MRG to date, Hink and Ohmart (1984) found 18 different species of reptiles and amphibians in the MRG. Eastern fence lizard (S*celoporus undulatus*), New Mexican whiptail (A*spidoscelis neomexicanus*), and Woodhouse toad (*Bufo woodhousii*) were common and widespread. Several common species in the Middle Rio Grande, such as bullfrogs (*Rana catesbeiana*), leopard frogs (*Rana pipiens*), and Woodhouse toads, are ubiquitous throughout the state. Others, like the chorus frog (*Pseudacris triseriata*) and the common gartersnake (*Thamnophis sirtalis*), are unique to the MRG (Hink and Ohmart 1984).

Throughout the year, riparian communities of the MRG provide important habitat during breeding and migration for many bird species. Hink and Ohmart (1984) recorded 277 species of birds within 163 miles of MRG bosque habitat. Stahlecker and Cox (1997) documented 126 species in the Rio Grande Nature Center State Park (RGNCSP). They estimate that 60–65 species of birds breed most years in the park (Stahlecker and Cox 1997). The 10 most common species during the winter of 1996–1997 were dark-eyed junco (*Junco hyemalis*), American crow (*Corvus brachyrhynchos*), American goldfinch (*Carduelis tristis*), white-crowned sparrow (*Zonotrichia leucophrys*), American robin (*Turdus migratorius*), Canada goose *(Branta canadensis*), red-winged blackbird (*Agelaius phoeniceus*), mallard (*Anas platyrhynchos*), European starling (*Sturnus vulgaris*), and house finch (*Carpodacus mexicanus*).

The 10 most common species in the bosque during the summer of 1997 were black-chinned hummingbird (*Archilochus alexandri*), red-winged blackbird, black-headed grosbeak (*Pheucticus melanocephalus*), spotted towhee (*Pipilo maculatus*), brown-headed cowbird (*Molothrus ater*), mourning dove (*Zenaida macroura*), Bewick's wren (*Thryomanes bewickii*), black-capped chickadee (*Poecile atricapillus*), cliff swallow (*Petrochelidon pyrrhonota*), house finch, and European starling (Stahlecker and Cox 1997). The most abundant bird species found along the river in winter were mallard, Canada goose, and wood duck (*Aix sponsa*). Red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), western screech-owl (*Otus kennicottii*), and great-horned owl (*Bubo virginianus*) also occur in the proposed project area (Stahlecker and Cox 1997).

The peak nesting season for birds is April through August. The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) is the primary legislation in the United States established to conserve migratory birds. The list of the species protected by the MBTA appears in title 50, section 10.13, of the Code of Federal Regulations (50 CFR 10.13), and includes several species that may occur on the site including the bald eagle (*Haliaeetus leucocephalus)*. The MBTA prohibits taking, killing, or possessing of migratory birds unless permitted by the Secretary of the Interior. Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered a “take” and is potentially punishable by fines and/or imprisonment. The USFWS and the Department of Justice are the Federal agencies responsible for administering and enforcing the statute. In 1972, the MBTA was amended to include protection for migratory birds of prey (raptors). All species and subspecies of the families listed above are protected under the provisions of the 1972 amendment.

Hink and Ohmart (1984) recorded 35 mammal species in their study of the MRG, and Campbell et al. (1997) observed 14 mammal species in their survey of the Albuquerque Reach. Based on both surveys, the most common small mammals in the proposed project area include white-footed mouse (*Peromyscus leucopus*), western harvest mouse (*Reithrodontomys megalotis*), and house mouse (*Mus musculus*) (Hink and Ohmart 1984; Campbell et al. 1997). Large mammals in the area include coyotes, raccoons, beavers, muskrats, pocket gophers, and rock squirrels. Several species of bats also utilize the MRG.

3.6 Fish

The Rio Grande drainage in New Mexico historically supported at least 21 native fish species, representing ten families (Propst 1999). Since the beginning of European settlement along the Rio Grande, this system has lost a larger proportion of its native fish fauna than any other major drainage in New Mexico. Shovelnose sturgeon (*Scaphirhynchus platorhynchus*), longnose gar (*Lepisosteus osseus*), American eel (*Anguilla rostrata*), speckled chub (*Machrybopsis aestivalis aestivalis*), and Rio Grande shiner (*Notropis jemezanus*) have been extirpated from the Rio Grande in New Mexico, and blue catfish (*Ictalurus furcatus*), if it persists, occurs only in Elephant Butte Reservoir. Rio Grande bluntnose shiner (*Notropis simus simus*) and phantom shiner (*Notropis orca*) are extinct. Rio Grande silvery minnow is the only state and federally protected fish species currently inhabiting the Rio Grande, but Rio Grande sucker (*Catostomus plebeius*) and Rio Grande chub (*Gila pandora*) may warrant state protection (Propst 1999).

Common fish species of the MRG include river carpsucker (*Carpiodes carpio*), flathead chub (*Platygobio gracilis*), common carp (*Cyprinus carpio*), western mosquitofish (*Gambusia affinis*), and red shiner (*Cyprinella lutrensis*) (Platania 1993). Less common fish species present in the system are channel catfish (*Ictalurus punctatus*), fathead minnow (*Pimephales promelas*), longnose dace (*Rhinichthys cataractae*), white sucker (*Catostomus commersoni*), and the RGSM. Western mosquitofish, white sucker, and common carp are introduced species that are now common throughout the MRG.

3.7 Threatened, Endangered Species and Special Status Species

This section contains information and Reclamation's effect determination intended to serve the requirements under the provisions of Section 7 of the Endangered Species Act regarding consultation with the USFWS on potential effect to federally-listed species. Several threatened and endangered species occur in or along the Rio Grande and/or Chama River. These include the Rio Grande silvery minnow, the bald eagle (*Haliaeetus leucocephalus*), and the Southwestern willow flycatcher (*Empidonax traillii extimus*).

The agencies that have primary responsibility for the conservation of plants and animal species in New Mexico is the USFWS, under authority of the ESA; the NMDGF, under authority of the New Mexico Wildlife Conservation Act of 1974; and the New Mexico Energy, Minerals and Natural Resources Department, under authority of the New Mexico Endangered Plant Species Act. Protection from harassment, harm, or destruction of habitat is granted to species protected under the Endangered Species Act. The New Mexico Wildlife Conservation Act and New Mexico Endangered Plant Species Act protect state-listed species by prohibiting taking without proper permits.

3.7.1 Rio Grande Silvery Minnow

The Rio Grande silvery minnow was federally listed as endangered under the ESA on July 20, 1994 (FR 1994) and is listed as endangered by the State of New Mexico as well. The final recovery plan for the RGSM was released in July 1999 (FR 1999). The primary objectives are to

increase numbers of the RGSM, enhance its habitat in the Middle Rio Grande valley, and expand its current range by re-establishing the species in at least three other areas in its historic range (USFWS 2003). The species has declined as a result of impacts from dewatering, habitat destruction from dams after dewatering, channelization and flow regulation for irrigation, diminished water quality, and competition/predation by non-native species. The species is endemic to New Mexico, where it historically occupied large rivers with shifting sand substrates. The RGSM currently occupies less than 10 percent of its historic range and is found only in the Rio Grande from Cochiti Reservoir downstream to Elephant Butte Reservoir.

Natural habitat for the RGSM includes stream margins, side channels, and off-channel pools where water velocities are lower than in the main river channel. Areas with detritus and algal-covered substrate are preferred. The lee sides of islands and debris piles often serve as good habitat. Stream reaches dominated by straight, narrow, or incised channels with rapid flows would not typically be occupied by the RGSM (Sublette et al. 1990; Bestgen and Platania 1991). Critical habitat for the RGSM was designated by the USFWS from the Highway 22 Bridge downstream to the headwaters of Elephant Butte Reservoir. This designation became effective February 19, 2003 (USFWS 2003).

The RGSM is a moderate-sized, stout minnow that reaches 3.5 inches in total length. Its late spring – early summer spawning period coincides with high spring snowmelt flows (Sublette et al. 1990). This pelagic spawner produces 3,000 to 6,000 semi-buoyant, non-adhesive eggs during a spawning event (Platania 1995; Platania and Altenbach 1998); and may spawn multiple times during spring runoff and increased summer monsoon flows (USFWS 2003). The RGSM is herbivorous, feeding primarily on diatoms (Shirey 2004). It travels in schools and tolerates a wide range of conditions (Sublette et al. 1990), but generally prefers low-velocity (<0.33 feet per second, 10 cm/second) areas over silt or sand substrate that are associated with shallow (<15.8 inches [40 cm]) braided runs, backwaters, or pools (Dudley and Platania 1997). Adults are most commonly found in backwaters, pools, and sites associated with debris piles, whereas young-of-year (YOY) occupy shallow, low-velocity backwaters with silt substrates (Dudley and Platania 1997). Habitat includes stream margins, side channels, and off-channel pools where water velocities are low or reduced from main-channel velocities. Stream reaches dominated by straight, narrow, incised channels with rapid flows are not typically occupied by RGSM (Bestgen and Platania 1991).

Platania (1995) suggested that historically the downstream transport of eggs and larvae of the RGSM over long distances was likely beneficial to the survival of their populations. The spawning strategy of releasing floating eggs allows recolonization of reaches impacted during periods of natural drought (Platania 1995). Swimming studies demonstrate that RGSM can traverse distances equivalent to 50 km in 72 hours (Bestgen et al. 2003). Bestgen et al. (2003) also determined RGSM speed bursts up to 118 cm/sec (70.8 m/min) for short periods of time. The 2003 Biological Opinion (BiOp) (USFWS 2003) lists the following primary constituent elements of RGSM critical habitat:

1. Throughout its life-history, RGSM requires a hydrologic regime that provides sufficient flowing water with low to moderate currents capable of forming and maintaining a diversity of aquatic habitats, such as, but not limited to, backwaters; shallow side channels; pools; eddies;

and runs of varying depth and velocity. These characteristics are necessary for RGSM life-history stages in given seasons (e.g., habitat with sufficient flows from early spring [March] to early summer [June] to trigger spawning; flows in the summer [June] and fall [October] that do not increase prolonged periods of low or no flow; relatively constant winter flow [November through February]).

2. The presence of eddies created by debris piles, pools, or backwaters, or other refuge habitat within unimpounded stretches of flowing water of sufficient length (i.e., river miles) to provide a variation of habitats with a wide range of depth and velocities.

3. Substrates predominantly of sand or silt.

4. Water of sufficient quality to maintain natural, daily, and seasonally variable water temperatures in the approximate range of more than 1ºC (35ºF) and less than 30ºC (85ºF) and mitigate degraded conditions (e.g., decreased dissolved oxygen, increased pH).

The frequency of dewatering events and the large numbers of silvery minnows present in the Isleta Reach requiring salvage were two of the primary reasons that the three drain outfall sites were selected for habitat enhancement.

A Biological Opinion was released by the USFWS in 2003 covering Reclamation's water and river maintenance operations, the USACE's flood control operations, and Related Non-federal Actions on the MRG (USFWS 2003). The 2003 MRG BO requires habitat restoration projects on the MRG that will improve survival of all life stages of the endangered RGSM and other endangered species.

3.7.2 Southwestern Willow Flycatcher (*Empidonax trailii extimus*)

The southwestern willow flycatcher (SWFL) was listed as endangered without critical habitat designation on February 27, 1995 (FR 1995), and critical habitat was designated on July 22, 1997 (FR 1997) but was later withdrawn. In October 2004, the USFWS proposed a new designation of critical habitat (FR 2004). The final critical habitat designation became effective in November, 2005. The extent of critical habitat within the Project Area begins at the south boundary of the Isleta Pueblo and extends southward to the north boundary of the Sevilleta National Wildlife Refuge. The Los Chavez Wasteway, Peralta Wasteway and Lower Peralta Drain #1 lie within the designated critical habitat area.

The decline of the species has been attributed to loss of riparian habitat, brood parasitism, and lack of adequate protective regulations. The historic range of SWFL includes riparian areas throughout Arizona, California, Colorado, New Mexico, Texas, Utah, and Mexico (FR 1993). The flycatcher is an obligate riparian species and nests in thickets associated with streams and other wetlands where dense growth of willow, Russian olive, salt cedar, or other shrubs are present. Dense riparian woodlands are particularly important as breeding habitat. In New Mexico, the flycatcher occupies riparian habitat along the Rio Grande, Chama, Zuni, San Francisco, and Gila rivers and is found within 150 feet of a water source. Nests are frequently associated with an overstory of scattered cottonwood. (USFWS 2003). During spring and fall

migration the species occurs statewide, although migration patterns are not well understood. On the Rio Grande, the subspecies occurs near Velarde, Isleta, the Sevilleta NWR, the Bosque del Apache NWR, San Marcial, and Fort Selden.

3.7.3 Bald Eagle (*Haliaeetus leucocephalus*)

The Bald Eagle is currently listed as threatened by the USFWS and the State of New Mexico. Bald eagles are associated with habitats near open water and commonly winter adjacent to rivers and lakes, or where carrion is available. The major food items of bald eagles in New Mexico are waterfowl, fish, and carrion (NMGFD 2004c). Bald eagles are uncommon during the summer and have limited breeding sites in New Mexico, though nests have been documented in the extreme northern and western portions of the state. The number of birds wintering in the state has been steadily increasing. Wintering areas include the upper Rio Grande, and small wintering populations in the MRG and at Elephant Butte and Caballo reservoirs.

3.7.4 Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

The Western yellow-billed cuckoo is a USFWS Candidate species that occurs locally along riparian corridors throughout New Mexico. Ideal habitat appears to be dominated by cottonwood canopy with a well-developed willow understory. Yellow-billed cuckoo diet consists mainly of caterpillars but may also include various insects, some fruit, and occasional lizards or frogs (NMDGF 2004b). The breeding range of yellow-billed cuckoo extends from California and northern Utah north and east to southwestern Quebec and south to Mexico. In New Mexico, historical accounts indicate that the yellow-billed cuckoo was locally very common along the Rio Grande, but rare statewide (NMDGF 2004b). Both Hink and Ohmart (1984) and Stahlecker and Cox (1997) reported yellow- billed cuckoo as a nesting bird in the bosque of the Middle Rio Grande.

3.7.5 Common Black-Hawk (*Buteogallus anthracinus*)

The common black-hawk is listed as Threatened by the State of New Mexico and may occur in the Isleta Reach (NMDGF 2004a). Though the common black-hawk is considered rare in Valencia County, nesting was observed in the Isleta Reach during the summer of 2003 (Williams 2003). The species primarily occupies riparian woodlands, particularly areas with well-developed cottonwood galleries, or a variety of woodland and marsh habitats along permanent lowland streams. Breeding black-hawks require mature riparian forest stands near permanent water. Most birds winter south of the U.S., although some records report occurrences within southern Arizona and the Gulf coast in Texas. The diet of this riparian-obligate species consists mainly of fish, insects, crayfish, amphibians, and reptiles, but occasionally they will take small mammals and birds. Loss of riparian habitat poses the greatest risk to the species. In 1996 the NMDGF estimated 60 to 80 breeding pairs in the state.

3.7.6 New Mexican Jumping Mouse (*Zapus hudsonius luteus*)

The New Mexican jumping mouse (*Zapus hudsonius luteus*) is listed by the USFWS as a Species of Concern and is considered Threatened by the State of New Mexico. Also known as the New

Mexico meadow jumping mouse, the species is endemic to New Mexico and Arizona. The New Mexican jumping mouse is restricted to mesic habitats, preferring permanent streams, moderate to high soil moisture, and dense and diverse streamside vegetation consisting of grasses, sedges, and forbs (NMDGF 2004d). In the Rio Grande Valley, the species occurs mainly along the edges of permanent ditches and cattail stands. The proposed project area does not contain any wetland areas with cattails or dense herbaceous vegetation. Recent surveys (Hink and Ohmart 1984) have failed to detect the New Mexican jumping mouse north of Isleta Marsh. It is therefore unlikely that the species occupies either the riparian floodplain or any in-channel islands of the Middle Rio Grande.

3.8 Cultural Resources

Cultural Resources include archeological sites, sites eligible for the State Register of Cultural Properties and/or the National Register of Historic Places (NRHP), and properties of traditional religious or cultural importance (Traditional Cultural Properties [TCP's]). The probability of any artifacts that might have once existed in the floodplain of the Rio Grande have a very low probability of still being present (J. Hanson, pers. comm.). Archaeological resources that are listed on the NRHP, or are eligible for listing, are protected under the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470). A records search was conducted in the Archaeological Records Management Section (ARMS) database of the New Mexico State Historic Preservation Division. The entire MRG conveyance and delivery system as a unit is eligible for listing on the National Register of Historic Properties.

3.9 Socioeconomics and Environmental Justice

Socioeconomic resources include population and economic activity. Some related secondary components, such as housing availability and public services, are not considered in this analysis because the action has no potential to generate measurable changes in populations that will create demand for these resources. Statistics at the state, county and local level are used to describe the socioeconomic context. The proposed project is in Valencia County, New Mexico. The population in Valencia County was estimated at 69,417 in 2005 (U.S. Census Bureau 2006). It is approximately 1,068 square miles with 62 persons per square mile.

Valencia County is within the Albuquerque metro area. In 2004, Valencia County had a per capita personal income (PCPI) of $22,968, which compares to the state average PCPI of $26,184 (U.S. Dept. of Commerce 2006). Federal expenditures in New Mexico accounted for $19,863 Billion in 2004 (U.S. Census Bureau 2004). State expenditures in 2002 were $63,611 Million (New Mexico Dept. Finance & Admin. 2002).

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994), directs federal agencies (as well as State agencies receiving federal funds) to assess the effects of their actions on minority and/or low-income populations within their region of influence. The order requires agencies to develop strategies to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

No population, including populations defined as low-income or minority, would be disproportionately impacted by the Proposed Action or by the No Action Alternative.

3.10 Indian Trust Assets

The U.S. has an Indian trust responsibility (trust responsibility) to protect and maintain rights reserved by or granted to Indian tribes or Indian individuals by treaties, statutes, and executive orders, which rights are sometimes further interpreted through court decisions and regulations. This trust responsibility requires that all Federal agencies, including Reclamation, take all actions reasonably necessary to protect trust assets. Indian trust assets (ITAs) are legal interests in property held in trust by the U.S. for Indian tribes or individuals. "Legal interest" means there is a property interest for which a legal remedy, such as compensation or injunction, may be obtained if there is improper interference. For example, ITAs include land, minerals, hunting and fishing rights, and water rights. A characteristic of an ITA is that it cannot be sold, leased, or otherwise alienated without the U.S.' approval. Reclamation's Indian trust policy was stated in a July 2, 1993 memorandum from Reclamation's Commissioner. The policy statement is: "Reclamation will carry out its activities in a manner which protects trust assets and avoids adverse impacts when possible. When Reclamation cannot avoid adverse impacts, it will provide appropriate mitigation or compensation."

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The anticipated potential effects of the alternatives to the previously described environmental issues and resources in Chapter 3 are summarized in Table 2.

4.2 Geomorphology and Soils

No Action

There would be no change from the present geomorphology and soils along the MRG.

Proposed Action

It is unlikely that the overall geomorphology and soils would be affected. There would be a slight increase in the number of deeper water pools in the three drain outfalls. Soils would not be affected as the disturbance is very small.

Affected Resource	No Action	Proposed Action
Geomorphology/soils	No effect.	Some habitat complexity added to the MRG channel. Several pools would be created, adding variety to depths and velocities.
Hydrology	No effect.	No overall change to the hydrology of the MRG in the Isleta Reach. However during periods of channel dewatering, scoured pools may remain wetted.
Net Depletions	No effect.	No appreciable changes to net water depletions would occur due to the proposed action.
Vegetation	No effect.	Minor disturbance of weedy species in staging areas. Minor disruption of vegetation along banks as excavation for log structures is completed. A small amount of Russian olive and saltcedar will be disturbed at the Los Chavez site.
Wildlife	No effect.	No disturbance to nesting bird species as construction will be conducted after breeding season is completed (August 15 to April 15). Minor reduction in large dead cottonwoods that provide cavities for nesting and shelter. Minor disturbance to the bosque as snags are obtained. Areas have been previously disturbed by removal of non-native vegetation.
Fish	No effect.	It is anticipated that the number of perennially wetted habitats available to serve as refugia for fish in the vicinity during channel drying events will be increased. Increased availability of pool habitats as well as lower velocity habitats will occur, benefiting larval and juvenile stages of fish
T&E Species		
Rio Grande Silvery Minnow	No effect.	Will likely increase the number of perennially wetted habitats available for refugia during channel drying events. Increased habitat complexity will occur with the creation of pool habitats. Short-term adverse construction-related disturbance to habitat and water quality.
SW Willow Flycatcher	No effect.	No effect. Construction activities done after breeding season. No native willow habitats disturbed.
Bald Eagle	No effect.	May be temporary disturbance to wintering bald eagles. This will be offset by the commitment to cease all construction activities if bald eagles are observed within .25 miles of the construction site. The relocation of a few large cottonwood snags may have a slight effect on roosting bald eagles; however large mature cottonwoods are abundant in the project area.
WesternYellow-billed Cuckoo	No effect.	No effect. Construction activities done after breeding season. No live cottonwoods removed.
Cultural Resources	No effect.	No effect.
Environmental Justice	No effect.	No effect.
Indian Trust Assets	No effect.	No effect.

Table 2. Summary of Impacts.

4.3 Water Resources

No Action

No change would occur to the present hydrology of the MRG as this is controlled by the operation of upstream dams and the amount and timing of precipitation.

Overall water quality would continue at current levels.

There will be no changes to net depletions in this reach of the MRG.

Proposed Action

No change would occur to the present hydrology of the MRG. The proposed minor changes to the operations of the drain outfalls and wasteways involve small changes in the efficiency of operations and where possible focusing flows in the three outfalls where habitat enhancement would occur. There would be no change to the hydrology of the river channel.

Overall water quality would continue at current levels. There would be minor turbidity created for a few hours which would be confined to the site immediately adjacent to the trench dug into the bank to anchor the cottonwood logs.

There will be no changes to water deliveries, nor will any additional water be consumed as a result of installing the cottonwood logs in the three drain outfalls. It is not anticipated that any appreciable changes to net water depletions would occur in this reach of the MRG due to the Proposed Action.

4.4 Vegetation

No Action

Implementation of the No Action Alternative will have no effect on the vegetation community along the MRG in the Isleta Reach.

Proposed Action

If the Proposed Action is selected for implementation, minor disturbance of weedy species in staging areas and access roads would occur. A small amount of Russian olive and saltcedar will be disturbed at the Los Chavez site.

4.5 Wildlife

No Action

If the No Action Alternative is selected, no effect would occur to the wildlife species in the action area.

Proposed Action

Implementation of the Proposed Action would not disturb nesting bird species as construction will be conducted after breeding season is completed (August 15 to April 15). Minor reduction in large dead cottonwoods that provide cavities for nesting and shelter could occur. However mature cottonwood stands in the vicinity of the drain outfalls are fairly extensive. Overall impact would be slight given the small number of snags moved to the river channel. Minor

disturbance to the bosque would occur as snags are obtained; however the areas have been previously disturbed by removal of non-native vegetation. Efforts would be made to obtain snags from other projects which may have removed and stockpiled cottonwood snags.

Habitat for migratory bird and raptor species that fall under the purview of the Migratory Bird Treaty Act may have a slight potential be affected, however the amount of large snags retained on the landscape should exceed habitat requirements, and thus these species would not be adversely impacted.

4.6 Fish

No Action

The No Action Alternative would have no effect on the fish communities present in the Isleta Reach. Periodic channel dewatering has resulted in mortality for various fish species in the pest. However, recent rescue/salvage efforts have been performed for the RGSM with relocation of the RGSM to the Albuquerque Reach.

Proposed Action

Installation of large cottonwood snags under the Proposed Action is anticipated to increase the number of perennially wetted habitats available to serve as refugia for fish in the vicinity during channel drying events. However, river drying will still occur in the river system. Increased availability of pool habitats as well as lower velocity habitats will occur, benefiting all life stages of fish.

4.7 Threatened, Endangered and Special Status Species

4.7.1 Rio Grande Silvery Minnow

No Action

No effect would occur to the RGSM for the No Action Alternative. Continued mortalities and need for rescue operations would occur during channel drying events.

Proposed Action

Equipment would operate on the riverbank primarily and would come into contact with aquatic habitats of the RGSM only during installation of in-channel structures. The general commitment will be to install silt barriers along the interface between the wetted perimeter of the channel and the bank where construction will bring bank levels near the current water levels. This will assure that sediment is not accidentally deposited into shallow water habitats and that turbidity levels will remain at ambient levels in the river.

Installation of cottonwood snag structures would involve excavating a trench in the bank, placing the rootwad and lower trunk in the trench and backfilling with rock and soil. In-channel placements of snag structures will require anchoring. Minimal disturbance of RGSM habitat

would occur as the placements will be done primarily in the dry. There will be some drain outfall flows, but actual construction impacts are expected to be of very short duration (less than one day).

Indirect harm or mortality from lowering the water quality in the critical habitat of RGSM may occur from accidental introduction of hydrocarbon contaminants from fuel and fluids used with the proposed equipment when operating within the ordinary high water mark. Protection of hydraulic lines will prevent punctures during operation. All fueling activities will take place outside of the active floodplain, and all equipment will undergo thorough cleaning and inspection prior to operation. Equipment will be parked on predetermined locations on high ground overnight. No effects on RGSM are expected to result from contamination related to equipment fueling and leakage or accidental spills.

Over the long-term it is likely that the proposed installation of cottonwood logs at the Peralta Wasteway, Lower Peralta #1 Drain and Los Chavez Drain will result in the creation of scour pools that will extend into the ground water. These pools will provide refugia to RGSM during periods of channel dewatering and may improve the likelihood that RGSM can survive such events.

It is possible that the creation of perennially wetted pools for silvery minnows refugia may also create refugia for piscivorous species that may prey on silvery minnows. attracted to any newly created refugia pools resulting from cottonwood log installation. The major offsetting factor to this possibility is the addition of fine woody debris, first in the form of fine roots present in the rootwad that will form the bulk of the structure, and second from any woody debris collected in the rootwad. These fine and medium sized roots provide cover for small prey species such as silvery minnow. The root wad itself also serves to seine out from the river flows and collect fine woody debris such as small sticks, tree limbs, and windblown debris such as tumbleweeds. Fine woody debris has been documented to provide cover for silvery minnows during winter (Platania & Dudley, Broderick 2000).

One of the primary purposes of the enhanced monitoring that has been funded by the Collaborative Program is to determine the health of RGSM in these created refugial pools as well as level of predation.

4.7.2 Southwestern Willow Flycatcher

No Action

The No Action Alternative would have no effect on the SWFL.

Proposed Action

Short-term potential effects on SWFL during construction will be related to temporary noise during the nesting season. However, SWFL surveys conducted in the Belen Reach indicate that suitable SWFL habitat is limited (USBR 2006). This reach also receives very little overbank flooding. The majority of habitat in this reach consists of sparse, decadent saltcedar and Russian olive. Cottonwoods and grassy meadows are also interspersed throughout this reach. There are occasional stands of native willows adjacent to the river, which is where one unpaired male was

detected within the Belen reach during the 2005 surveys. That site was located 14 miles downstream of the proposed project area (USBR 2006). There are no willow stands near the project area. Project construction is proposed to take place outside of the breeding season for SWFL and will not directly affect the species. The project area occurs within critical habitat for SWFL. To minimize impacts to this and other riparian species, construction would take place between August 15 and April 15.

Indirect effects to SWFL will occur from removal of suitable habitats. Vegetation removal is limited to the removal of from three to six cottonwood snags. There will be minimal disturbance of vegetation as the cottonwood snags are in areas where understory has been cleared as part of the fuels reduction efforts. Impacts to dense, mature, or native vegetation and wetlands will be avoided. No long-term effects on SWFL populations or their habitats are expected as a result of the Project.

4.7.3 Bald Eagle

No Action

The No Action Alternative would have no effect on the bald eagle.

Proposed Action

The Proposed Action would remove from three to six cottonwood snags from each site, and relocate them to the drain outfall area. Relocation of such snags or trees could potentially change suitable bald eagle habitat from standing trees/snags to snags lying in the drain outfall area. These structures would be available for perching during hunting or resting activities. Short term construction related impacts may include temporary noise and other disturbance. Guidelines will be employed to minimize the potential for disturbing bald eagles (discussed in the Environmental Commitments section below). No long-term effects on bald eagle populations or habitat are expected to result from the Proposed Action. Large, mature cottonwood trees and snags are abundant in this area and are not limiting. Measures will be taken to minimize disturbance to riparian habitat. Proposed Action may have short-term minor potential effects to wintering bald eagles during construction, related to temporary noise and other disruptions. During construction of the habitats, if a bald eagle is spotted within 0.25 mile of active project construction, prior to starting, construction activities will be delayed until the eagle leaves the area on its own accord.

4.7.4 Western Yellow-billed Cuckoo

No Action

The No Action Alternative would have no effect on the yellow-billed cuckoo.

Proposed Action

No effects will occur to breeding cuckoos under the Proposed Action as construction is delayed until after August 15, after the breeding season. No live cottonwoods would be removed and hence no adverse impacts to habitat would occur.

4.7.5 Common Black-Hawk

No Action

The No Action Alternative would have no effect on the common black-hawk.

Proposed Action

The Proposed Action would not adversely affect this species as no adverse impacts would occur to riparian areas along the MRG in the mouths of drain outfalls.

4.7.6 New Mexican Jumping Mouse

No Action

The No Action Alternative would have no effect on the New Mexican jumping mouse.

Proposed Action

It is unlikely that this species inhabits the drain outfall areas. These are heavily impacted areas from recreational use and river maintenance activities and dense streamside vegetation, as well as wetlands with cattails have been eliminated in the areas proposed for cottonwood log structure installation. It is unlikely that this species is present in either the riparian floodplain or on in-channel islands in the vicinity of the three drain outfalls and thus would not be affected.

4.8 Cultural Resources

No Action

The No Action Alternative would have no effect on cultural resources.

Proposed Action

The Albuquerque Area Office Archaeologist determined that the project will have no effect on existing cultural resources.

4.9 Socioeconomics and Environmental Justice

No Action

The No Action Alternative would have no effect on socioeconomics or environmental justice.

Proposed Action

The proposed action would not adversely affect current socioeconomic conditions in Valencia County. The cost of the proposed action is approximately $220,000 which is small in comparison with combined state and federal expenditures within Valencia County, and will not adversely affect current economic conditions. No low-income or minority populations would be disproportionately impacted by the proposed action.

4.10 Indian Trust Assets

No Action

The No Action Alternative would have no effect on Indian Trust Assets.

Proposed Action

There are no impacts to ITAs, as no ITAs were identified within the Proposed Project Area.

4.11 Irretrievable Commitment of Resources

Implementation of the Project would result in the commitment of resources such as fossil fuels, construction materials, and labor. In addition, Federal public funds would be expended for the construction of the proposed Project.

4.12 Cumulative Effects

The NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (42 U.S.C. 4331-4335). Cumulative environmental impacts associated with the Proposed Action have been evaluated for the following projects relative to the Proposed Action.

The Collaborative Program has funded multiple habitat restoration projects in the vicinity of the proposed action. Work has been done towards the removal of islands and improving habitat at Isleta Pueblo to the north of this project. Work has also been completed at the Los Lunas project to the south. This involved lowering the floodplain and creating secondary channels. North of Isleta Diversion Dam, projects creating and/or improving silvery minnow habitat are being done by the City of Albuquerque, the Interstate Stream Commission, the Army Corps of Engineers, and Reclamation. The Collaborative Program will continue to fund habitat restoration projects nearby. The proposed action and these projects are improving and/or creating habitat for the silvery minnow in the Isleta and Albuquerque reaches. Other projects, like the silvery minnow augmentation project, should provide positive synergistic interactions with habitat that would be created by this project.

CHAPTER 5 ENVIRONMENTAL COMMITMENTS

The following environmental commitments will apply if the Proposed Action is selected and implemented:

All applicable permits have been or will be obtained prior to implementation of the project.

1. Should a bald eagle be observed within 0.25 mile, upstream or downstream of the active project site in the morning before project construction activity starts, or following breaks in project construction activity, the construction crew would be required to suspend all activity until the bird leave on its own volition, or if the Reclamation biologist in consultation with the USFWS, determine that the potential for harassment is minimal. However, if a bald eagle arrives during project construction activities or if a bald eagle is observed beyond the specified distance, construction would not need to be interrupted. If bald eagles are found consistently in the immediate action area during project construction, Reclamation would contact the USFWS to determine whether formal consultation under ESA is necessary.

2. To avoid direct impacts to migratory birds protected by the Migratory Bird Treaty Act (16 U.S.C. 703, et seq.), installation of the cottonwood structures would be scheduled between August 15 and April 15, outside of the normal breeding season for most avian species.

3. Implementing specific mitigation measures to avoid impacts to threatened and endangered species and their habitats identified in the project area, as determined in Section 7 consultation with USFWS under the Endangered Species Act.

4. Should evidence of possible scientific, prehistorical, historical, or archeological data be discovered during the course of this action, work shall cease at that location and the Area archaeologist shall be notified by phone immediately, with the location and nature of the findings. Care shall be exercised so as not to disturb or damage artifacts or fossils uncovered during operations, and the proponents shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the Government.

5. RGSM critical habitat encompasses the entire project area (FR 2003) in the river channel. Best Management Practices would be enforced to minimize potential impacts to RGSM from direct construction impacts and erosional inputs into the river during work periods. A silt fence will be installed around the perimeter of areas to be excavated below the existing water line to exclude RGSM from the work area. Trenches constructed for snag placement would be seined immediately prior to placement of the snag in the trench to remove any RGSM that may enter the trench during the brief (approximately 1 hour) period of time the trench would be opened to the channel. To protect shallow water habitats adjacent to the bankline, a silt curtain will be installed. To protect aquatic habitats from spills or contamination, hydraulic lines will be protected from punctures. Additionally, all fueling will take place outside the active floodplain and all equipment will under go cleaning and inspection prior to operation. Equipment will be parked on predetermined locations on high ground away from the project area overnight. Consultation with the USFWS would determine other effective Best Management Practices

6. Impacts to terrestrial habitats would be minimized by using existing roads and cleared staging areas. In general, equipment operation would take place in the most open area available and would minimize damage to native vegetation.

7. To mitigate potential short-term construction impacts to SWFL, clearing of dense woody vegetation would be avoided. Construction would occur only between August 15 and April 15.

8. Clean Water Act (CWA) compliance is required of all aspects of the Project, and since most work associated with the Proposed Action would be completed within aquatic areas regulated by this law, a 404 permit is required. A state water quality certification permit under Section 401 of the CWA may also be required. The 404 and 401 permitting processes would be completed prior to commencement of the Proposed Action.

9. Storm water discharges under the Proposed Action would be limited to ground-disturbing activities outside the mean high water mark. All such activities would be evaluated for compliance with National Pollutant Discharge Elimination System (NPDES) guidance, an NPDES permit, or a Storm Water Pollution Prevention Plan.

10. All necessary permits for access points, staging areas, and study sites would be acquired prior to construction activity.

CHAPTER 6 CONSULTATION & COORDINATION

The Service was notified of the proposed action and federally protected species potentially occurring in the project site were identified. The Army Corps of Engineers and New Mexico Environment Department were consulted for CWA Section 404 and 401 compliance.

CHAPTER 7 LIST OF PREPARERS

Susan Broderick, Bureau of Reclamation, MS Wildlife Management, Fisheries Biologist
Charles Fischer, Bureau of Reclamation, M.S., Agronomy and Soils Science, Environmental Protection Specialist

CHAPTER 8 REFERENCES

Abbe, T.B., A.P. Brooks and D.R. Montgomery. 2003. Wood in river rehabilitation and management. American Fisheries Society Symposium 2003.

Arthington, A.H., S.R. Balcombe, G.A. Wilson, M.C. Thoms and J. Marshall. 2005. Spatial and temporal variation in fish-assemblage structure in isolated waterholes during the 2001 dry season of an arid-zone floodplain river, Cooper Creek, Australia. Marine and Freshwater Research. 56:25-35.

Bestgen, K.R., and S.P. Platania. 1991. Status and conservation of the Rio Grande silvery minnow *Hybognathus amarus*. Southwestern Naturalist 36: 225–232.

Bestgen, K. R., B. Mefford, J. Bundy, C. Walford, B. Compton, S. Seal, and T. Sorensen. 2003. Swimming performance of Rio Grande silvery minnow. Final Report to U. S. Bureau of Reclamation, Albuquerque Area Office, New Mexico. Colorado State University, Larval Fish Laboratory Contribution 132, 70 pp.

Broderick, Susan. 2000. Fish and herptile communities in wetlands in the Fort Craig reach of the Rio Grande and Elephant Butte delta, Socorro County, New Mexico, May 1997 to May 1998. U.S. Bureau of Reclamation, Denver, CO.

Brooks, A.P. and G.J. Brierly. 2002. Mediated equilibrium: the influence of riparian vegetation and wood on the long-term character and behavior of a near pristine river. Earth Surface Processes and Landforms 27:343-367.

Bryant, M.D. and J.R. Sedell. 1995. Riparian forests, wood in the water and fish habitat complexity. Condition of the world's aquatic habitats. proceedings of the World Fisheries Congress, Theme 1, Amer. Fish. Society, Bethesda, MD.

Campbell, M.L., J.N Stuart, and J.B.M. Miyashiro. 1997. A survey of mammal populations in the Rio Grande Valley State Park, Albuquerque, NM, City of Albuquerque Open Space Division, Albuquerque.

Carlson, J.Y., C.W. Andrus and H.A. Forehlich. 1990. Woody debris, channel features and macroinvertebrates of streams with logged and undisturbed riparian timber in northeastern Oregon, USA. Can. J. Fish. and Aquatic Sciences 47, 1103-1111.

Culp, J.M., G.J. Scrimgeour, and G.D. Townsend. 1996. Simulated fine woody debris accumulations in a stream increase rainbow trout fry abundance. Transactions of the American Fisheries Society 125:472-479.

Dudley, R.K. and S.P. Platania. 1996. Rio Grande silvery minnow winter population habitat use monitoring project, April 1996. Report to the U.S. Army Corps of Engineers, Albuquerque. MRGCD. 12 pp.

Dudley, R.K. and S.P. Platania . 1997. Habitat use of Rio Grande silvery minnow. University of New Mexico, Albuquerque, NM. 88p.

Fausch, K.D. and T.G. Northcote. 1992. Large woody debris and salmonid habitat in a small coastal British Columbia stream. Can. J. Fish. and Aquatic Sci. 49, 682-693.

Federal Register (FR). 1993. Endangered and Threatened Wildlife and Plants: Proposed rule to list the Southwestern Willow Flycatcher as Endangered with Critical Habitat. Vol. 58, No. 140 / Wednesday, June 23, 1993 / Proposed Rule. pp 39495–39522.

FR. 1994. Endangered and Threatened Wildlife and Plants: Final Rule To List the Rio Grande Silvery Minnow as an Endangered Species. Vol. 59, No. 138 / Wednesday, July 20, 1994 / Final Rule. pp 36988–36995.

FR. 1995. Endangered and Threatened Wildlife and Plants; Final rule determining endangered status for the Southwestern Willow Flycatcher. Volume 60, No. 38 / Monday, February 27, 1995 / Final Rule. pp. 10694-10715

FR. 1997. Endangered and Threatened Wildlife and Plants: Final determination of critical habitat for the Southwestern Willow Flycatcher. Vol. 62, No. 140 / Tuesday, July 22, 1997 / Final Rule. pp 39129–39147.

FR. 1999. Endangered and Threatened Wildlife and Plants: Designation of critical habitat for the Rio Grande Silvery Minnow. Vol. 64, No. 128 / Tuesday, July 6, 1999 / Proposed Rule. pp 36274–36290.

FR. 2003. Endangered and Threatened Wildlife and Plants: Designation of critical Habitat for the Rio Grande Silvery Minnow. Vol. 68, No. 33 / Wednesday, February 19, 2003 / Final Rule. pp 8087–8135.

FR. 2004. Endangered and Threatened Wildlife and Plants: Proposed designation of critical habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*); Proposed Rule. Vol. 69, No. 196 / Tuesday, October 12, 2004. pp 60706–60786.

Ford, D. 2004. Water Work *In* New Mexico State University. College of Agriculture & Home Economics. Resources: Fall 2004.

Gregory, S.V., F.J. Swanson, W.A. McKee and K.W. Cummins. 1991. An ecosystem perspective of riparian zones: focus on links between land and water. Bioscience 41:540-551.

Kennard, M.J. 1995. Factors influencing freshwater fish assemblages in floodplain lagoons of the Normanby River, Cape York Peninsula: a large tropical Australian river. M.Sc. Thesis, Griffith University, Brisbane.

Harmon, M.E., J.F. Franklin, F.J. Swanson, P. Sollins, S.V. Gregory, J.D. Lattin, H.H. Anderson, S.P. Cline, N.G. Aumen, J.R. Sedell and G.W. Lienkamper. 1986. Ecology of coarse woody debris in temperate ecosystems. *In* A. MacFadyen and E. Ford, editors. Advances in Ecological Research 15, 133-302. Harcort Brace Jovanovich, New York.

Hilderbrand, R.H., A.D. Lemly, C.A. Dolloff and K.L. Harpster. 1998. Design considerations for large woody debris placement in stream enhancement projects. North American Journal of Fisheries Management 18, 161 - 167.

Hink, V.C. and R.D. Ohmart. 1984. Middle Rio Grande Biological Survey. U.S. Army Corps of Engineers, Albuquerque District, NM. Contract No. DACW47-81-C-0015, Arizona State University. 193 pp.

Lassettre, N.S. 1999. Annotated bibliography on the ecology, management, and physical effects of large woody debris (LWD) in stream ecosystems. Report to the California Department of Forestry.

Montgomery, D.R. 2003. Wood in rivers: interactions with channel morphology and processes. Editorial. Geomorphology 51: 1-5.

NMDGF. 2004a. Biota Information System of New Mexico, Species Account 040040 – Common Black-hawk. New Mexico Department of Game and Fish.

NMDGF. 2004b. Biota Information System of New Mexico, Species Account 040250 – Yellow-billed Cuckoo. New Mexico Department of Game and Fish.

NMDGF. 2004c. Biota Information System of New Mexico, Species Account 040370 – Bald Eagle, New Mexico Department of Game and Fish.

NMDGF. 2004d. Biota Information System of New Mexico, Species Account 050410 – Meadow Jumping Mouse. New Mexico Department of Game and Fish.

Platania, S.P. 1993. The fishes of the Rio Grande between Velarde and Elephant Butte Reservoir and their habitat associations. U.S. Bureau of Reclamation, Albuquerque, New Mexico. 188 pp.

Platania, S.P. 1995. Reproductive biology and early life-history of the Rio Grande silvery minnow, *Hybognathus amarus*. Albuquerque District, U.S. Army Corps of Engineers, Albuquerque.

Platania, S.P., and C. Altenbach. 1998. Reproductive strategies and egg Types of Seven Rio Grande Basin Cyprinids. Copeia 1998(3): 559–569.

Propst, D.L. 1999. Threatened and endangered fishes of New Mexico. Technical Report No. 1, New Mexico Dept. of Game and Fish. Santa Fe. 84 pp.

Reeves, G.H., J.D. Hall, T.D. Roelofs, T.L. Hickman and C.O. Baker. 1991. Rehabilitating and modifying stream habitats. Chapter 15, pp. 519-557 *In* W.R. Meehan, editor, Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19, Bethesda, MD.

Shirey, P.D. 2004. Foraging habits and habitat utilization of Rio Grande Silvery minnow (*Hybognathus amarus*) as inferred by diatom frustules. MS Thesis. New Mexico State University Las Cruces, New Mexico, August 2004.

Stahlecher, D.W. and N.S. Cox. 1997. Bosque Biological Monitoring Program: Bird Populations in Rio Grande Valley State Park, Winter 1996-97 and Spring 1997. City of Albuquerque Open Space Division. Albuquerque.

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

Talmage, P.J., J.A. Perry and R.M. Goldstein. 2002. Relation of instream habitat and physical conditions to fish communities of agricultural streams in the northern Midwest. North American Journal of Fisheries Management 22, 825-833.

Tetra Tech, Inc. 2004. Habitat restoration plan for the middle Rio Grande. Prepared for MRGESA Collaborative Program, Habitat Restoration Subcommittee. September.

Treadwell, S. 1999. Managing snags and large woody debris. *In* S. Lovett & P. Price (eds., riparian Land Management Technical Guidelines. Vol. 2: On-ground Management Tools and Techniques. Land and Water Resources Research and Development Corporation, Canberra, Australian Capital Territory.

U.S. Bureau of Reclamation (USBR). 2006. 2005 Southwestern willow flycatcher study results. Selected sites along the Rio Grande from Velarde to Elephant Butte Reservoir, New Mexico. Denver Technical Service Center, Denver, CO.

U.S. Bureau of Reclamation (USBR). 1993. Final Supplement to the Final Environmental Impact 126 Statement-River Maintenance program for the Rio Grande-Velarde to Caballo Dam-Rio Grande and Middle Rio Grande projects, New Mexico. 140 pp.

U.S. Census Bureau. 2006. New Mexico Quick Facts. http://quickfacts.census.gov/qfd/states/35/35061.htm .

U.S. Dept. Commerce. Bureau of Economic Analyses. News Release, April 26, 2006. BEA 06-15.

U.S. Fish and Wildlife Service (USFWS). 2001. Programmatic Biological Opinion on the Effects of Actionis Associated with the U.S. Bureau of Reclamation's, U.S. Army Corps of Engineers', and Non-Federal Entities' Discretionary Actions Related to Water Management on the Middle Rio Grande, New Mexico.

U.S. Fish and Wildlife Service (USFWS). 2003. Biological and Conference Opinions on the effects of actions associated with the Programmatic Biological Assessment of Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, Albuquerque, New Mexico. Consultation No. 2-22-03-F-0129. March 17, 2003.

U.S. Fish & Wildlife Service (USFWS). 2006. Rio Grande silvery minnow rescue and salvage – 2005. Interagency Agreement 02-AA-40-8190. Albuquerque, NM.

Wallace, J.B. and A.C. Burke. 1984. Quantification of wood habitat in subtropical coastal plain streams. Can. J. Fish. and Aquatic Sciences 41, 1643-1652.

Webb, A.A. and W.D. Erskine. 2003. Distribution, recruitment, and geomorphic significance of large woody debris in an alluvial forest stream: Tonghi Creek, Southeastern Australia. Geomorphology 51:109-126.

Welcomme, R.L. 2001. Inland Fisheries Ecology and Management. Fishing News Books, Blackwell Science, Ltd, Oxford.

Wesche, T.A. 1985. Stream channel modifications and reclamation structures to enhance fish habitat. Chapter 5, pp.103-164 *In* J.A. Gore, editor, The Restoration of Rivers and Streams. Butterworth Publishers, Boston.

Wesche, T.A., D.E. Cowley, and S. Grogan. 2004. Development of perennial pools for Rio Grande silvery minnow in the Middle Rio Grande using cottonwood snags. FY 2003 Project Report on Grant Agreement No. 03-FG-40-2109-85.

Williams, S.O. 2003. New Mexico Spring 2003. *North American Birds*. Vol 57, No. 3:383-385.