Ecosystem Revitalization @ Route 66, Albuquerque, New Mexico
Section 1135 Project

Appendices

July 2008

US Army Corps of Engineers®
Albuquerque District

Appendix A. Public Scoping

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA, NE
ALBUQUERQUE, NEW MEXICO 87109-3435
FAX (505) 342-3199

Reply to
Attention of:

16 January 2003

Dear Interested Party:

The U.S. Army Corps of Engineers, Albuquerque District, in cooperation with the Middle Rio Grande Conservancy District, is proposing to restore a segment of the Rio Grande floodplain ecosystem in Bernalillo County, New Mexico. The study area includes both sides of the Rio Grande from levee to levee beginning on the north side of the Interstate 40 bridge and extending to the south side of the Bridge Street bridge in Albuquerque, Bernalillo County, New Mexico (Figure 1). The study is referred to as the "Bosque Ecosystem Restoration at Route 66". A feasibility study has begun and is expected to be completed by August 2003.

The Corps of Engineers is also studying ecosystem restoration opportunities throughout the greater Albuquerque Metropolitan area under a different authority entitled "The Middle Rio Grande Bosque Restoration Study". This study will determine the feasibility and advisability of ecosystem restoration of the bosque from the southern boundary of Sandia Pueblo south to the South Diversion Channel. This larger study encompasses the Bosque Ecosystem Restoration at Route 66 area. Both studies are part of a series of efforts to conserve and enhance the riparian bosque of the Rio Grande.

The purpose of the Bosque Ecosystem Restoration at Route 66 study is to investigate possible actions to aid in ecosystem restoration of the Rio Grande bosque. Potential alternatives include removing jetty jacks and non-native vegetation, such as salt cedar (*Tamarix chinensis*), from the floodplain. Removing jetty jacks would allow overbank flows to spread out onto the floodplain area between the levees. Removal of non-native vegetation would encourage growth and spread of native vegetation (e.g. cottonwood and willow). We would like your comments on this study and the potential alternatives. You may use the attached form or send a letter by 28 February 2003. Please mail or fax comments as indicated on the comment form.

As part of the planning process, the U.S. Army Corps of Engineers, Albuquerque District will prepare an environmental assessment to analyze potential impacts of the proposed actions in accordance with the National Environmental Policy Act (NEPA). A public information meeting to discuss the proposed action is tentatively planned for Summer 2003. If you would like to remain on the mailing list for this study and receive a flyer about the public meeting, please indicate so on the attached form. If we do not receive a response from you, we will assume that you do not want to remain on the mailing list and will remove your name accordingly.

For additional information about both studies on the internet, go to www.bosquerevive.com. If you have any questions regarding this study, please contact Lynette Giesen at (505) 342-3322. Thank you for your interest in this study.

Sincerely,

Fritz Blake
Project Manager

Enclosure

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

Please attach additional sheets if desired.

☐ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: _____

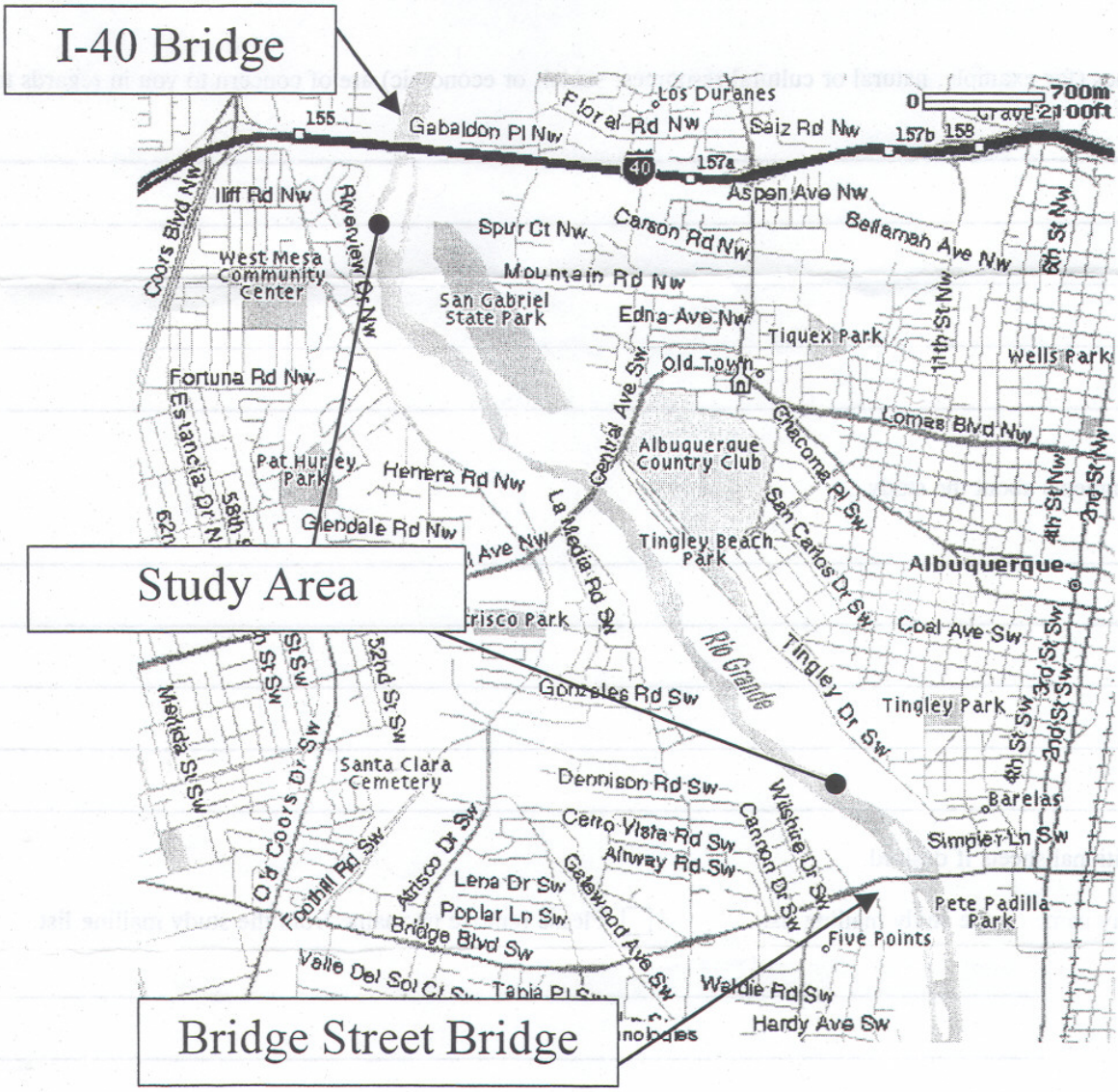
Address: _____

City, State, Zip: _____

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Figure 1. Rio Grande bosque ecosystem restoration at Route 66 study location map.



Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

Water is so badly needed - Sounds like removing Salt Cedar would be the right thing to do - Cost: how will this be paid for? Would this cost be a hard-ship for some Property Owner - The West side of river has been higher than River for many years - More than 60 years Would this effect Property Insurance? Flood -

2. Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Blanche N. Sumner

Address: 1922 Poplar Ln. SW

City, State, Zip: Albuquerque, NM 87105-3154

Please mail or fax your specific written comments by 28 February 2003 to: Blanche Sumner

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

1) Public access / recreational opportunities before and after restoration work

2) Impact to listing of endangered species – will this help the recovery / de-listing of RG silvery minnow and/or SW willow flycatcher (for example)?

2. Other comments about the study.

Both alternatives sound feasible; removing jetty jacks and removing salt cedar. I am sure this would make the study area aesthetically pleasing, if nothing else.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Garret Ross

Address: Bureau of Reclamation, 505 Marquette Ave NW, Ste 1513

City, State, Zip: Albuquerque, NM 87102-2162

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Albuquerque Area Office
505 Marquette, NW - Suite 1313
Albuquerque, NM 87102

Phone: (505)248-5357 - Fax: (505)248-5356

From: Garret Ross

Phone: _____ Mail Code ALB: 431

To:	Name - Office	Fax Number
	Fritz Blake	(505) 342-3197

Subject: Bosque Ecosystem Restoration

Message:

Pages including cover sheet: 2

COE TAG

FAX

FROM: DEPARTMENT OF GAME AND FISH
3841 MIDWAY PLACE NE
ALBUQUERQUE, NM 87109
FAX (505) 841-8885

PERSON SENDING MESSAGE: Rick CASTELL

DIVISION: NMDGF. NWA

TO FAX NUMBER: 342-3197

INDIVIDUAL: FRITZ BLAKE

ADDRESS: ACOE

NUMBER OF PAGES IN TRANSMISSION INCLUDING COVER SHEET: 2

ADDITIONAL MESSAGE:

PLEASE KEEP US informed.

Thanks.

State of New Mexico
Department of Game & Fish
3841 MIDWAY PLACE, NE
ALBUQUERQUE, NEW MEXICO 87109
PHONE: (505) 841-8881

RICK CASTELL
NWA OPERATIONS
(505) 342-4ACE

To report a violation call 1-800-432-4263

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

ARE you going to Try using goats for tamarisk control like the city of ALBUQUERQUE?

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: RICK CASTELL

Address: 3541 MIDWAY PL.

City, State, Zip: ALBUQUERQUE N.M. 87109

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Comments of Bosque Ecosystem Restoration Study:

1) My primary concern is the potential for improving the health of the bosque ecosystem. It is clear that the health of the bosque along the Rio Grande has suffered as urban growth and economic considerations haven been made priorities at the expense of numerous native species, the cottonwood gallery forest, and water quality. There are many potential social and economic benefits (increased recreation opportunities, improved ecosystem health, water quality) that would result from improving the health of the Rio Grande ecosystem.

2) I am concerned about the high level of maintenance (constant exotic removal, constant removal of dead and down material, planting and restoration of cottonwoods) required in many of the plans for bosque ecosystem restoration. For example, although valuable progress has been made in removing exotic trees and encouraging native plants at the Bosque del Apache National Wildlife Refuge, it has required high levels of human intervention, heavy machinery, maintenance and constant funding.

   Although it is clear that a return to a naturally function river ecosystem with regular flooding and native plant establishment is not possible given the current land uses and impacts in the Rio Grande valley, the potential for restoration of some level of natural processes should be seriously considered. Given the current lack of importance given by the White House and Congress on environmental quality and the general inconsistent political support in environmental priorities and funding, the probability for continued support for high levels of maintenance in the bosque over any significant length of time seems improbable. Therefore restoration and maintenance programs requiring constant funding would probably be continuously at risk of being stopped or scaled back. If some functions of the bosque ecosystem can be returned to their natural processes even at a reduced scale (e.g. some level of bank flooding), that might reduce the need for constant human intervention and have greater positive impacts.

   These issues may be beyond the scope of the Bosque Ecosystem Restoration study, however I feel the larger issues of natural ecosystem function in the Rio Grande must be considered. Treatment of small portions of the bosque without consideration of the entire Rio Grande ecosystem would seem to have only a short lived impact.

Name: Daniel Ryerson
Address: 1812 Kriss Place NE
City, State, Zip: Albuquerque, New Mexico 87112

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

See attached sheet.

2. Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Daniel Ryerson

Address: 1812 Kriss Place NE

City, State, Zip: Albuquerque, NM 87112

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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SANDRA L. STEGEMAN
1720 POPLAR LANE, SW
ALBUQUERQUE, NM 87105-3150

February 23, 2003

Fritz Blake, Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place, NE
Albuquerque, NM 87109

Dear Mr. Blake:

I have just received your letter dated January 16, 2003 and addressed to "Interested Party" about the proposed "Bosque Ecosystem Restoration at Route 66" and "The Middle Rio Grande Bosque Restoration Study." This is the first time I have heard of these studies. The lack of public information of these studies greatly disturbs me. Perhaps, like most of organizations, the U.S. Army Corps of Engineers, Albuquerque District, relies on the Internet to provide information to the public. Also like most organizations, the U.S. Army Corps of Engineers assumes most of the population has personal access to the Internet. This is a faulty assumption. As such, these organizations effectively exclude an incredibly vast amount of the community and "interested parties."

You asked what issues (for example, natural or cultural resources, social, or economic) are of concern regarding the study. Thank you for asking. Frankly, I have many concerns, partly because the brief letter did not give much information. It did not address, for example, the impact the proposed restoration will have on private property, homes, farmland, businesses, and so forth. Yes, I agree that the removal of nonnative vegetation such as salt cedar would be beneficial. I do not know, however, if I can say the same about the removal of the jetty jacks to allow "overbank flows to spread out onto the floodplain between the levees." How would this overflow (when we are not experiencing a severe drought) effect the populace?

Yes, I do want my name to be on the study mailing lists. I also wish to receive prompt notification of any public meetings regarding *"Bosque Ecosystem Restoration at Route 66"* and *"The Middle Rio Grande Bosque Restoration Study."* Please mail me more explanatory information about these studies.

Thank you.

Sincerely,

Sandra L. Stegeman

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

lease make your comments specific to the proposal described in the attached letter.

. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

See enclosed letter.

2. Other comments about the study.

See enclosed letter.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: S. L. Steeman

Address: 1720 Poplar Lane, SW

City, State, Zip: Alb., NM 87105-3120

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

We welcome the study and planned restoration. We would not favor removal of any live trees.

Thank you for your time and planned action.

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: [illegible]

Address: 721 Gabaldon NW

City, State, Zip: Albuquerque NM 87104

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

lease make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

Cultural and natural resources are very important concerns to the pueblo of Taos. Safety issues are important concerns as well.

2. Other comments about the study.

We would like to see more alternatives listed on/under the "project alternatives" posted on your website

ase attach additional sheets if desired.

☐ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: TAOS PUEBLO GOVERNORS OFFICE

ddress: P.O. Box 1846

City, State, Zip: TAOS, NM 87571

ease mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 1

Bosque Ecosystem Restora
Albuquerque, N

Comment

To Fritz Blake	From Janelle Jersey
Dept./Agency U.S. ACOE	Phone # 346-2420
Fax # 342-3197	Fax # 346-2406

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Janelle Jersey, Southern Pueblos Agency - BIA

Address: P.O Box 1667, 1000 Indian School Road, N.W.

City, State, Zip: Albuquerque, NM 87103

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1 What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

- A concern that no flooding of residential areas occurs
- that the bike path still be accessible + usable,
- What is the cost + how is it being paid for?

2 Other comments about the study.

I am in favor of restoring as much of the Rio Grande floodplain as possible.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Amy Jones

Address: 1825 Poplar SW

City, State, Zip: ABQ, NM 87105

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

a : make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

OF PRIME CONCERN IS PRESERVATION OF RIO GRANDE RIVER + ENTIRE RIPARIAN CORRIDOR, IN AS NATURAL A STATE AS POSSIBLE. This should include RE-INTRODUCTION OF SILVER MINNOWS. A HEALTHY RIVER IS THE LIFE BLOOD OF OUR city + IS CRUCIAL TO OUR RURAL LIFESTYLE IN SOUTH + NORTH VALLEYS.

Other comments about the study, * WOULD LIKE TO SEE NON NATIVE VEGETATION, PARTICULARLY WATER DRAINING SALT CEDAR, REMOVED.
CARE SHOULD BE TAKEN TO AVOID USING HERBICIDES OR ANY TOXIC APPLICATION, IN THIS EFFORT.
LIKE TO SEE ENHANCED, NON-MOTORIZED, RECREATION.
WETLANDS AREA WOULD BE BENEFICIAL
* NATURAL, HERBS, VEGETATION STUDY AREA.
* INCREASED EDUCATIONAL + INTERPRETIVE OPPORTUNITIES.
MAKE EVERY EFFORT TO REACH OUT TO LOCAL RESIDENTS + NEIGHBORHOOD ASSOCIATIONS, IN PLANNING.

: attach additional sheets if desired.

Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

me: TONI UNWIN
POPLAR ACRES NEIGHBORHOOD ASSOC.
ess: 1921 POPLAR LN SW
ty, State, Zip: ALBUQUERQUE, NM 87105

e mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: PAUL C. MCKEY

Address: 1371 WAGONTRAIN DR SE

City, State, Zip: ALBUQUERQUE, NM 87123

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Kara Gillon

Address: 829 Gold SW

City, State, Zip: Albuquerque, NM 87102

Please mail or fax your specific written comments by 28 February 2003 to:

TO:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

None at this time.

2. Other comments about the study.

Sounds like a great idea.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Roy Jamison

Address: Rocky Mountain Research Station, 333 Broadway SE, Suite 10[illegible]

City, State, Zip: Albuquerque, NM [illegible] 87102

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

(1) WOULD REMOVAL OF DEEPLY BURIED JETTY JACKS AND SIMILAR STRUCTURES CAUSE MORE DAMAGE THAN LEAVING THEM. (2) COULD OLD BRIDGE SITES AND FORDS BE MARKED? (3) SHOULD BICYCLES BE RESTRICTED TO PAVED PATHS AS THE MRGCD POLICY OF BLADING DITCH BANKS CLEAN CREATE EXCESS EROSION?

Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: R. BRUCE GROVE

Address: 2500 THOMPSON RD. NW

City, State, Zip: ALBUQUERQUE, NM 87104

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?
Potential depletions or diversions from the Rio Grande

2. Other comments about the study.
Can you contemporaneously provide us with any written plans or proposals for this project?

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Daniel R. Rubin

Address: Post Office Box 25102

City, State, Zip: Santa Fe, New Mexico 87504-5102

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico 18 Jan 2003

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

I support removal of non-native vegetation such as Tamerix – salt cedars. Removing jetty jacks is also important. They give an artificial look to the area and interfere with trails.

2. Other comments about the study.

It is very important to allow flooding of as much of the flood plain as possible. Flooding would allow cottonwood seeds to sprout and grow into trees.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Dr. James Vernon Lewis
Address: 3401 Mars Rd NE
y, State, Zip: Albuquerque NM 87107-4818

Please mail or fax your specific written comments by 28 February 2003 to:

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

A. With respect to removal of salt cedar, would there be any potential to cause property damage or would levees sufficiently prevent that from happening?

B. In addition to removal of salt cedar, which I strongly support, will the restoration area there be any additional removal of vegetation, i.e. small trees and brush. While some brush is acceptable, the area restored should not be impenetrable.

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: LARRY ALCALA (PARADISE HILLS C.O. & WESTSIDE COALITION)

Address: 6061 UNITAS CT, NW

City, State, Zip: ALBUQUERQUE, NM 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

My issues revolve around giving or at least sharing some of the remaining planet with nonhuman species. The bosque is a good place to do just that.

Other comments about the study.

I am very concerned about the current hate of salt cedar. I think it will be impossible to ever eradicate it from our ecosystem now that it has been introduced

2. The irradication process will cause more harm than good in terms

Please attach additional sheets

☐ Please keep my name on th

ame: Al

Address: 39

ity, State, Zip: Al

Please mail or fax your specific

REMOVE JETTY JACKS

All my life and have made it a point since I first used to the bosque as a child I know

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1 What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

It's a great idea. Please focus on removal of non-native species.

Other comments about the study.

Please study the feasibility of a paved bike trail through the trees as well as more bike trail at the edge of the bosque on the west side (not just in the current study area, but the entire bosque area proposed for eventual restoration).

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name:

Address:

City, State, Zip:

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

m :e your comments specific to the proposal described in the attached letter.

hat issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study? Natural & Recreational - Also Rio Grande remains a visitor draw to the old west & is currently a disappointment

Other comments about the study. Would like to learn more. Is there a location(s) where status/info is posted? web site? Do you have citizen participation?

Pl se attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Dick Traeger

A dress: 5908 Wildflower Trail NE *

City, State, Zip: Albuquerque, NM 87111

lease mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

* This is an address change from a Glen Oak address

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

Methods of clearing

Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Andrew Ortiz

Address: P.O. Box 1148

City, State, Zip: Santa Fe, NM 87504

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?
REMOVAL OF NON-NATIVE VEGETATION + JETTY JACKS

Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: GUY MILLER

Address: P.O. BOX 162

City, State, Zip: HIGH ROLLS, N.M. 88325

GuyMiller
PO 102
High Rolls NM88325

Please mail or fax your specific written comments by 28 February 2003 to:

PLEASE CORRECT ERRONEOUS P.O. BOX NO.

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

lease make your comments specific to the proposal described in the attached letter.

. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

From my perspective, (1) The removal of NON-NATIVE Species is primary; (2) CONTINUATION of Public Access via The Albuquerque Open Space (BG-State Park) Trail System.

.. Other comments about the study.

I am in support of the study.
Please keep my name on the mailing list.

Please attach additional sheets if desired. * with an address change

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: James Gregory Shaw

Address: P.O. Box 67967

City, State, Zip: Albuquerque, New Mexico 87193-7967

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

The diversion project now being built south of the Alameda Bridge will drain a considerable amount of water from the Rio Grande as it passes through Albuquerque & divert it to the Balloon Fiesta Park. With all this water gone will any "overbank flows" ever happen in that area again, with or without jetty jacks.

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico
Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

disturbing wildlife, impeding river flow, affecting my ability to ride my horse and hike down there

2. Other comments about the study.

Sometimes bikes, etc, come around blind corners too fast and scare my horse. Too many booze dogs

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Jim Simmons

Address: 9920 Riverside Rd NW

City, State, Zip: Albuquerque, NM 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?
Safety and non-destruction caused by persons using guns and motorized vehicles.

2. Other comments about the study.
I am very pleased with this study and feel it is long overdue.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: CAMILLE SEGRETTO

Address: P.O. BOX 640

City, State, Zip: LOS LUNAS, N.M. 87031

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

Natural resources are of greatest interest to our organization - In particular, we support restoration of natural ~~processes~~ hydrograph & geomorphic processes to the maximum extent possible.

2. Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list.

☐ Please remove my name from the study mailing list.

World Wildlife Fund

100 East Hadley Street
Las Cruces, New Mexico 88001

Tel: 505/525-9532
Fax: 505/523-2866
E-mail: beth.bardwell@zianet.com
www.worldwildlife.org

Beth Bardwell
Research Associate
Chihuahuan Desert Program

y 28 February 2003 to:

f Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1 What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

NATURAL. I FEEL IT IS IMPORTANT IN RESTORING THE BOSQUE AS MUCH AS POSSIBLE TO ITS NATURAL CONDITION.

GOOD LUCK WITH THE REMOVAL OF THE SALT CEDAR!

Other comments about the study.

IT IS IMPORTANT TO GET COMMUNITY OF ABQ. INVOLVED. THERE IS TOO MUCH IGNORANCE WHEN IT COMES TO OUR BOSQUE

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: BRIAN ROUTHIER

Address: 313 GIRARD SE #8

City, State, Zip: ABQ. NM 87106

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

Natural issues are the greatest – removal of tamarisk & allowing natural flooding to reseed Cottonwoods. Why? We have a unique area and need to preserve it for those who live here now & those who follow

2. Other comments about the study.

I am happy to see this study taking place – In the past the USACOE was responsible for damming rivers, now it seems just to share it repair damage.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: NOTE NEW ADDRESS M.J. Keya Horn

Address: 4905 Haines Ave NE

City, State, Zip: ABQ NM 87110

Please mail or fax your specific written comments by 28 February 2003 to: – Sorry late - life is crazy

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

lease make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

(1) Understanding the hydraulics of river, drain, canal, floodplain system
(2) Effects of CABQ DW Project.
(3) Wastewater Discharge ↔ Water Quality ↔ Aquatic Ecosystem

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: STEVE HARRIS

Address: BOX 3-C PILAR RT.

City, State, Zip: EMBUDO NM 87531

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

See Attached

Other comments about the study.

See Attached

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Scott C. Kane

Address: 7500 Jefferson NE

City, State, Zip: Albuquerque NM 87123

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

1) The initial process has gained some great and valuable information. Now that a basis has been laid it has become apparent to me through my conversations with the younger generation of users that the announcements / advertising of public meetings did not grab their attention. There are many users who have grown up using the Bosque and their input is invaluable. It is my belief that the largest user percentage has not had involvement in the past public meetings and we need to target these individuals.

2) I know the Corp is required to focus their efforts between the levees and of course all of its funding must go toward restoration between levees, but my worry is that if we don't coordinate with the local municipalities some important aspects may be missed. I believe it is our duty to find a representative from the city to inform and direct the study teams with the knowledge of what city development plans are coming online. With out this critical connection our team could wind up missing the boat on logical study areas, future access points, and logical traffic routing.

   Ex: If this restoration study determines a "Wildlife Reserve" to be isolated from public traffic, then what are the potential options / tie points for routing the public around these areas. If the city is not involved then we will potentially dead end the public into protected areas. This will result in human nature taking over and attempting to get through these restricted areas. To minimize impact we should have an understanding of what the city could potentially do to route the public outside of the levees under other projects; thus, providing an obvious alternate route.

3) I also worry that we do not have enough emphasis on ADA access to the Bosque. I believe that we need to bring in some expertise to develop a viable trail network for handicap. A perfect example is the existing trail network which has been installed at the Nature Center (End of Candelaria). Here we have a gravel parking lot which then connects to crusher fines trails to get you to the levees. These areas are very difficult for a wheelchair bound person to be able to maneuver. These trails are considered handicap accessible, but due to the rough gravel in the parking lot and the soft nature of the crusher fines we have installed an unfriendly atmosphere for elderly and handicap individuals. This is an area always left until the last minute, we do not have to design "hard scape" environment to accomplish this friendly environment. There are environmentally friendly systems which can be installed to mitigate access for the impaired (Ex: GEOGRID systems to stabilize).

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

ea make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study? That the natural quality of the Bosque be preserved with access to the public in a controlled fashion which would allow natural flora to flourish (plants, birds, fish & animals)

2. Other comments about the study. The Corps of Engineers has a reputation of being insensitive to environmental concerns and creating unnecessary projects which are harmful to the environment. I hope this is not true in this case.

lease attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

ame: ANN KIRKPATRICK

ddress: 159 EL REY DRIVE

City, State, Zip: CORRALES NM 87048-7117

lease mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

I support these efforts. However, I would expect that all environmental and wildlife protection rules, regulations, and good/sound practices are strictly followed.

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Dolores G. Hoffman

Address: 3216 Los Lentes Rd SE

City, State, Zip: Los Lunas, NM 87031

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

The removal of salt cedar is an important area to proceed with, but I'm not sure about petty removal. It would be nice to get rid of them just because they are so ugly!

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: D. Foster

Address: 1307 Gold SW

City, State, Zip: Albuq., NM 87102

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

I SUPPORT THE BOSQUE PROJECT.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: SAM BEARD

Address: 374 JUNIPER HILL RD, NE

City, State, Zip: ALBUQUERQUE, NM 87122-1404

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Am Open Space → **Comment Form** ← F. Service Volunteer.
(I ride 1 of my 2 horses in Bosque or mts. 6 days/wk.)

Please make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

1. The more bushes, trees + etc. taken out, the less wildlife then
2. + the more trails everyone will make → the less wildlife yet.
(I agree the salt cedar needs to go.) takes H_2O from nest.
3. Jetty jacks should stay @ may be needed for flooding some day. ⓑ make an opening in middle of all of them wide

2. Other comments about the study.

enough for horses + people, only, + only 1 opening, So people don't make more trails parralel to the river.

4. New trees planted is good. (15 yrs. or so for most to be shade). Many of planted cottenwoods die. Do you have proposal to keep them watered, or in H_2O table??

Please attach additional sheets if desired.

5. All dead trees + downed wood out, to prevent Fires! help

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Chris Hoden

Address: 1020 Stuart Rd. N.W.

City, State, Zip: Albuq., N.M. 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

REMOVE all TREES that take up all the water - out. all AREAS Need Cleaning up Need BAD - Need to CONTROL GROWTH BAD. - TREES, JUNK, IN BOSQUE Protect the WILDLIFE - Keep People out of AREAS

2. Other comments about the study.

Good - Study CONTINUE UNTIL SUCESS IS OBTAINED

I'M ready to help in Clean up if needed.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Tony J. Rael

Address: 5703 LIZARD RD SW

City, State, Zip: ALBUQ NM 87121-6935

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

CONTROL ACCESS TO BOSQUE AREAS- BICYCLE + HIKER, AFTER RESTORATION. TOO MANY PATHS FROM LEVEES INTO BOSQUE CAUSING EROSION, DIFFICULT TO RESTRAIN ACCESS DURING BOSQUE CLOSING DURING DRY SEASONS, SUCH AS WHAT HAPPENED MAY-JUNE 2002

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name:

Address:

City, State, Zip:

Yvonne & Don Heuszel
14356 Camino del Rey NE
Albuquerque, NM 87123-1902

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1 What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

My concerns are simple - preserve what we have that is natural and enhance the natural beauty along Rio Grande. I have been a volunteer for the Open Space Trail Program for years so I do have an appreciation for preserving Natural Resources.

2 Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Gene Leitka

Address: 3420 Black Hills Rd NE

City, State, Zip: Albuquerque, New Mexico 87111

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

- That the Bosque be returned to a beautiful Cottonwood Forest, free of Non Native trees and garbage.
- That the Riparian forest be developed in a Way to Make it accessible for everyone to enjoy.
- That it may become the great Landmark for the City, and State as it was when the First europeans entered.

2. Other comments about the study.

Once cleared a division of the State, or City, or County should see that it is maintained and protected.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Louie H. Tapia.

Address: 5702 A Isleta Blvd. SW

City, State, Zip: Albuquerque, New Mexico 87105

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

ALBUQUERQUE PUBLIC SCHOOLS
CATEGORICAL PROGRAMS
725 University, SE
P.O. Box 25704
Albuquerque, NM 87125
Phone 505-842-3648
Fax 505- 842-3619

FAX

COVER PAGE

Date: 1-30-03

TO: Fritz Blake

FAX NUMBER 342-3197

Pages(including cover page) 2

MESSAGE: Fax for Linda

FROM: Patricia Tyson

COE-TAG

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

I Wondering how you were going to eradicate the salt cedar.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Cibola National Forest Attn: Deborah Walker

Address: 2113 Osuna Rd Suite A

City, State, Zip: Albuquerque, NM 87113

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

lease make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

How will you keep salt cedars out once removed?
How will you assure overbank flooding for new cottonwoods?

2. Other comments about the study.

Removing jelly jacks is an emotional issue, not a real one.
You must have thought about how to protect the levees with the jacks gone. You should talk frankly to the public about this.
Is the city a partner, especially for policing? If not, why not?

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Frank Titus

Address: 2864 Tramway Cir NE

City, State, Zip: ABQ 87122-2289

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

le e make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

Could students from Rio Grande High School be involved in the study/research/restoration? 2 reach there

ease attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: JUDY STEWART VIDAL

ddress: 6440 Monte Serano, NE

City, State, Zip: ALB NM 87111

lease mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

My concern is how we remove the tamarisk & russian olive and it's disposal (using chemicals may kill birds) between the other foliage nearby. I also know they are very hard to dispose of. Perhaps goats would be best.

2. Other comments about the study.

I hate to see all our tax money spent on studies alone. I hope we can actually do this. What about using public volunteers to help out? This is a real treasure (the Bosque) and so close to our dear environment.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Mary Sharp Davis - neighborhood assn. president

Address: 1911 Poplar Ln. SW

City, State, Zip: Albuquerque, NM 87105

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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COE-TAG

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

ease make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

How will you assess and report the project's impact on available water supply and depletions to the State Engineer / ISC ?

2. Other comments about the study.

Restoration is generally seen as a good thing provided you can prove no new net depletion to the ISC.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: STEVEN BOWSER, ALB-709

Address: USBR, 505 Marquette Ave NW, SUITE 1313

City, State, Zip: Albuquerque, NM 87102

Please mail or fax your specific written comments by 28 February 2003 to:

TO ⇒

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?
No comments. Please keep me on the mailing list.
Thanks!

2. Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name:

Address:

City, State, Zip:

John P. Clendenin
820 8th St. NW
Albuquerque, NM 87102-2053

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

I am very concerned about 1) overall bosque health
2) removing exotic species
3) providing increased access but discouraging recreational
over-use. I do NOT support any commercial
use of any bosque (ie west central corridors study 04)

Other comments about the study.

There area across from Tingley should
be accessible to the public but only in
a controlled-access environment - ie
managed by the Albq Bio Park.
also how can non-native species
be kept away; what will be
done to assure this?

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Diane Souder

Address: 1709 Kit Carson S.E.

City, State, Zip: Albq. N.M 87104

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Thank you!!

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

~~Patrick R Vigil~~
~~59~~

Comment Form

eas make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

Ladies & Gentlemen,
I fully support & urge full completion of;
The Bosque Ecosystem Restoration at Route 66, and
The middle Rio Grande Bosque Restoration Study

2. Other comments about the study.

It appears that seasonal flooding of the bosque is neressary in order
to allow seeds to seed, germinate & propigate. Removing the man-made
levees help the "flooding" to occur. Will the ACE be leveling the
man-made flood control berms found throught the study area?
Can provision be made to increase the numbers of beaver control wrapping
to around existing native species? Beavers are working severe damage to
Please attach additional sheets if desired. trees that are, for now, unable to reproduce.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Patrick R. Vigil
Address: 5920 Open Sky Dr NW
City, State, Zip: Albuquerque NM 87120 277-2685

Thank you for this opportunity to respond

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

PS: I am still waiting to hear the proposal on returning the Black Rec. Area at ~~cochiti~~ cochiti to cochiti Pueblo.

~~Patrick~~

54

The University of New Mexico

UNM Biology Department
MSC03 2020
1 University of New Mexico
Albuquerque, NM 87131-0001

TO: Fritz Blake
U.S. Army Corps of Engineers
Albuquerque District
FAX NO.: (505) 342-3197

FROM: Cliff Crawford

DATE:

FAX NO.: 505/277-0304

PHONE NO.:

Total Number of Pages, including this page: 3

MESSAGE:

Fritz -

Hope to see you on the 6th. Enclosed is the comment form you asked for, plus a copy of my original e-mail to you and April dated 26 November 02.

Cliff Crawford

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

Restoration, monitoring + evaluation, and management of the bosque.

2. Other comments about the study.

Please see my page of comments, e-mailed to Fritz Blake and April Fetzner on 26 November 2002. They are fairly comprehensive.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Cliff Crawford

Address: Department of Biology, University of New Mexico

City, State, Zip: Albuquerque, NM 87131

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

No concerns about the study - except- please make it high priority. The bosque has deteriorated significantly since I was young.

2. Other comments about the study.

This is long overdue. You may count on those living along the Bosque to support this effort.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: M. Kim Johnson

Address: 9206 Loretta NW

City, State, Zip: Albuquerque, NM 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1 What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

I would like the river to always have water in it. Removal of the salt cedar would be a good step toward cutting down the need of other water for the river. Also, keep the river 'natural' – no soccer fields, etc in the restored areas.

2 Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: DAVID ARENT

Address: 369 La Chamisal LN. NW

City, State, Zip: Albuquerque, NM 87107

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

1) I applaud the removal of the Salt cedars but wonder about long term control of this species. i.e. can we be assured that the removal is permanent.

2) other species such as russian olive provide some value as food sources for wildlife and are of less concern.

. Other comments about the study.

3) The Jetty Jacks are an artifact of historical value & should be preserved.

4) Overbank flooding?? Is this possible or are we trying to ~~preserve~~ revive an environment that has already been unalterably changed.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Walter Klewono

Address: 2908 Calle Del

City, State, Zip: Albuquerque NM 87104

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1 What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2 Other comments about the study.

I LIKE THE PLAN, BUT WOULD LIKE TO HAVE THE RUSSIAN OLIVES REMAIN. I FEEL THEY ENHANCE THE BOSQUE

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: ROBERT KUNKLE

Address: 1519 ERWIN PL NW

City, State, Zip: ALBUQUERQUE NM 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

I think this is great. Although not a scientist, I think removal of non-native (water-guzzling) species has to top the list. I hope that the mountain-bike trail along the river will remain part of the plan.

2. Other comments about the study.

I would be happy to volunteer.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Patrick Griebel

Address: 2404 New York Ave SW

City, State, Zip: ABQ, NM 87104

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

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1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

We need to restore the bosque to historical levels. Restoration of native flora + fauna is top priority for the health of the entire region, not just the bosque. We need that water to be regenerated.

Other comments about the study.

Removal of Salt cedar, russian olive and chinese elm should be top priority. Restorative flooding should be allowed - within the level of the levees.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: *Louise Zeringue*

Address: *1231 Entrada Bonita SW*

City, State, Zip: *Albuquerque, NM 87105*

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

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Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1 What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

I feel very strongly that the health of a natural "Bosque" Forest ecosystem is the top priority. Folks access is secondary, but very important. I live on the Bosque in the S. Valley & I hear geese, sandhill cranes, owls & coyotes often - it's a wonderful natural area!

2 Other comments about the study.

Please try to remove all non-native invasive species such as the Russian Olive (birds have plenty of alternative food sources) salt cedar & the chinese & Russian elms etc..., flood as much as possible to encourage cottonwood restoration & seedling growth & fuel reduction is essential.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Michael Schvanzkopf

Address: 1231 Entrada Bonita SW

City, State, Zip: ABQ, NM 87105

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

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1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

IMPROVEMENT OF BOSQUE TRAILS

REMOVAL OF NON NATIVE VEGETATION TO IMPROVE GROWTH OF NATIVE VEGETATION.

REDUCE FIRE HAZARD!

2. Other comments about the study.

THERE IS A PROBLEM WITH GRAFFITI! BOSQUE MAY REQUIRE PATROLLING SOME IN DAYTIME ALSO AT NIGHT. VOLUNTEERS MAINLY ON DAYS. NIGHT MIGHT REQUIRE OPEN SPACE POLICE.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: ROBERT BARR

Address: 10005 ELDRIDGE NW

City, State, Zip: ALBUQUERQUE, N.M. 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

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1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

HAS AN ENVIRONMENTAL IMPACT STATEMENT BEEN DONE OR IS IT INCLUDED IN THE STUDIES? HAS EFFECTED AGENCIES, (IE. N.M. STATE PARKS, RIO GRAND CONSERVANCY) BEEN GIVEN CONSIDERATION; HOW WILL THE STUDY EFFECT PUBLIC ACCESS.

2. Other comments about the study.

MANY QUESTIONS.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: BILL DORY

Address: 374 BUFFALO CIR. SE.

City, State, Zip: ABQ. N.M. 87123

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?
natural resources + cultural + social !

2. Other comments about the study.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Desiree Dishero

Address: 13117 Candelaria NE #5

City, State, Zip: 87112

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Charles W. Kolberg

Address: PO Box 2248

City, State, Zip: Albuquerque, NM 87103

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

COE-TAG

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

How will the study address long-term maintenance?

- Vegetation concerns, ie:
  colonization of treated areas by noxious weeds (like perennial pepperweed)
  resprouting
  reseeding in treated areas
- Erosion/Sedimentation concerns, i.e:
  impact of equipment/soil disturbance
  slopes (banks, levees)
  degradation of water quality
  etc.

2. ~~Other comments about the study.~~

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Ciudad Soil & Water Consevation District

Address: 6200 Jefferson NE, Rm. 125

City, State, Zip: Albuquerque, NM 87109

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

COE - TAG

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

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1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

POTENTIAL FOR OVERBANK FLOWS AND FLOODING IS A CONCERN. NWS IS RESPONSIBLE FOR ISSUING FLOOD STATEMENTS AND FLOOD WARNINGS. CHANGES FROM EXISTING CONDITIONS WILL REQUIRE RE-EXAMING OUR ESTABLISHED BANKFUL & FLOOD STAGES FOR THE REACH SPECIFIED. OUR OFFICIAL RIVER FORECAST POINT IS THE USGS GAGING STATION ON THE OLD TOWN BRIDGE.

2. Other comments about the study.

ED POLASKO
SERVICE HYDROLOGIST
NWS ABQ
505-244-9147
EXT 228

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: ED POLASKO, NATIONAL WEATHER SERVICE

Address: 2341 CLARK CARR LOOP SE

City, State, Zip: ABQ NM 87106

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

FAX COVER SHEET

DATE: 1-22-03

FAX NUMBER: 505 342-3197

TO: Fritz Blake - Project Manager

FROM: Jane Nedom
HARRISON MIDDLE SCHOOL

No.1 of 2 **pages**

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

In my "Adapted Site" we are saving sections and hand clearing for learning Stations. These Stations include Jetty Jacks and vegetation surrounding them that are used for birds and other animals. large "specimen" trees i.e. large willow, A- Burned Snag to exhibit Nature, lightening decomposition, Area of Herba manza which is us and has been used for medicinal purpo

2. Other comments about the study:

These are just a few examples of specific areas that are invaluable as a teaching statio for our youth and generations to come. Beaver damag and other necessary habitat are ~~attributes~~ types of centers for our learning station. I would like to visit more at length about our plans + long term goal These Learning Stations will eventually have educational materials available at their sites.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Jane Nedom

Address: c/o 3912 Isleta Blvd. SW

City, State, Zip: Albuq. NM 87105

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?
Look at existing ecosystem, although restored, is today vital diverse and well adapted to our environment.
The huge amount of trash from city streets entering the river @ N. diversion channel

2. Other comments about the study.
Whatever is done in terms of "restoration" should be balanced. Some controls should be left.
Where is the money to maintain the restoration in future years?

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☒ Please remove my name from the study mailing list.

Name: Kevin McCormack

Address: 10451 4th St NW

City, State, Zip: ABQ NM 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

2. Other comments about the study.

This study is important to ensure the health of the bosque. I enjoy visiting the trails and hope that future generations will have the same opportunity. I'm interested in any proposed action on this wonderful resource.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Jackie Bouker

Address: 414 Mission Ave. NE

City, State, Zip: Albuquerque, NM 87107

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

ease make your comments specific to the proposal described in the attached letter.

What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study?

- Could this change the river flood zone beyond the levees?
- I am concerned about the impact of the proposed water reclamation dams that is proposed N of Paseo Del Norte and wonder about the impact of such a major project on the bosque habitat.

Other comments about the study.

- I would like to see the jetty jacks removed - I doubt that modern theory would support the use of such a system anyway and they provide physical barriers as well as ~~intr~~reduce the natural appeal of the bosque
- I would like to see the salt cedars removed & return the natural foliage.

Please attach additional sheets if desired.

☒ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Neil & Diane Tewes

Address: 10077 Bosque Ck NW

City, State, Zip: Albq, NM 87114

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Ecosystem Restoration at Route 66 Study
Albuquerque, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the study? Restoration is a good idea

2. Other comments about the study.

Please attach additional sheets if desired.

☑ Please keep my name on the study mailing list. ☐ Please remove my name from the study mailing list.

Name: Steve Miller

Address: RR5 Box 302A

City, State, Zip: Santa Fe, NM 87506

Please mail or fax your specific written comments by 28 February 2003 to:

Fritz Blake
Project Manager
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Place NE
Albuquerque, NM 87109
Fax: (505) 342-3197

Bosque Clients

COMPANY	CONTACT	STREET ADDRESS	CITY, STATE ZIP
Adobe Acres Neighborhood Assoc.	Delia Ruiloba	4002 Calle del Prado SW	Albuquerque, NM 87105
Alban Hills Neighborhood Assoc.	Jim Shepherd	6566 Calle Redonda NW	Albuquerque, NM 87120
Albuquerque Area Office	Rob Baraker	P.O. Box 26567	Albuquerque, NM 87125-6567
Albuquerque Bicycle Center	Lee Newsom	1570 Juan Tabo NE	Albuquerque, NM 87112
Albuquerque Journal	Lisa Abeyta, Freelance Journalist	7777 Jefferson NE	Albuquerque, NM 87109
AMAFCA	Jerry Lovato	2600 Prospect Ave NE	Albuquerque, NM 87107
AMAFCA	John Kelly	2600 Prospect Ave NE	Albuquerque, NM 87107
Armijo Neighborhood Assoc.	Clara Pena	710 Isleta SW	Albuquerque, NM 87105
Barcelona Neighborhood Assoc.	Daniel Denton	2903 El Corto Dr. SW	Albuquerque, NM 87105
Bernalillo County	Carl Berglund	2400 Broadway SE	Albuquerque, NM 87104
Bernalillo County	Clay Campbell, Senior Park Plann	111 Union Square	Albuquerque, NM 87102
Bohannan Huston	Gordon Walhood	7500 Jefferson St. NE	Albuquerque, NM 87109
Bosque del Acres Neighborhood Assoc.	Thomas Schroeder	9731 Loretta NW	Albuquerque, NM 87114
Bosque Restoration	Sally McGrath	P.O. Box 3114	Corrales, NM 87048
Buckboard Neighborhood Assoc.	Carla Miszkiel	P.O. Box 561	Tijeras, NM 87059
Canyon Estates Neighborhood Assoc.	Sue Copus	41 Eagle Trail	Tijeras, NM 87059
Cibola National Forest	Deborah Walker	2113 Osuna Rd NE, Suite A	Albuquerque, NM 87113-1001
City of Albuquerque	Mayor Martin Chavez	City/County Building 11th Floor	Albuquerque, NM 87102
Albuquerque Planning Department	Richard Sertich	P.O. Box 1293	Albuquerque, NM 87103
Albuquerque Planning Department	Victor Chavez, Director	P.O. Box 1293	Albuquerque, NM 87102
Albuquerque Biological Park	Bob Morin, Operations Mgr.	903 10th Street SW	Albuquerque, NM 87102
Albuquerque Biological Park	Ray Darnell, Director	903 10th Street SW	Albuquerque, NM 87102
	Susan Cognetto	537 Riverside SW	Albuquerque, NM
Albuquerque Open Space Division	Matt Schmader	P.O. Box 1293	Albuquerque, NM 87103
Albuquerque Parks & Recreation Dept.	Blanca Hise, Director	1801 4th Street NW	Albuquerque, NM 87102
Albuquerque Public Works Dept.	John Stomp, Water Resources Mg	P.O. Box 1293	Albuquerque, NM 87103
Albuquerque Public Works Dept.	Charles T. Asbury, Director	P.O. Box 1293	Albuquerque, NM 87103
Albuquerque Public Works Dept.	James Chavez, Water Resources	P.O. Box 1293	Albuquerque, NM 87103
Ciudad Soil & Water Conservation Dist.	Susan Rich, Executive Director	6200 Jefferson NE, Room 125	Albuquerque, NM 87109
Conita Real Neighborhood Assoc.	Orlando Olivas	1911 Conita Real SW	Albuquerque, NM 87105
Coors Ranch Neighborhood Assoc.	Chyrel Sotelo	3013 Dona Juanita Pl SW	Albuquerque, NM 87121
Corrales Planning & Zoning	Claudia Smith, Director	294 Old Church Road	Corrales, NM 87048
Crestview Neighborhood Assoc.	Hank Westrich	74 Crestview Rd.	Edgewood, NM 87015

COMPANY	CONTACT	STREET ADDRESS	CITY, STATE ZIP
UNM, Dept. of Biology	Dr. Cliff Crawford	167 Castetter Hall - UNM	Albuquerque, NM 87131
UNM, Dept. of Biology	Dr. Bruce Milne	167A Castetter Hall	Albuquerque, NM 87131-1091
UNM, Dept. of Biology	Dr. Clifford Dahm	167A Castetter Hall	Albuquerque, NM 87131-1091
UNM, Dept. of Biology	Dr. Manuel Molles	167A Castetter Hall	Albuquerque, NM 87131-1091
UNM, Dept. of Biology	Dr. Bill Degenhardt, Curator Emer	Museum of Southwester Biology	Albuquerque, NM 87131
UNM, Dept. of Civil Engineering	Dr. Tim Ward	MSC01 1070, 1 UNM	Albuquerque, NM 87131-0001
UNM, Dept. of Civil Engineering	Clifford Anderson	Tapy Hall, Room 209	Albuquerque, NM 87131-1351
UNM, Dept. of Civil Engineering	Dr. Julie Coonrod	MSC01 1070, 1 UNM	Albuquerque, NM 87131-0001
UNM, Dept. of Geography	Bradley Cullen, Ph.D.	Geography Department	Albuquerque, NM 87131
Dept. of Science & Mathematics	Bill Sayre	1600 St. Michael's Drive	Santa Fe, NM 87505
CSWCD, District Conservationist	Corinne Brooks	6200 Jefferson NE, Room 125	Albuquerque, NM 87109
Don Felipe Neighborhood Assoc.	Ernest Baca	5239 Don Mariano SW	Albuquerque, NM 87105
Dona Pauline Neighborhood Assoc.	Richard Baca	1220 Montrose Pl SW	Albuquerque, NM 87105
Echo Canyon Neighborhood Assoc.	Keith Ross	9 Camino de Cielo NE	Albuquerque, NM 87123
El Paraiso Neighborhood	Mary Jane Fiala	505 Mullen Dr. NW	Albuquerque, NM 87107
Environment Department		Route 5, Box 315-A	Santa Fe, NM 87501
Eye Watchers Neighborhood Assoc.	Diane Zafra	115 Willow Rd. NW	Albuquerque, NM 87107
Senator Domenici's Office	Veronica Rodriguez	120 South Federal Place, RM 302	Santa Fe, NM 87501
Five Hills Area Neighborhood Assoc.	William Brandt	21 Holiday Dr.	Tijeras, NM 87059
Five Points Neighborhood Assoc.	John Sparks	3203 Rio Grande Blvd. NW	Albuquerque, NM 87107
Green Woods Neighborhood Assoc.	Kim Arthun	6660 Edgewood NW	Albuquerque, NM 87107
Heatherland Hills Landowners Assoc.	Dan Neal	17 Eric Alan Lane	Tijeras, NM 87059-0356
Horseshoe Valley Landowners Assoc.	Robert Morrell	168 Brannan Rd.	Tijeras, NM 87059
Juan Thomas Valley Landowners Assoc.	Jim Morgan	30 Young Rd.	Tijeras, NM 87059
Los Duranes Neighborhood Assoc.	Ruby Meek	3316 Beach Rd. NW	Albuquerque, NM 87104
Los Padillas Neighborhood Assoc.	Robert Chavez	22311 Black Mesa Lp. SW	Albuquerque, NM 87121
Los Ranchos de Albuquerque	Cynthia Tidwell, Planner	6718 Rio Grande Blvd NW	Albuquerque, NM 87107
Los Ranchos de Albuquerque	John Hooker, Mayor	6718 Rio Grande Blvd NW	Albuquerque, NM 87107
Lost Realm Neighborhood Assoc.	Crawford MacCallum	144 Sedillo Hill Rd.	Tijeras, NM 87059
Manzanita Neighborhood Assoc.	Windell Gilliam	9 Camino del Norte	Tijeras, NM 87059
Maria Diers Neighborhood Assoc.	Terry Cooper	97 Diers Rd NW	Albuquerque, NM 87114
Meade Estates Neighborhood Assoc.	Cathy Roybal	3425 Meade Place SW	Albuquerque, NM 87105
Middle Rio Grande Conservancy Dist.	Sterling Grogan	P.O. Box 581	Albuquerque, NM 87103-0581
Middle Rio Grande Conservancy Dist.	Subhas Shah, District Engineer	P.O. Box 581	Albuquerque, NM 87103-0581
Monticello Neighborhood Assoc.	Pamela Slater	25 Siempre Verde Dr.	Albuquerque, NM 87123

COMPANY	CONTACT	STREET ADDRESS	CITY, STATE ZIP
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Nature Conservancy of NM	Terry Sullivan	212 East Marcy St, Suite 200	Santa Fe, NM 87501
Nature Conservancy of NM	Richard Barish	3935 Anderson Avenue, SE	Albuquerque, NM 87108-4306
Nichols Road Neighborhood Assoc.	Mario Hernandez	33 Nichols Rd.	Tijeras, NM 87059
New Mexico State Land Office	Jennifer Parody	4308 Carlisle NE, Suite 209	Albuquerque, NM 87107
NMED, Surface Water Quality Bureau	Brian Wirtz	P.O. Box 26110	Santa Fe, NM 87504-6110
NM State Forestry/District VI	Nancy Neskauskas, District Forest	P.O. Box 458	Bernalillo, NM 87004
NM State Forestry	Charlie Wicklund, Forester	P.O. Box 1948	Santa Fe, NM 87504
N. Albq. Acres Community Assoc.	Jerry Janicke	12505 Del Rey Ave. NE	Albuquerque, NM 87122
North Edith Corridor Assoc.	George Montez	5150 A Edith NE	Albuquerque, NM 87107
Northeast Valley Neighborhood Assoc.	Linda Trujillo	508 Bear Canyon Ln. NE	Albuquerque, NM 87113
Office of the State Engineer	John D'Antonio, State Engineer	P.O. Box 25102	Santa Fe, NM 87504-5102
State Engineer's Office, District 1	Rolf Schmidt-Petersen	121 Tijeras NE, Suite 2000	Albuquerque, NM 87102
State Engineer's Office, District 1	Linda Tenorio	121 Tijeras NE, Suite 2000	Albuquerque, NM 87102
State Engineer's Office, District 1	Rhea Graham	121 Tijeras NE, Suite 2000	Albuquerque, NM 87102
State Engineer's Office, District 1	Nabil Shafike	121 Tijeras NE, Suite 2000	Albuquerque, NM 87102
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Ojo Grande Homeowners Assoc.	Dennis Hayes	P.O. Box 591	Tijeras, NM 87059
Open Meadow Ranch	Stuart Allmon	30 Open Meadow Dr.	Tijeras, NM 87059
Pajarito Village Assoc.	Joe Hlifka	2212 Don Felipe SW	Albuquerque, NM 87105
Paradise Hills Civic Assoc.	Larry Weaver	6001 Unitas Ct. NW	Albuquerque, NM 87114
Perry Road Neighborhood	Michele Chisolm	P.O. Box 12392	Albuquerque, NM 87105
Polar Acres Neighborhood Assoc.	Mary Sharp Davis	1911 Poplar Lane SW	Albuquerque, NM 87105
Ponderosa Pines Neighborhood Assoc.	Patricia Cote	106 Kuhn Dr.	Tijeras, NM 87059
Ponderosa Ranch Estates Landowners	Jim Szenasi	28 Ponderosa Dr.	Cedar Crest, NM 87008
Pueblo of Isleta	Jim Paitt, Environmental Program	P.O. Box 1270	Isleta Pueblo, NM 87022
Pueblo of Isleta	John Sorrell	P.O. Box 1270	Isleta Pueblo, NM 87022
Pueblo of Isleta	Lt. Governor Lawrence Lucero	P.O. Box 1270	Isleta Pueblo, NM 87022
Pueblo of Isleta	Phillip Jiron, Environmental Progr	P.O. Box 1270	Isleta Pueblo, NM 87022
Pueblo of Isleta	Governor Alvino Lucero	P.O. Box 1270	Isleta Pueblo, NM 87022
Pueblo of Sandia	Beth Janello, Enviromental Dept.	P.O. Box 6008	Bernalillo, NM 87004
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COMPANY	CONTACT	STREET ADDRESS	CITY, STATE ZIP
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Rincon Loop	Nancy Baugus	P.O. Box 217	Tijeras, NM 87059
Riverfront Estates Assoc.	Bob Ponto	9505 Dancing River NW	Albuquerque, NM 87114
Sabino Canyon Neighborhood Assoc.	Nita Brenholdt	P.O. Box 2043	Tijeras, NM 87059
Sandia Heights Homeowners Assoc.	Don Aunapu	2 B San Rafeal Ave. NE	Albuquerque, NM 87122
Sandia Knolls Neighborhood Assoc.	Kathy McCoy	P.O. Box 617	Cedar Crest, NM 87008
Sandia Mountain Ranch	John Brink	25 Western Saddle Dr.	Tijeras, NM 87059
Sandia Park Neighborhood Assoc.	Lois Johnson	P.O. Box 382	Sandia Park, NM 87047
Sedillo Road Neighborhood Assoc.	Linda Barbour	22 Anne Ct.	Tijeras, NM 87059
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Senator Bingaman's Office	Sharon Miner	625 Silver Ave SW, Suite 130	Albuquerque, NM 87120
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Sierra Vista South	Yvonne Rhodes	P.O. Box 347; 15 High Contry Dr.	Cedar Crest, NM 87008
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Southside Farms Community Assoc.	Reina Jimenez	1358 Lakeview SW	Albuquerque, NM 87105
Sunhills Neighborhood Assoc.	Loretta Chavez	2732 Barcelona Pl. SW	Albuquerque, NM 87105
Sunset Hills Homeowners Assoc. Inc.	Tom Morrow	9600 Desert Mountain NE	Albuquerque, NM 87122
Tablazon Neighborhood Assoc.	Richard Besser	22 Venado Rd.	Tijeras, NM 87059
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COMPANY	CONTACT	STREET ADDRESS	CITY, STATE ZIP
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U.S. Fish & Wildlife Service	Brian Ortiz	2105 Osuna Road NE	Albuquerque, NM 87113
U.S. Fish & Wildlife Service	Chris Hoagstom	2105 Osuna Road NE	Albuquerque, NM 87113
U.S. Fish & Wildlife Service	Chris Perez	2105 Osuna Road NE	Albuquerque, NM 87113
U.S. Fish & Wildlife Service	Jim Brooks	2105 Osuna Road NE	Albuquerque, NM 87113
U.S. Fish & Wildlife Service	Patricia Zenone	2105 Osuna Road NE	Albuquerque, NM 87113
U.S. Fish & Wildlife Service	Russ MacRae	2105 Osuna Road NE	Albuquerque, NM 87113
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U.S. Fish & Wildlife Service	Brian Hanson	2105 Osuna Road NE	Albuquerque, NM 87113
U.S. Fish & Wildlife Service	Joy Nicholopoulos, Field Supervis	2105 Osuna Road NE	Albuquerque, NM 87113
U.S. Fish & Wildlife Service	Jude Smith	2105 Osuna Road NE	Albuquerque, NM 87113
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Valencia SWCD	Lucy Aragon	267 Courthouse Road	Los Lunas, NM 87031
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COMPANY	CONTACT	STREET ADDRESS	CITY, STATE ZIP
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Vista de Manana Neighborhood Assn.	Garry & Elsie Kather	27 Paso de Paz	Tijeras, NM 87059
West Old Town Neighborhood Assoc.	Ben Lovato	2820 Azar Rd. NW	Albuquerque, NM 87104
Wildwood Lane Neighborhood Assoc.	John Gould	1800 Wildwood Lane SW	Albuquerque, NM 87105
Zia Gardens Neighborhood Assoc.	Jennifer Burnes	137 Velarde Rd. NW	Albuquerque, NM 87107
	Shannon Horst	#1 El Nido Amado SW	Albuquerque, NM 87121
	Karen Foster	10 Paseo Circhlo NE	Albuquerque, NM 87123
	Bruce Hopper	10005 4th St. NW	Albuquerque, NM 87123
	Robert Barr	10005 Eldridge NW	Albuquerque, NM 87114
	Elaine Brouillard	1001 University Blvd SE, Ste 103	Albuquerque, NM 87106
	Bill Waller	10011 Irbid Rd NE	Albuquerque, NM 87122
	Tom Anderson	10013 Plunkett Dr NW	Albuquerque, NM 87114
	Richard Becker	1005 Indiana St. SE	Albuquerque, NM 87102
	Valerie Reighard	1006 San Lorenzo NW	Albuquerque, NM 87107
	Richard Lindberg	1007 Roadrunner Lane NW	Albuquerque, NM 87107
	Diane Tewes	10077 Bosque Circle NW	Albuquerque, NM 87114
	Jerry & Sylvia Goffe	1009 El Alhambra Cr NW	Albuquerque, NM 87107
	Pearl Yeast	10101 Maya Ct. NE	Albuquerque, NM 87111
	Rich Miera	1011 Forrester NW	Albuquerque, NM 87102
	Sherry Morelock	10149 Bosque Cr. NW	Albuquerque, NM 87114
	Deborah Potter	1019 Guadalupe Ct. NW	Alameda, NM 87114
	Chris Hoden	1020 Stuart Rd. NW	Albuquerque, NM 87114
	Gerald Sussman	1024 City Lights Drive NE	Albuquerque, NM 87111
	John Carrangelo	103 Neel Street	Socorro, NM 87801
	Nyleen Stowe	103 Neel Street	Socorro, NM 87801
	Kathy Tomlinson	104 Diers Rd NW	Albuquerque, NM 87114
	Roger Magdalena	1043 Highway 313	Bernalillo, NM 87004
	Jim & Lisa Graham	1043 Monte Largo Dr NE	Albuquerque, NM 87123
	Leandra Hussey	1044 Sandia Vista Rd. NE	Albuquerque, NM 87124
	Kevin McCormack	10451 4th St. NW	Albuquerque, NM 87114
	Lou Ann Kovarna	10451 4th St. NW	Albuquerque, NM 87114
	Anna Hamilton	105 Cienega Street	Santa Fe, NM 87502
	Jolinda Balmer	10590 Vista Bella Pl	Albuquerque, NM 87114
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	Valerie Pagilaro	11112 Paris NE	Albuquerque, NM 87111
	James Guiterrez	1115 Cerro Vista SW	Albuquerque, NM 87105
	Denise Fort	1117 Stanford NE	Albuquerque, NM 87131
	Judy Flynn-O'Brien	1117 Stanford NE	Albuquerque, NM 87131-1446
	Rae Van Hoven	1120 Cerrillos Road	Santa Fe, NM 87501-4142
	Allison & Tom Coe	116 Walter NE	Albuquerque, NM 87102
	Tommy Thompson	11600 Academy NE, #1524	Albuquerque, NM 87111
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New Mexico Environment Department	Ron Curry, Secretary	P.O. Box 26110	Santa Fe, NM 87502-6110
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	Sally Fish	121 Cynthia Loop NW	Albuquerque, NM 87114
	Joan Coppens	1216 Nakomis Drive #L	Albuquerque, NM 87112
	Donald Kolkmeyer	1216 Western Meadows	Albuquerque, NM 87114
	Johnananna Gonzales	1217 Isleta Blvd SW	Albuquerque, NM 87105
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	Letty Belin	1239 Madrid Road	Madrid, NM 87501
	Pauline Rael	124 Willow Rd NW	Albuquerque, NM 87107
	Paul Daily	12904 Hugh Graham NE	Albuquerque, NM 87111
	Cathy Boilinger	13001 Sunrise Trail Pl. NE	Albuquerque, NM 87111
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	Celestino Gachupin	135 Capitol Square Drive	Zia Pueblo, NM 87053-6013
	Harold Reid	135 Capitol Square Drive	Zia Pueblo, NM 87053-6013
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	Paul Mckey	1371 Wagon Train Drive SE	Albuquerque, NM 87112
	Susan Cornes	14 Baugus Lane	Edgewood, NM 87015
	Ellie Robinson	14 Rossiter	Cedar Crest, NM 87008
	Jan Kramer	140 Five Hills Dr	Tijeras, NM 87059
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	John Horning	1411 2nd Street, Suite 1	Santa Fe, NM 87505-3486
	Melinda Smith	1417 Princeton NE	Albuquerque, NM 87112
	Don & Yvonne Heuszel	14356 Camino Del Rey NE	Albuquerque, NM 87123
	Robert Hall	144 Green Valley NW	Albuquerque, NM 87107
	Leonard Atencio	1474 Rodeo Road	Santa Fe, NM 87505
	Cindy Brindley	15 Jaybird Loop	Los Lunas, NM 87031
	Rick Hawpe	1501 Polo NW	Albuquerque, NM 87114
	Jerry Galassini	1504 Erwin Pl NW	Albuquerque, NM 87114
	Chuck Lee	1504 Tejana Mesa Pl. NE	Albuquerque, NM 87112
	William DeBuys	1511 Don Gaspar	Santa Fe, NM 87501
	Cherie Skinner	1513 Wellesley NE	Albuquerque, NM 87106
	Anne Dobernich	1516 Plaza Encantada NW	Albuquerque, NM 87101
	Robert Kunkle	1519 Erwin Pl NW	Albuquerque, NM 87114
	Matt Coulombe	152 Kuhn Rd	Tijeras, NM 87059
	Duke & Pat Colket	1523 Eagle Ridge NE	Albuquerque, NM 87122
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	Steve Petrakis	1703 Escalante SW	Albuquerque, NM 87104
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	Lisa Bastian	181 La Vega Drive SW	Albuquerque, NM 87105
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	Senator DeDe Feldman	1821 Meadowview Dr. NW	Albuquerque, NM 87104
	Robert Gardiner	1824 Tramway Terrace Loop NE	Albuquerque, NM 87122
	Lillian Gasis	1832 Conestoga Drive SE	Albuquerque, NM 87123
	Mike Moye	1836 Wildwood Lane SW	Albuquerque, NM 87105
	Gary O'Dea	184 Rierra Encantada	Corrales, NM 87048
	Ray Lucas	190 Brannon Rd	Tijeras, NM 87059
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	Pete Eschman	1916 Conita Real SW	Albuquerque, NM 87105
	Toni Unwin	1921 Poplar Lane SW	Albuquerque, NM 87105
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	Carol Parker	2 Calle Ponderosa	Placitas, NM 87043
	Bruce Sanchez	2 Dove Road	Bernalillo, NM 87004
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	Karen Quisenberry	207 D Cornell SE	Albuquerque, NM 87106
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	Jean Gauna	211 10th Street, SW	Albuquerque, NM 87102
	Trisha Lundlum	2112 Campbell Rd NW	Albuquerque, NM 87104
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	Lori Floyd	2516 Gretta NE	Albuquerque, NM 87112
	Maryll & Tom Dauphinee	2528 Bosque Entrada Tr. NW	Albuquerque, NM 87120
	Frank Padilla	2609 Rio Orilla Lane NW	Albuquerque, NM 87120
	Angie Romero	2625 Fantozzi Rd SW	Albuquerque, NM 87105
	Jose Mendoza	2650 Del Sur Dr. SW	Albuquerque, NM 87105
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	Jim Timmons	2715 Pueblo Grande NW	Albuquerque, NM 87120
	Lisa Wishard	2718 Tramway Circle NE	Albuquerque, NM 87122
	Ruth Barros	2725 Barcelona Pl SW	Albuquerque, NM 87121
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Albuquerque Fire Department	Terrel Treat	11510 Sunset Gardens SW	Albuquerque, NM 87121

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Senator Domenici's Office	Joaquin Sanchez	SH-328, United States Senate	Washington D.C. 20510
	Amy Jones	1825 Poplar SW	Albuquerque, NM 87105
	Sandra L. Stegeman	1720 Poplar SW	Albuquerque, NM 87105
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New Mexico Dept. of Game & Fish	Rick Castell	3841 Midway Place NE	Albuquerque, NM 87109
	Larry Caudill	4915 Watercress NE	Albuquerque, NM 87113
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New Mexico State Land Office	Andrew Ortiz	P.O. Box 1148	Santa Fe, NM 87504
World Wildlife Fund	Beth Bardwell	100 East Hadley Street	Las Cruces, NM 88001
	Dolores G. Hoffman	3216 Los Lentes Road SE	Los Lunas, NM 87031
	Charles Kolberg	P.O. Box 2248	Albuquerque, NM 87103
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Bohannan Huston	Scott Armstrong	7500 Jefferson St. NE	Albuquerque, NM 87109
Albuquerque Open Space Division	Jay Hart	P.O. Box 1293	Albuquerque, NM 87103
Ciudad Soil & Water Conservation Dist.	Lori Weber	6200 Jefferson NE, Room 125	Albuquerque, NM 87109
Downtown Action Team	Luisa Lindsey	111 Fifth Street NW	Albuquerque, NM 87102
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U.S. Bureau of Reclamation	Nancy Umbreit	505 Marquette NW, Suite 1313	Albuquerque, NM 87102-2162
Riverbend Engineering	Christopher S. Philips, PE	5929 Pauline St. NW	Albuquerque, NM 87107
	Roema Ashby	2930 Floral Road NW	Albuquerque, NM 87104
	Joaquin Sanchez	1400 Joyce Street	Arlington, VA 22202
	Betty Trahan	2700 Vista Grande NW #59	Albuquerque, NM 87120
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Bernalillo County, Dept. of Public Works	Martin Garcia	2400 Broadway SE	Albuquerque, NM 87102
New Mexico Interstate Stream Commission	Estevan Lopez	Bataan Memorial Bldg, P.O Box 2	Santa Fe, NM 87504-4102
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Huning Castle Neighborhood Assoc.	Gregory Hicks	400 San Pasquale Ave SW	Albuquerque, NM 87104
Barelas Neighborhood Association	Robert J. Vigil, c/o Barelas CDC	700 Fourth Street SW	Albuquerque, NM 87102
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	R.R. and S.E. Rager	20 Canada Vista Drive	Sandia Park, NM 87047
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UNM, Dept. of Civil Engineering	Dr. Bruce Thomson	MSC01 1070, 1 UNM	Albuquerque, NM 87131-0001
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Senate Appropriations Committee	Scott O'Malia	127 Dirksen Building, United Stat	Washington, D.C. 20510
Senator Domenici's Office	Tara Shaw	SH-328, United States Senate	Washington, D.C. 20510-3101

Appendix B. U.S. Fish and Wildlife Coordination Act Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

July 15, 2008

Cons. # 22420-2008-FA-0037

Lt. Colonel Kimberly M. Colloton
Attn: Ondrea Hummel
Environmental Resources
U.S. Army Corps of Engineers
Albuquerque, New Mexico 87109

Re: Final Fish and Wildlife Coordination Act Report for the Ecosystem Revitalization @ Route 66 Project, Albuquerque, New Mexico.

Dear Lt. Colonel Colloton:

Enclosed is the Final Fish and Wildlife Coordination Act Report for the referenced project in Bernalillo County, New Mexico, proposed by the U.S. Army Corps of Engineers, Albuquerque District. The proposed project on the Rio Grande addresses restoration of riverine, riparian, and wetland habitats.

This report has been prepared by U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, under authority of and in accordance with the requirements of Section 1135 of the Water Resources Development Act of 1986 (Public Law 99-662).

Sincerely,

Wally Murphy
Field Supervisor

Enclosure

Final Fish and Wildlife Coordination Act Report
for the
Ecosystem Revitalization Project @ Route 66
Albuquerque, New Mexico

Submitted to:
U.S. Army Corps of Engineers
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109-3435

Prepared by:
Santiago Gonzales
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque, New Mexico 87113

July 2008

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EXECUTIVE SUMMARY

This is the Final Fish and Wildlife Coordination Act Report (CAR) for the Ecosystem Revitalization @ Route 66 Project (Project), Albuquerque, New Mexico, prepared by the U.S. Fish and Wildlife Service (Service). This Project is being conducted under the authority of Section 1135 of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662). The objective of this authority is to improve the quality of the environment through modification of the structure or operation of existing water resources projects constructed by the U.S. Army Corps of Engineers (USACE), providing modifications that are feasible and consistent with the original project purpose. Improvements in ecosystem structure and function in areas adversely affected by such projects are also included in this CAR. This report has been prepared in cooperation with the USACE.

The purpose of the Project is to undertake environmental restoration measures to improve the function of the Rio Grande bosque ecosystem in central Albuquerque. Potential alternatives include removing jetty jacks and non-native vegetation, such as salt cedar, Russian olive and Siberian elm, enhancing existing high-flow channels, outfall wetlands, and other alterations to the floodplain. Improvements of existing facilities for educational, interpretive and low-impact recreational uses have also been considered in the Route 66 Project.

The overall goal of the project is to restore the dynamic bosque mosaic of open areas, woodland patches, shrub patches and wet areas. The ecosystem restoration objectives for the Project include: 1) enhancement of the native cottonwood community; 2) enhancement and increasing the number of water-related habitat features in the bosque; 3) implement limited measures to rehabilitate some hydraulic connection between the bosque and the river consistent with operational constraints; 4) protect, extend and enhance areas of potential habitat for listed species within the existing bosque; 5) prevent catastrophic fires in the bosque through the reduction of fuel loads identified as hazardous; 6) develop and implement with the sponsor a long-term Operations, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) plan and long-term monitoring strategy; 7) coordinate and integrate related project planning and monitoring with other ongoing restoration and research efforts in the bosque; and 8) increase access and opportunities for education and low-impact recreation that is compatible with ecosystem integrity.

The Middle Rio Grande has one of the highest value riparian ecosystems remaining in the Southwest. The variety of vegetation types support a relatively high diversity and number of animals. The vegetation communities of the bosque in the Project Area are the result of an altered flow regime, drainage for agriculture and development, levees, channelization and straight armored bank formation from Kellner jack construction; and the growth of exotic salt cedar, Russian olive, and Siberian elm. Overbank flooding and in-channel scouring rarely occurs, reducing the opportunity for cottonwood regeneration. The introduction and subsequent establishment of salt cedar, Russian olive, and other exotic plants that thrive in the altered hydrologic regime has significantly degraded the

riparian plant community. In addition, these conditions limit the formation and maintenance of wetlands, a habitat type that is extremely limited in the Project Area. Changes to the river channel and floodplain that affect how base flow and flood currents move downstream and across the floodplain (dams, levees, channelization, etc.) would continue to have effects on patterns of erosion, aggradation, and maintenance or regeneration of riparian vegetation. There are approximately 643 acres of riparian woodlands within the Project Study Area where project alternatives were considered.

Through implementation of the Preferred Alternative, five out of eleven Solution Areas– totaling approximately 121 acres of bosque would be restored by enhancing hydrologic function and restoring native vegetation. In addition, recreational use of the bosque would be improved by creating designated trails with benches, signs and other interpretive features.

In the Project Area, past actions have reduced the total habitat from historic conditions and severely altered habitat conditions for the minnow. Narrowing and deepening of the channel, lack of side channels and off-channel pools, and changes in natural flow regimes have all adversely affected the minnow and its habitat.

Without the Project the river, floodplain, and the associated fish and wildlife would continue to experience adverse effects from Federal, state, and private actions, including new and long-term ongoing activities. The Project provides opportunities to restore some Rio Grande ecosystem biological components to benefit fish and wildlife resources. The Project represents the extensive coordination of ideas and planning on a multi-party level. Project implementation and reporting of the monitoring results will also provide valuable information for future projects in a river-based ecosystem approach to restoration throughout the Middle Rio Grande.

The proposed restoration plan incorporates many of the recommendations from the Middle Rio Grande Ecosystem: Bosque Biological Management Plan. The proposed plan would create wetlands within the Rio Grande riparian zone; and would sustain and enhance existing cottonwood communities as well as create new native cottonwood and willow communities.

Activities that restore and enhance fish and wildlife habitat within the Middle Rio Grande are timely, as riparian and wetland habitats are scare and disappearing at an astonishing rate. About 90 percent of the historic wetland and riparian habitat in the Southwest has been eliminated.

The Service is encouraged by the restoration and conservation of valuable fish and wildlife resources represented by the proposed project. The following recommendations are provided by the Service to prevent and reduce adverse project effects on fish and wildlife resources during construction, operation, and maintenance of the proposed project:

1. Where possible, avoid construction during the migratory bird nesting season of March through August. Where that is not possible, tree stands or other adequately vegetated areas slated for grubbing or clearing should be surveyed for the presence of nesting birds prior to construction. Avoid disturbing nesting areas until nesting is complete.

2. Employ silt curtains without lead weights, cofferdams, dikes, straw bales or other suitable erosion control measures during construction.

3. Store and dispense fuels, lubricants, hydraulic fluids, and other petrochemicals outside the 100-year floodplain. Inspect construction equipment daily for petrochemical leaks. Contain and remove any petrochemical spills and dispose of these materials at an approved upland site. Park construction equipment outside the 100-year floodplain during periods of inactivity.

4. Ensure equipment operators carry an oil spill kit or spill blanket at all times and are knowledgeable in the use of spill containment equipment. Develop a spill contingency plan prior to initiation of construction. Immediately notify the proper Federal and state authorities in the event of a spill.

5. All work and staging areas should be limited to the minimum amount of area required. Existing roads and right-of-ways and staging areas should be used to the greatest extent practicable to transport equipment and construction materials to the project site, and described in the USACE's project description. Provide designated areas for vehicle turn around and maneuvering to protect riparian areas from unnecessary damage.

6. Backfill with uncontaminated earth or alluvium suitable for re-vegetation with native plant species.

7. Scarify compacted soils or replace topsoil and revegetate all disturbed sites with suitable mixture of native grasses, forbs, and woody shrubs.

8. Protect mature cottonwood trees from damage during clearing of non-native species or other construction activities using fencing, or other appropriate materials.

9. Use local genetic stock wherever possible in the native plant species establishment throughout the riparian area.

10. Continue coordination of Rio Grande water management activities that develop and maintain riverine and terrestrial habitats by mimicking the typical natural hydrograph. An intergraded management of flows from upstream reservoirs should be pursued by USACE for the purpose of protecting and enhancing the aquatic and terrestrial habitats along the Rio Grande.

11. Pursue and conduct floodplain management activities that discourage further development in the floodplain and address physical constraints to the higher flows that would be part of a natural hydrograph.

12. Explore expansion of the active floodplain of the Rio Grande at every opportunity.

13. Develop a coordinated program to monitor biological quality with emphasis on diversity and abundance of native species and ecosystem integrity with emphasis on restoring the functional connection between the river and the riparian zone of the Middle Rio Grande ecosystem.

14. Develop partnerships with local schools, universities, or other interested groups to help address post-project monitoring and adaptive management needs (e.g., conduct periodic wildlife surveys, monitoring ecosystem response, etc.).

INTRODUCTION

Identification of Purpose, Scope, and Authority

This is the Final Fish and Wildlife Coordination Act Report (CAR) for the Ecosystem Revitalization @ Route 66 Project (Project), Albuquerque, New Mexico, prepared by the U.S. Fish and Wildlife Service (Service). This Ecosystem Revitalization @ Route 66 Project is being conducted under the authority of Section 1135 of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662). The objective of this authority is to improve the quality of the environment through modification of the structure or operation of existing water resources projects constructed by the US Army Corps of Engineers (USACE), providing modifications that are feasible and consistent with the original project purpose. Improvements in ecosystem structure and function in areas adversely affected by such projects are also included in this CAR. This report has been prepared in cooperation with the.USACE Should project plans change or a considerable amount of time elapse before this project begins to be constructed, impacts on fish and wildlife should be re-examined.

The Rio Grande in New Mexico has been negatively impacted by water diversions, dams, levees, drains, channelization, jetty jacks, and urbanization. Water management has altered the river channel and floodplain, and has altered the flow regime. Willow and cottonwood recruitment has declined, noxious plants have increased in abundance, combustible organic litter has accumulated, wetlands have been lost, and the overall value of aquatic and bosque (Spanish word for woodland or forest) habitat has declined. Urbanization has also impacted the Rio Grande via widespread trash and debris dumping, high-impact recreational use, and human induced bosque fires. In response to these issues, the Middle Rio Grande Conservancy District (MRGCD) initiated a request to the USACE under Section 1135 of the Water Resource Development Act of 1986, as amended, to restore and enhance the Rio Grande bosque ecosystem.

The placement of levees and installation of Kellner jetty jacks for bank stabilization on the Rio Grande and some of its tributaries (Public Law 80-858) have contributed to the degradation of riparian/wetland ecosystem functions and values. Additionally, the completion of the Jemez Dam on the Jemez River in 1953 which was authorized for sediment control (Public Law 80-858), and Cochiti Dam on the Rio Grande, in 1975 authorized for flood and sediment control (Public law 86-645) reduced the frequency and intensity of overbank flooding contributing further to the degradation of riparian ecosystem functions and values of the Middle Rio Grande bosque. All of these projects are part of the comprehensive flood control plan for the Rio Grande watershed authorized in the Flood Control Act of 1948.

The purpose of the Project is to undertake environmental restoration measures to improve the Rio Grande bosque ecosystem function in central Albuquerque. Potential alternatives include removing jetty jacks and non-native vegetation, such as salt cedar, Russian olive and Siberian elm, enhancing existing high-flow channels, outfall wetlands, and other alterations to the

floodplain. Improvements of existing facilities for educational, interpretive and low-impact recreational uses have also been considered in the Route 66 Project.

The MRGCD is the non-federal sponsor for this Project. The MRGCD manages most of the bosque and controls and maintains a system of canals, drainage ways and other facilities along the Middle Rio Grande from Cochiti Dam downstream to the northern boundary of Bosque del Apache National Wildlife Refuge. The City of Albuquerque (COA) Open Space Division (OSD) co-manages the bosque within the Project Area, and is a critical partner in the development and implementation of this preferred alternative. The OSD manages 33,000 acres of bosque in the COA.

The overall goal of the project is to restore the dynamic bosque mosaic of open areas, woodland patches, shrub patches and wet areas. The ecosystem restoration objectives for the project include: 1) enhancement of the native cottonwood community; 2) enhancement and increasing the number of water-related habitat features in the bosque; 3) implement limited measures to rehabilitate some hydraulic connection between the bosque and the river consistent with operational constraints; 4) protect, extend and enhance areas of potential habitat for listed species within the existing bosque; 5) prevent catastrophic fires in the bosque through the reduction of fuel loads identified as hazardous; 6) develop and implement with the sponsor a long-term Operations, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) plan and long-term monitoring strategy; 7) coordinate and integrate related project planning and monitoring with other ongoing restoration and research efforts in the bosque; and 8) increase access and opportunities for education and low-impact recreation that is compatible with ecosystem integrity.

This CAR provides information concerning: 1) the Project Area; 2) fish and wildlife resources; 3) an evaluation of the impacts of the preferred alternative; and 4) a discussion ; and recommendations to avoid or minimize adverse effects and maximize benefits for fish and wildlife resources.

ACKNOWLEDMENT OF INPUT AND COORDINATION

The Project Delivery Team responsible for the planning process included representatives of the MRGCD, OSD and New Mexico State Parks (NMSP) in addition to the USACE and their consultants. As part of identifying the Preferred Alternative, a number of alternative plans were developed by the Project Delivery Team and compared with the “no action alternative,” allowing for the ultimate identification of the Recommended Plan or National Ecosystem Restoration (NER) Plan. The NER Plan reasonably maximizes ecosystem restoration benefits compared to costs, considering the cost-effectiveness and incremental cost of implementing other restoration options.

Discussion of Prior Studies and/or Reports

In the late 1980s the Bosque Initiative was begun by representatives of management agencies, including the USACE. This interagency team drafted the Middle Rio Grande Bosque Biological Management Plan (1993) (MRGBBMP), a guiding document for all subsequent restoration projects in the Middle Rio Grande, including the Bosque Revitalization at Route 66 Project. Under the direction of the Bosque Improvement Group (BIG), the Bosque Initiative has continued to provide funding to a number of small research and restoration projects, including the Bosque Ecosystem Monitoring Program (BEMP) at the Rio Grande Restoration site near the Tingley Ponds.

USACE projects currently underway in the area of the Middle Rio Grande bosque include a series of projects known as the Middle Rio Grande Restoration Projects. This initiative comprises four projects as follows: 1) Albuquerque Bio-Park Tingley Ponds and Wetland Restoration (construction completed in October 2005), 2) Middle Rio Grande Bosque Restoration (in Feasibility Study phase), 3) Bosque Revitalization at Route 66, the subject of this report and 4) the Bosque Wildfire Project (ongoing construction since 2004).

The first of these studies, the Albuquerque Biological Park Tingley Ponds and Wetlands Restoration Project (Bio-Park Project), is a Section 1135 Feasibility Project undertaken by the USACE at the request of the COA in 2001 to determine the advisability of rehabilitating the ponds at Tingley Beach and constructing a series of new wetlands within the adjacent bosque. The COA through the Albuquerque Biological Park, was the non-federal Sponsor for that project. The report and environmental assessment for the Bio-Park Project was completed in February 2004. The project's goal is to increase the acreage, quality and diversity of aquatic habitat in Tingley Ponds by constructing a wetlands complex in the adjacent bosque. The USACE completed the construction project in the fall of 2005.

The second of these studies, the Middle Rio Grande Bosque Restoration Study, is a 905b General Investigation Study (the Bosque Restoration Project). It was initiated in spring 2002 to determine if there is a Federal interest in restoring the Rio Grande Bosque in the vicinity of Albuquerque, New Mexico. The Study Area of the Bosque Restoration Project roughly corresponds to the boundaries of the Rio Grande Valley State Park (RGVSP). The sponsor for this project is the MRGCD. The authorization for the Reconnaissance Phase of this study is contained in U.S. House of Representatives Resolution 107-258 for fiscal year 2002. On July 28, 2002, the Reconnaissance Report for this study was approved at the Headquarters of the USACE in Washington, D.C. for funding by Congress. The planning process included considerable community and stakeholder input in developing overall goals, objectives and concepts for future restoration efforts. These concepts were summarized in the Middle Rio Grande Bosque Restoration Supplemental Planning Information Document, which was completed in summer 2003. The feasibility phase for the Bosque Restoration Study began in 2005, and is proposed to be complete in 2008.

The third and present Study is the Ecosystem Revitalization @ Route 66 Project. The Study

began at the end of 2002. The area encompassed by the Project is probably the most intensively used area of the bosque within the Middle Rio Grande reach and was identified as a high priority restoration area in the Bosque Restoration Study. The Route 66 Project has incorporated concepts and community input developed during the Bosque Restoration Study. The implementation of the Study would, in turn, provide important guidance for the feasibility phase of the Bosque Restoration Study.

The fourth study is the Bosque Wildfire Project undertaken in the spring of 2004 in response to the bosque fires in summer 2003. The project would reduce the probability of catastrophic fire through removal of access obstacles and increasing the number of access points. The draft environmental assessment was released to the public in July 2004 and was finalized in September 2004.

In addition to these projects, there are several other USACE projects that affect the planning in the Project area. The USACE, in conjunction with the U.S. Bureau of Reclamation and the New Mexico Interstate Stream Commission (NMISC) is engaged in the Upper Rio Grande Water Operations and Procedures Study (URGWOPS). The URGWOPS is providing important parameters for the restoration efforts contemplated in this study, such as baseline vegetation and hydraulic data. The Middle Rio Grande Endangered Species Act Collaborative Program (MRGESACP), in which the USACE is also a participant, is responsible for funding much of the ongoing research and restoration efforts in the Middle Rio Grande to enhance habitat for endangered species. The MRGESACP and URGWOPS, as well as researchers at the University of New Mexico have provided important input for the study. Other projects undertaken by the USACE in alliance with local sponsors at Los Lunas and the Pueblo of Santa Ana have provided important planning and restoration precedents. The Project provides an opportunity to apply much of what has been learned in all of these projects and studies to a comprehensive, large-scale restoration project with high visibility in the community.

DESCRIPTION OF THE STUDY AREA

The Project Area encompasses a small portion of the Middle Rio Grande within the COA, between Bridge Boulevard and Interstate 40, Bernalillo County, New Mexico (Figure 1). The Project's Study Area consists of 3.1 river miles along the Rio Grande stretching north and south from Central Avenue. The north side of the I-40 Bridge is the upstream limit of the Project Study Area, and the south side of the Bridge Boulevard Bridge is the downstream limit. The Project Study Area is bounded on the east and west by the levees and riverside drains, except for a portion of the area north of the Central Avenue bridge on the west side where there is no levee or riverside drain and the boundary is the adjacent bluff.

The Project Study Area includes approximately 643 acres. There are 370 acres within the active river channel and 273 acres of riparian woodlands, or bosque as it is commonly referred to in New Mexico. With the exception of the northwest corner of the Project Area, the lands are managed by the MRGCD and the COA OSD as part of the RGVSP.

Geomorphology

The previous water projects have had some dramatic effects on the geomorphology of the Middle Rio Grande. For example, since Cochiti Dam was constructed, and to a lesser extent the Jemez Canyon Dam, much of the sediment in the previously turbid Rio Grande now settles out in the reservoirs. The sediment hungry water below the dams has essentially changed the Middle Rio Grande from an aggrading regime to a degrading system and has resulted in an incised channel through much of the area. The reduction of peak flows, however, has had an opposite effect where unregulated tributaries and arroyos such as the Calabacillas Arroyo discharge into the river. Adequate flows are not available to transport the sediment. Sediment deltas are more persistent; they reduce the river gradient upstream tending to increase aggradation and increase the gradient downstream tending to reduce aggradation. These trends are usually localized near the arroyos (USACE 2008).

Another result of the dams has been to reduce peak flows during the spring runoff period. These flood events were key to overbank flooding and river bar creation, which helped renew the cottonwood riparian forest and remaining wetlands. As a result the bosque today experiences less and less inundation compared to pre-dam times. This loss of inundation prevents native plant rejuvenation that once maintained a healthy riparian condition within the bosque (USACE 2008).

As a result of the channelization projects (installation of levees and jetty jacks) the river has become constrained into a single, narrower floodway throughout much of the Middle Rio Grande, resulting in an approximate 85 percent loss of the original floodplain (Earth Reflections 2003). The current floodplain is generally confined to the levees. Historically it was bounded by lower terraces, then by 300 to 500-foot high mesas.

The flood control and drainage projects implemented were widely successful in rejuvenating the declining agricultural communities and providing opportunities for expanding settlements. This occurred, however, at the expense of wetlands and marshes, which were dramatically reduced in number and extent (Berry and Lewis 1997, Crawford *et al.* 1993, Hanson 1997). Although there are several small areas and former side channels that function as seasonal wetlands, there are no longer any wetlands of significant size in the Project Area. These areas occasionally become wet during seasonal runoff events but may or may not be regarded as jurisdictional wetlands however they are part of the current Middle Rio Grande geomorphology. The USACE Bio-Park Project construction approximately 9 acres of wetland habitat within the Project Study Area.

The change in seasonal discharges has also impacted channel-forming processes. Discharge is the dominant variable that affects channel morphology, but sediment transport, channel bed & bank material and other hydraulic factors are also important influences. Historically, the wide shallow channel was described as a sand-bed stream (Nordin and Beverage 1965) with a braided pattern (Lane and Borland 1953) likely resulting from sediment overload (Woodson 1961). The river followed a pattern of scouring and filling during floods and was in an aggrading regime (accumulating sediment). Flood hazards associated with the aggrading riverbed prompted the building of levees along the floodway. However, the levee system confined the sediment and increased the rate of aggradation in the floodway. Additionally, channel stabilization works

which included jetty jacks installed during the 1950s and 1960s contributed to building up and stabilizing the over-bank areas where the bosque currently exists.

Construction of dams at Jemez Canyon (1953), Abiquiu (1963), Galisteo Creek (1970), and Cochiti (1973) were expected to slow aggradation or reverse the trend and promote degradation in the Middle Rio Grande Valley. The flood control improvements have reduced the sediment load in the Middle Rio Grande and accomplished flood control objectives for much of the river valley. This has caused changes in the geomorphology of the Rio Grande through the Albuquerque reach and affected the conveyance capacity of the active river channel. The result of these changes has been a reduction in the frequency of over-banking flows into the Rio Grande Bosque.

Within the Project Study Area, the Rio Grande is predominantly a sand bed river with low, sandy banks. There are numerous sandbars, and the river channel tends to be straight due to jetty jack fields and levee placement (Crawford *et al.* 1993). In this area, the river is typified by a uniform channel width averaging approximately 600 feet. Approximately two feet of degradation has occurred in the Albuquerque reach (due to flood control measures upstream) with no significant change in bed material (Mussetter 2006). The slope of the riverbed is less than 0.01 feet per foot (Tashjian 1999). At flows less than the bankfull, the river is establishing a sinuous configuration within the cleared floodway.

The riverbed is changing from one of fine silt particles and sand to coarse sands and gravel. This is a result of the fine sediments becoming trapped by upstream dams and removed in downstream reaches by hungry water. Over time, it is expected that the transitional area will continue to move downstream, accelerating the channel degradation process.

Hydrology

The hydrology of the Middle Rio Grande has been well documented. There are numerous reports that provide a good summary of the data collected. Among these reports are the MRGBBMP and Bio-Park Project (USACE 2003a). These two reports provide the basis for most of the text within this section.

The hydrology of the Middle Rio Grande valley has historically followed a pattern of high flows during spring snow melt runoff and low flows during the fall and winter months and short duration high flows from summer precipitation events.

Although considered a perennial river prone to major floods, there are reaches of the Middle Rio Grande that currently experience no surface flow during some summer months in dry climatic periods. It is likely that in certain dry years, this was the case prior to man's settlement of the area as well.

Construction of reservoirs, jetty jack fields, and levees for flood control was initiated beginning in the early 1900s. The Middle Rio Grande hydrology has been altered dramatically by the flood control facilities. Average yearly hydrographs for pre- and post-Cochiti Dam periods shows that

Cochiti Dam has reduced the peak flows and extended the duration of the high-flow period. In addition, average winter base flows are somewhat larger during the post-dam period.

The actual flood flow capacity of the Rio Grande is determined by the location, size, and strength of the levee system and natural features such as terraces, mesas, and rock outcrops. Within the Middle Rio Grande, the reach through Albuquerque has the highest flood flow capacity: 20,000 cfs for sustained (spring) flows and 42,000 cfs for short duration (summer) flows. At the other extreme is the reach in the Corrales area on the east side, and between Albuquerque and Isleta on both sides of the river. In these areas the flood flow capacity is generally only 7,500 cfs (USACE 1989). Recently completed work on the Corrales levee may have increased this capacity.

Water Quantity

It is estimated that the average annual water loss due to Evapotranspiration (ET) in the Middle Rio Grande riparian corridor accounts for 20-50 percent of that reach's total water depletion (Dahm *et al.* 2002). Bosque ET appears to be higher in dense stands of salt cedar and in mature stands of cottonwood containing an extensive understory of salt cedar and Russian olive than it is in less dense salt cedar stands and mature cottonwood stands with few understory trees (Dahm *et al.* 2002). The Project Study Area contains large areas that are predominately tall trees with a relatively dense understory of saplings and shrubs and open stands of mid-sized tress with widely scattered shrubs and sparse herbaceous growth, although most of the understory is composed of salt cedar (USACE 2008). It has been estimated that ET in the densest portions of the Project Study Area equals approximately 562.6 acre-feet annually (USACE 2008).

Water Quality

Water quality in the Rio Grande through the Project Study Area is impacted by fecal coliform contamination, municipal point sources, urban runoff, and storm sewers (NMED Surface Water Quality Bureau 2002). There are three major storm sewer outfalls to the Rio Grande in the Project Area. Two of these outfalls are located on the east side of the river between the Bridge Boulevard and Central Avenue crossings. The third outfall is located near the old Atrisco Diversion on the west side of the river between the Central Avenue and I-40 crossings. Contaminants introduced to the Rio Grande from these outfalls include solid waste, oils, pesticide and herbicide residues, phosphorous, nitrogen, and fecal coliform (Tague and Drypolcher, 1979).

Vegetation Changes

A major change in vegetation dynamics in the bosque ecosystem has been loss of meander cut-off, meander migration, and flood scour processes, which were a driving force in the dynamics of the naturally functioning system. These processes removed existing vegetation and created new sites for founding of plant communities. Sediment deposition in the Project Area is now restricted to a few, largely ephemeral, mid-channel bars and transitory lateral bars proximal to the river. Meander cut-off and lateral meander migration no longer occur. Bare soil sites are

now created primarily through mechanical disturbance or fire; typically in areas no longer subject to periodic inundation and with relatively dry soil moisture regimes (Pittenger 2003).

Non-native plant species have become prominent in the bosque. Salt cedar (*Tamarix ramosissima*) is now a prominent colonizer of exposed, bare soil sites in the bosque (Smith *et al.* 2002). Salt cedar produces seed for several months beginning in spring whereas cottonwood (*Populus deltoides wislizenii*) produces seed only for a short time in the spring, which remains viable for only about month and a half under ideal conditions (Ware and Penfound 1949, Horton *et al.* 1960). The flowering and fruiting phenology of salt cedar allows seedlings to establish on and dominate open sites wetted by runoff, rainfall, or river flows during the summer, precluding the possibility of cottonwood establishment on potentially suitable sites the following spring.

Fire was virtually unknown in naturally functioning, low-elevation riparian ecosystems of the Southwest (Busch and Smith 1993, Steuver 1997). However, fuel accumulations coupled with mainly human-caused ignitions have introduced fire as a major disturbance mechanism in the bosque ecosystem (Steuver 1997). Russian olive was present in the bosque in 1981 (Hink and Ohmart 1984) and continues to increase in the understory of the cottonwoods in the Project Study Area (Sivinski *et al.* 1990).

Several other non-native tree species, in addition to salt cedar and Russian olive, are at least locally common, if not abundant. These species are Siberian elm, tree of heaven (*Ailanthus altissima*), and mulberry (*Morus alba*). All three species are shade-tolerant and readily colonize disturbed sites (Crawford *et al.* 199, Sivinski *et al.* 1990).

Jurisdictional wetlands were found at six locations in the Project Study Area. These wetlands were characterized by shallow depth to water, saturated soils near the surface, organic-streaked sandy soils below about 10 inches, and vegetation dominated by coyote willow, cottonwood, inland saltgrass (*Distichlis spicata*), and Russian olive.

Water management, including development of impoundments, levees, and diversions have drastically altered natural hydrological processes (e.g., spring and monsoonal runoff). This altered hydrology limits natural regeneration of native cottonwoods and willows, and promotes the growth of non-native salt cedar and Russian olive, which are replacing the native

cottonwood/willow vegetative complex. As a result of these changes, the quality and quantity of fish and wildlife habitat has steadily decreased (USFWS 2001).

A listing of common and scientific names of plants that may occur in the Middle Rio Grande floodplain is provided in Appendix A.

Fish and Wildlife Changes

The uniqueness of the Rio Grande system and its critical value as wildlife habitat make it of the utmost significance as a resource. The bosque is unique; it is a thin line of significant riparian habitat in an arid landscape of the Southwest. The habitat quality, although diminished over the past few decades, still remains one of the most significant in the region. Over 300 species of birds, mammals, amphibians and reptiles live in the bosque, which are more than double those found in any other major ecosystem in the State. In addition to the indigenous wildlife species, the bosque serves as a migration route for thousands of North American birds moving along the Central Flyway.

The change from a mosaic of native plant communities of various structures and ages to increasingly large stands of non-native forest has affected the overall value of aquatic and terrestrial wildlife habitat provided by the bosque. There is an opportunity to rehabilitate the existing bosque into a dynamic mosaic of native vegetation patches of various ages, structure types and constituent species.

An estimated 407 species of vertebrates may occur in aquatic, wetland, or riparian habitat in Bernalillo County, based on a query of the Biota Information System of New Mexico (version 1/00). This estimate includes 24 species of fish, 11 amphibian taxa, 39 species of reptiles, 279 species of birds, and 54 mammalian taxa (Pittenger 2003). Birds are the most important group, based on number of taxa, comprising 69 percent of all vertebrate species in the estimate.

Terrestrial wildlife that were extirpated from the Rio Grande drainage included the gray wolf, jaguar, grizzly bear, river otter, and mink (Hink and Ohmart 1984). Approximately 46 mammalian species currently occur within the Middle Rio Grande (see Appendix B for a listing of common and scientific names of mammals).

Declining species are associated with decreasing native riparian areas, and the increasing species are associated with agricultural areas (Thompson *et al.* 1994). Therefore, changes in the fish and wildlife community of the Rio Grande are largely due to the direct and indirect effects of human settlements and/or development and manipulation of the Rio Grande and associated changes in watershed and riparian zones.

Aquatic Resources

Historically, 27 native fish species occupied the Rio Grande drainage (Sublette *et al.* 1990). Many native fish are extinct or extirpated from the Rio Grande in New Mexico. There are at least 31 introduced or non-native fish species within the Rio Grande drainage (Sublette *et al.* 1990). A considerable number of non-native fishes have been introduced into the Middle Rio Grande, either accidentally or as game fish by the New Mexico Department of Game and Fish. See Appendix C for a listing of common and scientific names of fish that may occur in the Middle Rio Grande.

The aquatic habitat in the Rio Grande has been altered by levees, dams, irrigation structures, and reservoirs for agriculture, flood control, recreation, and protection for developments within the floodplain. Jetty jack fields have straightened and channelized the river for more effective water transport. Reservoir operations have altered the river's natural hydrograph (i.e., its characteristic rise and fall) including reductions in peak spring flows (Crawford *et al.* 1993). Downstream of Cochiti Dam, the altered sediment and flow regimes have transformed the river from a wide, braided, sand bed system to a narrower and deeper channel with no active floodplain (U.S. Bureau of Reclamation 1999). Therefore, wetlands and slack water areas are scarce (Crawford *et al.* 1993). The cold, clear water releases from Cochiti Dam and the entrenched channel, armored with a gravel bed, have created an aquatic system that favors cool-water fishes and invertebrates, and limits warm-water fisheries below the dam downstream to Albuquerque. Consequently, the existing aquatic resources in the Project Study Area differ from those that occurred historically due to human activities (Crawford *et al.* 1993). The loss of native fish species in the Middle Rio Grande illustrates that the hydrologic and morphological changes in the channel have had a major impact on fishery resources. The Rio Grande silvery minnow (minnow) (*Hybognathus amarus*) is the only native pelagic, broadcast spawning minnow surviving in the Middle Rio Grande (Bestgen and Platania 1991).

Terrestrial Resources

Vegetation

The change from a mosaic of native plant communities of various structures and ages to increasingly large stands of non-native forest has affected the overall value of aquatic and terrestrial wildlife habitat provided by the bosque. There is an opportunity to rehabilitate the existing bosque into a dynamic mosaic of native vegetation patches of various ages, structure types and constituent species.

The degradation of the bosque ecosystem has impaired interpretive, educational and recreational uses of the bosque in one of the most heavily used segments of the RGVSP. There is an opportunity to develop existing trails into a highly educational, aesthetically pleasing and safe interpretive system that furthers the overall goal of restoration.

The loss of wetlands, braided channels and backwaters has reduced the extent and quality of

aquatic habitat and the potential for aquifer recharge. There is an opportunity to restore and create new wet habitat, which would improve habitat and recharge potential, as well as provide storm water filtration.

The lack of inundation, scouring and sediment deposition within the bosque has curtailed native tree species such as cottonwood and willow seedling recruitment, increased the mortality rate of cottonwoods and willows, and resulted in significant leaf litter and dead and down wood, as well as a skewed age structure in the remaining cottonwood stands. There is an opportunity to remove dead and down wood and create new areas for colonization or planting of native vegetation.

Human uses in the bosque connected to urbanization in areas outside the levees have further degraded the bosque through widespread dumping, accidental fires and high-impact recreational uses. There is an opportunity to clean up and revegetate these sites, as well as limit access and structure human use and experience of the bosque through well-developed trails and interpretive signage.

The cumulative impact of the loss of inundation, the lower water table, cottonwood mortality and urbanization has led to the replacement of the mosaic of native woodlands and wetlands in many parts of the Study Area by dense stands of non-native salt cedar, Russian olive, Siberian elm, tree of heaven and white mulberry trees. There is an opportunity to remove non-native plants and revegetate with a variety of native plants, thereby improving habitat.

The strings of jetty jacks and altered vegetation structure of the bosque have increased the potential for a catastrophic fire in the bosque. The density of the brush and existing jetty jacks can also make fighting a fire difficult and potentially dangerous. An opportunity exists to remove some of the jetty jacks and much of the vegetation that has created the existing fire hazard.

The past water management operations and flood control measures, including levees, jetty jacks and upstream dams, have eliminated the historic broad, meandering channel and the flood regime that had resulted in periodic inundation of the bosque. Even with these limitations, however, there is an opportunity to re-create some limited hydraulic connectivity between the bosque and the river by enhancing existing high-flow side channels, excavating swales, constructing wet habitat and other interventions.

Mammals

Existing mammal populations are also a result of the existing water operations and land uses in the Project Study Area. Hink and Ohmart (1984) performed systematic floral and faunal surveys throughout the Middle Rio Grande. Residential development, agricultural conversion and subsequent irrigation systems, and construction of bridges/roads resulted in the permanent loss of all habitats within developed areas. Development has also caused a disruption of animal movement and dispersal patterns, and has caused continual disturbance to animal communities in the adjacent, fragmented portions of the bosque (Crawford *et al.* 1993). Residential

development, agricultural conversion and subsequent irrigation systems, and construction of bridges and roads resulted in permanent loss of all habitats in the developed area, disruption of animal movement and dispersal, and creation of a continual disturbance that affects animal communities in the adjacent fragmented portions of the bosque (Crawford *et al.* 1993). The largest mammals likely to occur in the Project Area are black bear, mule deer, and coyotes. Other mammals such as raccoon, beaver, muskrat, long-tailed weasel, and striped skunk may occur in the general Project Study Area. Desert cottontail rabbit, black-tailed jackrabbit, rock squirrel, pocket gopher, deer mouse, western harvest mouse, and American porcupine are also likely to occur. The most common small mammals in the Middle Rio Grande bosque are the white-footed mouse and house mouse (Stuart and Bogan 1996). Eleven species of bats are found along the Rio Grande (Findley *et al.* 1975). Two bat species are restricted to riparian areas, the Yuma myotis and little brown bat.

Opportunities exist to increase in the amount of moist, densely-vegetated habitats and coyote willow stands would also likely increase the abundance of small mammals. The amount of habitat for mammal species associated with wetlands in the bosque would increase.

Birds

Hink and Ohmart (1984) found that riparian areas are used heavily by most bird species in New Mexico. Cottonwood-dominated community types are used by large numbers of bird species, and are preferred habitat for a large proportion of the species, especially during breeding season. Bird density appears to be strongly related to density of foliage, regardless of species composition of the plant community. In the Hink and Ohmart study, bird densities were higher in stands of non-native trees and shrubs. Marshes, drains, and areas of open water contribute to the bird diversity of the riparian ecosystem because of the strong attraction by water-loving birds. At various times of the year, such as during migration, riparian areas support the highest bird densities and species richness in the Middle Rio Grande region.

The river in and near the proposed Project Study Area provides habitat on a seasonal basis for a variety of waterfowl including Canada geese, mallard, gadwall, green-winged teal, American widgeon, northern pintail, northern shoveler, ruddy duck, and common merganser. Shorebirds such as the spotted sandpiper and killdeer may occur in the Project Area. Raptors that may occur in the Project Area include the bald eagle, turkey vulture, northern harrier, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, American kestrel, common barn owl, and great-horned owl. Game species include the mourning dove and scaled quail.

Opportunities exist to increase in the amount of moist, densely-vegetated habitats and coyote willow stands would also likely increase the abundance of birds. The amount of habitat for avian species associated with wetlands in the bosque would increase.

A listing of common and scientific names of birds that may occur in the Middle Rio Grande floodplain is provided in Appendix D.

Reptiles and Amphibians

Hink and Ohmart (1984) documented 3 turtle species, 17 lizard species, and 18 snake species in the Middle Rio Grande Valley. Many of these are upland species that do not occur regularly in the riparian habitats. Riparian and upland habitats in the Project Study Area likely support a diverse assemblage of reptiles and amphibians. According to Degenhardt *et al.* (1996), up to 57 species of reptiles may occur in the Middle Rio Grande of New Mexico. Most amphibians depend on the aquatic habitat of riparian areas for at lease a portion of their lifecycle, which are generally lacking in the Project Study Area.

Opportunities exist to increase in the amount of moist, densely-vegetated habitats and coyote willow stands would also likely increase the abundance of reptiles and amphibians. The amount of habitat for reptiles and amphibians species associated with wetlands in the bosque would increase.

A listing of common and scientific names of reptiles and amphibians that may occur in the Middle Rio Grande floodplain is provided in Appendix E.

Threatened and Endangered Species

As the quality and quantity of the fish and wildlife habitat within the Middle Rio Grande corridor has decreased so has its ability to sustain certain native flora and fauna. Several species endemic to the Middle Rio Grande are extinct, extirpated, or have been federally listed as threatened or endangered under the Endangered Species Act (ESA). This CAR provides information concerning the federally listed endangered Rio Grande silvery minnow with designated critical habitat and the endangered southwestern willow flycatcher that may be affected by the proposed project.

Rio Grande Silvery Minnow

The minnow was formerly one of the most widespread and abundant species in the Rio Grande Basin occurring from Española, New Mexico, to the Gulf of Mexico (Bestgen and Platania 1991). The silvery minnow currently occupies a 170-mile reach of the Middle Rio Grande, New Mexico, from Cochiti Dam, Sandoval County, to the headwaters of Elephant Butte Reservoir, Socorro County (USFWS 1994). Currently is the only remaining endemic pelagic spawning minnow in the Middle Rio Grande.

The species was federally listed as endangered in July 1994 (59 FR: 36988-37001) and is also listed as endangered by the State of New Mexico. The Service (58 FR: 11821-11828) cited the de-watering of portions of the Rio Grande below Cochiti Dam through water regulation activities, the construction of main-stream dams, the introduction of non-native competitor/predator species, and the degradation of water quality as factors responsible for declines in the minnow population. On February 19, 2003, the Service published a final rule

establishing critical habitat for the minnow within the last remaining portion of their historical range in the Middle Rio Grande, from Cochiti Dam to the utility line crossing the Rio Grande, a permanent identified landmark in Socorro County (68 FR: 8088-8135). Portions of the proposed project occur within designated minnow critical habitat.

Within the Project Study Area, past actions have eliminated and severely altered habitat conditions for the minnow. Narrowing and channel deepening, restraints to channel migration through jetty jacks, the invasion of non-native vegetation species, and changes in the flow regime have all adversely affected the minnow and its habitat. These environmental changes have degraded spawning, nursery, feeding, resting, and refugia areas required for species survival and recovery (USFWS 1993).

Natural habitat for the minnow 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 minnows (Sublette *et al.* 1990, Bestgen and Platania 1991).

The proposed project would provide opportunities to increase potential habitat for the minnow and create additional nursery habitat in this reach. If successful, these construction activities would help the minnow population and its critical habitat.

This project would create additional habitat that would potentially benefit the minnow. The proposed project would create management solutions that may partially fulfill requirements of the "Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of the Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico," for the minnow and its critical habitat.

Southwestern Willow Flycatcher

The Service listed the southwestern willow flycatcher (flycatcher) (*Empidonax traillii extimus)* as endangered on February 27, 1995 (60 FR: 10694-10715). The flycatcher is also classified as endangered by the State of New Mexico (New Mexico Department of Game and Fish 1987). In New Mexico, the species has been observed in the Rio Grande, Rio Chama, Zuni, San Juan, San Francisco, and Gila River drainages. Available habitat and overall numbers have declined statewide (62 FR: 39129-39147). A final recovery plan for the flycatcher has been developed (68 FR: 10485).

Loss and modification of nesting habitat is the primary threat to this species (Phillips *et al.* 1964, Unitt 1987, 58 FR: 39495-39522). Loss of migratory stopover habitat also threatens the flycatcher's survival. Large scale losses of Southwestern wetlands have occurred, particularly the cottonwood-willow riparian habitats that are used by the flycatcher (Phillips *et al.* 1964, Carothers 1977, Rea 1983, Johnson and Haight 1984, Howe and Knopf 1991).

The flycatcher is a riparian obligate and nests in riparian thickets associated with streams and other wetlands where dense growths of willow, buttonbush, boxelder, Russian olive, salt cedar or other plants are present. Nests are often associated with an overstory of scattered cottonwood. Throughout the flycatcher's range, these riparian habitats are now rare, widely separated by vast expanses of arid lands, in small and/or linear patches.

Flycatchers begin arriving in New Mexico in late April and May to nest, and the young fledge in early summer. Flycatchers nest in thickets of trees and shrubs with a densely vegetated understory from the ground or water surface. Surface water or saturated soil is usually present beneath or next to occupied thickets (Phillips *et al.* 1964, Muiznieks *et al.* 1994). At some nest sites, surface water may be present early in the nesting season with only damp soil present by late June or early July (Muiznieks *et al.* 1994, Sferra *et al.* 1995). Habitats not selected for nesting or singing are narrower riparian zones with greater distances between willow patches and individual willow plants. Suitable habitat adjacent to high gradient streams does not appear to be used for nesting. Areas not selected for nesting or singing may still be used during migration.

Potential flycatcher habitat exists along the Rio Grande in the Albuquerque area. This habitat is primarily composed of riparian shrubs and trees, chiefly Goodding's, peachleaf, and coyote willow, Rio Grande cottonwood, and salt cedar. The habitat within the Project Study Area may be used by migrating flycatchers.

This project would create additional habitat that would potentially benefit the flycatcher. The proposed project would create management solutions that may partially fulfill requirements of the "Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of the Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico," for the flycatcher and its potential habitat.

PROJECT DESCRIPTION

Development of the Route 66 Project follows the USACE six-step planning process specified in Engineering Regulation (ER) 1105-2-100. These steps include 1) identifying problems and opportunities, 2) inventorying and forecasting conditions, 3) formulating alternative plans, 4) evaluating alternative plans, 5) comparing alternative plans, and 6) selecting a plan. This process is used to identify and respond to problems and opportunities associated with the Federal objective and specific state and local stakeholder concerns.

As part of identifying the Preferred Alternative, a number of alternative plans were developed by the Project Delivery Team and compared with the "no action alternative," allowing for the ultimate identification of the Recommended Plan or National Ecosystem Restoration (NER) Plan. The NER Plan reasonably maximizes ecosystem restoration benefits compared to costs, considering the cost-effectiveness and incremental cost of implementing other restoration options.

Comparison of Selected Alternatives

A number of alternatives were considered and rejected, including: 1) the No Action Alternative; 2) All Features Alternative; 3) Removal Features Only Alternative; 4) Significant Recreational and Interpretive Features Alternatives; 5) Other Cost-Effective Alternatives; 6) Best Buy Plans 2, 3, and 4 Alternatives; 7) Best Buy Plan 6 Alternative; and the 8) Preferred Alternative.

No Action Alternative

Future conditions without project implementation were projected to characterize the No Action Alternative and its effects, and to form a basis for comparison of restoration benefits. Throughout the Middle Rio Grande Valley, the river, floodplain, and the associated fish and wildlife populations would be expected to continue to experience adverse effects from new and ongoing Federal, state, and private water resource development projects. Additionally, increasing urbanization and development within the historic floodplain would continue to eliminate remnant riparian areas located outside the levees, putting increased pressure on the habitat and wildlife in the riparian zone within the floodway. Local agencies would continue to perform maintenance of non-native vegetation as they are able, but the features connecting the bosque and river would not be constructed.

All Features Alternative

An "All Features Alternative" was briefly considered, but rejected for budgetary reasons. The cap on the budget for 1135 projects is just under $7 million. Since the All Features Alternative would cost more than the cap set by legislative authority, and the incremental increase in habitat units was minor, it was rejected. All Features Alternatives by class or type of feature, (e.g., all water related features, all bosque features) were also considered singly, but rejected because by focusing on only one habitat type, they would not satisfy the goal of creating a dynamic mosaic in the bosque.

Removal Features Only Alternative

Although not generated by the Incremental Cost Analysis, a Removal Only Alternative was considered. This alternative would consist of all of the Removal Features, (i.e., the removal of all non-native vegetation, dead and down wood, dumps and debris and jetty jacks) in the Project Area. This alternative is consistent with the project goals of improving the health of the native bosque and reducing the fire hazard. Under this alternative, however, there would be no re-vegetation other than seeding in areas of major disturbance from the removal process. The

Removal Only Alternative would enable native plants to have a better opportunity to succeed in the bosque, but no new habitat would actually be created directly by this alternative in the near term. There would be little possibility of re-establishing the dynamic mosaic in the bosque. No additional wet habitat or other water-related features would be created. Woodland, savannah and open areas would predominate, and there would be few, if any, bosque patches with the understory that are crucial to wildlife diversity in the bosque (Pittenger 2003; Hink and Ohmart 1984). Under this alternative, no additional recreational elements would be created, which is inconsistent with the current intensity of recreational use of the Project Study Area. For these reasons and for the reason that the USACE Bosque Wildfire Project and OSD's fuel reduction efforts may complete much of the removal process, this alternative was rejected.

Significant Recreational and Interpretive Features Alternatives

Alternatives that contained more intensive recreational features such as paved trails, pavilions, restrooms, picnic areas, etc., within the solution areas were considered. However, this would increase the amount of human disturbance in the Project Study Area. The Route 66 Project's primary goal was to restore the bosque and the wildlife habitat it provides by channeling recreational use to fewer, designated areas, thereby reducing the impact of recreational users elsewhere in the bosque. Furthermore, although this portion of the bosque sustains the greatest amount of recreational use, it does not warrant greater expenditures than that typically allocated for Section 1135 projects at the expense of restoration features. USACE Policy Guidance Letter No. 59, "Recreation Development at Ecosystem Restoration Projects" limits recreational features to ten percent of project costs, unless prior approval from the Assistant Secretary of the Army (Civil Works) is obtained. The guidance further indicates that this limit "…. should be viewed as an upper limit on Federal cost sharing and not as a goal for expenditures." Therefore, alternatives that included significant recreational and interpretive features were also rejected.

Other Cost-Effective Alternatives

Other cost-effective plans generated by the Incremental Cost Analysis were eliminated as alternatives in favor of the Best Buy Plans. In addition, a number of the Solution Areas not selected as part of one of the Best Buy Plans have significant existing habitat and/or are likely to be the focus of restoration activities as part of the other projects being undertaken in the Albuquerque reach by USACE. For example, Solution Areas G and I are included in the Bio-Park Project's created wetlands. Solution Areas A, B and C would be addressed as part of the Bosque Wildfire Project.

Best Buy Plans 2, 3, and 4 Alternatives

Best Buy Plans 2, 3 and 4 Alternatives were also evaluated. All three of these alternatives were composed of various mixes of habitat. Best Buy Plans 2, 3 and 4 Alternatives were rejected primarily because the target goal percentage for shrub thicket habitat was not met and the total acreage of bosque patch habitat would have exceeded 50 percent. Although all of the Best Buy Plans (other than the No Action alternative) had larger percentages of wet habitat, the skewed distribution toward bosque patch habitat was counter to the overall goal of the proposed project to restore the dynamic mosaic of the bosque.

Best Buy Plan 6 Alternative

The primary difference between the Best Buy Plan 6 Alternative and the Preferred Plan was the inclusion of Solution Area A. This alternative has perhaps the best overall distribution of habitat. Although Best Buy Plan 6 Alternative meets the target percentages, the incremental cost is greater than Best Buy Plan 5. For this reason and because the cost of implementing this plan, given other costs would have exceeded the budget, Best Buy Plan 6 Alternative was rejected. Additionally, the inclusion of Solution Area A would have eliminated the possibility of including interpretive and recreational features in the project, which are important to the sponsor. As stated previously, the Project Area is one of the most intensively used areas in the bosque, and there is opportunity through the proposed recreational features to: 1) lessen the potential impact of recreation on the bosque in the Project Area; and 2) to provide connections to a number of recreational amenities in adjacent areas which can support more active uses.

Preferred Alternative

The Preferred Alternative is Best Buy Plan 5 combined with the proposed interpretive and recreational facilities. Best Buy Plan 5 meets the target percentages and even exceeds the overall target percentages for the three different habitat types, and through implementation would result in a dynamic mosaic in the Project Area. Implementation of Best Buy Plan 5 would result in the restored bosque and allows for all of the objectives of the proposed project to be met. The overall budget for Best Buy Plan 5 would allow for much needed designated recreational and interpretive features which would reduce the overall impact of recreational users on the bosque as it is restored while still providing important connections to adjacent facilities. Implementation of the Preferred Alternative would maintain and enhance the function of the bosque in the Project Area as a wildlife refuge and integrate it into the fabric of the COA's portion of the Middle Rio Grande bosque.

IMPACTS OF PREFERRED ALTERNATIVE

Implementation of the Preferred Alternative should improve habitat in the bosque and benefit fish and wildlife resources. The Preferred Alternative would include removal of jetty jacks and non-native vegetation across 121 acres of bosque north and south of Central on the west side of the river and north of Central on the east side of the river, Non-native vegetation to be removed would include salt cedar (*Tamarix ramosissima*), Russian olive (*Elaeagnus angustifolia*), Tree of

Heaven (*Ailanthus altissima*) and Siberian elm (*Ulmus pumila*). The proposed action also includes recreating 3 hi-flo channels, and enhancing 1 outfall wetland at the Gonzales Drain. Further restoration features include planting of native vegetation throughout the project area (121 acres) and creation of a number of willow swales. Improvements of existing facilities for educational, interpretive and low-impact recreational uses are also included in the Preferred Alternative. Trail and facility improvements would help minimize impacts to fish and wildlife habitats by directing recreational use to designated areas. The fire breaks proposed under the Preferred Alternative should reduce the risk of catastrophic bosque fire and its impacts to fish and wildlife resources.

EVALUATION METHODOLOGY

Since project planning began in 2002, the Service has attended meetings with the USACE, MRGCD, and the COA to discuss project features, design, and construction methods. The Service and USACE also conducted a joint field trip to the Project Area. Additional biological data and background information were derived through review of relevant literature and personal communications. The USACE and the COA have provided a majority of the technical and background information. Surveys for the southwestern willow flycatcher were conducted in the project vicinity, but no flycatchers were detected within the Preferred Alternative area. Minnow surveys were conducted in the Rio Grande along the Albuquerque reach in previous years.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

The river, floodplain, and the associated fish and wildlife would continue to experience adverse effects from Federal, state, and private actions, including new and long-term ongoing activities. In addition, increasing urbanization and development within the historic floodplain would continue to eliminate remnant riparian areas located outside the levees, while putting increased pressure on the habitat and wildlife in the riparian zone.

Channelization, levee replacement and construction, Kellner jetty jack installation and maintenance, sediment retention in reservoirs, and channel widening would continue to have effects on patterns of erosion, aggradation, and maintenance or regeneration of riparian vegetation. These river management structures created a fixed channel plan form and a narrower floodplain that has less frequent inundation. The result has been disruption or termination of major processes of dynamics in a naturally functioning bosque ecosystem.

The bosque would remain as is or continue to deteriorate without the project. Jetty jacks would continue to confine the Rio Grande to its existing channel, causing the river in the Project Area to further incise. As the river channel further incises, the water table would continue to lower. Periodic bosque flooding would become increasingly uncommon or nonexistent. Recruitment of native vegetation would decline as the water table lowers, bosque flooding diminishes, and non-native vegetation proliferates. Thus, non-native vegetation in the bosque would increase in abundance while native vegetation would decrease. Vegetative water demand and evapotranspiration would likely increase as non-native vegetation proliferates. This may

exacerbate the rate at which the water table declines. Bosque wetland habitat would further degrade and/or be lost as the water table lowers and non-native vegetation invades. As non-native vegetation accumulates, the risk of catastrophic bosque fire would increase. Human induced fires and high impact recreation in the Project Area would also continue to occur without the project.

Without implementation of the Preferred Alternative additional substantial enhancement of native riparian vegetation and wet habitat in the Project Area, with concurrent reduction of nonnative stands would not occur. The overall quality and quantity of fish and wildlife habitat is expected to continue to deteriorate within the Project Area.

Vegetation structure and species composition in the Project Area would not alter about 121 acres. Clearing of non-native understory vegetation and woody debris as part of a fire-fuel reduction program conducted under the Bosque Wildfire Project would continue. The combined effect of proposed Non-native Plant Removal, Planting of Native Species, and Excavation of Channel, Outfall Channel, and Swale areas on vegetation structure dominated by non-native species would be minimized. With respect to the entire Project Area, without implementation of the Preferred Alternative the overall increase in the diversity of vegetation communities would no occur.

Without maintenance of the Project Area the establishment of non-native-dominated stands would continue. The High-Flow Channels and Swales would not likely result in propagation of native vegetation. During times of low flow, the channels would not provide a moist soil area for plants, such as coyote willow, sedges, and rushes, and wildlife that prefer moister environments. Both functions are critical to improving the overall habitat in the reach (Crawford *et al.* 1993).

The High Flow channel features may not restore some semblance of over-bank flooding in localized areas. Thus establishment of early successional stands dominated by cottonwood and coyote willow would not occur. Localized lowering of the soil surface in Swales would not occur therefore some areas would not restore naturally functioning wetland plant communities in those areas. Fluvial geomorphic processes that create new sites for establishment of early succession wetland and shrub-sapling communities (Pittenger 2003) would not be influenced by the Preferred Alternative.

Individual locations within the proposed project would not have varied re-vegetation strategies. Edge effect and the creation of denser patches such as the proposed shrub thickets important for increasing wildlife diversity within the bosque would not occur. The long-term effects of replacing the non-native dominated vegetation system with native dominated species would not be as extensive.

Without the implementation of the Preferred Alternative, creation of wet habitat would not increase habitat available for wetland-dependent reptile and amphibian species. The expected increase in the amount of moist, densely-vegetated habitats and coyote willow stands would not occur therefore, an increase small mammal habitats and abundance would not be likely. The amount of habitat for mammal species associated with wetlands in the bosque would not increase.

While bird species richness may not increase in the Project Area as a result of the Preferred Alternative, bird abundance and the amount of habitat suitable for rare bird species would likely remain the same. Without restoration of wetlands, cottonwood-willow, and cottonwood-New Mexico olive habitats, Neotropical migrant bird species that breed in the bosque would likely remain at current levels. Without restoration of early-successional willow thickets, in association with wetlands increase the amount of suitable habitat for the flycatcher and other bird species associated with wetlands and riparian shrub habitat would not occur. The proposed work would occur during the winter therefore disturbance to Bald Eagles and other wintering birds may occur. The peak nesting season in the bosque is April through August without the proposed project effects to breeding birds would be minimal.

Trails and recreational developments would not occur without implementation of the Preferred Alternative and could have a negative impact on bird abundance and species richness in the Project Area. Approximately 40,000 linear feet of undesignated trails would not be replaced by approximately 13,900 linear feet of stabilized trails and 8,600 linear feet of soft-surface trails. Human presence and disturbance in the bosque reduces habitat quality for many bird species and in general results in lower species richness and bird abundance (Thompson *et al.* 1994). Recreational uses of trails by hikers, bicyclists, and equestrians cause noise disturbance and usually results in waste accumulation (which may attract scavengers and predators) would continue. Additionally, trails create openings that may facilitate brown-headed cowbird parasitism. The frequency and intensity of recreational use associated with the proposed recreation features may further reduce habitat suitability for birds in the Project Area.

The primary goal and effect of implementation of the Preferred Alternative is to revegetate with native species, which would create a healthier ecosystem in the long-term for native wildlife. Without implementation of the Preferred Alternative short-term negative affects on fish and wildlife with long-term positive benefits would not occur.

Threatened and Endangered Species

Foreseeable affects to the minnow its critical habitat and to the flycatcher are discussed below. A Biological Assessment has been submitted to the USFWS for their concurrence on these species.

Rio Grande Silvery Minnow

The proposed work for habitat enhancement within designated critical habitat for the minnow would not be conducted. Construction from the proposed project and other projects within the Project Area would not take place in the channel but it would take place along the bank and it may result in erosion or other inputs into the river. The proposed project would provide potential habitat for the minnow and could potentially create additional nursery habitat in this reach which would help the minnow population.

Southwestern Willow Flycatcher

Flycatcher surveys would be conducted if other federal activities were proposed at the project locations. Surveys conducted in 2002 through 2005 have detected flycatchers within the Project Study Area but not in the proposed project action area. Critical habitat has been designated for the flycatcher but is not within the proposed Project Study Area therefore the proposed project would not affect it critical habitat. No breeding habitat has been identified during protocol surveys therefore it is highly unlikely that breeding habitat for the flycatcher would be affected. Other projects in the area, such as the Bio-Park Project, have created additional potential habitat for the flycatcher. Without this project, additional habitat that would potentially benefit the flycatcher would not be created.

Without the proposed project some of the management solutions in the Preferred Alternative that may partially fulfill requirements of the "Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of the Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico," for both the minnow and the flycatcher would not be realized.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

Temporary, short-term impacts to fish and wildlife may occur from noise, dust, and the presence of workers and machinery during project construction. Runoff from construction work sites, access routes, staging areas, and unprotected fills could degrade water quality in the Rio Grande. Accidental spills of fuels, lubricants, hydraulic fluids and other petrochemicals, although unlikely, would be harmful to aquatic life.

Implementation of the Route 66 Project should improve long-term bosque habitat conditions. Selected jetty jack removal should help facilitate meandering of the river and overbank flows in the Project Area. As fluvial processes in the river and bosque return to a state nearer to natural conditions, incision of the river channel should slow or cease. As a result, lowering of the water table in the Project Area should slow or cease. Overbank flows should promote native cottonwood and willow recruitment in the bosque. As native species proliferate, non-native species should, to some extent, be displaced or outcompeted. Overbank flows and flows through the high-flow side channels should help reduce accumulated fuels. This should help reduce the likelihood of catastrophic bosque fires. Human impacts to the Project Area should also decline

through implementation of the interpretive elements of the project. The proposed trail improvements should encourage people to stay in designated areas and minimize use in sensitive areas. This would help facilitate bosque habitat recovery, and minimize or prevent future human induced disturbances.

With the project, short- and long-term, bosque conditions are expected to improve. Species diversity should increase and future habitat conditions should help ensure the continued persistence of federally listed species and other fish and wildlife resources. Wetlands would be created and the quality of existing wetlands should improve. Native cottonwood and willow should begin to recover as non-native vegetation is reduced in the Project Area. The overall quality and quantity of fish and wildlife habitat is expected to improve.

According to Crawford *et al.* (1993), wetlands have experienced the greatest decline of any floodplain plant community within the Middle Rio Grande. The creation of additional wetland communities would help to reduce this trend. This project supports Crawford *et al.* (1993) Recommendation No. 15 (to protect, enhance, and create wetlands throughout the Middle Rio Grande riparian zone). The bosque wetlands would create more open water habitat and edge habitat, thus increasing benefits to fish and wildlife resources. The replacement of exotic species with native species would increase the amount and types of food and cover available for resident and migratory birds and thereby increase species diversity. Long-term bosque restoration and wetland creation would enrich the local fauna by attracting wildlife that otherwise are uncommon in the arid Southwest (Crawford *et al.* 1993).

The combined effect of proposed Non-native Plant Removal, Planting of Native Species, and Excavation of Channel, Outfall Channel, and Swale areas on vegetation structure dominated by non-native species would be changed to open areas or stands dominated by native species, namely cottonwood and coyote willow. With respect to the entire Project Study Area, the Preferred Alternative would result in an overall increase in the diversity of vegetation communities.

This forecast of future conditions assumes that maintenance of the Project Area would prevent reestablishment of non-native-dominated stands and that Outfall Channel Habitat, High-Flow Channels, and Swales would develop and maintain a hydrologic connection between the river and bosque. The High-Flow Channels and Swales would likely result in propagation of native vegetation, which would help the area. During times of low flow, the channels would provide a moist soil area for plants, such as coyote willow, sedges, and rushes, and wildlife that prefer moister environments. Both functions are critical to improving the overall habitat in the reach (Crawford *et al.* 1993). Over the long term, the cottonwood-dominated structure stands would develop into later successional structure types.

The High Flow channel features could potentially restore some over-bank flooding in localized areas. This could promote establishment of early succession stands dominated by cottonwood and coyote willow. Localized lowering of the soil surface in Swales could subject some areas to fluctuating moisture regimes, which could restore functioning wetland plant communities in those areas.

Individual locations within the proposed project would have varied re-vegetation strategies in order to achieve the target mosaic and stay within current water demands. Re-creation of the tiered bosque forest is important to sustaining a number of plants and animals in the bosque (Crawford *et al.* 1993, Hink and Ohmart 1984). These areas would become the patchy groves described in many of the early accounts of the river valley near Albuquerque (Scurlock 1998). The larger size of these patches would provide important core habitat, while maintenance of the firebreaks would provide important edge habitat (Hink and Ohmart 1984). Edge effect and the creation of denser patches such as the proposed shrub thickets would be important for increasing wildlife diversity within the bosque (Crawford *et al.* 1993, Hink and Ohmart 1984). Although, the Preferred Alternative may not be able to positively influence all the degradation processes at work in the bosque, replacement of dead material and non-native vegetation with a mosaic of native vegetation should lead to a system of less water use, decreased fire danger, and increased diversity of native species for use by wildlife. Therefore, the long-term effects of replacing the non-native dominated vegetation system with native dominated species is proposed to outweigh the short-term negative effects, which would be caused by the Preferred Alternative.

Creation of wet habitat in the Project Area would increase habitat available for wetland-dependent reptile and amphibian species. An increase in the amount of moist, densely-vegetated habitats and coyote willow stands would also likely increase the habitat and abundance of small mammals.

While bird species richness may not increase in the Project Study Area as a result of the Preferred Alternative, bird abundance and the amount of habitat suitable for rare bird species would likely be increased. Restoration of wetlands, cottonwood-willow, and cottonwood-New Mexico olive habitats would provide important habitat, particularly for Neotropical migrant bird species that breed in the bosque (Thompson *et al.* 1994). Many Neotropical migrant bird species in the western U.S. are declining and many of those species breed in riparian areas, which makes those habitats particularly important (Finch 1991). Restoration willow thickets, in association with wetlands, could increase the amount of suitable habitat for the flycatcher and other bird species associated with wetlands and riparian shrub habitat. Timber-foliage foraging, timber-drilling, and timber-gleaning species that nest in the bosque would be enhanced.

The emphasis in the Preferred Alternative on creating edge habitat and a fine-grained distribution of restoration features may facilitate brood parasitism by the brown-headed cowbird. This is a threat to many nesting bird species in the bosque, including the endangered flycatcher (Finch *et al.* 1995, Schweitzer *et al.* 1998). Clustering numerous small patches to create larger, contiguous habitats and reducing the number of edges adjacent to open areas where cowbirds forage could

potentially offset this effect. Also, increasing vegetation of open areas to reduce their coverage in the Project Area would reduce cowbird foraging habitat.

Trails and recreational developments that would occur with implementation of the Preferred Alternative could have a negative impact on bird abundance and species richness. Human presence and disturbance in the bosque reduces habitat quality for many bird species and in general results in lower species richness and bird abundance (Thompson *et al.* 1994). The Preferred Alternative includes about 22,500 linear feet of trails, benches, signs, two boardwalks, and wildlife blind. Recreational uses of trails by hikers, bicyclists, and equestrians causes noise disturbance and usually results in waste accumulation (which may attract scavengers and predators). Trails create openings that may facilitate brown-headed cowbird parasitism. The frequency and intensity of recreational use associated with the proposed recreation features may further reduce habitat suitability for birds. However, the design, construction and maintenance of a limited number of formal trails would be preferable to the existing condition where numerous informal trails have been created and are used.

The proposed work would occur during the winter, which is when Bald Eagles may be in or near the Study Area. In order to minimize the potential for disturbing Bald Eagles utilizing adjacent habitat, the following guidelines would be employed. Also, cottonwood snags or other large trees present along the riverbanks that may serve as potential roost habitat would be left intact as part of this project. Implementation of these measures would preserve undisturbed Bald Eagle use of roost, foraging and perching sites in the riparian area adjacent to the project sites.

The peak nesting season in the bosque is April through August. In order to minimize potential effects on nesting birds in the Project Area, clearing of live vegetation would only occur between September and April.

Since the primary goal and effect of implementation of the Preferred Alternative is to restore the bosque with native species, which would create a healthier ecosystem in the long-term for native wildlife, these short-term effects (displacement, etc.) and impacts of limited recreational access would be outweighed by the long-term benefits. Therefore, the Preferred Alternative would have short-term negative affects on fish and wildlife with long-term positive benefits.

Threatened and Endangered Species

Foreseeable effects to federally listed species are discussed below. A Biological Assessment has been submitted to the Service for their concurrence on these species. Analysis of effects to listed species will be addressed in detail during ESA section 7 consultation between the Corps and the Service.

Rio Grande Silvery Minnow

The proposed work area is within designated critical habitat for the minnow. Work would not take place in the channel but it would take place along the bank and it may result in erosion or other inputs into the river. When work is to occur close to the bank of the river, best

management practices (BMPs) would be enforced to prevent erosion inputs into the river. These BMPs would include, but would not be limited to: the use of silt fences without lead weights adjacent to the riverbank to prevent erosion to the river; blocking of work zones to the river when constructing the High-Flow Channels, fueling of vehicles would not take place inside the levees; and storage of equipment and vehicles should not occur in the bosque.

Additionally, this project would provide potential habitat for the minnow and would create additional nursery habitat in this reach which would help its distribution and abundance. The bosque wetlands would create more open water habitat and edge habitat, thus increasing benefits to fish and wildlife resources.

Southwestern Willow Flycatcher

Flycatcher surveys conducted in 2002 and 2003 did not find any nesting activity in the Project Study Area. During the 2004 and 2005 survey seasons, flycatchers were detected within the Project Study Area along the Tingley Bar. In 2004 a single individual was heard and observed singing in a clump of salt cedar along the river bank, and the second individual was heard singing in a dense clump of tall coyote willow on the river bar. In 2005, an individual was heard and observed in a stand of Russian olive on an island bar. It is presumed that these individuals were migrants.

Based on surveys it is highly unlikely that nesting flycatchers would occupy the Project Study Area during the construction. It is very possible that migrants would be detected, as they were along the Tingley Bar during the 2004 and 2005 survey periods.

Critical habitat has been designed for the flycatcher but is not within the proposed Project Area. As stated above, no breeding habitat has been identified during protocol surveys. Other projects in the area, such as the Bio-Park Project, would create additional potential habitat for the flycatcher. This project would also create habitat that would potentially benefit the flycatcher. The bosque wetlands would create more open water habitat and edge habitat, thus increasing benefits to fish and wildlife resources.

DISCUSSION

The Route 66 Project provides opportunities to restore some Rio Grande ecosystem biological components to benefit fish and wildlife resources. The project represents extensive coordination of ideas and plans on a multi-party level. Project implementation and reporting of the monitoring results would provide valuable information for future projects in a river-based ecosystem approach to restoration throughout the Middle Rio Grande.

The proposed restoration plan incorporates many of the recommendations from the Middle Rio Grande Ecosystem: Bosque Biological Management Plan (Crawford *et al.* 1993). The proposed plan would create wetlands within the Rio Grande riparian zone; and would sustain and enhance existing cottonwood communities as well as create new native cottonwood communities.

Activities that restore and enhance fish and wildlife habitat within the Middle Rio Grande are timely, as riparian and wetland habitats are scare and disappearing at an astonishing rate. About 90 percent of the historic wetland and riparian habitat in the Southwest has been eliminated (Johnson and Jones 1977). Hink and Ohmart (1984) found a wetland and riparian area decrease of 87 percent along the Rio Grande from 1919 t0 1982.

The value of riparian habitat is well known to resource managers because of the high diversity and abundance of animal species which rely on the ecosystem for its unique plant community types, hydrologic features, soil, topography, and other environmental features that do not exist in adjacent upland habitat. Many animals species are obligates (depending entirely on the riparian zone) while most are facultative (occurring in riparian habitat as well as in other habitat types).

The ecological attributes that contribute to the high value of riparian habitat should be maintained to preserve the value to wildlife include the following:

- Heterogeneity of plant communities and structure
- Predominance of woody plant communities
- Presence of surface water, soil moisture, and high water table
- Continuous, unfragmented corridors of habitat
- Sustainability

These factors should all be seriously considered in this as well as other restoration activities within the Middle Rio Grande ecosystem.

Because of the scarcity and high wildlife value of wetlands in the Southwest, wetland restoration and creation is desirable wherever possible. Managed wetlands in areas removed and protected from human, pets, and livestock would be most valuable to fish and wildlife. The easiest method to establish a wetland is to expand an existing one or to allow natural flow regimes to re-establish former wetlands. Wetlands with a variety of water depths, water movement through the wetland, small islands, an irregular water-land interface, and protection of adjacent uplands, are habitat requirements to produce a diverse healthy wetland. To maximize benefits to fish and wildlife resources, the Service recommends further exploration of wetland creation opportunities within the Middle Rio Grande.

Construction activities that result in unavoidable adverse impacts to fish and wildlife require the development of mitigation plans. These plans consider the value of fish and wildlife habitat affected. The Service has established a mitigation policy used as guidance in determining resource categories and recommending mitigation (46 FR: 7644-7663). The riparian bosque and associated floodplain habitat within the Project Area are consistent with “Resource Category No.

2"; that is, habitats of high value that are relatively scarce or becoming scarce on a national basis or in the eco-region.

Although the Project Area contains a large amount of exotic species; overall, riparian and wetland habitats are classified in Category 2 because they are scarce. According to Johnson and Jones (1977), about 90 percent of the historic wetland and riparian habitat in the Southwest has been eliminated. Hink and Ohmart (1984) found a wetland decrease of 87 percent along the Rio Grande from 1918 to 1982. The Service mitigation policy states that the degree of mitigation should correspond to the value and scarcity of the fish and wildlife habitat at risk. Consequently, no net loss of in-kind habitat value should be the mitigation goal for this resource category. The Service believes that the proposed project not only meets, but exceeds the "no net loss of in-kind habitat" mitigation goal for this resource category. Therefore, no specific mitigation is needed for the project, as proposed.

Monitoring provides the feedback needed to establish protocols and make adjustments where and when necessary to achieve the desired results. Monitoring would be essential to the success of the Route 66 Project, as well as other USACE studies. Baseline data would be collected so that results can be quantified and compared. Wetland and bosque monitoring would include vegetation mortality, wildlife and vegetation species, groundwater and other environmental indicators. Post-project monitoring is a crucial requisite of the adaptive management process, as performance feedback may generate new insights on ecosystem response and provides a basis for determining the necessity or feasibility of subsequent design or operational modifications. Success should be measured by comparing post-project conditions to the restoration project objectives and pre-project conditions.

Another component of restoration of the Rio Grande ecosystem is water management. The single most important adverse impact to the fish and wildlife habitat within the Rio Grande ecosystem has been the change in the flow regime through water management. Present water management, including reduced peak releases, reduced volumes due to consumption, irrigation, improper timing of water releases, water salvage attempts, and water drainage has produced an overwhelmingly negative effect on fish and wildlife and their habitat.

All waste material would be disposed of properly at pre-approved or commercial disposal areas or landfills. Fuel, oil, hydraulic fluids and other similar substances would be appropriately stored away from the Rio Grande and must have a secondary containment system to prevent spills if the primary storage container leaks. All heavy equipment operating in or near river floodplain should carry an oil spill kit or spill blanket at all times. No refueling or staging shall occur in the bosque.

Permanent structures, access roads, staging, parking, refueling, and work areas could directly impact riparian habitats through removal and/or trampling. These impacts would be mitigated because access to all work areas would be along the levee. Staging would occur in adjacent open areas that are available from the sponsor, MRGCD, or within the bosque if none is available. Additional access and subsidiary staging areas to facilitate construction activities would need to be coordinated with MRGCD, OSD, and the Bio-Park. No fueling would take place in the

bosque.

The Service anticipates some minor short-term impacts to fish and wildlife resources associated with project construction. To ensure that federally listed species are not adversely impacted by the project, ESA section 7 consultation should be completed prior to construction. To minimize adverse impacts to birds protected under the Migratory Bird Treaty Act, tree stands or other adequately vegetated areas slated for grubbing or clearing should be surveyed for the presence of nesting birds during the general migratory bird nesting season of March through August. Disturbance to nesting areas should be avoided until nesting is completed. Vegetation clearing and construction related soil disturbances can cause sediment-laden runoff to enter waterways. To minimize impacts associated with erosion, the contractor should employ silt curtains without lead weights, coffer dams, dikes, straw bales, or other suitable erosion control measures. Construction related petrochemical spills can also negatively impact fish and wildlife resources. Therefore, measures should be implemented to minimize the likelihood of petrochemical spills. Spill procedures should be in place prior to construction to minimize impacts associated with unexpected spills. To ensure that the objectives of the project are met, post-construction monitoring of the Project Area should be conducted.

The Route 66 Project would provide the public a quality outdoor experience and would provide fish and wildlife benefits by restoring portions of the bosque to a condition nearer to natural and productive biotic community. Therefore, the Service believes the project would improve important long-term migratory bird habitat as well as resident fish and wildlife habitat within the Rio Grande corridor in Albuquerque.

RECOMMENDATIONS

The Service is encouraged by the restoration and conservation of valuable fish and wildlife resources represented by the proposed project. The following recommendations are provided by the Service to prevent and reduce adverse project effects on fish and wildlife resources during construction, operation, and maintenance of the proposed project:

1. Where possible, avoid construction during the migratory bird nesting season of March through August. Where that is not possible, tree stands or other adequately vegetated areas slated for grubbing or clearing should be surveyed for the presence of nesting birds prior to construction. Avoid disturbing nesting areas until nesting is complete.

2. Employ silt curtains without lead weights, cofferdams, dikes, straw bales or other suitable erosion control measures during construction.

3. Store and dispense fuels, lubricants, hydraulic fluids, and other petrochemicals outside the 100-year floodplain. Inspect construction equipment daily for petrochemical leaks. Contain and remove any petrochemical spills and dispose of these materials at an approved upland site. Park construction equipment outside the 100-year floodplain during periods of inactivity.

4. Ensure equipment operators carry an oil spill kit or spill blanket at all times and are knowledgeable in the use of spill containment equipment. Develop a spill contingency plan prior to initiation of construction. Immediately notify the proper Federal and state authorities in the event of a spill.

5. All work and staging areas should be limited to the minimum amount required. Existing roads and right-of-ways and staging areas should be used to the greatest extent practicable to transport equipment and construction materials to the project site, and described in the USACE's project description. Provide designated areas for vehicle turn around and maneuvering to protect riparian areas from unnecessary damage.

6. Backfill with uncontaminated earth or alluvium suitable for re-vegetation with native plant species.

7. Scarify compacted soils or replace topsoil and revegetate all disturbed sites with suitable mixture of native grasses, forbs, and woody shrubs.

8. Protect mature cottonwood trees from damage during clearing of non-native species or other construction activities using fencing, or other appropriate materials.

9. Use local genetic stock wherever possible in the native plant species establishment throughout the riparian area.

10. Continue coordination of Rio Grande water management activities that develop and maintain riverine and terrestrial habitats by mimicking the typical natural hydrograph. An intergraded management of flows from upstream reservoirs should be pursued by USACE for the purpose of protecting and enhancing the aquatic and terrestrial habitats along the Rio Grande.

11. Pursue and conduct floodplain management activities that discourage further development in the floodplain and address physical constraints to the higher flows that would be part of a natural hydrograph.

12. Explore expansion of the active floodplain of the Rio Grande at every opportunity.

13. Develop a coordinated program to monitor biological quality with emphasis on diversity and abundance of native species and ecosystem integrity with emphasis on restoring the functional connection between the river and the riparian zone of the Middle Rio Grande

ecosystem.

14. Develop partnerships with local schools, universities, or other interested groups to help address post-project monitoring and adaptive management needs (e.g., conduct periodic wildlife surveys, monitoring ecosystem response, etc.).

Figure 1

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APPENDICES

Appendix A. Common and Scientific Names of Plants That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Baccharis (N)	*Baccharis spp.*
Seepwillow (N)	*Baccharis glutinosa*
Coyote willow (N)	*Salix exigua*
Peachleaf willow (N)	*Salix amygdaloides*
Goodding's willow (N)	*Salix gooddingii*
Buttonbush (N)	*Cephalanthus spp.*
False indigo bush (N)	*Amorpha fruticosa*
New Mexico olive (N)	*Forestiera neomexicana*
Black locust (N)	*Robinia pseudo-acacia*
Boxelder (N)	*Acer negundo*
Chinaberry (I)	*Melia azedarach*
Rio Grande cottonwood (N)	*Populus fremonti*
White mulberry (I)	*Morus alba*
Russian olive (I)	*Elaeagnus angustifolia*
Salt cedar (I)	*Tamarix spp.*
Siberian elm (I)	*Ulmus pumila*
Tree-of-heaven (I)	*Ailanthus altissima*
Apache plume (N)	*Fallugia paradoxa*
Wolfberry (N)	*Lycium andersonii*
Fourwing saltbush (N)	*Atriplex canescens*
Virginia creeper (I)	*Parthenocissus inserta*
Phragmites (N)	*Phragmites communis*
Sago pondweed (N)	*Potamogeton pectinatus*
Sedge (N)	*Carex spp.*
Saltgrass (N)	*Distichlis stricta*
Spikerush(N)	*Eleocharis spp.*
Horsetail (N)	*Equisetum spp.*
Rush (N)	*Juncus spp.*
Bulrush (N)	*Scirpus spp.*
Sacaton (N)	*Sporobolus spp.*
Cattail (N)	*Typha latifolia*
Smartweed (N)	*Polygonum lapathifolium*
American milfoil (N)	*Myriophyllum exalbescens*
Yerba manza (N)	*Anemopsis californica*
Primrose (N)	*Oenothera spp.*
Fendler globemallow (N)	*Sphaeralcea fendleri*
Pricklypear (N)	*Opuntia spp.*
Buffalo gourd (N)	*Cucurbita foetidissima*
Spiny aster (I)	*Aster spinosus*
Golden currant (N)	*Ribes aureum*
Watercress (N)	*Nasturtium officionale*

(N=native, I=introduced or non-native)

Appendix B. Common and Scientific Names of Mammals That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Opossum	*Didelphis virginiana*
Desert shrew	*Notiosorex crawfordi*
Yuma myotis	*Myotis yumanensis*
Little brown bat	*Myotis lucifugus*
Long-legged myotis	*Myotis volans*
Silver-haired bat	*Lasionycteris noctivagans*
Big brown bat	*Eptesicus fuscus*
Hoary bat	*Lasiurus cinereus*
Spotted bat	*Euderma maculatum*
Townsend's big-eared bat	*Plecotis townsendii*
Pallid bat	*Antrozous pallidus*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Desert cottontail	*Sylvilagus auduboni*
Black-tailed jackrabbit	*Lepus californicus*
Beaver	*Castor canadensis*
Gunnison's prairie dog	*Cynomys gunnisoni*
Colorado chipmunk	*Eutamias quadrivittatus*
Spotted ground squirrel	*Spermophilus spilosoma*
Rock squirrel	*Spermophilus variegatus*
Red squirrel	*Tamiasciurus hudsonicus*
Northern grasshopper mouse	*Onychomys leucogaster*
Deer mouse	*Peromyscus maniculatus*
White-footed mouse	*Peromyscus leucopus*
Piñon mouse	*Peromyscus truei*
Western harvest mouse	*Reithrodontomys megalotis*
Hispid cotton rat	*Sigmodon hispidus*
Norway rat	*Rattus norvegicus*
Muskrat	*Ondatra zibethicus*
New Mexican jumping mouse	*Zapus hudsonius luteus*
Ord kangaroo rat	*Dipodomys ordii*
Merriam kangaroo rat	*Dipodomys merriami*
Silky pocket mouse	*Perognathus flavus*
Plains pocket mouse	*Perognathus flavescens*
Yellow-faced pocket gopher	*Pappogeomys castanops*
Botta pocket gopher	*Thomomys bottae*
American porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Gray fox	*Urocyon cinereoargenteus scottii*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitis mephitis*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
Badger	*Taxidea taxus*
Bobcat	*Lynx rufus*
Mountain lion	*Felis concolor*
Mule deer	*Odocoileus hemionus*

Appendix C. Common and Scientific Names of Fish That May Occur in the Middle Rio Grande.

Common Name	Scientific Name
Gizzard shad (N)	*Dorosoma cepedianum*
Rainbow trout (I)	*Oncorhynchus mykiss*
Brown trout (I)	*Salmo trutta*
Northern pike (I)	*Esox lucius*
Red shiner (N)	*Cyprinella lutrensis*
Common carp (I)	*Cyprinus carpio*
Rio Grande chub (N)	*Gila pandora*
Rio Grande silvery minnow (N)	*Hybognathus amarus*
Fathead minnow (N)	*Pimephales promelas*
Flathead chub (N)	*Platygobio gracilis*
Longnose dace (N)	*Rhinichthys cataractae*
River carpsucker (N)	*Carpiodes carpio*
Flathead catfish (N)	*Pylodictis olivaris*
White sucker (I)	*Catostomus commersoni*
Rio Grande sucker (N)	*Catostomus plebeius*
Smallmouth buffalo (N)	*Ictiobus bubalus*
Black bullhead (I)	*Ictalurus melas*
Yellow bullhead (I)	*Ictalurus natalis*
Channel catfish (I)	*Ictalurus punctatus*
Western mosquitofish (N)	*Gambusia affinis*
White bass (I)	*Morone chrysops*
Green sunfish (I)	*Lepomis cyanellus*
Bluegill (N)	*Lepomis macrochirus*
Longear sunfish (I)	*Lepomis megalotis*
Largemouth bass (I)	*Micropterus salmoides*
White crappie (I)	*Pomoxis annularis*
Black crappie (I)	*Pomoxis nigromaculatus*
Yellow perch (I)	*Perca flavescens*

(N=native, I=introduced or non-native)

Appendix D. Common and Scientific Names of Birds That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Pied-billed grebe	*Podilymbus podiceps*
Common loon	*Gavia immer*
American white pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
Olivaceous cormorant	*Phalacrocorax olivaceus*
American bittern	*Botaurus lentiginosus*
Least Bittern	*Ixobrychus exilis*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Little blue heron	*Egretta caerulea*
Cattle egret	*Bubulcus ibis*
Green-backed heron	*Butorides striatus*
Black-crowned night heron	*Nycticorax nycticorax*
White-faced ibis	*Plegadis chihi*
Snow goose	*Chen caerulescens*
Canada goose	*Branta canadensis*
Wood duck	*Aix sponsa*
Green-winged teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Cinnamon teal	*Anas cyanoptera*
Northern shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
Hooded merganser	*Mergus cuculatus*
Red-breasted merganser	*Mergus serrator*
Ruddy duck	*Oxyura jamaicensis*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Common moorhen	*Gallinula chloropus*
American coot	*Fulica americana*
Sandhill crane	*Grus canadensis*
Whooping crane	*Grus americana*
Killdeer	*Charadrius vociferus*
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*
Solitary sandpiper	*Tringa solitaria*
Spotted sandpiper	*Actitis macularia*
Long-billed curlew	*Numenius americanus*
Forster’s tern	*Sterna forsteri*
Black tern	*Chlidonias niger*
Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Black-shouldered kite	*Elanus caeruleus*
Mississippi kite	*Ictinia mississippiensis*
Bald eagle	*Haliaeetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Cooper's hawk	*Accipiter cooperii*
Common black-hawk	*Buteogallus anthracinus*
Swainson’s hawk	*Buteo swainsoni*

Appendix D continued. Common and Scientific Names of Birds That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
American peregrine falcon	*Falco peregrinus anatum*
Ring-necked pheasant	*Phasianus colchicus*
Northern bobwhite	*Colinus virginianus*
Scaled quail	*Callipepla squamata*
Gambel's quail	*Callipepla gambelii*
Rock dove	*Columba livia*
White-winged dove	*Zenaida asiatica*
Morning dove	*Zenaida macroura*
Common ground-dove	*Columbina passerina*
Yellow-billed cuckoo	*Coccyzus erythropthalmus*
Greater roadrunner	*Geococcyx californianus*
Common barn-owl	*Tyto alba*
Great horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Lesser nighthawk	*Chordeiles acutipennis*
Common nighthawk	*Chordeiles minor*
White-throated swift	*Aeronautes saxatalis*
Black-chinned hummingbird	*Archilochus alexandri*
Rufous hummingbird	*Selasphorus rufus*
Belted kingfisher	*Ceryle alcyon*
Northern flicker	*Colaptes auratus*
Olive-sided flycatcher	*Contopus borealis*
Western wood-pewee	*Contopus sordidulus*
Southwestern willow flycatcher	*Empidonax traillii extimus*
Black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Cassin's kingbird	*Tyrannus vociferans*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Violet-green swallow	*Tachycineta thalassina*
Bank swallow	*Riparian riparia*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Black-billed magpie	*Pica pica*
American crow	*Corvus caurinus*
Chihuahuan raven	*Corvus cryptoleucus*
Black-capped chickadee	*Parus atricapillus*
Verdin	*Auriparus flaviceps*
White-breasted nuthatch	*Sitta carolinensis*
Cactus wren	*Campylorhynchus brunneicapillus*
Black-tailed gnatcatcher	*Polioptila melanura*
Eastern bluebird	*Sialia sialis*
Western bluebird	*Sialia mexicana*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*

Appendix D continued. Common and Scientific Names of Birds That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Gray catbird	*Dumetella carolinensis*
Cactus wren	*Campylorhynchus brunneicapillus*
Black-tailed gnatcatcher	*Polioptila melanura*
Cactus wren	*Campylorhynchus brunneicapillus*
Black-tailed gnatcatcher	*Polioptila melanura*
Eastern bluebird	*Sialia sialis* Cactus wren *Campylorhynchus brunneicapillus*
Black-tailed gnatcatcher	*Polioptila melanura*
Eastern bluebird	*Sialia sialis*
Western bluebird	*Sialia mexicana*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*
Gray catbird	*Dumetella carolinensis*
Northern mockingbird	*Mimus polyglottos*
Curved-billed thrasher	*Toxostoma curvirostre*
Crissal thrasher	*Toxostoma dorsale*
European starling	*Sturnus vulgaris*
Bell's vireo	*Vireo bellii*
Warbling vireo	*Vireo gilvus*
Orange-crowned warbler	*Vermivora celata*
Virginia's warbler	*Vermivora virginiae*
Lucy's warbler	*Vermivora luciae*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Yellow-breasted chat	*Icteria virens*
Summer tanager	*Piranga rubra*
Western tanager	*Piranga ludoviciana*
Northern cardinal	*Cardinalis cardinalis*
Pyrrhuloxia	*Cardinalis sinuatus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Indigo bunting	*Passerina cyanea*
Painted bunting	*Passerina ciris*
Spotted towhee	*Pipilo maculatus*
Brown towhee	*Pipilo fuscus*
Dark-eyed junco	*Junco hyemalis*
Rufous-crowned sparrow	*Aimophila ruficeps*
American tree sparrow	*Spizella arborea*
Chipping sparrow	*Spizella passerina*
Lark sparrow	*Chondestes grammacus*
Black-throated sparrow	*Amphispiza bilineata*
Lark bunting	*Calamospiza melanocorys*
Lincoln's sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Red-wing blackbird	*Agelaius phoeniceus*

Appendix D continued. Common and Scientific Names of Birds That May Occur in the Middle Rio Grande Floodplain.

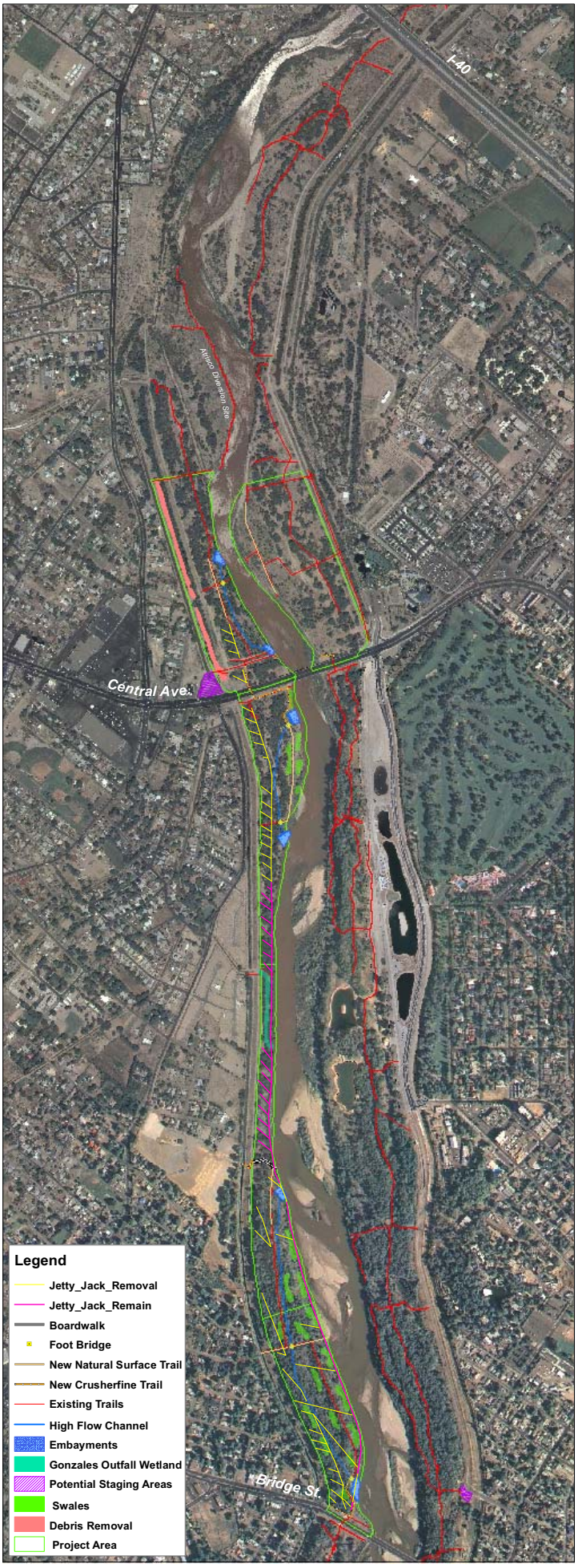
Common Name	Scientific Name
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Great-tailed grackle	*Quiscalus mexicanus*
Bronzed cowbird	*Molothrus aeneus*
Brown-headed cowbird	*Molothrus ater*
Orchard oriole	*Icterus spurius*
Northern oriole	*Icterus galbula bullockii*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*

Appendix E. Common and Scientific Names of Reptiles and Amphibians That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Tiger salamander	*Ambystoma tigrinum*
Couch's spadefoot	*Scaphiopus couchii*
Plains spadefoot	*Spea bombifrons*
New Mexico spadefoot	*Spea multiplicata*
Great Plains toad	*Bufo cognatus*
Red-spotted toad	*Bufo punctatus*
Woodhouse's toad	*Bufo woodhousii*
Canyon treefrog	*Hyla arenicolor*
Western chorus frog	*Pseudacris triseriata*
Bullfrog (introduced)	*Rana catesbeiana*
Northern leopard frog	*Rana pipiens*
Yellow mud turtle	*Kinosternon flavescens*
Snapping turtle	*Chelydra serpentina*
Painted turtle	*Chrysemys picta*
Ornate box turtle	*Terrapene ornata*
Red-eared slider (introduced)	*Trachemys scripta*
Spiny softshell	*Trionyx spiniferus*
Collared lizard	*Crotaphytus collaris*
Leopard lizard	*Gambelia wislizenii*
Greater earless lizard	*Cophosaurus texanus*
Lesser earless lizard	*Holbrookia maculata*
Texas horned lizard	*Phrynosoma cornutum*
Roundtail horned lizard	*Phrynosoma modestum*
Desert spiny lizard	*Sceloporus magister*
Eastern fence lizard	*Sceloporus undulatus*
Tree lizard	*Urosaurus ornatus*
Side-blotched lizard	*Uta stansburiana*
Chihuahuan whiptail	*Cnemidophorus exsanguis*
Checkered whiptail	*Cnemidophorus grahamii*
Little striped whiptail	*Cnemidophorus inornatus*
New Mexico whiptail	*Cnemidophorus neomexicanus*
Western whiptail	*Cnemidophorus tigris*
Desert grassland whiptail	*Cnemidophorus uniparens*
Plateau striped whiptail	*Cnemidophorus velox*
Many-lined skink	*Eumeces multivirgatus*
Great Plains skink	*Eumeces obsoletus*
Texas blind snake	*Leptotypholps dulcis*
Glossy snake	*Arizona elegans*
Racer	*Coluber constrictor*
Ringneck snake	*Diadophis punctatus*
Great Plains rat snake	*Elaphe guttata*

Appendix E continued. **C**ommon and Scientific Names of Reptiles and Amphibians That May Occur in the Middle Rio Grande Floodplain.

Common Name	**Scientific Name**
Western hooknose snake	*Gyalopion canum*
Western hognose snake	*Heterodon nasicus*
Night snake	*Hypsiglena torquata*
Common kingsnake	*Lampropeltis getula*
Milk snake	*Lampropeltis triangulum*
Smooth green snake	*Liochlorophis vernalis*
Coachwhip	*Masticophis flagellum*
Striped whipsnake	*Masticophis taeniatus*
Bullsnake or gopher snake	*Pituophis melanoleucus*
Longnose snake	*Rhinocheilus lecontei*
Mountain patchnose snake	*Salvadora grahamiae*
Plains blackhead snake	*Tantilla nigriceps*
Blackneck garter snake	*Thamnophis cyrtopsis*
Wandering garter snake	*Thamnophis elegans*
Checkered garter snake	*Thamnophis marcianus*
Common garter snake	*Thamnophis sirtalis*
Western diamondback rattlesnake	*Crotalus atrox*
Blacktail rattlesnake	*Crotalus molossus*
Western rattlesnake	*Crotalus viridis*
Massasauga	*Sistrurus catenatus*



Ecosystem Revitalization @ Route 66 Project

US Army Corps of Engineers
Albuquerque District

0 850 1,700 3,400 Feet

0.1 0.05 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 Miles

Source Imagery:
Bio Park Area - Apr. 2006 MRCOG
All Else - July 2005 Statewide DOQQs

Revision: May-28-2008

Appendix C. Cultural Resources Coordination

070294

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA, NE
ALBUQUERQUE, NEW MEXICO 87109-3435
FAX (505) 342-3199

Reply to Attention of:

February 12, 2004

Planning. Project and Program Management Division
Planning Branch
Environmental Resources Section

Ms. Katherine Slick
State Historic Preservation Officer
New Mexico State Historic Preservation Bureau
228 East Palace Avenue, Room 320
Santa Fe, New Mexico 87501

Dear Ms. Slick:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of "No Historic Properties Affected" for the proposed project entitled, "Middle Rio Grande Bosque 1135 Ecosystem Restoration Project at Route 66". The Corps' involvement in this restoration work stems from the authority of Section 1135(b) of the Water Resources Development Act of 1986 (Public Law 99-662).

The Route 66 Ecosystem Restoration Project is located within the City of Albuquerque, Bernalillo County, New Mexico. It is situated on lands under the joint jurisdiction of Federal, State, and City agencies. Most of the land is managed by the Middle Rio Grande Conservancy District under permit from the U.S. Bureau of Reclamation. A portion of the undertaking is also within the Rio Grande Valley State Park that is jointly managed by the City of Albuquerque's Open Space Division and the New Mexico State Parks Division.

The 3.1 mile-long project area is confined to the riverside and bosque areas within the flood control levees on both sides of the Rio Grande and is bounded on the north by the Interstate Highway 40 bridge and on the south by the Barelas Bridge. Of the total 643-acre project area, 370 acres are within the river channel and active flood plain, and 273 acres are within the bosque. A Class III cultural resources inventory survey of the 273 acres was conducted by Cibola Research Consultants. The survey is reported by Michael Marshall in the enclosed report entitled *A Cultural Resources Survey for the Proposed Middle Rio Grande Bosque Restoration Project, Bernalillo County, New* Mexico, Cibola Research Consultants Reports No. 345; NMCRIS No. 82701.

The proposed restoration project involves removing old jetty jacks, other post-and-cable flood control structures, non-native species and accumulated vegetation that adds to the fuel load in the

event of a fire. Native species of trees will be replanted. Access is provided by the roads on the flood control levees that were constructed in the 1950s and 1960s.

The records of the New Mexico Historic Preservation Division's Archaeological Records Management Section and other archives were reviewed; the survey discovered seven historic-period archaeological sites and 21 isolated occurrences. The sites are all related to bridge crossings (3), irrigation works (3), and flood control features (1). They will not be impacted by any of the work associated with the project. Most of the isolated occurrences are recent trash dumps; several camps of homeless persons were also recorded. The isolated occurrences need no additional consideration as they were recorded in sufficient detail to exhaust their useful contribution to the State's cultural database.

The Corps is of the opinion that there would be "No Adverse Effect to Historic Properties" as a result of the proposed restoration project. Pursuant to 36 CFR 800.11, should previously unknown cultural resource manifestation be encountered during the project, a determination of significance made and a mitigation plan formulated in consultation with your office.

Thank you for your attention to this matter. If you have any questions or require additional information, please contact Dr. John D. Schelberg, Archeologist, at (505) 342-3359.

Sincerely,

Julie A. Hall
Chief, Environmental Resources Branch

DATE 03/29/07

I Concur 03/29/07
for Katherine Slick
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER

Enclosure

Copy furnished: (w/o enclosure)

Mr. Don Klima
Advisory Council on Historic Preservation
Office of Planning and Review
12136 W. Bayaud Ave., #330
Lakewood, Colorado 80228-2115

2005 Tribal Mailing List

for BERNALILLO County projects
Hopi Tribe
Isleta Pueblo
Laguna Pueblo
Navajo Nation
Sandia Pueblo
White Mountain Apache Tribe
Ysleta del Sur Pueblo

Honorable Wayne Taylor, Jr.
Chairman, Hopi Tribal Council
Post Office Box 123
Kykotsmovi, Arizona 86039

cf:
Mr. Leigh Kuwanwisiwma
Director, Cultural Preservation Office
Hopi Tribe
Post Office Box 123
Kykotsmovi, Arizona 86039

Honorable Robert Benavides
Governor, Pueblo of Isleta
Post Office Box 1270
Isleta Pueblo, New Mexico 87022

Honorable Roland Johnson
Governor, Pueblo of Laguna
Post Office Box 194
Laguna Pueblo, New Mexico 87026

cf:
Mr. Victor Sarracino
NAGPRA Committee Chairman
Pueblo of Laguna
Post Office Box 194
Laguna Pueblo, New Mexico 87026

Honorable Joe Shirley, Jr.
President, Navajo Nation
Post Office Box 9000
Window Rock, Arizona 86515

cf:
Alan S. Downer, Ph.D., Director
Navajo Nation Historic Preservation Department
Post Office Box 4950
Window Rock, Arizona 86515

Honorable Stuwart Paisano
Governor, Pueblo of Sandia
481 Sandia Loop
Bernalillo, New Mexico 87004

cf:
Mr. Sam Montoya
Cultural Resources Administrator
Pueblo of Sandia
481 Sandia Loop
Bernalillo, New Mexico 87004

Honorable Dallas Massey, Sr.
Chairman, White Mountain Apache Tribe
Post Office Box 700
Whiteriver, Arizona 85941

cf:
Mr. John Welsh
Director, Historic Preservation Office
White Mountain Apache Tribe
Post Office Box 507
Fort Apache, Arizona 85926

Honorable Arturo Senclair
Governor, Ysleta del Sur Pueblo
Post Office Box 17579 - Ysleta Station
El Paso, Texas 79917

cf:
Mr. Jacob Massoud
Environmental Management Director
Ysleta del Sur Pueblo
Post Office Box 17579 – Ysleta Station
El Paso, Texas 79917

2005 Tribal Mailing List

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Director, Cultural Preservation Office
Hopi Tribe
Post Office Box 123
Kykotsmovi, Arizona 86039

Honorable Robert Benavides
Governor, Pueblo of Isleta
Post Office Box 1270
Isleta Pueblo, New Mexico 87022

Honorable Roland Johnson
Governor, Pueblo of Laguna
Post Office Box 194
Laguna Pueblo, New Mexico 87026

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NAGPRA Committee Chairman
Pueblo of Laguna
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Bernalillo, New Mexico 87004

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Post Office Box 17579 - Ysleta Station
El Paso, Texas 79917

cf:
Mr. Jacob Massoud
Environmental Management Director
Ysleta del Sur Pueblo
Post Office Box 17579 – Ysleta Station
El Paso, Texas 79917

THE NAVAJO NATION

JOE SHIRLEY, JR.
PRESIDENT

BEN SHELLY
VICE-PRESIDENT

April 03, 2008

Ms. Ondrea C. Hummel, Chief
Environmental Resources Section
Department of the Army
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

Subject: Tribal Consultation Request. Proposing to Revitalize the Bosque by improving the ecosystem function in Central Albuquerque, Bernalillo County, New Mexico.

Dear Ms. Hummel:

Our apology for an oversight and missing the deadline date of our response to your request, please note that in reference to your letter of March 20, 2008, the Historic Preservation Department – Traditional Culture Program (HPD-TCP) received a request for consultation regarding the above undertaking and/or project. After reviewing your consultation documents, HPD-TCP has concluded the proposed undertaking/project area **will not impact** any Navajo traditional cultural properties or historical properties.

However, if there are any inadvertent discoveries made during the course of the undertaking, your agency shall cease all operations within the project area. HPD-TCP shall be notified by telephone within 24 hours and a formal letter be sent within 72 hours. All work shall be suspended until mitigation measures/procedures have been developed in consultation with the Navajo Nation.

The HPD-TCP appreciates your agency's consultation efforts, pursuant to 36 CFR Pt. 800.1 (c)(2)(iii). Should you have additional concerns and/or questions, do not hesitate to contact me. My contact information is listed below.

Sincerely,

Mr. Tony Joe, Program Manager
Historic Preservation Department – Traditional Culture Program

Tel: 928.871.7688 Fax: 928.871.7886 E-mail: tonyjoe@navajo.org

TCP 08-536
File: Office file/chrono

PUEBLO OF LAGUNA
P.O. BOX 194
LAGUNA, NEW MEXICO 87026

(505) 552-6598
(505) 552-6654
(505) 552-6655

Office of:
The Governor
The Secretary
The Treasurer

April 17, 2008

Ms. Ondrea C, Hummel
Environmental Resources Section
Department of The Army
Albuquerque District, Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435

Dear Ms. Hummel:

RE: Proposed Project to Improve the Rio Grande Bosque Ecosystem

Pueblo of Laguna appreciates your consideration to comment on possible interests your project may have on any traditional or cultural properties

The Pueblo of Laguna has determined that the proposed undertaking WILL NOT have a significant impact at this time. However, in the event that any new archaeological sites are discovered and any new artifacts are removed, we request to be notified to review items, and if possible furnish photographs of items. As our migration history is, that our ancestors journeyed from the north through that area and possibilities of some findings.

We thank you and your staff for the information provided.

Sincerely,

John E. Antonio, Governor
Pueblo of Laguna

070294

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA, NE
ALBUQUERQUE, NEW MEXICO 87109-3435
FAX (505) 342-3199

Reply to Attention of:

February 12, 2004

Planning. Project and Program Management Division
Planning Branch
Environmental Resources Section

Ms. Katherine Slick
State Historic Preservation Officer
New Mexico State Historic Preservation Bureau
228 East Palace Avenue, Room 320
Santa Fe, New Mexico 87501

Dear Ms. Slick:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of "No Historic Properties Affected" for the proposed project entitled, "Middle Rio Grande Bosque 1135 Ecosystem Restoration Project at Route 66". The Corps' involvement in this restoration work stems from the authority of Section 1135(b) of the Water Resources Development Act of 1986 (Public Law 99-662).

The Route 66 Ecosystem Restoration Project is located within the City of Albuquerque, Bernalillo County, New Mexico. It is situated on lands under the joint jurisdiction of Federal, State, and City agencies. Most of the land is managed by the Middle Rio Grande Conservancy District under permit from the U.S. Bureau of Reclamation. A portion of the undertaking is also within the Rio Grande Valley State Park that is jointly managed by the City of Albuquerque's Open Space Division and the New Mexico State Parks Division.

The 3.1 mile-long project area is confined to the riverside and bosque areas within the flood control levees on both sides of the Rio Grande and is bounded on the north by the Interstate Highway 40 bridge and on the south by the Barelas Bridge. Of the total 643-acre project area, 370 acres are within the river channel and active flood plain, and 273 acres are within the bosque. A Class III cultural resources inventory survey of the 273 acres was conducted by Cibola Research Consultants. The survey is reported by Michael Marshall in the enclosed report entitled *A Cultural Resources Survey for the Proposed Middle Rio Grande Bosque Restoration Project, Bernalillo County, New* Mexico, Cibola Research Consultants Reports No. 345; NMCRIS No. 82701.

The proposed restoration project involves removing old jetty jacks, other post-and-cable flood control structures, non-native species and accumulated vegetation that adds to the fuel load in the

event of a fire. Native species of trees will be replanted. Access is provided by the roads on the flood control levees that were constructed in the 1950s and 1960s.

The records of the New Mexico Historic Preservation Division's Archaeological Records Management Section and other archives were reviewed; the survey discovered seven historic-period archaeological sites and 21 isolated occurrences. The sites are all related to bridge crossings (3), irrigation works (3), and flood control features (1). They will not be impacted by any of the work associated with the project. Most of the isolated occurrences are recent trash dumps; several camps of homeless persons were also recorded. The isolated occurrences need no additional consideration as they were recorded in sufficient detail to exhaust their useful contribution to the State's cultural database.

The Corps is of the opinion that there would be "No Adverse Effect to Historic Properties" as a result of the proposed restoration project. Pursuant to 36 CFR 800.11, should previously unknown cultural resource manifestation be encountered during the project, a determination of significance made and a mitigation plan formulated in consultation with your office.

Thank you for your attention to this matter. If you have any questions or require additional information, please contact Dr. John D. Schelberg, Archeologist, at (505) 342-3359.

Sincerely,

Julie A. Hall
Chief, Environmental Resources Branch

DATE 03/29/07

I Concur 03/29/07
for Katherine Slick
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER

Enclosure

Copy furnished: (w/o enclosure)

Mr. Don Klima
Advisory Council on Historic Preservation
Office of Planning and Review
12136 W. Bayaud Ave., #330
Lakewood, Colorado 80228-2115

084449

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

May 30, 2008

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

Ms. Katherine Slick
State Historic Preservation Officer
New Mexico Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Rec'd 6-6-2008
GDE

Re: HPD Consultation No. 070294
Attn: Ms. Glenna Dean, State Archaeologist

Dear Ms. Slick:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of "No Adverse Effect to Historic Properties" for the proposed project entitled, **Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project.** In 2004, this project was known as the Middle Rio Grande Bosque 1135 Ecosystem Restoration Project at Route 66. The Corps is planning the riparian habitat restoration project in coordination with numerous other Federal, State, Tribal, and local entities. The Corps is the Lead Federal Agency for the proposed project. The proposed restoration project is being conducted under the authority of Section 1135(b) of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662).

The Corps originally consulted with State Historic Preservation Officer in 2004 for the project proposed during that feasibility study, and your office concurred with the Corps' determination of No Historic Properties Affected (SHPO concurrence dated March 29, 2004; HPD Consultation No. 070294, copy attached for your convenience). The archaeological survey of the project area was conducted by Cibola Research Consultants and reported by Michael Marshall (2003; New Mexico Cultural Resource Information System [NMCRIS] No. 82701).

The Route 66 Bosque Revitalization Project is located within the Rio Grande Floodway (between the riverside drains) in the City of Albuquerque, Bernalillo County, New Mexico, south of the Interstate Highway 40 bridge that crosses the Rio Grande south to the Bridge

Boulevard (Barelas) bridge. The project is located on lands under the joint jurisdiction of Federal, State and City agencies. Most of the land is managed by the Middle Rio Grande Conservancy District (MRGCD) under permit from the U.S. Bureau of Reclamation. Project land is also within the Rio Grande Valley State Park that is jointly managed by the City of Albuquerque's Open Space Division and New Mexico State Parks Division.

As originally planned in 2004, the proposed project included the removal of exotic plant species such as the invasive tamarisk and Russian olive, as well as dead and down vegetation debris, the thinning and removal of other vegetation, the removal of some Kellner jetty-jacks that are now deemed unnecessary for flood protection, and re-vegetation. The proposed project has been modified and now also includes the installation of high water flow channels, moist soil depressions, and outfall wetlands for the benefit of habitat diversity.

As currently planned, the proposed construction of a high flow water channel would cross remnant channels of the historic Atrisco and Ranchos de Atrisco Irrigation Canals. During the Project's 2003 archaeological survey, Marshall recorded the historic Atrisco and Ranchos de Atrisco Irrigation Canals, both recorded under Laboratory of Anthropology No. LA138859. Both of the old acequia ditches are in a deflated condition. The crossings would affect approximately 80-feet of the existing 300-foot long Atrisco ditch remnant and approximately 110-feet of the existing 750-foot long Ranchos de Atrisco ditch remnant. These acequia remnants are located on the west side of the Rio Grande, within the flood control levees (in the floodplain), about 400-meters north of the Central Avenue bridge (see attached map figures). The proposed high flow channel would be an engineered channel so that during high river flows, water could flow through the channel, enhancing the riparian habitat in that part of the floodplain. Two other historic properties that are adjacent to the project area but that would not be affected by the proposed construction include LA138856, pilings from the old 1930s Central Avenue Bridge and LA138858, pilings that were a part of the Old Atrisco Irrigation Diversion Works.

The Atrisco and Ranchos de Atrisco acequias originally diverted irrigation water from the Rio Grande at or very near the same location (see enclosure, Additional Documentation). The Atrisco acequia flowed in a southwesterly direction while the Ranchos de Atrisco acequia flowed in a southeasterly direction. With the 1930s MRGCD consolidation and modernization of the Middle Rio Grande Valley irrigation system (between Cochiti Dam and La Joya), many of the acequia diversion points (headings) and short segments of the ditches were cut-off by the construction of flood control levees and riverside drains, and were abandoned within the Rio Grande Floodway/floodplain.

These 1930s levees and drains were rehabilitated in the 1950s/1960s by the U.S. Bureau of Reclamation and the Corps of Engineers. Like many of the other abandoned acequia remnants that occur in the area such as Albuquerque Acequia Madre (LA143458), Los Padillas Acequia/Drain (LA145560), and the Isleta Indian Lateral (LA100484), the historic Atrisco Irrigation Canal and the Ranchos de Atrisco Irrigation Canal are in a deflated condition, having been affected by abandonment and the resulting lack of further maintenance, high river flows and flooding, and/or by occasional earth moving disturbances that have occurred within the bosque/floodplain. It is unlikely that these physical ditches would have any significant information potential other than that which has already been recorded such as their location, alignment, and photography (e.g. Marshall 2003; see enclosure Additional Documentation). Any additional information potential would come from archival research.

Crossing the deflated LA138859 ditches will have an effect. However, crossing the remnant ditches would not significantly affect their original alignments or form. The proposed removal of dead-and-down vegetation, exotic plant species, and unnecessary jetty-jacks from the area would return the area to a more natural setting, enhancing visual quality. The new high flow channel would mimic the acequia's historical irrigation function as well as a semblance of its visual quality and form, those elements that contribute to an acequia's cultural and historical significance. The project plans to include parks-type signage regarding the old Atrisco ditches in the form of a plaque for educational purposes. Crossing the abandoned acequia remnants would not detract from their cultural and historical significance.

Consulting parties in the Section 106 process for the proposed rehabilitation project include the Corps, Bureau of Reclamation, and your office. Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, and based on the State of New Mexico Indian Affairs Department and Historic Preservation Division's 2008 Native American Consultations List, American Indian Tribes/Pueblos that have indicated they have concerns within Bernalillo County have been contacted regarding several proposed riparian habitat restoration projects in the Albuquerque area. These include Hopi Tribe, Pueblo of Isleta, Pueblo of Laguna, Navajo Nation, Ohkay Owingeh, Pueblo of Sandia, White Mountain Apache Tribe, Pueblo of Ysleta del Sur, as well as the Jicarilla Apache Nation. Currently, there are no known Tribal concerns and no traditional cultural properties are known to occur within or adjacent to the project area. The Corps has thus far received two scoping letter responses; from the Navajo Nation and the Pueblo of Laguna and neither has concerns regarding the proposed project.

Based upon the above information and the available documentation, the Corps is of the opinion that the proposed Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project and the proposed crossing of the Atrisco and Ranchos de Atrisco Canal remnants will have "No Adverse Effect to Historic Properties."

Pursuant to 36 CFR 800.13, should previously unknown artifacts or other historic properties be encountered during construction, work would cease in the immediate vicinity of the resource. A determination of significance would be made, and a mitigation plan would be formulated in consultation with your office, the Bureau of Reclamation, and with American Indian Tribes that have cultural concerns in the area.

If you have any questions or require additional information regarding the Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project, please contact Gregory D. Everhart, Archaeologist at (505) 342-3352, or myself, at (505) 342-3281.

Sincerely,

Julie Alcon,
Chief, Environmental Resources
Section

Enclosures

Copy furnished:

Jeff Hansen, Archaeologist
U.S. Bureau of Reclamation
Albuquerque Area Office
555 Broadway Blvd., NE, Suite 100
Albuquerque, New Mexico 87102-2352

3 June 2008
Date

I CONCUR

for KATHERINE SLICK
NEW MEXICO STATE HISTORIC
PRESERVATION OFFICER

Additional Documentation
Regarding
the Atrisco and Ranchos de Atrisco Acequias

Marshall (2003:56-58) reported that the historic Atrisco and the Ranchos de Atrisco Irrigation Canals, both recorded under Laboratory of Anthropology No. LA138859, date to the 18th and 19th centuries. The U.S. General Accounting Office (GAO) accepted 1692 as the year the Town of Atrisco Community Land Grant was granted (GAO 2001:9) and the ditches likely date to about that time. Other references effectively argue that ranchos and/or estancias had been established in the area by the year 1703, and perhaps as early as the 1660s or possibly the 1630s (Marshall 2003:14-17; Sanchez 1998; Simmons 1982:37-41, 87; Metzgar 1977; Greenleaf 1967). Spanish Colonial mission settlements, one at Sandia Pueblo and one at Isleta Pueblo, were constructed in the area around 1610 (Marshall 2003:14-17; Simmons 1982:37-41). Visitas (chapels) were also constructed at the pueblos of Puaray and Alameda, and it is reported that there were approximately 20 estancias in the Albuquerque area prior to the 1680 Pueblo Revolt (Marshall 2003:14-17; Simmons 1982:39). These Atrisco acequias, therefore, are among the oldest Hispanic ditches in New Mexico and may be the oldest in the Albuquerque area. Follett (1898) and Yeo (1910) briefly described these ditches (Marshall 2003:40-42). The ditches are shown on the 1922 U.S. Reclamation Service map 163-C-12. As per the NMCRIS archaeological site record, no formal determination of eligibility has been made.

In 1910, Yeo provided brief descriptions of four acequia diversions that once diverted water from the west bank of the Rio Grande (in Marshall 2003:42). These ditches, which utilized brush and hand-dug ditches in the river channel as a means of diversion, included the Acequia de Atrisco, Acequia de Arenal, Acequia Nueve de Atrisco, and the Acequia Vieja de Atrisco. Of these, the Acequia de Atrisco ditch was positioned further north and west of the others, and would later be northwest of the Central Avenue Bridge (see the attached copy of the 1922 Reclamation Service map 163-C-12, from Marshall 2003). These ditches provided irrigation water to a total of about 2,875 acres. No ditch remnants of these other acequias were observed south of the Central Avenue Bridge during Marshall's 2003 survey.

In 1933, when these old ditches were abandoned, the MRGCD built the Atrisco Header and Diversion Works (LA138860) which

diverted water to the Atrisco and Arenal canal systems. This structure, constructed of concrete, metal and wood planking, was ineffective and was replaced in 1955 by the Atrisco Siphon (Marshall 2003:43-44, 59-61). The 78-inch diameter concrete siphon, brought water from the MRGCD system on the east side of the river via the Atrisco Feeder Canal to the west side. This delivery system/structure is still in use today.

Two other structures that are related to the diversion structures noted above are the North Atrisco flood control structure, LA138855, which is an old post-and-cable structure, and LA138858 which is a set of wooden pilings in the river channel that are identified as the Old Atrisco Irrigation Diversion Works (Marshall 2003:47-49, 54-55).

References:

Follett, W.W. 1898. *Equitable Distribution of the Waters of the Rio Grande*. 55th Congress, 2nd Session. Senate document No. 229, Washington, D.C.

Greenleaf, Richard E. 1967. Atrisco and Las Ciruelas 1722-1769. In New Mexico Historical Review. Vol 42, No. 1 (January 1967). 5-25.

Kramer, Karen L. and Dan H. Wells. 1998. **Cultural Resource Survey for the Atrisco Riverside Drain Trail in the City of Albuquerque, Bernalillo County, New Mexico**. Ecosystem Management Report No. LH-52-01, Albuquerque.

Marshall, Michael P. 2003. **A Cultural Resource Survey for the Proposed Middle Rio Grande Bosque Restoration Project, Bernalillo County, New Mexico**. Cibola Research Consultants Report No. 345 (NMCRIS No. 82701). Prepared for Bohannan-Huston Inc., Albuquerque. Submitted to U.S. Army Corps of Engineers, Albuquerque District, Albuquerque.

Metzgar, Joseph V. 1977. The Atrisco Land Grant, 1692-1977. In New Mexico Historical Review. Vol 52, No. 4 (October 1977).

Sánchez, Dr. Joseph P. 1998. **Don Fernando Durán y Chaves's Land and Legacy**. National Park Service. Southwest Parks and Monuments Association, Tucson.

Simmons, Marc. 1982. **Albuquerque, A Narrative History.** University of New Mexico Press, Albuquerque.

United States General Accounting Office (GAO). 2001. **Treaty of Guadalupe Hidalgo: Definition and List of Community Land Grants in New Mexico.** Report to Congressional Requesters. Report No. GAO-01-951. Washington D.C.

United States Department of the Interior, Reclamation Service. 1922 (June). Middle Rio Grande Project, New Mexico: Topographic Sheets 1 – 39 (with map key), White Rock Canyon to San Marcial. Denver, Colorado

Yeo, Herbert. 1910. *Report on Hydrographic and Irrigation Conditions in the Rio Grande Valley, New Mexico*. U.S. Reclamation Service, El Paso. Manuscript on file, Rio Grande Historical Collection No. 94, Branson Library, New Mexico State University, Las Cruces.

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

July 11, 2008

084750

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

Ms. Katherine Slick
State Historic Preservation Officer
New Mexico Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Recd 7-28-2008
GDE

Re: HPD Consultation No. 070294 & 084449

Dear Ms. Slick:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of "No Historic Properties Affected" for proposed debris removal related to the proposed **Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project.** In 2004, this project was known as the Middle Rio Grande Bosque 1135 Ecosystem Restoration Project at Route 66. The Corps is planning the riparian habitat restoration project in coordination with numerous other Federal, State, Tribal, and local entities. The Corps is the Lead Federal Agency for the proposed project. The proposed restoration project is being conducted under the authority of Section 1135(b) of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662).

The Corps originally consulted with your office in 2004 for the project proposed during the feasibility study, and your office concurred with the Corps' determination of No Historic Properties Affected (SHPO concurrence dated March 29, 2004; HPD Consultation No. 070294, copy attached for your convenience). The archaeological survey of the project area was conducted by Cibola Research Consultants and reported by Michael Marshall (2003; New Mexico Cultural Resource Information System [NMCRIS] No. 82701).

The Route 66 Bosque Revitalization Project is located within the Rio Grande Floodway (between the riverside drains) in the City of Albuquerque, Bernalillo County, New Mexico, south of the Interstate Highway 40 bridge that crosses the Rio Grande south to the Bridge Boulevard (Barelas) bridge. The project is located on lands under the joint jurisdiction of Federal, State and City agencies. Most of the land is managed by the Middle Rio Grande Conservancy District (MRGCD) under permit from the U.S. Bureau of Reclamation. Project land is

also within the Rio Grande Valley State Park that is jointly managed by the City of Albuquerque's Open Space Division and New Mexico State Parks Division.

As originally planned in 2004, the proposed project included the removal of exotic plant species such as the invasive tamarisk and Russian olive, as well as dead and down vegetation debris, the thinning and removal of other vegetation, the removal of some Kellner jetty-jacks that are now deemed unnecessary for flood protection, and re-vegetation. The proposed project has been modified and now also includes the installation of high water flow channels, moist soil depressions, and outfall wetlands for the benefit of habitat diversity.

Recently, the Corps consulted with your office regarding an added high-flow channel to be constructed within the Rio Grande bosque that would cross remnant channels of the historic Atrisco and Ranchos de Atrisco Irrigation Canals, both documented under LA138859. Your office concurred with the Corps' determination of No Adverse Effect to Historic Properties (SHPO concurrence dated June 3, 2008; HPD Consultation No. 084449, copy attached for your convenience).

Almost at the same time as that June consultation, Corps planners and engineers determined, as another added part of the project, to remove earthen fill materials, broken concrete and asphalt, and other debris from an area adjacent to the bosque. These MRGCD stock-piled materials are located on the land side of the flood control levee; this area was not surveyed during the 2003 Marshall survey.

Please find enclosed for your review the Corps' report entitled **A Cultural Resources Inventory of 11.0 Acres for an Additional Project Area of the Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project, Bernalillo County, New Mexico** (Report No. COE-2008-005, NMCRIS No. 110754) and associated documentation. The Corps' survey of the 11.0-acre debris removal area (APE) was conducted on June 6, 2008, and covered 100-percent of the project area. One historic archaeological site, the Atrisco Riverside Drain Abandoned Segment, was recorded as LA159913. This historic structure would be completed avoided by the proposed debris removal. No other artifacts were observed.

Consulting parties in the Section 106 process for the proposed rehabilitation project include the Corps, Bureau of Reclamation, and your office. Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, and based on the State of New Mexico Indian Affairs Department and Historic Preservation Division's 2008 Native American Consultations List, American Indian Tribes/Pueblos that have indicated they have concerns within Bernalillo County have been contacted regarding several proposed riparian habitat restoration projects in the Albuquerque area. These include Hopi Tribe, Pueblo of Isleta, Pueblo of Laguna, Navajo Nation,

Ohkay Owingeh, Pueblo of Sandia, White Mountain Apache Tribe, Pueblo of Ysleta del Sur, as well as the Jicarilla Apache Nation. Currently, there are no known Tribal concerns and no traditional cultural properties are known to occur within or adjacent to the project area. The Corps has thus far received two scoping letter responses; from the Navajo Nation and the Pueblo of Laguna, and neither has concerns regarding the proposed project.

Based upon the above information and available documentation, the Corps is of the opinion that there would be "No Historic Properties Affected" by the proposed debris removal portion of the Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project

Pursuant to 36 CFR 800.13, should previously unknown artifacts or other historic properties be encountered during construction, work would cease in the immediate vicinity of the resource. A determination of significance would be made, and a mitigation plan would be formulated in consultation with your office, the Bureau of Reclamation, and with American Indian Tribes that have cultural concerns in the area.

If you have any questions or require additional information regarding the Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project, please contact Gregory D. Everhart, Archaeologist at (505) 342-3352, or myself, at (505) 342-3281.

Sincerely,

Julie Alcon,
Chief, Environmental Resources Section

22 JULY 2008
Date

I CONCUR

for KATHERINE SLICK
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER

Enclosures

Copy furnished:

Jeff Hansen, Archaeologist
U.S. Bureau of Reclamation
Albuquerque Area Office
555 Broadway Blvd., NE, Suite 100
Albuquerque, New Mexico 87102-2352

NMCRIS INVESTIGATION ABSTRACT FORM (NIAF)

1. NMCRIS Activity No.: 110754	2a. Lead (Sponsoring) Agency: U.S. Army Corps of Engineers (USACE), Albuquerque District	2b. Other Permitting Agency(ies):	3. Lead Agency Report No.: COE-2008-005

4. Title of Report:
A Cultural Resources Inventory of 11.0 Acres for an Additional Project Area of the Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project, Bernalillo County, New Mexico.

Author(s) Gregory D. Everhart

5. Type of Report
☐ **Negative** **X Positive**

6. Investigation Type
☐ Research Design **X** Survey/Inventory ☐ Test Excavation ☐ Excavation ☐ Collections/Non-Field Study
☐ Overview/Lit Review ☐ Monitoring ☐ Ethnographic study ☐ Site specific visit ☐ Other

7. Description of Undertaking (what does the project entail?): The Corps, in cooperation with MRGCD, is planning a bosque revitialization project. An archaeological survey of the bosque project area, on the river side of the flood control levee, was completed by Marshall (2003). This report covers a small, previously un-surveyed area on the land side of the flood control levee where debris, broken pieces of concrete, asphalt, trash, and earth-dredged/fill materials will be removed by Corps contract.

8. Dates of Investigation:
(from: March 25, 2008 to: July 7, 2008)

9. Report Date: July 11, 2008

10. Performing Agency/Consultant: U.S. Army Corps of Engineers, Albuquerque District
Principal Investigator: Gregory D. Everhart
Field Supervisor: Gregory D. Everhart
Field Personnel Names: Gregory D. Everhart

11. Performing Agency/Consultant Report No.:
COE-2008-005

12. Applicable Cultural Resource Permit No(s):
NM-08-193

13. Client/Customer (project proponent): U.S. Army Corps of Engineers, Albuquerque District
Contact: Gregory D. Everhart
Address: 4101 Jefferson Plaza, NE
Albuquerque, NM 87109
Phone: (505) 342-3352

14. Client/Customer Project No.:

15. Land Ownership Status ***(Must be indicated on project map):***

Land Owner	Acres Surveyed	Acres in APE
U.S. Bureau of Reclamation / Middle Rio Grande Conservancy District	11.0	11.0
TOTALS	11.0	11.0

16 Records Search(es): Original archaeological survey work on this project began in 2003 by Michael Marshall. See Management Summary below.

Date(s) of ARMS File Review: April 22, 2008 & June 25, 2008	Name of Reviewer(s) Gregory D. Everhart	
Date(s) of NR/SR File Review April 22, 2008	Name of Reviewer(s) Gregory D. Everhart	
Date(s) of Other Agency File Review: March 25, 2008	Name of Reviewer(s) Gregory D. Everhart	Agency : U.S. Army Corps of Engineers, Albuquerque District

17. Survey Data:

a. Source Graphics **X NAD 27** **X NAD 83**

X USGS 7.5' (1:24,000) topo map ☐ **Other topo map, Scale:**

X GPS Unit **Accuracy** ☐ **<1.0m** **X 1-10m** ☐ **10-100m** ☐ **>100m**

b. USGS 7.5' Topographic Map Name **USGS Quad Code**

Albuquerque West, NM	35106-a6

c. County(ies): Bernalillo

17. Survey Data (continued):

d. Nearest City or Town: Albuquerque

e. Legal Description:

Township (N/S)	Range (E/W)	Section	¼ ¼ ¼
			, , .
			, , .
			, , .
			, , .
			, , .
			, , .
			, , .
			, , .
			, , .

Projected legal description? Yes [ ] , No [ ] **Unplatted [X]**

f. Other Description (e.g. well pad footages, mile markers, plats, land grant name, etc.): The project area is within the unplatted portion of the historic 1692 Town of Atrisco Community Land Grant. The project area is located north of Central Ave., west of the Rio Grande and west of the flood control levee and east of the modern Atrisco (irrigation) Ditch/alignment.

18. Survey Field Methods:

Intensity: **X** 100% coverage ☐ <100% coverage

Configuration: ☐ block survey units **X** linear survey units (l x w): ☐ other survey units (specify):

Scope: X non-selective (all sites recorded) ☐ selective/thematic (selected sites recorded)

Coverage Method: X systematic pedestrian coverage ☐ other method (describe)

Survey Interval (m): 15 Crew Size: 1 Fieldwork Dates: June 6, 2008

Survey Person Hours: 2 Recording Person Hours: 1 Total Hours: 3

Additional Narrative:

19. Environmental Setting (NRCS soil designation; vegetative community; elevation; etc.): The project area is a highly disturbed area; disturbed from excavation of historic irrigation ditches, the Atrisco Riverside Drain and flood control levee as well as the modern Atrisco Ditch. The flood control levee and roads along the Atrisco Ditch are barren of vegetation. Vegetation that occurs within the old, abandoned segment of the Atrisco Riverside Drain included elms, cottonwood, willows, and tamarisk as well as cattails. The local soils are primarily riparian sands and loams; Brazito fine sandy loam (Br) and Torrifluvents (TP) (NRCS Web Soil Survey 2008). The project area is at 4960 feet in elevation.

20. a. Percent Ground Visibility: 95 b. Condition of Survey Area (grazed, bladed, undisturbed, etc.): highly disturbed

21. CULTURAL RESOURCE FINDINGS X Yes, See Page 3 ☐ **No, Discuss Why:**

22. Required Attachments (check all appropriate boxes):	23. Other Attachments:
X USGS 7.5 Topographic Map with sites, isolates, and survey area clearly drawn X Copy of NMCRIS Mapserver Map Check X LA Site Forms - new sites (*with sketch map & topographic map*) ☐ LA Site Forms (update) - previously recorded & un-relocated sites (*first 2 pages minimum*) ☐ Historic Cultural Property Inventory Forms ☐ List and Description of isolates, if applicable ☐ List and Description of Collections, if applicable	X Photographs and Log ☐ Other Attachments *(Describe)*:

24. I certify the information provided above is correct and accurate and meets all applicable agency standards.

Principal Investigator/Responsible Archaeologist: Gregory D. Everhart

Signature Gregory D. Everhart Date 7-11-2008 Title (if not PI):

25. Reviewing Agency: USACE, Albuquerque District	26. SHPO
Reviewer's Name/Date J. Lundquist 7-11-2008 JANICE LUNDQUIST Accepted (X) Rejected ( ) Tribal Consultation (if applicable): X Yes ☐No	Reviewer's Name/Date: HPD Log #: SHPO File Location: Date sent to ARMS:

CULTURAL RESOURCE FINDINGS

[fill in appropriate section(s)]

1. NMCRIS Activity No.:	2. Lead (Sponsoring) Agency:	3. Lead Agency Report No.:
110754	**USACE, Albuquerque District**	**COE-2008-005**

SURVEY RESULTS:

Sites discovered and registered: 1
Sites discovered and NOT registered:
Previously recorded sites revisited (*site update form required*):
Previously recorded sites not relocated ***(site update form required):***
TOTAL SITES VISITED: 1
Total isolates recorded: **Non-selective isolate recording?** ☐
Total structures recorded (*new and previously recorded, including acequias*): **1**

MANAGEMENT SUMMARY: **The active Atrisco Riverside Drain is approximately 12.7-miles in length and sections have previously been documented under the LA numbers: LA100485, LA117692, and LA120376. One active segment, LA117692, was previously determined eligible under criterion d (HPD Consultation No. 55049). The current report and LA159913 document an abandoned segment of the Atrisco Riverside Drain. Original archaeological survey work for this Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project was conducted in 2003 by Michael Marshall. Original scoping for the Feasibility Study was conducted in January 2003. Original consultation and submittal of the Marshall 2003 survey report was sent to the NM SHPO on February 12, 2004, with SHPO concurrence for No Historic Properties Affected dated March 29, 2004. Due to the lack of funding the project was on-hold for approximately two years. Work continued on the Feasibility Study in 2005 and new scoping letters were sent out on March 18, 2008. Subsequent to the original 2004 SHPO consultation, the project description changed to include high-flow channels that would affect the Atrisco Irrigation Ditch and the Ranchos de Atrisco Irrigation Ditch alignments, both documented by Marshall as LA138859. The SHPO concurred with the Corps determination of No Adverse Effect to Historic Properties (i.e., LA138859) on June 3, 2008 (HPD Consultation No. 084449). Almost at the same time as that consultation, Corps planners and engineers determined, as a part of the project, to remove earthen fill materials, broken concrete and asphalt, and other debris previously stock-piled by MRGCD from an adjacent area to the bosque, located on the land side of the flood control levee; this area was not surveyed during the 2003 Marshall survey. This report covers those 11.0 acres of the Project's debris removal area; one historic archaeological site was identified, an abandoned segment of the Atrisco Riverside Drain. This historic structure would not be affected by the proposed debris removal. No other artifacts were observed.**

IF REPORT IS NEGATIVE YOU ARE DONE AT THIS POINT.

SURVEY LA NUMBER LOG

Sites Discovered:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

Previously recorded revisited sites:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

MONITORING LA NUMBER LOG *(site form required)*

Sites Discovered (*site form required*) **:** **Previously recorded sites** ***(Site update form required):***

LA No.	Field/Agency No.	LA No.	Field/Agency No.

Areas outside known nearby site boundaries monitored? Yes ☐, No ☐ If no explain why:

TESTING & EXCAVATION LA NUMBER LOG (*site form required)*

Tested LA number(s)	Excavated LA number(s)

LABORATORY OF ANTHROPOLOGY SITE RECORD

1. IDENTIFICATION & OWNERSHIP

LA Number: 159913 (contact ARMS for site registration) ☐ **Site Update**? (complete at least Sections 1-4)

Site Name(s): Atrisco Riverside Drain, Abandoned Segment

(other segments of the living/active/working Atrisco Riverside Drain have previously been given LA site numbers: LA100485, LA117692, & LA120376)

Other Site Number(s):	**Agency Assigning Number:**
_____	_____
_____	_____
_____	_____

Current Site Owner(s): U.S. Bureau of Reclamation / Middle Rio Grande Conservancy District

Site Type: ground / irrigation water drainage ditch **Occupation Type:** structural

2. RECORDING INFORMATION

NMCRIS Activity No.: 110754 **Field Site Number:** _____

Site Marker? ☐ (specify ID#): _____

Recorder(s): Gregory D. Everhart

Agency: U.S. Army Corps of Engineers, Albuquerque District **Recording Date (dd-MMM-yyyy):** 06 Jun 2008

Site Accessibility (choose one): ☒ accessible ☐ buried (sterile overburden) ☐ flooded ☐ urbanized ☐ not accessible

Surface Visibility (% visible; choose one): ☐ 0% ☐ 1-25% ☐ 26-50% ☐ 51-75% X 76-99% ☐ 100%

Remarks: This site is an abandoned segment of the Atrisco Riverside Drain, an open earthen ditch with standing water and, since it is no longer maintained as a viable drain ditch, thick vegetation.

Recording Activities:

☐ sketch mapping	X photography
☐ instrument mapping (e.g., total station mapping)	☐ shovel or trowel tests; probes
☐ surface collection (controlled or uncontrolled)	☐ test excavation
☐ in-field artifact analysis	☐ excavation (data recovery)
☐ other activities (specify): _____	

Description of Analysis or Excavation Activities: _____

Photographic Documentation: Olympus digital camera, Model # Stylus 400 Digital, set on HQ [2272x1704 pix]; Photos 2, 3, 4, & 5

Surface Collections (choose one):

☒ no surface collection	
☐ uncontrolled surface collection	☐ collections of specific items only
☐ controlled (sample: <100%)	☐ controlled (complete: 100%)
☐ other method (describe): _____	

Records Inventory:

X site location map	☐ excavation, collection, analysis records	☐ field journals, notes
☐ sketch map(s)	X photos, slides, and associated records	☐ NM Historic Building Inventory form
☐ instrument map(s)	☐ other records: _____	

Repository for Original Records: U.S. Army Corps of Engineers, Albuquerque District, Albuquerque

Repository for Collected Artifacts: n/a

3. CONDITION

Archaeological Status: ☐ surface collection ☐ test excavation ☐ partial excavation ☐ complete excavation

Disturbance Sources: ☐ wind erosion ☐ water erosion ☐ bioturbation ☐ vandalism X construction/land development

☐ other source (specify): _____

Vandalism: ☐ defaced glyphs ☐ damaged/defaced building ☐ surface disturbance ☐ manual excavation

☐ mechanical excavation ☐ other vandalism (specify): _____

Percentage of Site Intact (choose one)**:** ☐ 0% ☐ 1-25% ☐ 26-50% ☐ 51-75% X 76-99% ☐ 100%

Observations on Site Condition: the southern portion, approx. 300 feet, of this abandoned segment of the Atrisco Riverside Drain has been previously filled in, date unknown.

4. RECOMMENDATIONS (for Performer/Recorder use only)

National Register Eligibility (choose one)**:** ☐ eligible X not eligible ☐ not sure

Applicable Criteria: ☐ (a) ☐ (c)

☐ (b) ☐ (d)

Basis for Recommendation: This abandoned segment of the Atrisco Riverside Drain (abandoned in the mid-1950s) is not considered to be eligible for nomination to the NRHP in and of itself; it is however, a contributing structural component of the historic Middle Rio Grande Conservancy District's (MRGCD) irrigation system which may be considered as eligible as a historic district (constructed in the 1930s with significant rehabilitation by the Corps and Bureau of Reclamation in the 1950s-1960s). The active Atrisco Riverside Drain is approximately 12.7-miles in length and has previously been documented under the LA numbers: LA100485, LA117692, and LA120376. One active segment, LA117692, was previously determined eligible under criterion d (HPD Consultation No. 55049). At this writing, the SHPO is considering Marron and Associates recommendation and the Corps determination to concur with the Marron recommendation that the Atrisco Riverside Drain is also eligible under criteria a and c (as described in Marron and Associates 2008, NMCRIS No. 109907; and Corps consultation letter dated June 17, 2008).

Assessment of Project Impact: No Effect

Treatment Recommendations: Avoid

5. SHPO CONSULTATIONS (for SHPO and Sponsor use only)

Sponsor NR Determination: ☐ eligible ☐ not eligible ☐ not determined **Applicable Criteria:** ☐ (a) ☐ (b) ☐ (c) ☐ (d)

Sponsor Staff: _____ **Date (dd-MMM-yyyy):** ___ (day) ___ (month) ___ (year)

Sponsor Remarks: _____

SHPO NR Concurrence: ☐ eligible ☐ not eligible ☐ not determined **Applicable Criteria:** ☐ (a) ☐ (b) ☐ (c) ☐ (d)

HPD Staff: _____ **Date (dd-MMM-yyyy):** ___ (day) ___ (month) ___ (year) **HPD Log No:** _____

Register Status: ☐ listed on National Register ☐ listed on State Register ☐ formal determination of eligibility

State Register No.: _____

SHPO Remarks: _____

6. LOCATION

Source Graphics:

☒ USGS 7.5' (1:24,000) topo maps **X** rectified aerial photos [Scale: **April 2006 MRCOG aerial imagery**]

☐ other topo maps [Scale: _____] ☐ unrectified aerial photos [Scale: _____]

X GPS unit GPS accuracy (choose one): ☐ < 1.0 m **X** 1-10 m ☐ 10-100 m ☐ >100 m

☐ other source (describe): _____

UTM Coordinates (@ center of site; at least one set of coordinates required):

Map-based Coordinates Datum: NAD27 **Zone:** 13 **E:** 346199 **N:** 3884196

GPS-based Coordinates Datum: NAD27 **Zone:** **E:** _____ **N:** _____

Directions to Site: Within Albuquerque, Bernalillo County, this abandoned segment of the Atrisco Riverside Drain is located north of Central Ave., west of the Rio Grande and west of the flood control levee, and east of the modern Atrisco Ditch (irrigation canal/alignment). In highway R-O-W? ☐

Town (if in city limits): Albuquerque **State:** NM **County:** Bernalillo

USGS Quadrangle Name	Date	USGS Code
Albuquerque West, N.Mex.	1960 PhotoRevised 1967 and 1972	35106-a6

PLSS Meridian	Unplatted	Township	Range	Section	¼ Sections			Protracted?
New Mexico	☐	T _____	R _____	__	_____	_____	_____	☐
New Mexico	☐	T _____	R _____	__	_____	_____	_____	☐
New Mexico	☐	T _____	R _____	__	_____	_____	_____	☐
New Mexico	☐	T _____	R _____	__	_____	_____	_____	☐

7. PHYSICAL DESCRIPTION

Site Dimensions: 10 **x** 832 meters **Basis for Dimensions** (choose one): X estimated ☐ measured

Site Area: 8320 sq m **Basis for Area** (choose one): X estimated ☐ measured **Elevation:** 4960 feet

Site Boundaries Complete? (choose one): X Yes ☐ No (explain): _____

Basis for Site Boundaries: ☐ distribution of archeological features & artifacts X modern features or ground disturbance

☐ property lines ☐ topographic features ☐ other (specify): _____

Depositional/Erosional Environment: X alluvial ☐ aeolian ☐ colluvial ☐ residual ☐ no deposition (on bedrock)

☐ other process (describe): _____

Stratigraphy & Depth of Archeological Deposits (choose one): X unknown/not determined

☐ no subsurface deposits present ☐ subsurface deposits present ☐ stratified subsurface deposits present

Estimated Depth of Deposits: _____

Basis for Depth Determinations: ☐ estimated ☐ shovel/trowel tests ☐ core/auger tests ☐ excavations

☐ road or arroyo cuts ☐ rodent burrows ☐ other observations (describe): _____

Observations on Subsurface Archeological Deposits: n/a

Local Vegetation (list species in decreasing order of dominance)**:**

Overstory: **elm, cottonwood, willows, Russian olive**

Understory: **cattails, various grasses**

Vegetation Community (choose one or two): ☐ forest ☐ woodland ☐ grassland ☐ scrubland ☐ desert scrubland ☐ marshland

X other community (specify): **Riparian woodland (bosque, but with standing water)**

Topographic Location:				
☐ alluvial fan	☐ bench	☐ dune	☐ low rise	☐ ridge
☐ arroyo/wash	☐ blowout	X flood plain/valley	☐ mesa/butte	☐ rockshelter
☐ badlands	☐ canyon rim	☐ foothill/mountain front	☐ mountain	☐ saddle
☐ base of cliff	☐ cave	☐ hill slope	☐ open canyon floor	☐ talus slope
☐ base of talus slope	☐ cliff/scarp/bluff	☐ hill top	☐ plain/flat	☐ terrace
☐ other location (describe): _____	☐ constricted canyon	☐ lava flow (malpais)	☐ playa	

Observations on Site Setting: **This abandoned ground/irrigation water drainage ditch would have originally been a part of the bosque/Rio Grande floodplain prior to the ditch's construction and construction of the flood control levee.**

8. ASSEMBLAGE DATA

Assemblage Content (all components)**:**

Lithics:

- ☐ lithic debitage
- ☐ chipped-stone tools
- ☐ diagnostic projectile points
- ☐ non-local lithic material
- ☐ stone-tool manufacturing items (cores, hammerstones, etc.)
- ☐ ground-stone tools
- ☐ other stone tools

Prehistoric Ceramics

- ☐ whole ceramic vessels
- ☐ diagnostic ceramics
- ☐ other prehistoric ceramics

Historic Artifacts:

- ☐ diagnostic glass artifacts
- ☐ other glass artifacts
- ☐ diagnostic metal artifacts
- ☐ other metal artifacts
- ☐ whole ceramic vessel
- ☐ diagnostic ceramics
- ☐ other historic ceramics

Other Artifacts and Materials:

- ☐ bone tools
- ☐ faunal remains
- ☐ macrobotanical remains
- ☐ perishable artifacts
- ☐ ornaments
- ☐ figurines
- ☐ mineral specimens
- ☐ architectural stone
- ☐ burned adobe
- ☐ fire-cracked rock/burned caliche

X Other items (specify): **constructed irrigation drainage ditch/ structural earthen feature**

Assemblage Size (all components)**:**

artifact class	estimated frequency: 0	1s	10s	100s	1000s	>10,000	*Counts (if <100)
lithic artifacts (choose one): (include debitage)	X	☐	☐	☐	☐	☐	_____
prehistoric ceramics (choose one):	X	☐	☐	☐	☐	☐	_____
historic artifacts (choose one):	X	☐	☐	☐	☐	☐	_____
total assemblage size (choose one):	X	☐	☐	☐	☐	☐	_____

Dating Potential: ☐ radiocarbon ☐ dendrochronology ☐ archeomagnetism ☐ obsidian hydration

☐ relative techniques (e.g. seriation, diagnostics, etc.) X other methods (specify): historic records

Assemblage Remarks: _____

9. CULTURAL/TEMPORAL AFFILIATIONS

TOTAL NUMBER OF COMPONENTS DEFINED: 1

COMPONENT #1 (EARLIEST)

Cultural Affiliation: Hispanic – Anglo/Euro-American _____

Basis for Temporal Affiliations (choose one)**:** ☐ not applicable X based on associated chronometric data or historic records

☐ associated diagnostic artifact or feature types ☐ based on analytically derived assemblage data or archeological experience

***Period of Occupation:** (*see NMCRIS Guidelines for valid periods, default occupation dates, and phase/complex names)

	Period Name	Begin Date	End Date
Earliest Period:	NM Statehood	1930-1934	1955-1964
Latest Period (if any)**:**	Recent		

Dating Status: ☐ radiocarbon ☐ dendrochronology ☐ archaeomagnetism ☐ obsidian hydration

☐ relative techniques (e.g. seriation, diagnostics, etc.) X other methods (specify): historic records

Basis for Cultural/Temporal Affiliation: Prior to the Middle Rio Grande Conservancy District(MRGCD), there were numerous irrigation diversions for acequias and likely return drains in the Route 66 Project area; some of these acequias date from the 17th, 18th, and 19th centuries (Marshall 2003; HPD Consultation No. 084449). The MRGCD began modernization of the valley's irrigation in the early 1930s by consolidating approximately 72 historic acequia systems into a single, manageable irrigation district which included irrigation canals and ditches with associated structural components, drainage ditches, and flood control levees. This system became in disrepair in the 1940s and 1950s and Congressional legislation ultimately lead to a memorandum of agreement between the Corps and the Interior Department, Bureau of Reclamation to study, plan, and rehabilitate the MRGCD system; work began in 1951 and was completed by 1964. The Atrisco Riverside Drain likely dates to the 1930s MRGCD construction although an earlier drain is shown on an 1898 map in MRGCD records (Kramer and Wells 1998:7 cited in Marshall 2003:43).

Component Type: Agricultural

Remarks: _____

***Associated Phase/Complex Name(s):** _____

COMPONENT #2

Cultural Affiliation: _____ _____

Basis for Temporal Affiliations (choose one)**:** ☐ not applicable ☐ based on associated chronometric data or historic records

☐ associated diagnostic artifact or feature types ☐ based on analytically derived assemblage data or archeological experience

***Period of Occupation:** (*see NMCRIS Guidelines for valid periods, default occupation dates, and phase/complex names)

	Period Name	Begin Date	End Date
Earliest Period:	_____		
Latest Period (if any)**:**	_____	_____	_____

Dating Status: ☐ radiocarbon ☐ dendrochronology ☐ archaeomagnetism ☐ obsidian hydration

☐ relative techniques (e.g. seriation, diagnostics, etc.) ☐ other methods (specify): _____

Basis for Cultural/Temporal Affiliation: _____

Component Type: _____ _____

Remarks: _____

***Associated Phase/Complex Name(s):** _____

10. FEATURE DATA

(see NMCRIS User's guide for a list of valid feature types)

Feature Type	Reliable ID ?	# Observed	Assoc. Comp. #s	Feature ID, Notes
Irrigation System	Yes	1	1	Riverside drainage ditch

Feature Remarks: This abandoned segment of the Atrisco Riverside Drain measures approximately 10 meters in width by 832 meters in length (approx. 30 feet by 2,730 feet) as measured electronically using April 2006 Mid Region Council of Governments (MRCOG) aerial imagery.

11. REFERENCES

Written Sources of Information: Since originally constructed in the early 1930s, there appear to be no recent references regarding this abandoned segment of the Atrisco Riverside Drain (ARMS map search, June 2008). For a recent description of the active, working Atrisco Riverside Drain, see Brown, Estes, and Brown 2008.

Brown, Marie E., J. Robert Estes, and Kenneth L. Brown. 2008. A Class I and Class III Cultural Resource Survey for a 5.1-km (3.2-mi) Section of the West Levee in Albuquerque's South Valley, Bernalillo County, New Mexico. Report No. 0283 (NMCRIS No. 109907). Prepared by Marron and Associates, Inc., Albuquerque. Prepared for Bohannan Huston, Inc., Albuquerque.

Additional Sources of Information:

For a brief description of the Corps of Engineers and Bureau of Reclamation's Rio Grande Joint Investigation and work on the Rio Grande Floodway Project, see Everhart 2004.

Everhart, Gregory D. 2004. Documentation of Cultural Resources for the Albuquerque Biological Park's Tingley Pond and Wetland Restoration Project in Albuquerque, Bernalillo County, New Mexico. Revised Edition. Report No. COE-2003-03 (NMCRIS No. 83240). U.S. Army Corps of Engineers, Albuquerque District. Albuquerque.

For a brief description of the Atrisco and Ranchos de Atrisco (acequia) Ditches as well as the Atrisco Riverside Drain, see Marshall 2003.

Marshall, Michael P. 2003. A Cultural Resource Survey for the Proposed Middle Rio Grande Bosque Restoration Project, Bernalillo County, New Mexico. Cibola Research Consultants Report No. 345 (NMCRIS No. 82701). Prepared for Bohannan-Huston Inc., Albuquerque. Submitted to U.S. Army Corps of Engineers, Albuquerque District, Albuquerque.

For information regarding the active, working Atrisco Riverside Drain previously recorded as LA100485, LA117692, and LA120376, see Willmer 1993, Cunninghan, Rhodes and Crolett 1997, and Berry 1997, respectively.

Willmer, Adisa J. 1993. A Cultural Resource Survey Along I-25 from Just North of Belen, NM to the West Side of the Rio Grande. Report No. 93-36 (NMCRIS No. 44711). Museum of NM, Office of Archaeological Studies, Santa Fe. Prepared for NM State Highway and Transportation Department.

Cunninghan, Vicky J., Lori E. Rhodes, and E.T. Crolett. 1997. Cultural Resource Investigation of 7.3 Acres for the Isleta Boulevard Improvement Project, Bernalillo County, New Mexico. Report No. 216 (NMCRIS No. 56875). Prepared by Lone Mountain Archaeological Services, Albuquerque. Prepared for Marron and Associates, Albuquerque.

Berry, K. Lynn. 1997. A Cultural Resoures Survey for the Atrisco Riverside Drain Trail, Bernalillo County, New Mexico. (NMCRIS No. 58872). Prepared by Marron and Associates, Albuquerque. Prepared for Leedshill-Herkenhoff, Inc.

Other References noted in this document:

Ackerly, Neal W., David A. Phillips, Jr. and Kevin Palmer. 1997. The Development of Irrigation Systems in the Middle Rio Grande Conservancy District, Central New Mexico: A Historical Overview. SWCA Archaeological Report No. 95-162. SWCA, Inc. Environmental Consultants, Albuquerque. Prepared for USDI, Bureau of Reclamation, Albuquerque Area Office.

Burkholder, Joseph L. 1928. Report of the Chief Engineer: Submitting a Plan for Flood Control, Drainage, and Irrigation of the Middle Rio Grande Conservancy District. Middle Rio Grande Conservancy District. Albuquerque.

Linford, Dee. 1956. Water Resources of New Mexico. New Mexico State Engineer's Office and Interstate Stream Commission. Ms. on file, New Mexico State Engineer's Office, Santa Fe.

Kelley, Vincent C. 1974. Albuquerque: Its Mountains, Valley, Water, and Volcanoes. Scenic Trips to the Geologic Past No. 9. New Mexico Bureau of Mines and Mineral Resources, Socorro.

Kramer, Karen L. and Dan H. Wells. 1998. Cultural Resource Survey for the Atrisco Riverside Drain Trail in the City of Albuquerque, Bernaialillo County, New Mexico. Report No. LH-52-01 (NMCRIS No. 62161). Ecosystem Management, Albuquerque.

Wozniak, Frank E. 1987. Irrigation in the Rio Grande Valley, New Mexico: A Study of the Development of Irrigation Systems Before 1945. Prepared for New Mexico Historic Preservation Division, Santa Fe, and the USDI, Bureau of Reclamation, southwest Regional Office, Amarillo, Texas.

12. NARRATIVE DESCRIPTION

This abandoned segment of the Atrisco Riverside Drain measures approximately 10 meters in width by 832 meters in length (approx. 30 feet by 2,730 feet) as measured electronically using April 2006 Mid-Region Council of Governments (MRCOG) aerial imagery. The southern portion, approx. 300 feet, of this abandoned segment of the Atrisco Riverside Drain has been previously filled in, date unknown. This site is an open earthen ditch with standing water and, since it is no longer maintained as a viable drain ditch, includes thick vegetation. This abandoned segment is located within Albuquerque, Bernalillo County; north of Central Ave., west of the Rio Grande and west of the flood control levee, and east of the modern Atrisco Ditch (irrigation canal/alignment). This abandoned ground/irrigation water drainage ditch would have originally been a part of the bosque/Rio Grande floodplain prior to the ditch's construction and construction of the flood control levee.

The Middle Rio Grande Conservancy District began modernization of the valley's irrigation in the early 1930s by consolidating approximately 72 historic acequia systems into a single, manageable irrigation district which included irrigation canals and ditches with associated structural components, drainage ditches, and flood control levees (Ackerly et al. 1997:29; Burkholder [1928:25] and Linford [1956:292] in Wozniak 1987:130, 138). This system became in disrepair in the 1940s and 1950s and Congressional legislation, i.e., the Flood Control Act of 1941, with a clause inserted by NM State Representative Clinton P. Anderson, ultimately lead to a memorandum of agreement between the Corps and the Interior Department, Bureau of Reclamation, to study, plan, and rehabilitate the MRGCD system. Rehabilitation work began in 1951 and was completed by 1964 (Everhart 2004:10-12).

In 1933, when the old acequia ditches were abandoned or rehabilitated as part of the MRGCD system, the MRGCD built the new Atrisco Header and Diversion Works (LA138860) which diverted river water to the Atrisco and Arenal canal systems. This concrete and metal structure with wood planking was ineffective and was replaced in 1955/56 by the Atrisco Siphon (Marshall 2003:43-44, 59-61; for a construction photograph, see Kelley [1974:93]). The Atrisco Siphon, a 78-inch diameter concrete siphon, brought water from the MRGCD system on the east side of the river via the Atrisco Feeder Canal to the west side. This delivery system/structure is still in use today. With the new Atrisco Siphon, MRGCD reworked the upstream ends of the Atrisco and Arenal canals, and evidently at this time, abandoned the segment of the Atrisco Riverside Drain now being documented.

This abandoned segment of the Atrisco Riverside Drain (abandoned in the mid-1950s) is not considered to be eligible for nomination to the NRHP in and of itself; it is however, a contributing structural component of the historic Middle Rio Grande Conservancy District's (MRGCD) irrigation system which may be considered as eligible as a historic district (constructed in the 1930s with significant rehabilitation by the Corps and Bureau of Reclamation in the 1950s-1960s). The active Atrisco Riverside Drain is approximately 12.7-miles in length and has previously been documented under the LA numbers: LA100485, LA117692, and LA120376. One active segment, LA117692, was previously determined eligible under criterion d (HPD Consultation No. 55049). At this writing, the SHPO is considering Marron and Associates recommendation and the Corps determination to concur with the Marron recommendation that the Atrisco Riverside Drain is also eligible under criteria a and c (as described in Marron and Associates 2008, NMCRIS No. 109907; and Corps consultation letter dated June 17, 2008).

13. SITE RECORD ATTACHMENTS

☒ site location map (USGS 7.5' topo; required) ☒ sketch map or site plan (required) ☐ continuation forms?

☐ other materials (itemize): _____

Ecosystem Revitalization @ Route 66 Project

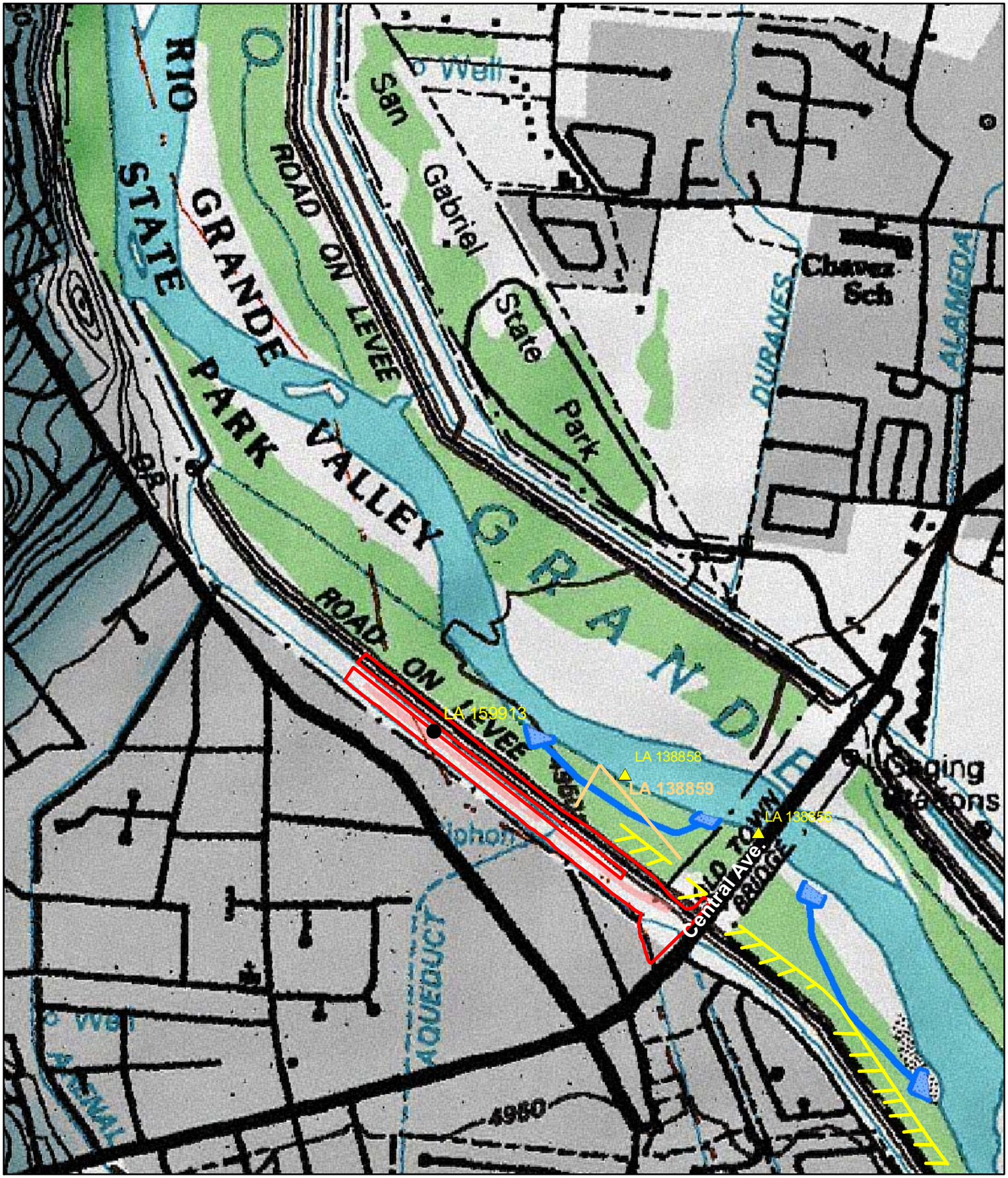
Legend

- Jetty Jack Removal
- Embayments
- High Flow Channel
- Debris Removal
- Cultural Resource Survey Marshal
- Atrisco and Ranchos de Atrisco Ditches (LA 138859)
- Cultural Resource Survey Everhart 6 June 2008
- Atrisco Riverside Drain, Abandoned Segment

0 325 650 1,300 Feet

Source Imagery:
Apr. 2006 MRCOG

US Army Corps of Engineers
Albuquerque District
Revision: 28 May 2008



Ecosystem Revitalization @ Route 66 Project

Source Imagery:
Apr. 2006 MRCOG

Legend

- Jetty Jack Removal
- Embayments
- High Flow Channel
- Debris Removal
- Cultural Resource Survey Marshal
- Atrisco and Ranchos de Atrisco Ditches (LA 138859)
- Cultural Resource Survey Everhart 6 June 2008
- Atrisco Riverside Drain, Abandoned Segment

0 405 810 1,620 Feet

US Army Corps of Engineers
Albuquerque District

Revision: 28 May 2008

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

August 20, 2008

085054

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

Ms. Katherine Slick
State Historic Preservation Officer
New Mexico Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Re: HPD Consultation No's. 070294, 084449, & 084750

Dear Ms. Slick:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of "No Adverse Effect to Historic Properties" for rehabilitation of an existing irrigation wastewater conduit as a part of the proposed **Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project.** In 2004, this project was known as the Middle Rio Grande Bosque 1135 Ecosystem Restoration Project at Route 66. The Corps is planning the riparian habitat restoration project in coordination with numerous other Federal, State, Tribal, and local entities. The Corps is the Lead Federal Agency for the proposed project. The proposed restoration project is being conducted under the authority of Section 1135(b) of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662).

The Route 66 Bosque Revitalization Project is located within the Rio Grande Floodway (between the riverside drains) in the City of Albuquerque, Bernalillo County, New Mexico, south of the Interstate Highway 40 Bridge that crosses the Rio Grande south to the Bridge Boulevard (Barelas) bridge. The project is located on lands under the joint jurisdiction of Federal, State and City agencies. Most of the land is managed by the Middle Rio Grande Conservancy District under permit from the U.S. Bureau of Reclamation. Project land is also within the Rio Grande Valley State Park that is jointly managed by the City of Albuquerque's Open Space Division and New Mexico State Parks Division. This project is being conducted in cooperation with the project sponsor, the Middle Rio Grande Conservancy District (MRGCD).

As originally planned in 2004, the proposed project included the removal of exotic plant species such as the invasive tamarisk and Russian olive, as well as dead and down vegetation debris, the

thinning and removal of other vegetation, the removal of some Kellner jetty-jacks that are now deemed unnecessary for flood protection, and re-vegetation. The proposed project has been modified and now also includes the installation of high water flow channels, moist soil depressions, and rehabilitation of an irrigation conduit that will result in a bosque wetland area for the benefit of habitat diversity.

The archaeological survey of the 2004 project area was conducted by Cibola Research Consultants and reported by Michael Marshall (2003, NMCRIS No. 82701; HPD Consultation No. 070294, copy attached for your convenience). Subsequent to the 2008 project modifications, the Corps consulted with your office regarding other portions of the Route 66 Project. These Route 66 Project consultations and survey reports are addendums to the 2003 Marshall report. They include HPD Consultation No. 084449 (concurrence with No Adverse Effect to the Atrisco and Ranchos de Atrisco ditches) and the Corps survey report regarding an abandoned segment of the Atrisco Riverside Drain (NMCRIS No. 110754) and its HPD Consultation No. 084750 (concurrence with No Historic Properties Affected for removal of MRGCD debris near the Drain) (copies attached for your convenience). The enclosed Corps' survey report, noted below, regarding the Atrisco Lateral Wasteway box culvert is also a Route 66 Project addendum to the 2003 Marshall report.

The modified project includes the rehabilitation of an existing wastewater structure, a 2-foot by 3-foot by about 75-foot concrete box culvert, identified as the Atrisco Lateral Wasteway. The existing structure was constructed by the Corps in 1955 (replacing a 1930s MRGCD structure). Therefore, the existing structure is over 50-years of age. Since the structure is located under/within the flood control levee, it was not a part of the project's initial archaeological survey conducted by Marshall in 2003. The Atrisco Lateral Wasteway is one structural component of the massive MRGCD irrigation and drainage system. The MRGCD system can be considered eligible for listing to the National Register of Historic Places as a historic district.

The structure is located approximately 1/4-mile downstream (south) of Central Avenue and on the west side of the Rio Grande. Use of the structure has been abandoned for an unknown number of years. MRGCD placed earthen fill material in the structures upstream opening to block flows through the structure, re-routing the flows through a gated box and down the Atrisco Riverside Drain. As a part of the 2008 project modifications, the Corps plans to reuse this wasteway conduit in order to provide for a wetland area in the bosque for habitat diversity. However, the existing 1955 wasteway structure is too high in elevation to function properly; perhaps a reason that MRGCD had abandoned use of the structure. Therefore, the Corps plans to remove the existing structure and replace it with a new concrete drain structure, constructed at a lower elevation for proper functionality. The new structure will be constructed in the same location as the existing box culvert.

Please find enclosed for your review the Corps' positive survey report entitled **An Addendum to the Bosque Revitalization @ Route 66 Section 1135 Project Surveys: A Cultural Resources Inventory of 0.7 Acre for Rehabilitation of the Atrisco Lateral Wasteway, Bernalillo County, New Mexico** (Report No. COE-2008-008, NMCRIS No. 111175) and associated documentation. The Corps' 0.7-acre survey of the structure's construction area was conducted on March 25, 2008, and covered 100-percent of the project area (APE). No other artifacts or historic properties were observed.

Consulting parties in the Section 106 process for the proposed rehabilitation project include the Corps, Bureau of Reclamation, and your office. Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, and based on the State of New Mexico Indian Affairs Department and Historic Preservation Division's 2008 Native American Consultations List, American Indian Tribes/Pueblos that have indicated they have concerns within Bernalillo County have been contacted regarding several proposed riparian habitat restoration projects in the Albuquerque area. These include Hopi Tribe, Pueblo of Isleta, Pueblo of Laguna, Navajo Nation, Ohkay Owingeh, Pueblo of Sandia, White Mountain Apache Tribe, Pueblo of Ysleta del Sur, as well as the Jicarilla Apache Nation. Currently, there are no known Tribal concerns and no traditional cultural properties are known to occur within or adjacent to the project area. The Corps has thus far received two responses; from the Navajo Nation and the Pueblo of Laguna, and neither has concerns regarding the proposed project.

The proposed project will affect approximately 140 feet of the non-functioning portion of the extremely large and long MRGCD irrigation (acequia) and drainage system. The box culvert itself, built in 1955, is not unique or otherwise historically significant. Based upon the above information and available documentation, the Corps is of the opinion that the proposed rehabilitation of the Atrisco Lateral Wasteway would have a negligible effect to the MRGCD irrigation and drainage system. The rehabilitation of the structure would also have a negligible effect to the flood control levee. Therefore, rehabilitation of the wasteway, as a part of the Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project, would have "No Adverse Effect to Historic Properties."

Pursuant to 36 CFR 800.13, should previously unknown artifacts or other historic properties be encountered during construction, work would cease in the immediate vicinity of the resource. A determination of significance would be made, and a mitigation plan would be formulated in consultation with your office, the Bureau of Reclamation, and with American Indian Tribes that have cultural concerns in the area.

If you have any questions or require additional information regarding the proposed rehabilitation of the Atrisco Lateral Wasteway as a part of the Bosque Revitalization @ Route 66, Albuquerque, New Mexico, Section 1135 Project, please contact Gregory D. Everhart, Archaeologist at (505) 342-3352, or myself, at (505) 342-3281.

Sincerely,

Julie Alcon,
Chief, Environmental Resources Section

9/2/08
Date

I CONCUR

KATHERINE SLICK
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER

Enclosures

Copy furnished w/ enclosures:

Jeff Hansen
Archaeologist, U.S. Bureau of Reclamation
Albuquerque Area Office
555 Broadway Blvd., NE, Suite 100
Albuquerque, New Mexico 87102-2352

Ray Gomez
Middle Rio Grande Conservancy District
1931 Second Street, SW
Albuquerque, New Mexico 87105

Dr. Matt Schmader, Director
City of Albuquerque
Open Space Division
Post Office Box 1293
Albuquerque, New Mexico 87103

Appendix D. Material Safety Data Sheets

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

GARLON* 3A HERBICIDE

Effective Date: 11/24/03
Product Code: 38321
MSDS: 004422

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Garlon* 3A Herbicide

COMPANY IDENTIFICATION:
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Triclopyr ((3,5,6-trichloro-2-pyridinyl)oxy)acetic acid), triethylamine salt	CAS # 057213-69-1	44.4%
Inert Ingredients, Total, Including		55.6%
Ethanol	CAS # 000064-17-5	
Triethylamine (N,N-Diethylethanamine)	CAS # 000121-44-8	
Ethylenediaminetetraacetic Acid (EDTA)	CAS # 000060-00-4	

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Hazardous Chemical. Light purple-pink liquid, ammonia-like odor. May cause eye irritation with corneal injury. May cause skin irritation. LD_{50} for skin absorption is >5000 mg/kg. Oral LD_{50} is 1847-2574 mg/kg. Toxic and irritating gases may be formed during fire conditions.
EMERGENCY PHONE NUMBER: 800-992-5994

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur Vapor of amines may cause swelling of the cornea resulting in visual disturbances such as blurred or hazy vision. Bright lights may appear to be surrounded by halos. Effects may be delayed and typically disappear spontaneously. When tested on animals, dilutions of this material were less irritating to eyes than the undiluted products.

SKIN: Prolonged or repeated exposure may cause skin irritation, even a burn. When tested on animals, dilutions of this material were less irritating to skin than the undiluted product. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals. With the dilute mix, no allergic skin reaction is expected. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD_{50} for skin absorption in rabbits is >5000 mg/kg.

INGESTION: Low toxicity if swallowed. The oral LD_{50} for rats is 2574 mg/kg (male) and 1847 mg/kg (female). Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing may cause gastrointestinal irritation or ulceration.

INHALATION: Brief exposure (minutes) is not likely to cause adverse effects.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Excessive exposure may cause liver or kidney effects.

CANCER INFORMATION: Triclopyr did not cause cancer in laboratory animal studies. This material contains ethanol. Epidemiology studies provide evidence that drinking of alcoholic beverages (containing ethanol) is associated with cancer, and IARC has classified alcoholic beverages as carcinogenic to humans.

TERATOLOGY (BIRTH DEFECTS): For triclopyr, birth defects are unlikely. Even exposures having an adverse effect on the mother should have no effect on the fetus. Ethanol has been shown to cause birth defects and toxicity to the fetus in laboratory animal tests. It has also been shown to cause human fetotoxicity and/or birth defects when ingested during pregnancy.

REPRODUCTIVE EFFECTS: For triclopyr, in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Ingestion of large amounts of ethanol has been shown to interfere with fertility in human males.

4. FIRST AID:

EYES: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth to an unconscious person.

INHALATION: No emergency medical treatment necessary.

NOTE TO PHYSICIAN: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach & lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. If burn is present, treat as any thermal burn, after decontamination. Exposure to amine vapors may cause minor transient edema of the corneal epithelium (glaucopsia) with blurred vision, blue haze & halos around bright objects. Effects disappear in a few hours and temporarily reduce ability to drive vehicles. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 110°F (43°C)
METHOD USED: TCC
FLAMMABLE LIMITS
LFL: Not determined
UFL: Not determined

EXTINGUISHING MEDIA: Alcohol foam and CO_2.

FIRE & EXPLOSION HAZARDS: Toxic, irritating vapors may be formed or given off if product is involved in fire. Although product is water-based, it has a flash point due to the presence of small amounts of ethanol and triethylamine.

FIRE-FIGHTING EQUIPMENT: Use positive-pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Contain small spills and absorb with an inert material such as clay or dry sand. Report large spills to Dow AgroSciences at 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: HANDLING: Keep out of reach of children. Causes irreversible eye damage. Harmful if inhaled or absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic skin reaction in some individuals. Avoid contact with eyes, skin, clothing, breathing vapor, or spray mist. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
STORAGE: Store above 28°F or agitate before use. Store in original container. See product label for handling/storage precautions relative to the end use of this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S):
Ethanol (ethyl alcohol): ACGIH TLV and OSHA PEL are 1000 ppm. ACGIH classification is A4.
3,5,6-Trichloro-2-pyridyloxyacetic acid (Triclopyr), triethylamine salt: Dow AgroSciences Industrial Hygiene Guideline is 2 mg/M^3 as acid equivalent; Skin.
Triethylamine: ACGIH TLV is 1 ppm TWA, 3 ppm STEL, Skin. OSHA PEL is 10 ppm TWA, 15 ppm STEL.

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE PROTECTION: Use chemical goggles. Eye wash fountain should be located in immediate work area. If exposure causes eye discomfort, use a NIOSH approved full-face respirator.

SKIN PROTECTION: When prolonged or frequently repeated contact could occur, use chemically protective clothing resistant to this material. Selection of specific items such as face shield, gloves, boots, and apron or full-body suit will depend on operation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use a NIOSH approved air-purifying respirator.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

BOILING POINT: Not determined
VAPOR PRESSURE: Not determined
VAPOR DENSITY: Not applicable
SOLUBILITY IN WATER: Miscible
SPECIFIC GRAVITY: 1.135 (68/68°F)
APPEARANCE: Light purple/pink liquid
ODOR: Ammonia-like odor

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Avoid sources of ignition if temperature is near or above flash point.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Any oxidizing agent. Consult manufacturer for specific cases.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides and hydrogen chloride may be formed under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

MUTAGENICITY: For triclopyr and ethanol: in-vitro genetic toxicity studies were negative. For triclopyr: animal genetic toxicity studies were negative. For ethanol: animal genetic toxicity studies were negative in some cases and positive in other cases.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING: Based largely or completely on information for triclopyr. Bioconcentration potential is low (BCF <100 or Log Pow <3).

DEGRADATION & PERSISTENCE: Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD >40%). The 20-Day biochemical oxygen demand (BOD20) is 0.30 p/p. Theoretical oxygen demand (ThOD) is calculated to be 0.75 p/p.

ECOTOXICOLOGY: Material is slightly toxic to aquatic organisms on an acute basis (LC_{50} or EC_{50} is between 10 and 100 mg/L in most sensitive species).
Acute EC_{50} for shell deposition inhibition in Eastern oyster *(Crassostrea virginica)* is 56-87 mg/L.
Acute LC_{50} for rainbow trout *(Oncorhynchus mykiss)* is 400 mg/L.
Acute LC_{50} for channel catfish *(Ictalurus punctatus)* is 446 mg/L.
Acute LC_{50} for pink shrimp *(Penaeus duorarum)* is 895 mg/L.
Growth inhibition EC_{50} for green alga *(Selenastrum capricornutum)* is 45 mg/L.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Do not contaminate food, feed, or water by storage or disposal. Excess wastes are toxic. Improper disposal or excess wastes are a violation of federal law. If wastes resulting from the use of this product cannot be disposed of according to label instructions, dispose of these wastes at an approved facility. Contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance.

14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For non-bulk shipments by land:
This material is not regulated for transport.

For bulk shipments by land:
COMBUSTIBLE LIQUID, N.O.S. (TRIETHYLAMINE, ETHANOL)/COMBUSTIBLE LIQUID/NA1993/PGIII

For shipments by air or vessel:
FLAMMABLE LIQUIDS, N.O.S. (TRIETHYLAMINE, ETHANOL)/3/UN1993/PGIII

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
N,N-Diethylethanamine	000121-44-8	3%

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard
A fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

GARLON* 3A HERBICIDE

Effective Date: 11/24/03
Product Code: 38321
MSDS: 004422

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
Ethylenediamine Tetraacetic Acid	000060-00-4	NJ3 PA1 PA3
Ethanol	000064-17-5	NJ1 NJ3 PA1
N,N-Diethylethanamine PA3	000121-44-8	NJ1 NJ3 PA1

NJ1=New Jersey Special Health Hazard Substance (present at > or = to 0.1%).
NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at > or = to 1.0%).
PA3=Pennsylvania Environmental Hazardous Substance (present at > or = to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

CATEGORY	RATING
Health	3
Flammability	2
Reactivity	0

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Chemical Name	CAS Number	RQ	% in Product
Triethylamine	000121-44-8	5000	3%
Ethylenediaminetetra-acetic Acid (ETDA)	000060-00-4	5000	2.3%

RCRA Categorization Hazardous Code:
Triethylamine = U404

16. OTHER INFORMATION:

MSDS STATUS: Revised Section: 3, 4, 8, 11 & 14
Reference: DR-0121-6064
Replaces MSDS dated: 1/17/01
Document Code: D03-101-003
Replaces Document Code: D03-101-002

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.

MATERIAL SAFETY DATA SHEET

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Dow AgroSciences

GARLON* 4 HERBICIDE

Effective Date: 2/22/02
Product Code: 38322
MSDS: 004788

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Garlon* 4 Herbicide

COMPANY IDENTIFICATION:
Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Triclopyr ((3,5,6-trichloro-2-pyridinyl)oxy) acetic acid, butoxy ethyl ester	CAS# 064700-56-7	61.6%
Other ingredients, total, including:		38.4%
Kerosene	CAS# 008008-20-6	
Proprietary surfactants		

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Hazardous Chemical. Amber liquid. Combustible. Kerosene-like odor. May cause eye and skin irritation The LD_5 for skin absorption is >2000 mg/kg (rabbits) and >5000 mg/kg (rats). Oral LD_{50} for rats is 1581 mg/kg (males) and 1338 mg/kg (females). Toxic to aquatic organisms.
EMERGENCY PHONE NUMBER: 800-992-5994

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: May cause slight temporary eye irritation. Corneal injury is unlikely.

SKIN: Prolonged or repeated contact may cause skin irritation. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals. With the dilute mix, no allergic skin reaction is expected. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated skin contact may result in absorption of harmful amounts. The LD_5 for skin absorption is >2000 mg/kg (rabbits) and >5000 mg/kg (rats).

INGESTION: Low toxicity if swallowed. The oral LD_{50} for rats is 1581 mg/kg (males) and 1338 mg/kg (females). Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

INHALATION: Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Kerosene may cause central nervous system effects.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Triclopyr BEE, in animals, effects have been reported on the following organs: blood, kidney, and liver.

CANCER INFORMATION: Triclopyr BEE did not cause cancer in laboratory animals. In a lifetime animal dermal carcinogenicity study, an increased incidence of skin tumors was observed when kerosene was applied at doses that also produced skin irritation. This response was similar to that produced in skin by other types of chronic chemical/physical irritation. No increase in tumors was observed when non-irritating dilutions of kerosene were applied at equivalent doses, indicating that kerosene is unlikely to cause skin cancer in the absence of long-term continued skin irritation. In long-term animal studies with ethylene glycol butyl ether, small but statistically significant increases in tumors were observed in mice but not rats. The effects are not believed to be relevant to humans. If the material is handled in accordance with proper industrial handling, exposures should not pose a carcinogenic risk to man.

TERATOLOGY (BIRTH DEFECTS): For triclopyr BEE, birth defects are unlikely. Exposures having no effect on the mother should have no effect on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother.

REPRODUCTIVE EFFECTS: Triclopyr BEE, in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

4. FIRST AID:

EYES: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several minutes. If affects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN: The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 147°F (64°C)
METHOD USED: TCC

FLAMMABLE LIMITS
LFL: Not determined
UFL: Not determined

EXTINGUISHING MEDIA: Water fog, foam, CO_2, and dry chemical.

FIRE & EXPLOSION HAZARDS: Combustible. Toxic, irritating vapors may be produced if product is involved in fire.

FIRE-FIGHTING EQUIPMENT: Use positive pressure self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Keep out of streams and domestic water supplies. Absorb small spills in inert material such as sand. For large spills, dike the area and contact Dow AgroSciences at 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not use near heat or open flame. Harmful if swallowed, inhaled, or absorbed through skin. Avoid contact with eyes, skin and clothing. Avoid breathing mists and vapors. Avoid contamination of food. Store above 28°F or agitate before use. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. For handling relative to end-use of this product, read the product label for further information concerning the use of personal protective equipment (PPE) under the Worker Protection Standard of 1993. Store in the original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where a potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S):
3,5,6-Trichloro-2-pyridinyloxyacetic acid, Dowanol EB ester: Dow AgroSciences Industrial Hygiene Guide is 2 mg/M^3 as acid equivalent, Skin.
Kerosene: Dow AgroSciences Industrial Hygiene Guide is 10 mg/M^3.

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

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Dow AgroSciences LLC
Indianapolis, IN 46268

GARLON* 4 HERBICIDE

Effective Date: 2/22/02
Product Code: 38322
MSDS: 004788

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guidelines. When respiratory protection is required for certain operations, use a NIOSH approved air-purifying respirator.

SKIN PROTECTION: Use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full body suit will depend on operation. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly.

EYE/FACE PROTECTION: Use safety glasses.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: >302°F (150°C) initial
VAPOR PRESSURE: 0.1 mm @ 37.8°C (kerosene)
VAPOR DENSITY: >1
SOLUBILITY IN WATER: Emulsifies
SPECIFIC GRAVITY: 1.08
APPEARANCE: Amber liquid
ODOR: Kerosene-like

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Combustible. Avoid sources of ignition if temperature is near or above flash point. Stable under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Acid, base, and oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides, hydrogen chloride, and phosgene may result under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

MUTAGENICITY: For triclopyr BEE, in-vitro and animal mutagenicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). Measured log octanol/water partition coefficient (Log Pow) is 4.09. Log air/water partition coefficient (Log Kaw) is -4.0.

DEGRADATION & PERSISTENCE: Biodegradation under aerobic static laboratory conditions is moderate (BOD20 or BOD28/ThOD between 10 and 40%).

ECOTOXICOLOGY: Material is highly toxic to aquatic organisms on an acute basis (LC_{50}/EC_{50} is between 0.1 and 1 mg/L in most sensitive species).
Acute LC_{50} in rainbow trout *(Oncorhynchus mykiss)* is 0.8 – 4.9 mg/L.
Acute LC_{50} for fathead minnow *(Pimephales promelas)* is 2.2 - 6.3 mg/L.
Acute LC_{50} for water flea *(Daphnia magna)* is 2.2 mg/L.
Acute LC50 in bluegill (Lepomis macrochirus) is 2.1 mg/L.
Growth inhibition EC_{50} in green alga *(Selenastrum capricornutum)* is 13.3 - 16.8 mg/L.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Excess wastes that cannot be used according to label instructions must be disposed of according to all applicable federal, state, or local procedures.

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14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION

FOR ALL PACKAGE (NON-BULK) SIZES SHIPPED BY AIR, LAND OR WATER:
Material is not regulated for transportation.

FOR BULK SHIPMENTS BY LAND:
COMBUSTIBLE LIQUID, N.O.S. (CONTAINS KEROSENE)/COMBUSTIBLE LIQUID/NA1993/PGIII

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard
A fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
Proprietary Ingredient	Proprietary	PA1 NJ3
Kerosene	008008-20-6	PA1 NJ3

NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	2
Flammability	2
Reactivity	1

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 3, 4, 7, 8, 10, 12, & 14
Reference: DR-0196-5102
Replaces MSDS dated: 9/9/99
Document Code: D03-102-002
Replaces Document Code: D03-102-001

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.

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Appendix E. Section 404 (b)(1) Evaluation

Section 404 (b) (1) Evaluation – Ecosystem Restoration at Route 66

I. Project Description

Approximately 121 acres of bosque between Interstate 40 (I-40) and Bridge Blvd. in Albuquerque, New Mexico would be restored by enhancing hydrologic function and restoring native vegetation. In addition, recreational use of the bosque would be improved by creating designated trails with benches, signs and other interpretive features. In total, approximately 20 acres of water-related features (this includes high flow channels, swales and outfall channel habitat). The overall acreage for the areas encompassed by the selected Solution Areas of the Preferred Alternative is approximately 121 acres. Much of this acreage would be treated for non-native vegetation (removed and/or sprayed with herbicide) and replanted with native vegetation to create shrub thickets, bosque patches, meadow and savannah areas, some of which would be maintained in the form of firebreaks between the other features.

a. Location

The project is located within the bosque and along the banks of the Rio Grande between I-40 and Bridge Blvd. in Albuquerque, New Mexico.

b. General Description

The Study Area consists of 3.1 river miles along the Rio Grande stretching north and south from Central Avenue. Central Avenue is the longest intact segment of historic U.S. Route 66, which is the basis for the project's name. The project is an 1135 Ecosystem Restoration project.

c. Authority and Purpose

This Feasibility Study is being conducted under the authority of Section 1135 of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662). The objective of this authority is to improve the quality of the environment through modification of the structure or operation of existing water resources projects constructed by the USACE, providing modifications that are feasible and consistent with the original project purpose. Improvements in ecosystem structure and function in areas adversely affected by such projects are also included in this Study.

The placement of levees and installation of Kellner jetty jacks for bank stabilization on the Rio Grande and some of its tributaries (Public Law 80-858) have contributed to the degradation of riparian/wetland ecosystem functions and values. Additionally, the completion of the Jemez Dam on the Jemez River in 1953 which was authorized for sediment control (Public Law 80-858), and Cochiti Dam on the Rio Grande, in 1975 authorized for flood and sediment control (Public law 86-645) reduced the frequency and intensity of overbank flooding contributing further to the degradation of riparian ecosystem functions and values of the Middle Rio Grande bosque. All of these projects are part of the comprehensive flood control plan for the Rio Grande watershed authorized in the Flood Control Act of 1948.

The purpose of the Study is to determine the advisability of undertaking environmental restoration measures to improve the Rio Grande bosque ecosystem function in central Albuquerque. Potential alternatives include removing jetty jacks and non-native vegetation, such as salt cedar, Russian olive and Siberian elm, enhancing existing high-flow channels, outfall wetlands, and other alterations to the floodplain. Improvements of existing facilities for educational, interpretive and low-impact recreational uses have also been considered in the Route 66 Project.

d. General Description of Dredged or Fill Material

During construction of the proposed high flow channels, a temporary diversion structure would be placed at the bank of the Rio Grande, which is a water of the United States.

(1) General Characteristics of Material (grain size, soil type)

Soils along the bank of the river are fine-grained alluvial silts, sands, and gravels. Soils derived from these deposits in the Study Area are Torrifluvents, Calciorthids and Torriorthents (Soil Conservation Service 1974). Grain size is therefore very small.

(2) Quantity of Material (cu. yds.)

The approximate quantify of material to be removed is approximately 19,025 cubic yards. This material would be removed and used within the site to build up berms along the channel or other features (such as the outfall channel habitat) but none of this dredged material would be placed.

(3) Source of Material

No material would be placed during the construction of this project.

e. Description of the Proposed Discharge Site(s)

No material would be discharged during construction of this project.

(1) Location (map)
(2) Size (acres)
(3) Type of Site (confined, unconfined, open water)
(4) Type(s) of Habitat
(5) Timing and Duration of Discharge

f. Description of Disposal Method (hydraulic, drag line, etc.)

This material would be removed and used within the site to build up berms along the channel or other features (such as the outfall channel habitat) but none of this dredged material would be placed. If excess material exists, it would be hauled off site and deposited at an approved location.

II. Factual Determination

There would be short-term effects on waters of the United States during dredging of the inlet and outlet of the high flow channels. A coffer dam would be placed at the bank edge and pushed out into the water to create a 'work zone.' Sediment dredged within this

area would be removed as described in Section f and would not be allowed to discharge or be placed in the river.

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope – Substrate elevation is in line with the bank of the river and a steep slope exists. This would be modified to allow a connection of the existing high flow channel to the river.

(2) Sediment Type – Sediments are those described in d.(1) as well as in river sediments consisting of organic and inorganic solid materials.

(3) Dredged/Fill Material Movement - Movement of dredged material would be limited by the methodology of removal as well as the installation of the coffer dam. Material would be removed by an excavator and placed directly into a dump truck to be used on site (outside of the river) or hauled off site.

(4) Physical Effects on Benthos (burial, changes in sediment type, etc.) – Benthos would be affected during dredging of the material at the bank of the river.

(5) Other Effects – Fish may also be affected by the dredging. The installation of the coffer dam will assist in minimizing these affects.

(6) Actions Taken to Minimize Impacts –

- If a disposal site is needed (other than on site outside of the river), a site that has been previously used for dredged material would be utilized.
- As described above, a coffer dam would be placed in the river and dewatered (if needed) in order to create a work zone.
- This area would be monitored for fish or invertebrates present. If any are found, they would be placed back into the river proper.
- Construction of the diversion structures (coffer dam or other) would be performed during low-flow conditions outside of the spring runoff and summer thunderstorm seasons.
- Sediment and erosion controls would be used to prevent bank and streambed erosion if storm evens occur during the construction period and before stream banks are permanently stabilized.

b. Water Circulation, Fluctuation and Salinity Determinations

There would be minimal impact to the water within the main channel of the river since the coffer dam would be installed at the edge of the bank for the work zone.

(1) Water – There would minimal, short-term effects to water quality during the installation and removal of the coffer dam. Water quality at the outside edge of the coffer dam would be monitored before, during and after installation and removal in order to determine any major changes in the following:

(a) Salinity – No change in salinity is expected.

(b) Water Chemistry (Ph, etc.) – Ph and dissolved oxygen may change slightly due to this action.
(c) Clarity – Clarity would be affected during and after installation and removal of the coffer dam.
(d) Color – Color would be affected during and after installation and removal of the coffer dam.
(e) Odor – There may be an additional odor due to the excavation of river sediments.
(f) Taste – Taste of water may be more silty due to this action.
(g) Dissolved Gas Levels – DO levels may drop during and after installation and removal of the coffer dam..
(h) Nutrients – Nutrient levels may change during and after installation and removal of the coffer dam.
(i) Eutrophication – Eutrophication may be affected during and after installation and removal of the coffer dam.
(j) Others as Appropriate

(2) Current Patterns and Circulation - Current patterns of flow and circulation would be affected during and after installation and removal of the coffer dam as follows:

(a) Current Patterns and Flow – Patterns and flow at the bank edge would be disturbed during and after installation and removal of the coffer dam.
(b) Velocity – Velocity would be slightly affected during and after installation and removal of the coffer dam. Since the coffer dam would be fairly small in size, water would be diverted around it.
(c) Stratification – Stratification may be affected as the water column is stirred up during and after installation and removal of the coffer dam.
(d) Hydrologic Regime – Hydrologic regime would be fairly unaffected.
(3) Normal Water Level Fluctuations (tides, river stage, etc.) - Normal water level would not be affected.
(4) Salinity Gradients – NA.

(5) Actions That Will be taken to minimize impacts:

- Water quality at the outside edge of the coffer dam would be monitored before, during and after installation and removal in order to determine any major changes in water chemistry.
- Care would be taken to minimize effects on water quality and flow during installation of the coffer dam by pushing the water column out from the edge of the bank slowly.
- Construction of the diversion structures (coffer dam or other) would be performed during low-flow conditions outside of the spring runoff and summer thunderstorm seasons.
- Sediment and erosion controls would be used to prevent bank and streambed erosion if storm evens occur during the construction period and before stream banks are permanently stabilized.

c. Suspended Particulate/Turbidity Determinations

(1) Expected changes in suspended particulates and turbidity levels in vicinity of disposal site – Suspended particulates and turbidity levels would increase during and after installation and removal of the coffer dam.

(2) Effects – There would be minimal short-term effects to suspended particulates and turbidity during and after installation and removal of the coffer dam.

(a) Light Penetration – Light penetration would be affected for a short period of time during and after installation and removal of the coffer dam.

(b) Dissolved Oxygen – Dissolved oxygen (DO) may drop during and after installation and removal of the coffer dam. DO would be monitored during and after installation and removal of the coffer dam.

(c) Toxic Metals and Organics – Toxic metals and organics are not anticipated to occur due to construction.

(d) Pathogens – Pathogens are not anticipated to be found due to construction.

(e) Aesthetics – Aesthetics would be altered for a short time during construction.

(f) Others as Appropriate

(3) Effects on Biota – Macroinvertebrates, microinvertebrates, amphibious and/or fish species may be affected by these short term impacts to water quality based on suspended particulates and/or turbidity. Since this impact would be limited to a short period of time during and after installation and removal of the coffer dam, the following factors should not be affected:

(a) Primary Production, Photosynthesis
(b) Suspension/Filter Feeders
(c) Sight Feeders

(4) Actions taken to minimize impacts:

- Care would be taken to minimize effects on suspended particulates and turbidity in the water during installation of the coffer dam by pushing the water column out from the edge of the bank slowly.
- This area would be monitored for amphibians, fish or invertebrates present. If any are found, they would be placed back into the river proper.
- Construction of the diversion structures (coffer dam or other) would be performed during low-flow conditions outside of the spring runoff and summer thunderstorm seasons.
- Sediment and erosion controls would be used to prevent bank and streambed erosion if storm evens occur during the construction period and before stream banks are permanently stabilized.

d. Contaminant Determinations - Contaminants would not be increased due to construction of this project. Therefore, the required determinations pertaining to the presence and effects of contaminants can be made without testing.

e. Aquatic Ecosystem and Organism Determinations - Since there is no anticipated addition of contaminants due to construction, the following would not be affected by construction of the project due to contaminants.

(1) Effects on Plankton
(2) Effects on Benthos
(3) Effects on Nekton
(4) Effects on Aquatic Food Web
(5) Effects on Special Aquatic Sites

(a) Sanctuaries and Refuges – Not applicable.

(b) Wetlands – Wetlands would be avoided during construction. There is no wetland habitat adjacent to the channel where excavation to connect the channel to the river would take place. Dredging along the bank of the river would occur and therefore, this analysis concludes that activities would be covered under Nationwide Permit #33.

(c) Mud Flats – Not applicable.

(d) Vegetated Shallows - Not applicable.

(e) Coral Reefs – Not applicable.

(f) Riffle and Pool Complexes – Installation of the coffer dam to excavate the channel may have a short-term effect on riffle and pool complexes during construction only.

(6) Threatened and Endangered Species - Refer to Section 6.7 of the Detailed Project Report/Environmental Assessment (DPR/EA).

(7) Other Wildlife – Refer to Section 6.6.2 of the DPR/EA.

(8) Actions to Minimize Impacts – Actions to minimize impacts as described in the DPR/EA would be implemented including the following:

- All conditions for the Nationwide 33 would be adhered to during construction.
- BMPS's discussed in reference to the Rio Grande silvery minnow would be implemented as follows:
- The use of silt fences adjacent to the riverbank to prevent erosion to the river .

- Work zones to the river would be blocked when constructing the High-Flow Channels.
- Fueling of vehicles would not take place inside the levees,
- Storage of equipment and vehicles would not occur in the bosque.
- The proposed work would occur during the winter, which is when Bald Eagles may be in or near the Study Area. In order to minimize the potential for disturbing Bald Eagles utilizing adjacent habitat, the following guidelines would be employed. If a Bald Eagle is present within 0.25 mile upstream or downstream of the active construction site in the morning before activity starts, or is present following breaks in project activity, the contractor would be required to suspend all activity until the bird leaves of its own volition; or an USACE biologist, in consultation with the USFWS, would determine that the potential for harassment is minimal. However, if a Bald Eagle arrives during construction activities or if an eagle is greater than 0.25 mile away, construction need not be interrupted.

f. Proposed Disposal Site Determinations – Any excess excavated material would be hauled to an approved site.

(1) Mixing Zone Determination – Not applicable.

(2) Determination of compliance with applicable water quality standards – All standards listed in the Nationwide 33, 401 water quality certification, and Section 402 (p) of the CWA would be adhered to during construction.

(3) Potential effects on human use characteristic – Human use would not be affected by the proposed project.

(a) Municipal and Private water supply – The proposed project is not within or adjacent to municipal or private water supplies.

(b) Recreational and commercial fisheries - Not applicable.

(c) Water related recreation – No recreational resources would be affected by the proposed project.

(d) Aesthetics – As discussed above, water quality would be affected during installation of the coffer dams. Turbidity would be increased for a short duration.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and similar preserves – The proposed project is within the Rio Grande Valley State Park. All rules and regulations of the Park would be adhered to during construction.

g. Determination of Cumulative Effects on the Aquatic Ecosystem – There are three proposed high-flow channels within the project. They are located in 3 different locations as shown on Figure 5.1 of the DPR/EA. Each high-flow and the excavation in order to connect it to the river would occur within the same approximate timeframe. Therefore, installation of the coffer dams in order to allow construction could create a cumulative effect on water quality and the aquatic ecosystem. All actions to minimize impacts as described above would be implemented in order to reduce this cumulative effect as much as possible. Also, each channel would be constructed from the downstream end to the upstream end so that no sediment loosened by the construction would outflow into the river. It would all be removed before the upstream end is excavated and the coffer dam removed.

h. Determination of Secondary Effects on the Aquatic Ecosystem - There is no placement of fill proposed within this project, therefore, there no secondary effects on the aquatic ecosystem are anticipated.

III. Findings of Compliance or Non-Compliance with the restrictions on discharge

a. Adaptation of the Section 404(b) (1) Guidelines to this Evaluation – Not applicable.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge site which would have less adverse impact on the aquatic ecosystem

There is no discharge sites proposed within the project.

c. Compliance with applicable state water quality standards

The proposed action is in compliance with applicable state water quality standards. Concurrence (and a 401 water quality certificate, if required) from the New Mexico Environment Department would be obtained prior to start of construction.

d. Compliance with applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act

Not applicable.

e. Compliance with Endangered Species Act of 1973

The proposed project is in compliance with the Endangered Species Act of 1973. Effects on listed species have been determined and are discussed in Section 6.7. A Biological Assessment requesting concurrence would be submitted to the U.S. Fish and Wildlife Service.

f. Compliance with specified protection measures for marine sanctuaries designated by the Marine Protection, Research and Sanctuaries Act of 1972

Not applicable.

g. Evaluation of Extent of Degradation of the Waters of the United States

(1) Significant adverse effects on human health and welfare – No significant adverse effects on human health or welfare would occur due to the proposed project.

(a) Municipal and private water supplies – No effect to municipal or private water supplies would occur from the proposed project.

(b) Recreation and commercial fisheries – No effect to recreation or commercial fisheries would occur from the proposed project.

(c) Plankton – Plankton would not be affected by the proposed project.

(d) Fish - Fish species may be affected by these short term impacts to water quality based on suspended particulates and/or turbidity.

(e) Shellfish – Shellfish would not be affected by the proposed project.

(f) Wildlife – Wildlife would not be affected by the proposed project.

(g) Special Aquatic sites – No applicable.

(2) Significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems – There would not be significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems.

(3) Significant adverse effects on aquatic ecosystem diversity, productivity and stability - There would not be significant adverse effects on aquatic ecosystem diversity, productivity and stability.

(4) Significant adverse effects on recreational, aesthetic, and economic values - There would not be significant adverse effects on recreational, aesthetic, and economic values.

h. Appropriate and practicable steps taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem – All of the actions to minimize potential adverse impacts of the proposed project as listed above include:

- If a disposal site is needed (other than on site outside of the river), a site that has been previously used for dredged material would be utilized.
- As described above, a coffer dam would be placed in the river and dewatered (if needed) in order to create a work zone.

- This area would be monitored for fish or invertebrates present. If any are found, they would be placed back into the river proper.
- Construction of the diversion structures (coffer dam or other) would be performed during low-flow conditions outside of the spring runoff and summer thunderstorm seasons.
- Sediment and erosion controls would be used to prevent bank and streambed erosion if storm evens occur during the construction period and before stream banks are permanently stabilized.
- Water quality at the outside edge of the coffer dam would be monitored before, during and after installation and removal in order to determine any major changes in water chemistry.
- Care would be taken to minimize effects on water quality and flow during installation of the coffer dam by pushing the water column out from the edge of the bank slowly.
- Care would be taken to minimize effects on suspended particulates and turbidity in the water during installation of the coffer dam by pushing the water column out from the edge of the bank slowly.
- This area would be monitored for amphibians, fish or invertebrates present. If any are found, they would be placed back into the river proper.
- All conditions for the Nationwide 33 would be adhered to during construction.
- BMPS's discussed in reference to the Rio Grande silvery minnow would be implemented as follows:
- The use of silt fences adjacent to the riverbank to prevent erosion to the river.
- Work zones to the river would be blocked when constructing the High-Flow Channels.
- Fueling of vehicles would not take place inside the levees,
- Storage of equipment and vehicles would not occur in the bosque.
- The proposed work would occur during the winter, which is when Bald Eagles may be in or near the Study Area. In order to minimize the potential for disturbing Bald Eagles utilizing adjacent habitat, the following guidelines would be employed. If a Bald Eagle is present within 0.25 mile upstream or downstream of the active construction site in the morning before activity starts, or is present following breaks in project activity, the contractor would be required to suspend all activity until the bird leaves of its own volition; or an USACE biologist, in consultation with the USFWS, would determine that the potential for harassment is minimal. However, if a Bald Eagle arrives during construction activities or if an eagle is greater than 0.25 mile away, construction need not be interrupted.

i. <u>On the basis of the guidelines, the proposed disposal site(s) for the discharge of dredged or fill material</u>

(1) Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

Appendix F
Biological Assessment/Biological Opinion

BIOLOGICAL ASSESSMENT

for the

BOSQUE REVITALIZATION @ ROUTE 66 PROJECT

ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Plaza Northeast
Albuquerque, New Mexico 87109

Updated May 30, 2008

First Submittal March 14, 2008

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BIOLOGICAL ASSESSMENT
for the
BOSQUE REVITALIZATION AT ROUTE 66 PROJECT,
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

Background

On June 29, 2001, the U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) regarding the effects of certain water management practices upon the Rio Grande silvery minnow (*Hybognathus amarus* [silvery minnow]), the Southwestern Willow Flycatcher (*Empidonax traillii extimus* [flycatcher]), the Bald Eagle (*Haliaeetus leucocephalus*), the Interior Least Tern (*Sterna antillarum*), and the experimental-nonessential population of the Whooping Crane (*Grus americana*). The BO was then updated in March 2003 (USFWS, 2003). Specifically, the BO evaluates the implications of the U.S. Bureau of Reclamation's (Reclamation) discretionary actions related to water management and the US Army Corps of Engineer's (Corps) water operation rules, and non-federal water depletions in the Middle Rio Grande. The USFWS concluded that the above management practices would likely jeopardize the continued existence of the SILVERY MINNOW and flycatcher and, therefore, developed a Reasonable and Prudent Alternative (RPA) that they believe must be implemented in order to avoid placing these species in jeopardy in accordance with the Endangered Species Act (ESA) 16 U.S.C. 1531 *et seq*.

This Biological Assessment (BA) was prepared by the U.S. Army Corps of Engineers, Albuquerque District (Corps), pursuant to Section 7(a)(2) and Section 7(c) of the Endangered Species Act of 1973, as amended (Act) and its implementing regulations (50 CFR, Part 402, "Interagency Cooperation"). The purpose of this BA is to evaluate potential effects of the proposed project on Federally listed species, and designated critical habitat. This BA is based on the best scientific and commercial data available and includes all information necessary and available to initiate formal consultation and determine the potential effects of the proposed project on listed species and proposed critical habitat in the action area. If information is developed by the Corps during ongoing planning and design studies that would add to a further understanding of project effects it would be provided to the Service during consultation.

The species considered in this document are:

Threatened, Endangered, Proposed Threatened or Proposed Endangered Species

Rio Grande silvery minnow (*Hybognathus amarus*)
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Proposed Action

The Bosque Revitalization at Route 66 Project feasibility study was conducted under the authority of Section 1135 of the Water Resources Development Act of 1986 (P.L. 99-662), as amended. The objective of this authority is to improve the quality of the environment through modification of the structure or operation of existing water resources projects constructed by the USACE, provided such modifications are feasible and consistent with the original project

purpose. Improvements in ecosystem structure or function in areas adversely affected by such projects are also included in the authority.

The Study Area is the riparian area located within the middle reach of the Rio Grande in New Mexico (Middle Rio Grande), which is broadly defined as extending from Cochiti Dam to Elephant Butte Reservoir. The actual Study Area encompasses a small portion of the Middle Rio Grande within the City of Albuquerque (COA), New Mexico (see **Figure 1**). The Study Area consists of 3.1 river miles along the Rio Grande stretching north and south from Central Avenue. Central Avenue is the longest intact segment at historic U.S. Route 66, which is the basis for the project's name. The north side of the Interstate 40 (I-40) Bridge is the upstream limit of the Study Area and the south side of the Bridge Boulevard is the downstream limit. The Study Area is bounded on the east and west sides by the levees and riverside drains, except for a portion of the area north of the Central Avenue Bridge on the west side where there is no levee or riverside drain and the boundary is the adjacent bluff.

The Study Area includes approximately 643 acres. There are 370 acres within the active river channel and 273 acres of riparian woodlands, or "bosque," as it is commonly referred to in New Mexico, (derived from the Spanish word for forest). With the exception of the northwest corner of the Study Area, the lands are managed by the Middle Rio Grande Conservancy District (MRGCD) and the City of Albuquerque Parks and Recreation Open Space Division (AOSD) as part of the Rio Grande Valley State Park (RGVSP).

The MRGCD is the non-Federal sponsor for this Study. The AOSD, with whom the MRGCD co-manages the bosque within the Study Area, is a critical partner in the development and implementation of this plan. The AOSD manages 33,000 acres of land in the Albuquerque area, of which the bosque is the largest portion. The team responsible for the planning process (the Project Development Team) included representatives of the MRGCD, AOSD and New Mexico State Parks in addition to the USACE and their consultants.

The purpose of the Study is to determine the advisability of undertaking environmental restoration measures to improve the Rio Grande bosque ecosystem function in central Albuquerque. Potential alternatives include removing jetty jacks and non-native vegetation, such as salt cedar (*Tamarix ramosissima*), Russian olive (*Elaeagnus angustifolia*) and Siberian elm (*Ulmus pumila*), enhancing existing high-flow channels, outfall wetlands and other alterations of the floodplain. Improvements of existing facilities for educational, interpretive and low-impact recreational uses have also been considered in the Route 66 Project. The Study began in 2002, and a scoping letter was sent to all relevant Federal, State and local agencies, as well as a number of non-governmental organizations and miscellaneous other stakeholders with ongoing projects in the bosque.

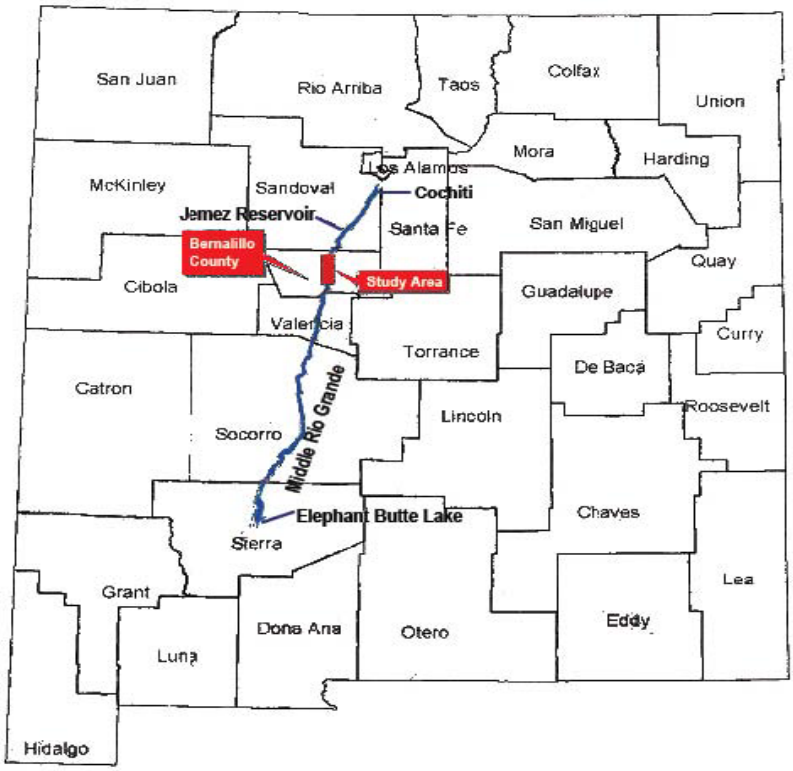
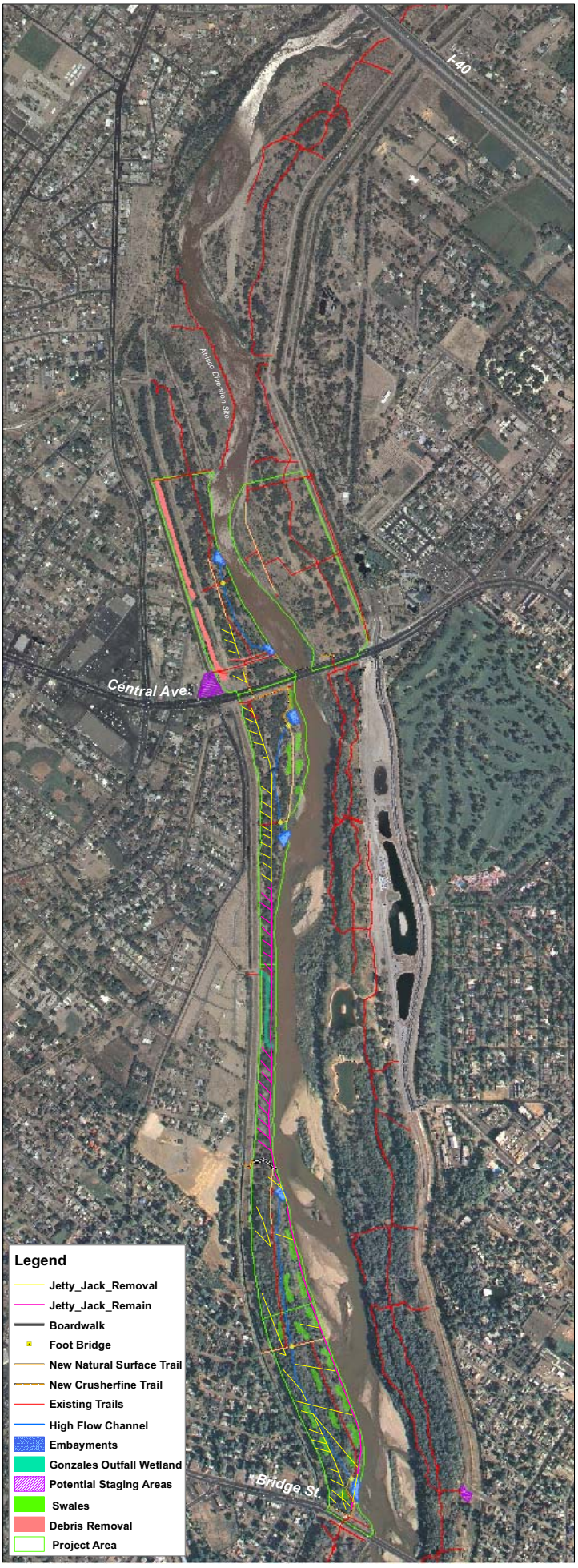


Figure 1. Bosque Revitalization @ Route 66 Study Area



Ecosystem Revitalization @ Route 66 Project

US Army Corps of Engineers
Albuquerque District

0 850 1,700 3,400 Feet

0.1 0.05 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 Miles

Source Imagery:
Bio Park Area - Apr. 2006 MRCOG
All Else - July 2005 Statewide DOQQs

Revision: May-28-2008

1. Removal Features

Under the Preferred Alternative, approximately 144,000 cubic yards of debris (concrete, asphalt, garbage) are proposed for removal from the area north of Central Ave. on the east side of the river (see Figure 2). Removal of the debris would create new areas for native revegetation and would improve the aesthetic quality of the bosque.

The Preferred Alternative envisions the removal of approximately 1000 non-functional jetty jacks. Bank-line jacks and tie-back jacks in narrow bank areas in the Study Area such as on the west side north of Bridge Blvd. would not be removed.

2. Water Related Features

The Preferred Alternative would involve the construction of three high-flow channels. Two channels are proposed north and south of Central Ave. on the west side. A third channel is proposed north of Bridge Blvd. on the west side of the river. All told, these channels constitute approximately 6 acres of new habitat. The high flow channels are designed to re-create the historic braided channels of the river during high-flow events. Design of the channels would be coordinated with final alignments of trails to limit access and create potential refuge areas on the river-side of the channels.

A single outfall wetland approximately an acre in size is envisioned by the Preferred Alternative at the Gonzales Wasteway Outfall on the west side of the river about half way between Central and Bridge.

The Preferred Alternative calls for 26 moist soil depressions (swales) approximately .5 acre in size each. In total, these areas would create approximately 13.5 acres of wet soil environments. As with other water related features, these features would become ephemerally wet when ground water is high (spring run-off period and monsoon periods), but would be drier during low ground water times (summer, fall and winter). Additionally, they would function as water harvesting features during major precipitation events. Cumulatively these effects would increase the water budget for the moist soil areas, enabling moisture loving plants such as reeds, rushes and willows to thrive. On the edge of the depression, thick stands of coyote willows, peachleaf willow, and other bosque endemic shrubs would form with an occasional cottonwood creating diversity in height and structure.

All told, approximately 20 acres of new wet soil areas would be created as part of the implementation of the Preferred Alternative. Moist soil areas, again, are key for catalyzing some of the native revegetation processes of the bosque and improving the overall habitat in the reach (Crawford et al, 1993).

3. Bosque Related Features

All areas of the Preferred Alternative would receive initial fuel reduction/exotic thinning (if needed) and treatment of resprouts of non-native vegetation. All areas would be replanted with native vegetation.

Effort would be made to reconstitute the native understory of the bosque wooded areas, including mid-canopy trees and shrubs such as peachleaf willow, black willow, New Mexico locust and New Mexico olive, and lower canopy shrubs such as gooseberry, sumac, golden current and amorpha. Over time, the structure of these areas would be similar to Hink & Ohmart's classes I & III. Re-creation of the tiered bosque forest is important to sustaining a number of plants and animals in the bosque (Crawford et al, 1993; Hink & Ohmart, 1984). These areas would become the patchy groves described in many of the early accounts of the river valley near Albuquerque (Scurlock, 1998). The larger size of these patches would provide important core habitat, while maintenance of the fire breaks would provide key edge habitat, thereby maximizing potential species richness (Hink & Ohmart 1984).

Some areas are also intended to become denser stands of shrubs and small trees. These patches would correspond to Hink & Ohmart's structure V and over time depending on the success of cottonwoods could evolve into structure type III. Included in the mix of plants would be peachleaf willow, black willow, New Mexico olive, chamisa, New Mexico locust, sumac, golden current, seep willow and adjacent to the river and other wetter areas, coyote willow. Fire break meadows would be maintained between these patches to enhance the edge effect and keep the potential for catastrophic fire to a minimum. Edge effect and the creation of denser patches such as the proposed shrub thickets would be important increasing wildlife diversity within the bosque (Crawford et al, 1993; Hink & Ohmart, 1984).

4. Recreation and Interpretive Features

A suite of recreation and interpretive features have been proposed as part of the Preferred Alternative (see Figure 2). Sensitive design and implementation of these features would be of critical importance to maintaining the success of the restoration features. Approximately 40,000 linear feet of undesignated trails would be replaced by approximately 15,000 linear feet of designated and defined trails.

Construction Sequence

Sequencing of the construction is proposed to reduce the amount of potential sediment moving into the river and reduce impacts to the river bank edge. The bosque between the levee and the river, moist soils areas, the hi-flow channel areas and outfall wetland would be thinned first in order to remove the non-native woody vegetation (Removal Features). The high flow channels, moist soil depressions and outfall wetland would be constructed separately after fuel reduction has been performed in these areas (Water Related Features). The high flow channels would be constructed so that the opening at the south end would be excavated first and the opening at the north end would be excavated last (similar to the Rio Grande Nature Center project). Flows in the river during construction of these high flow channels are anticipated to be about 300-400 cfs. The exact device used to divert the flow of water during construction would be at the discretion of the construction contractor and approved by the Corps. If flows are low enough, it is preferred that the contractor leave the edge of the berm for each end of the channel in place during construction until opening the channel at the very end. The berm could serve as the 'dam' itself. Therefore, a coffer dam or silt curtain may not be needed. If one is needed, the silt curtain or coffer dam would be placed along the bank line and then pushed out into the channel to expand the bankline, under the supervision of Corps' Biologists, in order to minimize disturbance to the flows. It would go out into the river approximately 10-20 feet from the bank.

It would take approximately one day to install. If needed, it would be something similar to what was proposed for the Rio Grande Nature Center project (though it was not used at the Nature Center since leaving the berm in place as described above was successful) (Figure 3). Since each channel and the outfall wetland have not been fully designed, the exact construction sequence is yet to be determined but these 'best management practices' discussed above would be implemented as much as possible. Areas would be revegetated as described in Bosque Related Features. Recreation and Interpretive Features would be constructed last.

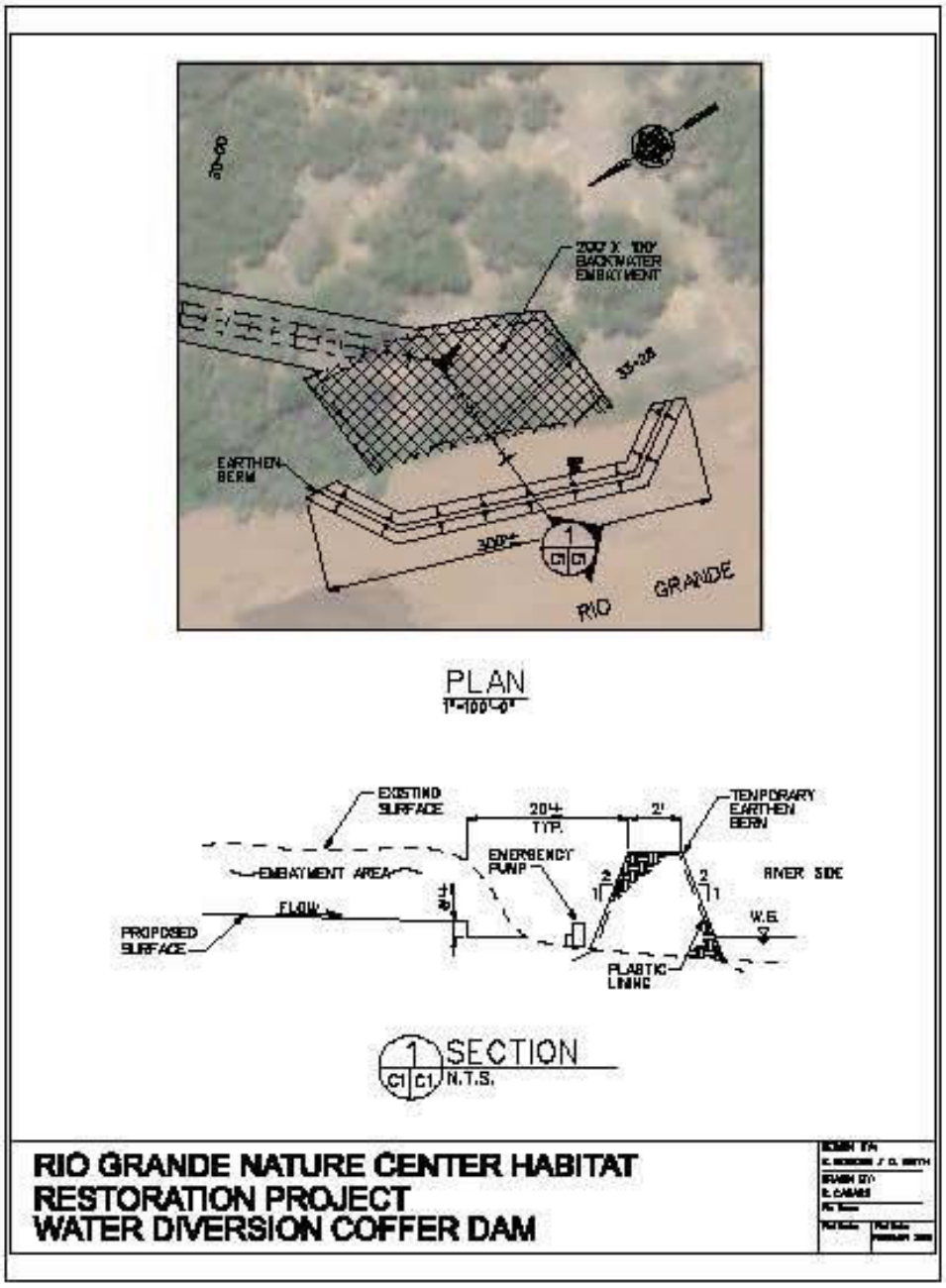


Figure 3. Example of potential coffer dam and/or silt curtain for use during construction of channel openings.

Removal/Disposal of Exotic Vegetation

Treatment Methods

There are a number of methods for reducing fuel loads and treating non-native vegetation that have been and are being utilized in the Middle Rio Grande and throughout the Southwest. These methods include both manual and mechanical treatment methods, which are described below.

Manual treatment

Using this method, dead material would be piled up and/or processed by cutting into smaller bolts using a chain saw. Large material would be hauled off. Some would be bucked up for use as fire wood. Smaller material would be chipped using a chipper on site. Chips would spread out on site or hauled off depending on the density. No more than 2 inches of chipped material would be left on site. The stump of any live non-native trees that is cut would be treated immediately with herbicide. This method would be used along the berms of the existing channel in order to minimize impacts to the bosque internal.

Mechanical treatment

Mechanical control entails the removal of aerial portions of the tree (trunk and stems) by large machinery such as a tree shear or large mulching equipment. Both dead material and live non-native trees would be treated mechanically. The remaining stump would be treated immediately with herbicide. Material would be processed as stated above – large material would be hauled off and smaller material would be chipped. This method would be used in open areas of the bosque that have already been initially 'treated' by the AOSD and also in areas of monotypic stands of non-native vegetation.

Combination treatment

The most efficient methodology for treatment of dead material and non-native vegetation is usually a combination of manual treatment, mechanical treatment and use of herbicide. Some areas may be very thick, and the use of manual methods allows them to be opened up for machinery access. Then mechanical equipment can take over while hand crews can move ahead of machinery to keep areas open enough to work in without damaging native vegetation. The methodology to be implemented at each location would be evaluated on a site-by-site basis, and adaptively managed.

Overall, a combination treatment would be utilized to remove non-native. Manual treatment would be utilized to thin additional non-native vegetation and fuel wood along the banks of the hi-flow channels.

Some of the trees would also be bucked up (instead of mulched) to allow a source of fuel wood for the local community. Chips would be spread out on site according to specifications that would be provided to the contractor (no more than 2 inches deep) though some may be hauled off to be used at other locations by the sponsoring agencies.

All areas would be revegetated with native seeds, shrubs and trees as described in Bosque Related Features above.

Access and Staging

The sites are located between the levee and the river channel. Access from the levee through the riparian forest to the river edge is available. A temporary access road off of the levee/paved trail would be constructed to access proposed construction areas if one does not exist. These temporary access roads would be removed and reseeded once construction is complete or left in place if so desired by AOSD. Any additional disturbance caused by equipment accessing the site would be reseeded with native vegetation and mulched once complete. Equipment would access proposed construction areas from the nearest river crossing (ie: Central and Bridge Blvd.'s). If needed, equipment would be stored overnight in a designated staging area (currently proposed at Central NW on the west side of the levee (see Figure 2). The staging areas would be reseeded once the project is complete. Staging would not take place in the bosque.

Species Information

Southwestern Willow Flycatcher

The Southwestern Willow Flycatcher (flycatcher) is found in the U.S. from May until September. It winters in southern Mexico, Central America, and northern South America (Unitt, 1987). In New Mexico, the Southwestern Willow Flycatcher is distributed in nine drainages (Gila, Rio Grande, Rio Chama, Coyote Creek, Nutria Creek, Rio Grande de Ranchos, Zuni, Bluewater Creek, and San Francisco). The flycatcher is an endangered species on the U.S. Fish and Wildlife Service Endangered Species List and critical habitat has been designated in the Middle Rio Grande, though not in the proposed project area. As of 1996, it was estimated that there were only about 400 Southwestern Willow Flycatchers in New Mexico, representing about 42% of the total population of the subspecies (Southwestern Willow Flycatcher Recovery Team, 2002). Southwestern Willow Flycatchers occur in riparian habitats along rivers, streams, or other wetlands, where dense growth of willows (*Salix* spp.), *Baccharis*, arrowweed (*Pluchea* sp.), saltcedar or other plants are present, often with a scattered overstory of cottonwood (Unitt 1987; Sogge et al., 1997; Finch and Stoleson, 2000). These riparian communities provide nesting and foraging habitat. Throughout the range of Southwestern Willow Flycatcher, these riparian habitats tend to be rare, widely separated, small and often linear locales, separated by vast expanses of arid lands. The Southwestern Willow Flycatcher is endangered by extensive loss and modification of suitable riparian habitat and other factors, including brood parasitism by the Brown-Headed Cowbird (*Molothrus ater;* Unitt, 1987).

The Southwestern Willow Flycatcher is an obligate riparian species and nests in thickets associated with streams and other wetlands where dense growth of willow, Russian olive, saltcedar, or other shrubs is present. Nests are frequently associated with an overstory of scattered cottonwood. Southwestern Willow Flycatchers nest in thickets of trees and shrubs approximately 6 to 23 feet in height or taller, with a densely vegetated understory approximately 12 feet or more in height. Surface water or saturated soil is usually present beneath or next to occupied thickets (Muiznieks et al. 1994). At some nest sites, surface water may be present early in the breeding season with only damp soil present by late June or early July (Muiznieks et al. 1994). Habitats not selected for nesting include narrow (less than 30 feet wide) riparian strips, small willow patches, and stands with low stem density. Suitable habitat adjacent to high gradient streams does not appear to be used for nesting. Areas not utilized for nesting may still be used during migration.

Breeding pairs have been found within the Middle Rio Grande from Elephant Butte Reservoir upstream to the vicinity of Española. Southwestern Willow Flycatchers begin arriving in New Mexico in early May. Breeding activity begins immediately and young may fledge as soon as late June. Late nests and re-nesting attempts may not fledge young until late summer (Sogge et al. 1997).

Occupied and potential Southwestern Willow Flycatcher nesting habitat occurs within the Middle Rio Grande valley. Occupied and potential habitat is primarily composed of riparian shrubs and trees, chiefly Goodding's willow and peachleaf willow, Rio Grande cottonwood, coyote willow, and saltcedar. The nearest known breeding Southwestern Willow Flycatchers from the project area occurs along the Rio Grande at Isleta Pueblo. Potential habitat exists adjacent to the proposed project area.

Rio Grande silvery minnow

Rio Grande silvery minnow (*Hybognathus amarus*) historically occurred in the Rio Grande drainage in New Mexico and Texas (Lee et al., 1980; Propst, 1999). The species was historically one of the most abundant and widespread fishes in the Rio Grande drainage (Bestgen and Platania, 1991). In New Mexico, historic range of the species included the Rio Chama from Abiquiu to the Rio Grande confluence, the main stem of the Rio Grande from Velarde downstream to the New Mexico-Texas state line, and the Pecos River downstream from Santa Rosa (Sublette et al., 1990). Rio Grande silvery minnow was extirpated from the Rio Grande downstream of the Pecos River by 1961 and Pecos River proper by the mid-1970s. The species was also extirpated from the Rio Grande upstream from Cochiti Dam and downstream from Elephant Butte Reservoir. One of the greatest threats to its survival is poor water quality (Utton Transboundary Resources Center, 2004). Currently, Rio Grande silvery minnow is present only in the Rio Grande between Cochiti Reservoir and the upper end of Elephant Butte Reservoir, which represents less than 10% of its historic distribution (Bestgen and Platania, 1991; Propst, 1999). Abundance of Rio Grande silvery minnow has declined markedly from 1994 to the present time and the population has become concentrated in the reach of the Rio Grande between San Acacia Diversion Dam and the headwaters of Elephant Butte Reservoir. Critical Habitat has been designated for the Rio Grande silvery minnow and is within the project area.

Rio Grande silvery minnow is a pelagic-broadcast spawner, producing nonadhesive, semi-buoyant eggs (Platania and Altenbach, 1998). Spawning is initiated by elevated stream discharge and occurs primarily in the late spring and early summer, when water temperatures are 68°F to 75°F (Propst, 1999). Females may produce three to 18 clutches of eggs, each clutch numbering from 200 to 300 eggs. Growth to maturation occurs in about two months. Rio Grande silvery minnow typically live only about one year, with less than 10% of the adult population surviving to up to two years (Platania and Altenbach, 1998; Propst, 1999). Habitat used by adult Rio Grande silvery minnow is characterized by silty to sandy substrate, depths of 8 in to 2.6 ft, and slow to moderate current velocity, 0 ft/sec to 0.98 ft/sec; (Dudley and Platania, 1997). Habitats with slow current velocity and associated cover are used in winter. Rio Grande silvery minnow feeds on algae and detritus (Propst, 1999; USFWS, 1999). Major threats to persistence of Rio Grande silvery minnow include diminution of river flows and dewatering by surface water diversions and dam regulation, modification of aquatic habitats that result in faster current velocities and narrower channels, and introduction of nonnative fishes (USFWS, 1999).

Recovery of Rio Grande silvery minnow requires stabilizing the population in the Middle Rio Grande and reestablishing the species in suitable habitats within its historic range (USFWS, 1999). Over the 2004 and 2005 monitoring season, a large population of Rio Grande silvery minnow was found in the Albuquerque Reach of the Middle Rio Grande.

Dudley and Platania (1997) documented habitat preferences of Rio Grande silvery minnow. They found that individuals were most commonly collected in shallow water (<40 centimeters [cm]) with low water velocities (<10 cm/second [cm/s]) and small substrate size, primarily silt and sand. Low-velocity habitats, such as backwaters and embayments, provide nursery areas for larvae (Dudley and Platania 1997, Massong et al. 2004), which grow rapidly in these areas. Restoration efforts that increase the availability of these habitat conditions would benefit Rio Grande silvery minnow. In addition to the quantity of preferred habitat, food availability may be influenced directly by river restoration activities. Rio Grande silvery minnow are herbivores that eat primarily diatoms, cyanobacteria, and green algae associated with sand or silt substrates in shallow areas of the river channel (Shirey 2004).

Recent research (Pease et al 2006; Porter and Massong 2004, 2006; Bureau of Reclamation 2007; SWCA 2007) indicates nursery habitat on inundated pointbars, islands, and the floodplain provide essential conditions for spawning, with survival of RGSM eggs and larvae. Increased recruitment during average spring flow result in increased fall populations (US Army Corps of Engineers 2007), supporting the value of habitat restoration and hydrograph management for producing RGSM in the river.

Currently, *Hybognathus amarus* is the only remaining endemic minnow with semi-buoyant eggs in the Middle Rio Grande. The peglagic spawning speckled chub (*Extrarius aestivalus*), Rio Grande shiner (*Notropis jemezanus*), phantom shiner (*Notropis orca*), and bluntnose shiner (*Notropis simus simus*) are either extinct or have been extirpated from the Middle Rio Grande (Bestgen and Platania 1991).

The remaining population of the silvery minnow is restricted to approximately 5 percent of its historic range. Every year since 1996, there has been at least one drying event in the river that has negatively affected the silvery minnow population. The population is unable to expand its distribution because poor habitat quality and Cochiti Dam prevent upstream movement and Elephant Butte Reservoir blocks downstream movement (USFWS, 1999). Augmentation of silvery minnows with captive-reared fish will continue, however, continued monitoring and evaluation of these fish is necessary to obtain information regarding the survival and movement of individuals.

Several habitat restoration projects have been completed in the Albuquerque reach through the Collaborative Program. These projects include two woody debris installation projects to encourage the development of pools and wintering habitat, and a river bar modification project south of the I-40 Bridge designed to create side and backwater channels on an existing bar as well as modify the top surface of the bar to create habitat over a range of flows. Additionally, in 2005, the ISC started a multi-year habitat restoration program that implements several island, bar, and bank line modification techniques throughout the Albuquerque Reach. Approximately 24 acres of habitat were restored in the Phase I. Phase II is scheduled to begin in winter 2007.

In April 2008, the Corps completed the Rio Grande Nature Center Habitat Restoration Project reconnecting an ephemeral side channel to the river for silvery minnow habitat.

Various conservation efforts have also been undertaken in the past and others are currently being carried out in the middle Rio Grande. Silvery minnow abundance has increased since 2003 population levels as a result of several years with average spring flows. The increased abundance of silvery minnow from 2004-2007 is a positive sign.

Analysis of the Effects of the Action

Southwestern Willow Flycatcher

Willow Flycatcher surveys were conducted within the Study Area in 2002 and 2003 and did not find any migratory or nesting Southwestern Willow Flycatcher in the Study Area. During the 2004 and 2005 survey seasons, Southwestern Willow Flycatcher (*Empidonax traillii* extimus) were detected within the Study Area along the Tingley Bar on 27 May 2004, and 30 May 2005. Single individuals responded to the tape play-back at two locations within the site in 2004 and one individual responded to the tape play-back from an island in 2005. The individuals observed in 2004 were heard and observed singing in a clump of salt cedar along the river bank, and the second individual was heard singing in a dense clump of tall coyote willow on the river bar, about 150 feet from the edge of the river. In 2005, the individual was heard and observed in a stand of Russian olive on an island bar. It is presumed that these individuals were migrants. Much of this habitat that was being utilized by these migrants has been removed by an island destabilization project conducted by the New Mexico Interstate Stream Commission through the Middle Rio Grande Endangered Species Collaborative Program to benefit the Rio Grande silvery minnow.

Based on these surveys and the fact that much of this potential habitat was removed, it is highly unlikely that nesting Southwestern Willow Flycatcher will occupy the Study Area during the construction proposed to begin in September 2008. It is very possible that migrants would be detected as they were along the Tingley Bar during the 2005 survey period. Surveys would take place again in 2008. If nesting Flycatchers are detected then consultation with USFWS would be reinitiated. Any nesting territories discovered would be avoided.

As stated above, no breeding habitat has been identified during protocol surveys. Other projects in the area, such as the Albuquerque Biological Park Wetland Restoration Project, have created additional potential habitat for the flycatcher. This project would also create habitat that would potentially benefit the Southwestern Willow Flycatcher.

Rio Grande silvery minnow

Rio Grande silvery minnow occurs in the Rio Grande in the project area. Fish obtained from 2005 salvage operations conducted during river drying events and captive propagation have been stocked in the Albuquerque area in an attempt to restore the population in that reach (J. Brooks, personal communication). Releases of captive-reared Rio Grande silvery minnow have been made at Alameda Bridge, north of the project area.

Designated critical habitat for the species (68 Federal Register 8087: 8135) encompasses nearly the entire project area. Work would not take place in the main channel but it would take place

along the bank when opening the hi-flo channels and it may result in erosion or other inputs into the river. When work is to occur close to the bank of the river, Best Management Practices listed under the Environmental Commitments section would be enforced to help prevent erosional inputs into the river. Additionally, this project is being constructed partially to provide potential habitat for the silvery minnow and would create additional nursery habitat in this reach which would help with the population.

Effects Determination

Southwestern Willow Flycatcher

No suitable breeding habitat occurs within the project area though potentially suitable habitat does exist. These areas (south of I-40 on the east side of the river and the Tingley Bar) would be avoided and are not included in the proposed action. The remainder of the proposed project area would create potential habitat where shrub habitat is proposed to be created as discussed above.

The USACE has determined that the proposed work may affect but is not likely to adversely affect, the Southwestern Willow Flycatcher. Designated Critical Habitat was determined for flycatcher in November 2005 but is not in the project area. There would be a net beneficial effect with project implementation through increasing the suitability of or otherwise protecting Willow Flycatcher potentially suitable habitat.

Rio Grande silvery minnow

Silvery minnows are present in the Albuquerque Reach (Dudley et al. 2006) and are expected to be present within the action area. The primary adverse effects of the proposed action on the silvery minnow would result from the potential placement of coffer dams or silt curtains around the channel openings (if needed) and the mobilization of sediment when opening the channels. The proposed action may affect the silvery minnow and it's critical habitat– directly, indirectly and beneficially as described below.

Direct Effects

The proposed action is likely to have direct short-term adverse effects on silvery minnows during final construction activities involved in creating the north and south embayments of each hi-flo channel. Silvery minnows may be disturbed as the coffer dam or silt curtain is installed (if needed). The silt curtain or coffer dam would be placed along the bank line and then pushed out into the channel to expand the bankline, under the supervision of Corps' Biologists. However, this form of disturbance would be minimal, short in duration, and the curtain/dam would exclude fish from contact with construction equipment and minimize mobilization of sediments. Construction at the channel openings would be monitored for minnows throughout construction. If silvery minnows were trapped in the project area, work would cease until the fish leave of their own volition, or a Corps biologist, in consultation with the USFWS, determines that the potential for harassment is minimal. Findings of trapped, injured or dead silvery minnows would be reported to USFWS.

Occasional adverse effects are still likely beyond the construction period. High flows may deposit sediment in or at the openings of constructed channels so that isolated pools containing silvery minnows would be formed. Silvery minnows may become stranded in these isolated pools and die.

Indirect Effects
Sediment disturbance may result in indirect effects to the silvery minnow such as decreases in primary production associated with increases in sedimentation and turbidity which potentially produce negative cascading effects through depleted food availability to zooplankton, insects, mollusks, and fish. Water quality measurements would be taken before, during and after construction activity.

Beneficial Effects
The proposed action is expected to establish diverse mesohabitats that support the silvery minnow. Such habitat benefits the species through improved egg and larval retention, increased recruitment rates, and increased survival of both YOY and adult minnows. In the long term, the project is anticipated to have a beneficial effect on the silvery minnow and its habitat, contributing to the improvement of the status of silvery minnow into the future.

Based on the potential effects described above the Corps has determined that the proposed action may affect and is likely to adversely affect the endangered silvery minnow during construction.

Silvery Minnow Critical Habitat
The proposed action is likely to have a positive long-term impact on three of the four primary constituent elements of critical habitat for the silvery minnow. These include backwaters, shallow side channels, pools, and runs of varying depth and velocity; substrates of primarily sand and silt; and 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) that provide a variation of habitats with a wide range of depth and velocities. The proposed restoration project will create backwater embayments, and side channels that will inundate at higher flows. These habitats provide critical nursery habitat for silvery minnow eggs and larvae and enhance opportunities for silvery minnow recruitment. Short-term habitat disturbance will occur during the construction phase of this project. However, these effects will be limited in area and duration.

Reconnection of the high flow channels would occur during the winter, when river flows are at a minimum. The Corps would monitor the location for minnow and coordinate with the Service on whether Rio Grande silvery minnow should be transported away from the project area if they are detected. Therefore, the proposed action may affect but is not likely to adversely affect designated Critical Habitat of the Rio Grande silvery minnow.

The proposed project would provide benefits to the silvery minnow with the planned reintroduction of flow into 6 acres of high flow channel. The increased frequency of inundation would provide shallow, low-velocity aquatic habitat suitable for silvery minnow foraging and rearing areas.

Environmental Commitments

1) Silt fence would be installed adjacent to the riverbank to prevent erosion to the river.

2) Fueling of vehicles would not take place in the bosque.

3) Cleaning of all equipment is required prior to entering the site.

4) A Corps' biologist would monitor the project during construction at the bank of the river in order to detect any potential silvery minnow in the area. Findings of injured or dead silvery minnows would be reported to the Service. Water quality measurements would be taken before, during and after construction activity.

5) In coordination with the Service, a protocol to monitor presence/absence of silvery minnows in the channels following high flows, and to determine whether channel maintenance is warranted, would be developed.

6) Construction activities would take place in designated areas only, avoiding any unnecessary damage to the riparian area.

7) Work inside of the bosque would not occur between May 1 and August 30. Surveys would be conducted for the presence/absence of Southwestern Willow Flycatchers during their breeding season throughout the project area immediately prior to construction. If such surveys indicate breeding season occupation in areas not considered in this BA, the avoidance procedures outlined above would be applied to newly discovered areas.

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PERSONAL COMMUNICATIONS

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July 10, 2008

Cons. # 22420-2008-F-0125

Lt. Colonel Kimberly M. Colloton
(**Attn: Julie A. Hall**)
Environmental Resources
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

Dear Lt. Colonel Colloton:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) on the effects of the action described in the Biological Assessment (BA) for the Bosque Revitalization at Route 66 project for the Albuquerque Reach of the Rio Grande in Bernalillo County, New Mexico. The duration of this action is from the issuance of this BO through April 2010. This BO concerns the effects of the action on the endangered Rio Grande silvery minnow (*Hybognathus amarus*) (silvery minnow), its designated critical habitat, and the endangered southwestern willow flycatcher, (*Empidonax traillii extimus*) (flycatcher). Your request for formal consultation, in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 531 *et seq.*), was received on May 30, 2008. The U.S. Army Corps of Engineers (Corps) is the lead Federal agency in this consultation.

This BO is based on information submitted in the draft BA dated March 14, 2008; the final BA dated May 30, 2008; conversations between the Corps and the Service; and other sources of information available to the Service. A complete administrative record of this consultation is on file at the Service's New Mexico Ecological Services Field Office (NMESFO).

You have determined that the proposed project may affect, is not likely to adversely affect, flycatcher and designated critical habitat for the silvery minnow. We concur with these determinations for the following reasons:

Flycatcher

1) Flycatcher surveys were conducted at the project location in 2002 and 2003 and no migrant or nesting flycatchers were observed. Surveys were conducted in 2004 and 2005, and migrant birds (observed only on the first survey occasion each year) were observed on the east side—across the river—from the project site. Since the observations, vegetation and potential habitat has been removed from the area. Surveys were not conducted in 2008 since flycatchers have never been observed at the project site, and vegetation has been removed.

2) Suitable migrant habitat may be found within .25 miles of the construction area. Construction within .25 miles of potential migrant habitat shall take place outside of the migrant season (April 15 through September 15). Construction not within .25 miles of suitable habitat may take place April 30 through August 30.

3) The project includes planting of native riparian/wetland vegetation, which can be beneficial to the flycatcher.

Silvery Minnow Designated Critical Habitat
The proposed action is likely to have a positive long-term impact on three of the four primary constituent elements of critical habitat for the silvery minnow. These include backwaters, shallow side channels, pools, and runs of varying depth and velocity; substrates of primarily sand and silt; and 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) that provide a variation of habitats with a wide range of depth and velocities. The proposed restoration project will create backwater embayments, and a side channel that will inundate at higher flows. These habitats provide critical nursery habitat for silvery minnow eggs and larvae and enhance opportunities for silvery minnow recruitment. Short-term habitat disturbance will occur during the construction phase of this project. However, these effects will be limited in size and duration and are therefore, insignificant and discountable.

The remainder of this biological opinion will deal with the effects of implementation of the proposed action on the silvery minnow.

Consultation History
A draft BA was provided to the Service to review on March 14, 2008. A final BA was received on May 30, 2008. This BO is tiered off the 2003 Biological and Conference Opinions on the Effects of the Bureau's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande (March 2003 BO).

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

Overview
The Bosque Revitalization at Route 66 Project (Route 66 Project) feasibility study was conducted under the authority of Section 1135 of the Water Resources Development Act of 1986 (P.L. 99-662), as amended. The objective of this authority is to improve the quality of the environment through modification of the structure or operation of existing water resources projects constructed by the Corps, provided such modifications are feasible and consistent with the original project purpose. Improvements in ecosystem structure or function in areas adversely affected by such projects are also included in the authority. The Route 66 Project will improve ecosystem structure and function and create habitat for the silvery minnow and flycatcher. This

project will recreate three hi-flo channels that will create habitat for the silvery minnow. Non-native vegetation will be removed and native vegetation will be planted, facilitating the regeneration of native vegetation suitable for the flycatcher.

The Route 66 Project is intended to partially fulfill the requirement of habitat restoration under the March 2003 BO Reasonable and Prudent Alternative (RPA) Element S which proposes "to 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 and flycatcher or their habitats."

Project location

The proposed project is located in the bosque along approximately 3 river miles of the Rio Grande between Central Avenue and Bridge Blvd. with a portion of the project north of Central on both sides of the river. The project area is bounded on east and west sides by levees and riverside drains. The total project area includes approximately 121 acres in the bosque.

Project Description

The proposed action includes removal of jetty jacks and non-native vegetation across 121 acres of bosque north and south of Central on the west side of the river and north of Central on the east side of the river (Figure 2, attachment), Non-native vegetation to be removed will include salt cedar (*Tamarix ramosissima*), Russian olive (*Elaeagnus angustifolia*), Tree of Heaven (*Ailanthus altissima*) and Siberian elm (*Ulmus pumila*). The proposed action also includes recreating 3 hi-flo channels, and enhancing 1 outfall wetland at the Gonzales Drain. Further restoration features include planting of native vegetation throughout the project area (121 acres) and creation of a number of willow swales. A detail of the size and acreage of each of the features is shown in Table 1. Improvements of existing facilities for educational, interpretive and low-impact recreational uses have also been considered in the Route 66 Project.

Table 1. Proposed Action

	Location	Dimension/#	# of Acres
Non-native vegetation removal			121*
Jetty jack removal		1000	
Hi-flo channel	Central NW		2
	Central SW		2
	Bridge NW		2
Outfall Wetland			1
Willow Swale	Central SW	5	3
	Bridge NW	14	10
Revegetation			121

*Note: Non-native vegetation removal will take place first across all areas and then hi-flo channels, etc. will be constructed. Therefore, the overall acreage affected is still 121 but all features (hi-flo channels, outfall wetland and willow swales) will be constructed in the same areas where the non-native vegetation removal will take place first.

1. Removal Features

Approximately 144,000 cubic yards of debris (concrete, asphalt, garbage) will be removed from the area north of Central Avenue on the west side of the river (see Figure 2). Removal of the debris will create new areas for native revegetation and will improve the aesthetic quality of the bosque.

Approximately 1000 non-functional jetty jacks will be removed during this project. Bank-line jacks and tie-back jacks in narrow bank areas in the Project Area such as on the west side north of Bridge Blvd. will not be removed. Removal of non-native vegetation and retreatment of areas where jetty jacks are removed is described in Removal/Disposal of Exotic Vegetation below.

2. Water Related Features

The Route 66 Project includes construction of three hi-flo channels. Two channels are north and south of Central Ave. on the west side. The third channel is north of Bridge Blvd. on the west side of the river. In total, these channels constitute approximately 6 acres of new habitat. The high flow channels are designed to re-create the historic braided channels of the river during hi-flo events. Design of the channels will be coordinated with final alignments of trails to limit access and create potential refuge areas on the river-side of the channels. The design of the channels is also being done in relation to lessons learned at the Nature Center channel. The Nature Center channel has two interior embayments which help create additional potential habitat but also created areas for sediment to fall out during the recent (May-June 2008) high flows. This created additional maintenance to ensure that the Rio Grande silvery minnow and other fish species were not trapped in the embayments once the water receded. Therefore, the channels proposed in this project do not have interior embayments. They are also only about half the width of the Nature Center channel (based on the width of the existing channels and limited area within the bosque). Therefore, the issue of sediment swirling and falling out within the channel should be much less than it has been at the Nature Center and should reduce the chances of trapping and Rio Grande silvery minnow.

A single outfall wetland approximately an acre in size will be constructed at the Gonzales Wasteway Outfall on the west side of the river about half way between Central and Bridge. A pre-existing drain is located here and no excavation will occur.

The proposed action calls for 19 willow swales, each approximately .5-1 acre in size. In total, these areas will create approximately 13.5 acres of willow swale environments. As with other water related features, these features will become ephemerally wet when ground water is high (spring run-off period and monsoon periods), but will be drier during low ground water times (summer, fall and winter). Additionally, they will function as water harvesting features during major precipitation events. Cumulatively these effects should increase the water budget for the willow swale areas, enabling moisture loving plants such as reeds, rushes and willows to thrive. On the edge of the depression, thick stands of coyote willows, peachleaf willow, and other bosque endemic shrubs will form with an occasional cottonwood creating diversity in height and structure.

Approximately 20 acres of new water related features will be created as part of the implementation of the proposed action. Moist soil areas, again, are key for catalyzing some of the native revegetation processes of the bosque and improving the overall habitat in the reach (Crawford et al, 1993).

3. Revegetation

All areas of the proposed action will receive initial fuel reduction/exotic thinning (if needed) and treatment of resprouts of non-native vegetation. All areas will be replanted with native vegetation.

Effort will be made to reconstitute the native understory of the bosque wooded areas, including mid-canopy trees and shrubs such as peachleaf willow, black willow, New Mexico locust and New Mexico olive, and lower canopy shrubs such as gooseberry, sumac, golden current and amorpha. Over time, the structure of these areas will be similar to Hink & Ohmart's classes I & III. Re-creation of the tiered bosque forest is important to sustaining a number of plants and animals in the bosque (Crawford et al, 1993; Hink & Ohmart, 1984). These areas will become the patchy groves described in many of the early accounts of the river valley near Albuquerque (Scurlock, 1998). The larger size of these patches will provide important core habitat, while maintenance of the fire breaks will provide key edge habitat, thereby maximizing potential species richness (Hink & Ohmart 1984).

Some areas are also intended to become denser stands of shrubs and small trees. These patches will correspond to Hink & Ohmart's structure V and over time depending on the success of cottonwoods could evolve into structure type III. Included in the mix of plants will be peachleaf willow, black willow, New Mexico olive, chamisa, New Mexico locust, sumac, golden current, seep willow and adjacent to the river and other wetter areas, coyote willow. Fire break meadows will be maintained between these patches to enhance the edge effect and keep the potential for catastrophic fire to a minimum. Edge effect and the creation of denser patches such as the proposed shrub thickets will be important increasing wildlife diversity within the bosque (Crawford et al, 1993; Hink & Ohmart, 1984).

4. Recreation and Interpretive Features

A suite of recreation and interpretive features have been proposed as part of the proposed action (see Figure 2). Sensitive design and implementation of these features will be of critical importance to maintaining the success of the restoration features. Approximately 40,000 linear feet of undesignated trails will be replaced by approximately 15,000 linear feet of designated and defined trails.

Equipment, staging and access

Sequencing of the construction is proposed to reduce the amount of potential sediment moving into the river and reduce impacts to the river bank edge. The bosque between the levee and the river (the 121 acre project area), willow swale areas, the hi-flo channel areas and outfall wetland will be thinned first in order to remove the non-native woody vegetation (Removal Features). The hi-flo channels, willow swales and outfall wetland will be constructed separately after fuel

reduction has been performed in these areas (Water Related Features). The hi-flo channels will be constructed so that the opening at the south end will be excavated first and the opening at the north end will be excavated last (similar to the Rio Grande Nature Center project). Flows in the river during construction of these high flow channels are anticipated to be about 300-400 cfs. The exact device used to divert the flow of water during construction will be at the discretion of the construction contractor and approved by the Corps. If flows are low enough, it is preferred that the contractor leave the edge of the berm for each end of the channel in place during construction until opening the channel at the very end. The berm could serve as the 'dam' itself. Therefore, a coffer dam or silt curtain may not be needed. If one is needed, the silt curtain or coffer dam will be placed along the bank line and then pushed out into the channel to expand the bankline, under the supervision of Corps' Biologists, in order to minimize disturbance to the flows. It will go out into the river approximately 10-20 feet from the bank. It will take approximately one day to install. If needed, it will be similar to what was proposed for the Rio Grande Nature Center project (though it was not used at the Nature Center since leaving the berm in place as described above was successful) (Figure 3). Since each channel and the outfall wetland have not been fully designed, the exact construction sequence is yet to be determined but these 'best management practices' discussed above will be implemented. Areas will be revegetated as described in Revegetation. Recreation and Interpretive Features will be constructed last.

The sites are located between the levee and the river channel. Access from the levee through the riparian forest to the river edge is available. A temporary access road off of the levee/paved trail will be constructed to access proposed construction areas if one does not exist. These temporary access roads will be removed and reseeded once construction is complete or left in place if so desired by AOSD. Any additional disturbance caused by equipment accessing the site will be reseeded with native vegetation and mulched once complete. Equipment will access proposed construction areas from the nearest river crossing (ie: Central and Bridge Blvd.'s). If needed, equipment will be stored overnight in a designated staging area (currently proposed at Central NW on the west side of the levee (see Figure 2). The staging areas will be reseeded once the project is complete. Staging will not take place in the bosque.

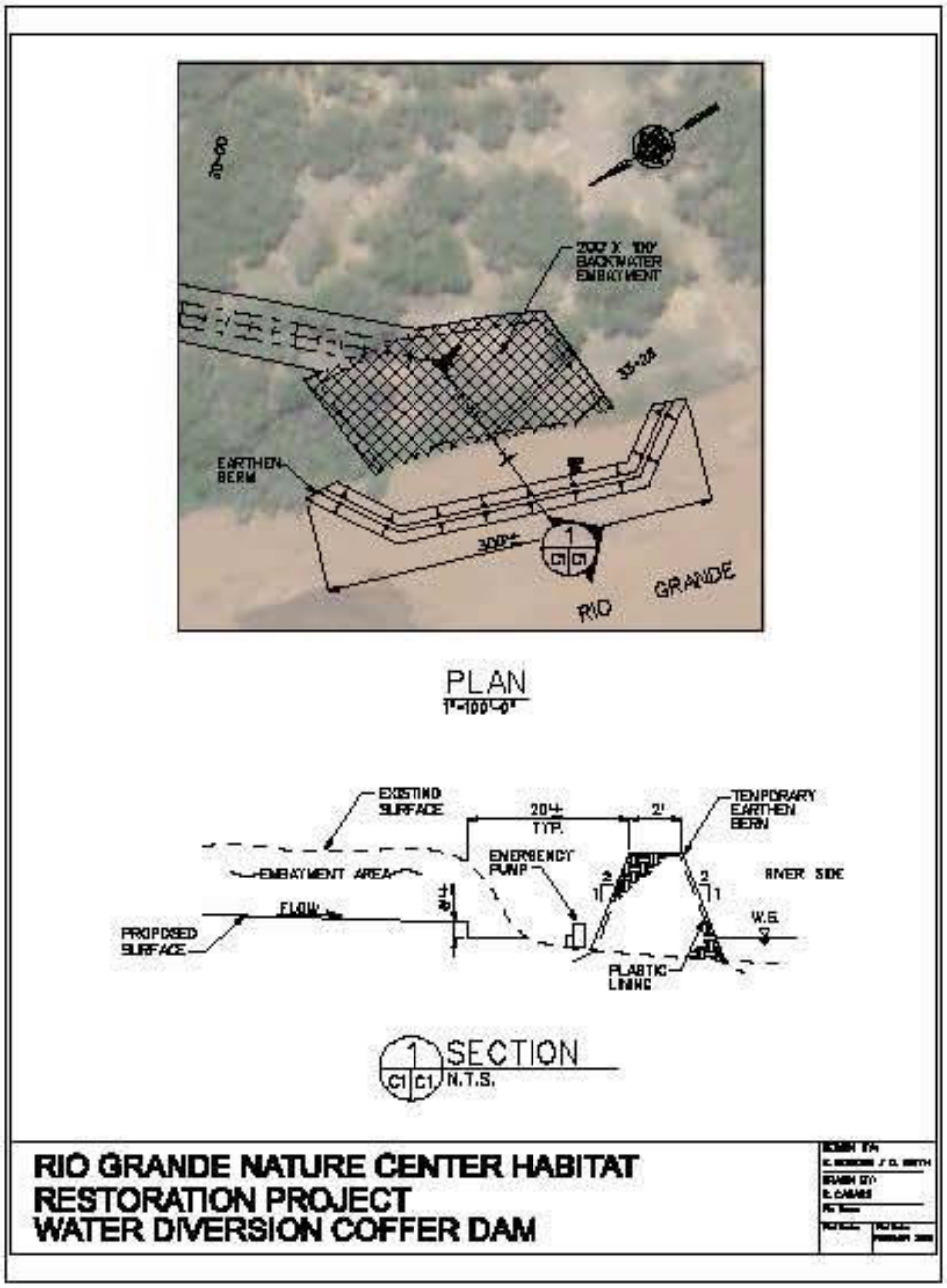

Figure 3. Example of potential coffer dam and/or silt curtain for use during construction of channel openings.

Conservation Measures

1) Silt fence will be installed adjacent to the riverbank to prevent erosion to the river.

2) Fueling of vehicles will not take place in the bosque.

3) Cleaning of all equipment is required prior to entering the site.

4) A Corps' biologist will monitor the project during construction at the bank of the river in order to detect any potential silvery minnow in the area. Findings of injured or dead silvery minnows will be reported to the Service. Water quality measurements will be taken before, during and after construction activity.

5) In coordination with the Service, a protocol to monitor presence/absence of silvery minnows in the channels following high flows, and to determine whether channel maintenance is warranted, will be developed.

6) Construction activities will take place in designated areas only, avoiding any unnecessary damage to the riparian area.

7) Work inside of the bosque will not occur between May 1 and August 30. Surveys will be conducted for the presence/absence of Southwestern Willow Flycatchers during their breeding season throughout the project area immediately prior to construction. If such surveys indicate breeding season occupation in areas not considered in this BA, the avoidance procedures outlined above will be applied to newly discovered areas.

Action Area
The action area is defined as the entire width of the 100 year floodplain within the reach from the Angostura Diversion Dam to the Isleta Diversion Dam. Silvery minnows that are present in the Action Area during the construction of ephemeral side channels and embayments are likely to be affected by the presence of construction equipment, the deployment of the coffer dam/porta dam, and by the mobilization of sediment into the Rio Grande.

II. STATUS OF THE SPECIES

RIO GRANDE SILVERY MINNOW

Description
The silvery minnow currently occupies a 170 mi (275 kilometer [km]) reach of the Middle Rio Grande, New Mexico, from Cochiti Dam, Sandoval County, to the headwaters of Elephant Butte Reservoir, Socorro County (U.S. Fish and Wildlife Service 1994). The silvery minnow is a stout minnow, with moderately small eyes, a small, sub-terminal mouth, and a pointed snout that projects beyond the upper lip (Sublette *et al.* 1990). The back and upper sides of the silvery minnow are silvery to olive, the broad mid-dorsal stripe is greenish, and the lower sides and abdomen are silver. Maximum length attained is about 3.5 in (90 millimeters [mm]). The only readily apparent sexual dimorphism is the expanded body cavity of ripe females during spawning (Bestgen and Propst 1994).

In the past, the silvery minnow was included with other species of the genus *Hybognathus* due to morphological similarities. Phenetic and phylogenetic analyses corroborate the hypothesis that it is a valid taxon, distinctive from other species of *Hybognathus* (Cook *et al.* 1992, Bestgen and Propst 1994). It is now recognized as one of seven species in the genus *Hybognathus* in the United States and was formerly one of the most widespread and abundant minnow species in the Rio Grande basin of New Mexico, Texas, and Mexico (Pflieger 1980, Bestgen and Platania 1991). Currently, *Hybognathus amarus* is the only remaining endemic pelagic spawning minnow in the Middle Rio Grande. The speckled chub (*Extrarius aestivalus*), Rio Grande shiner (*Notropis jemezanus*), phantom shiner (*Notropis orca*), and bluntnose shiner (*Notropis simus simus*) are either extinct or have been extirpated from the Middle Rio Grande (Bestgen and Platania 1991).

Legal Status

The silvery minnow was federally listed as endangered under the ESA on July 20, 1994 (U.S. Fish and Wildlife Service 1994). The species is also listed as an endangered species by the state of New Mexico. Primary reasons for listing the silvery minnow are described below in the Reasons for Listing section.

Critical habitat for the silvery minnow was designated on February 19, 2003 (68 FR 8088). The critical habitat designation extends approximately 157 mi (252 km) from Cochiti Dam, Sandoval County, New Mexico downstream to the utility line crossing the Rio Grande, a permanent identified landmark in Socorro County, New Mexico. The critical habitat designation defines the lateral extent (width) as those areas bounded by existing levees or, in areas without levees, 300 ft (91.4 meters) or riparian zone adjacent to each side of the bankfull stage of the Middle Rio Grande. Some developed lands within the 300 ft lateral extent are not considered critical habitat because they do not contain the primary constituent elements of critical habitat and are not essential to the conservation of the silvery minnow. Lands located within the lateral boundaries of the critical habitat designation, but not considered critical habitat include: developed flood control facilities, existing paved roads, bridges, parking lots, dikes, levees, diversion structures, railroad tracks, railroad trestles, water diversion and irrigation canals outside of natural stream channels, the Low Flow Conveyance Channel, active gravel pits, cultivated agricultural land, and residential, commercial, and industrial developments. The Pueblo lands of Santo Domingo, Santa Ana, Sandia, and Isleta within this area are not included in the critical habitat designation. Except for these Pueblo lands, the remaining portion of the silvery minnow's occupied range in the Middle Rio Grande in New Mexico is designated as critical habitat (68 FR 8088).

Habitat

The silvery minnow travels in schools and tolerates a wide range of habitats (Sublette *et al*. 1990); yet, generally prefers low velocity (<0.33 ft per second, 10 centimeters/second [cm/sec]) areas over silt or sand substrate that are associated with shallow (< 15.8 in, 40 cm) braided runs, backwaters or pools (Dudley and Platania 1997). Habitat for the silvery minnow 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 silvery minnow (Sublette *et al*. 1990, Bestgen and Platania 1991).

Adult silvery minnow are most commonly found in backwaters, pools, and habitats associated with debris piles; whereas, young of year (YOY) occupy shallow, low velocity backwaters with silt substrates (Dudley and Platania 1997). A study conducted between 1994 and 1996 characterized habitat availability and use at two sites in the Middle Rio Grande at Rio Rancho and Socorro. From this study Dudley and Platania (1997) reported that the silvery minnow was most commonly found in habitats with depths less than 19.7 in (50 cm). Over 85 percent were collected from low-velocity habitats (<0.33 ft/sec, 10 cm/sec) (Dudley and Platania 1997, Watts *et al*. 2002).

Critical Habitat

The Service has determined the primary constituent elements (PCEs) of silvery minnow critical habitat based on studies on silvery minnow habitat and population biology (68 FR 8088). They include:

1. A hydrologic regime that provides sufficient flowing water with low to moderate currents capable of forming and maintaining a diversity of aquatic habitats, such as, but not limited to the following: backwaters (a body of water connected to the main channel, but with no appreciable flow), shallow side channels, pools (that portion of the river that is deep with relatively little velocity compared to the rest of the channel), and runs (flowing water in the river channel without obstructions) of varying depth and velocity – all of which are necessary for each of the particular silvery minnow life-history stages in appropriate seasons (e.g., the silvery minnow requires habitat with sufficient flows from early spring (March) to early summer (June) to trigger spawning, flows in the summer (June) and fall (October) that do not increase prolonged periods of low- or no flow, and 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) that provide a variation of habitats with a wide range of depth and velocities;

3. Substrates of predominantly sand or silt; and

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

These PCEs provide for the physiological, behavioral, and ecological requirements essential to the conservation of the silvery minnow.

Life History

The species is a pelagic spawner that produces 3,000 to 6,000 semi-buoyant, non-adhesive eggs during a spawning event (Platania 1995, Platania and Altenbach 1998). The majority of adults spawn in about a one-month period in late spring to early summer (May to June) in association with spring runoff. Platania and Dudley (2000, 2001) found that the highest collections of silvery minnow eggs occurred in mid- to late May. In 1997, Smith (1999) collected the highest number of eggs in mid-May, with lower frequency of eggs being collected in late May and June. These data suggest multiple silvery minnow spawning events during the spring and summer, perhaps concurrent with flow spikes. Artificial spikes have apparently induced silvery minnows to spawn (Platania and Hoagstrom 1996). It is unknown if individual silvery minnows spawn more than once a year or if some spawn earlier and some later in the year.

Platania (2000) found that development and hatching of eggs are correlated with water temperature. Eggs of the silvery minnow raised in 30ºC water hatched in approximately 24 hours while eggs reared in 20-24ºC water hatched within 50 hours. Eggs were 0.06 inches (1.6 mm) in size upon fertilization, but quickly swelled to 0.12 inches (3 mm). Recently hatched larval fish are about 0.15 inches (3.7 mm) in standard length and grow about 0.005 inches (0.15 mm) in size per day during the larval stages. Eggs and larvae have been estimated to remain in the drift for 3-5 days, and could be transported from 134 to 223 miles (216 to 359 km) downstream depending on river flows (Platania 2000). Approximately three days after hatching the larvae move to low velocity habitats where food (mainly phytoplankton and zooplankton) is abundant and predators are scarce. YOY attain lengths of 1.5 to 1.6 inches (39 to 41 mm) by late autumn (U.S. Fish and Wildlife Service 1999). Age-1 fish are 1.8 to 1.9 inches (45 to 49 mm) by the start of the spawning season. Most growth occurs between June (post spawning) and October, but there is some growth in the winter months. In the wild, maximum longevity is about 25 months, but very few survive more than 13 months (U.S. Fish and Wildlife Service 1999). Captive fish have lived up to four years (C. Altenbach, City of Albuquerque, *pers. comm.* 2003).

Platania (1995) suggested that historically the downstream transport of eggs and larvae of the silvery minnow over long distances was likely beneficial to the survival of their populations. This behavior may have promoted recolonization of reaches impacted during periods of natural drought (Platania 1995). The spawning strategy of releasing floating eggs allows the silvery minnow to replenish populations downstream, but the current presence of diversion dams (Angostura, Isleta, and San Acacia Diversion Dams) prevents recolonization of upstream habitats (Platania 1995). As populations are depleted upstream and diversion structures prevent upstream movements, isolated extirpations of the species through fragmentation may occur (U.S. Fish and Wildlife Service 1999). Adults, eggs and larvae are also transported downstream to Elephant Butte Reservoir. It is believed that none of these fish survive because of poor habitat and predation from reservoir fishes (U.S. Fish and Wildlife Service 1999).

The silvery minnow is herbivorous (feeding primarily on algae); this is indicated indirectly by the elongated and coiled gastrointestinal tract (Sublette *et al.* 1990). Additionally, detritus,

including sand and silt, is filtered from the bottom (Sublette *et al.* 1990, U.S. Fish and Wildlife Service 1999).

Population Dynamics

Generally, a population of silvery minnows consists of only two age classes: YOY and Age-1 (U.S. Fish and Wildlife Service 1999). The majority of spawning silvery minnows are one year old. Two year old fish comprise less than 10 percent of the spawning population. High silvery minnow mortality occurs during or subsequent to spawning, consequently very few adults are found in late summer. By December, the majority (greater than 98 percent) of individuals are YOY (Age 0). This population ratio does not change appreciably between January and June, as Age 1 fish usually constitute over 95 percent of the population just prior to spawning.

Platania (1995) found that a single female in captivity could broadcast 3,000 eggs in eight hours. Females produce 3 to 18 clutches of eggs in a 12-hour period. The mean number of eggs in a clutch is approximately 270 (Platania and Altenbach 1998). In captivity, silvery minnows have been induced to spawn as many as four times in a year (C. Altenbach, City of Albuquerque, *pers. comm.* 2000). It is not known if they spawn multiple times in the wild. The high reproductive potential of this fish appears to be one of the primary reasons that it has not been extirpated from the Middle Rio Grande. However, the short life span of the silvery minnow increases the population instability. When two below-average flow years occur consecutively, a short-lived species such as the silvery minnow can be impacted, if not completely eliminated from dry reaches of the river (U.S. Fish and Wildlife Service 1999).

Distribution and Abundance

Historically, the silvery minnow occurred in 2,465 mi (3,967 km) of rivers in New Mexico and Texas. They were known to have occurred from Española upstream from Cochiti Lake; in the downstream portions of the Chama and Jemez Rivers; throughout the Middle and Lower Rio Grande to the Gulf of Mexico; and in the Pecos River from Sumner Reservoir downstream to the confluence with the Rio Grande (Sublette *et al.* 1990, Bestgen and Platania 1991). The current distribution of the silvery minnow is limited to the Rio Grande between Cochiti Dam and Elephant Butte Reservoir, which amounts to approximately 5 percent of its historic range.

The construction of mainstem dams, such as Cochiti Dam and irrigation diversion dams have contributed to the decline of the silvery minnow. The construction of Cochiti Dam in particular has affected the silvery minnow by reducing the magnitude and frequency of flooding events that help to create and maintain habitat for the species. In addition, the construction of Cochiti Dam has resulted in degradation of silvery minnow habitat within the Cochiti Reach. Flow in the river at Cochiti Dam is now generally clear, cool, and free of sediment. There is relatively little channel braiding, and areas with reduced velocity and sand or silt substrates are uncommon. Substrate immediately downstream of the dam is often armored cobble (rounded rock fragments generally 8 to 30 cm (3 to 12 in) in diameter). Further downstream the riverbed is gravel with some sand material. Ephemeral tributaries including Galisteo Creek and Tonque Arroyo introduce sediment to the lower sections of this reach, and some of this is transported downstream with higher flows (U.S. Fish and Wildlife Service 2001, 1999). The Rio Grande

below Angostura Dam becomes a predominately sand bed river with low, sandy banks in the downstream portion of the reach. The construction of Cochiti Dam also created a barrier between silvery minnow populations (U.S. Fish and Wildlife Service 1999). As recently as 1978, the silvery minnow was collected upstream of Cochiti Lake; however surveys since 1983 suggest that the fish is now extirpated from this area (U.S. Fish and Wildlife Service 1999).

Silvery minnow catch rates declined two to three orders of magnitude between 1993 and 2004. Additionally, relative abundance of silvery minnows declined from approximately 50 percent of the total fish community in 1995 to about 5 percent in 2004. However, in 2004, the October density of silvery minnows was significantly higher ($p<0.05$) than in 2003 and autumnal catch rates increased by over an order of magnitude between those years. Silvery minnow catch rates in 2004 were comparable to those in 2001. Catch rates in 2005 were even higher. October catch rates in 2005 (3,899) increased nearly 50 times over catch rates for 2004 (78) (Dudley *et al*. 2005).

Augmentation, throughout this period, likely sustained the silvery minnow population. Nearly 900,000 silvery minnows have been released (primarily in the Angostura Reach) since 2000 (see Environmental Baseline). Captively propagated and released fish supplemented the native adult population and most likely also took advantage of the good spawning conditions of 2004 and 2005.

The silvery minnow was the most abundant taxon in October 2005 captures; it comprised about 72 percent of the total catch (Dudley *et al.* 2005). The species was nearly twice as abundant as the next most-abundant taxon (western mosquitofish). The increase in abundance of silvery minnow in 2005 has been comparable to previous years with above average precipitation (e.g., mid-1990s) (Dudley *et al.* 2005). These monitoring results from 2005 indicate that the status of the species has improved markedly compared to Fall of 2004.

Increased discharge in the Rio Grande during 2004 contrasted with the extended low-flow conditions observed throughout the Middle Rio Grande during 2003 and 2002. The timing of the 2004 runoff flow was typical of a flow increase that would normally occur at the onset of the spring runoff period. Elevated and extended flows during 2004 likely resulted in more favorable conditions for the growth and survivorship of newly hatched silvery minnow larvae. It is possible that even low numbers of eggs and larvae could have resulted in greatly increased recruitment success because of the inundation of shoreline habitats, abandoned side channels, and backwaters. Low velocity and shallow areas provide the warm and productive habitats required by larval fishes to successfully complete their early life history.

Spring runoff in 2005 was also above average, leading to a peak of over 6,000 cfs at Albuquerque and sustained high flows (> 3,000 cfs) for more than 2 months. These flows improved conditions for both spawning and recruitment. October monitoring indicated a significant increase in silvery minnows in the Middle Rio Grande, increasing to 3,899 total silvery minnows captured from 2 and 78 in 2003 and 2004, respectively. In 2006, however, October numbers declined to 166 after an extremely low Spring runoff and channel drying in

June and July (Dudley et al. 2006). October samples yielded no small silvery minnows, indicating poor recruitment in the spring.

Middle Rio Grande Distribution

Since the early 1990s, the density of silvery minnows generally increased from upstream (Angostura Reach) to downstream (San Acacia Reach). During surveys in 1999, over 98 percent of the silvery minnows captured were downstream of San Acacia Diversion Dam (Dudley and Platania 2002). This distributional pattern has been observed since 1994 (Dudley and Platania 2002) and is attributed to downstream drift of eggs and larvae and the inability of adults to repopulate upstream reaches because of diversion dams.

However, in 2004 and 2005, Dudley *et al.* (2005 and 2006) found that this pattern reversed. Catch rates were highest in the Angostura Reach and approximately equal in the Isleta and San Acacia reaches. The Angostura Reach yielded the most silvery minnow (n=2,226) in 2004, followed by the Isleta Reach (n=442), and San Acacia Reach (n=371). Routine augmentation of silvery minnow in the Angostura Reach (nearly 900,000 since 2000), and the transplanting of silvery minnow rescued from drying reaches (approximately 770,000 since 2003) explains this change in pattern. Additionally, good spawning conditions (i.e., high and sustained spring runoff) throughout the Middle Rio Grande during April and May followed by wide-scale drying in the Isleta and San Acacia reaches from June-September, exacerbated the skew. High spring runoff and perennial flow in the Angostura Reach appeared to result in relatively high survival and recruitment of larval and juvenile silvery minnow compared to previous drought years (2002-2003). In contrast, large portions of the Rio Grande south of Isleta Diversion Dam were dewatered in 2004 and young silvery minnow in these areas were either subjected to poor recruitment conditions (i.e., lack of nursery habitats during low-flows) or they were trapped in drying pools where they perished.

Sampling in early 2006 indicates populations are again higher downstream. Of the 6,143 silvery minnows caught in March 2006, 33 were found in the Angostura Reach, 2,445 were found in the Isleta Reach, and 3,665 were caught in the San Acacia Reach. Silvery minnow catch rates were an average of 2.53 per 100 m^2 in the Angostura Reach.

Reasons for Listing/Threats to Survival

The silvery minnow was federally listed as endangered for the following reasons:

1. Regulation of stream waters, which has led to severe flow reductions, often to the point of dewatering extended lengths of stream channel;

2. Alteration of the natural hydrograph, which impacts the species by disrupting the environmental cues the fish receives for a variety of life functions, including spawning;

3. Both the stream flow reductions and other alterations of the natural hydrograph throughout the year can severely impact habitat availability and quality, including the temporal availability of habitats;

4. Actions such as channelization, bank stabilization, levee construction, and dredging result in both direct and indirect impacts to the silvery minnow and its habitat by severely disrupting natural fluvial processes throughout the floodplain;

5. Construction of diversion dams fragment the habitat and prevent upstream migration;

6. Introduction of nonnative fishes that directly compete with, and can totally replace the silvery minnow, as was the case in the Pecos River, where the species was totally replaced in a time frame of 10 years by its congener the plains minnow (*Hybognathus placitus*); and

7. Discharge of contaminants into the stream system from industrial, municipal, and agricultural sources also impact the species (U.S. Fish and Wildlife Service 1993b, 1994).

These reasons for listing continue to threaten the species throughout its currently occupied range in the Middle Rio Grande.

Recovery Efforts
The final recovery plan for the silvery minnow was released in July 1999 (U.S. Fish and Wildlife Service 1999) and is currently undergoing revision. The primary objectives for recovery are to increase numbers of the silvery minnow, enhance its habitat in the Middle Rio Grande valley, and to reestablish the species in at least three other areas of its historic range.

III. ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the ESA, when considering the effects of the action on federally listed species, we are required to take into consideration the environmental baseline. Regulations implementing the ESA (50 FR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impacts of State and private actions that are contemporaneous with the consultation in progress. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Drought, as an overriding condition of the last decade in the southwest, is an important factor in the environmental baseline. However, stream conditions in 2004 and 2005 improved over previous years. The United States Geological Survey (USGS) in Albuquerque, New Mexico

reported that stream flow conditions in 2005 were well above average to significantly above average statewide leading to a peak of over 6,000 cfs at Albuquerque and sustained high flows (> 3,000 cfs) for more than 2 months. These flows improved conditions for both spawning and recruitment. Despite good runoff, reservoir levels continue to be below average across the state. It will take a least another year or two of well above average precipitation to reach pre-drought reservoir conditions.

The 2006 spring runoff was well below average because of lower than normal snowpack. In May 2006, year to date precipitation was well below average with the snow pack at 20 percent of average in the Rio Grande Basin. Fortunately, a strong monsoon season led to the wettest period of record in July and August. Consequently, only 26.5 miles of river dried in the summer of 2006 the lowest amount since 2001.

Status of the Species within the Action Area

Past actions have eliminated and severely altered habitat conditions for the silvery minnow. These actions can be broadly categorized as changes to the natural hydrology of the Rio Grande and changes to the morphology of the channel and floodplain. Other factors that influence the environmental baseline are water quality, the release of captively propagated silvery minnows, silvery minnow rescue efforts, on-going research efforts, and past projects in the Middle Rio Grande. Also of importance is the current drought, the expected weather pattern for the near future, and how it may affect flow in the Rio Grande. Each of these topics is discussed below.

Changes in Hydrology

There have been two primary changes in hydrology as a result of the construction of dams on the Rio Chama and Rio Grande that affect the silvery minnow: Loss of water and changes to the magnitude and duration of peak flows.

Loss of Water

Prior to measurable human influence on the system, up to the fourteenth century, the Rio Grande was a perennially flowing, aggrading river with a shifting sand substrate (Biella and Chapman 1977). There is now strong evidence that the Middle Rio Grande first began drying up periodically after the development of Colorado's San Luis Valley in the mid to late 1800s (Scurlock 1998). After humans began exerting more influence on the river, there are two documented occasions when the river became intermittent; during prolonged, severe droughts in 1752 and 1861 (Scurlock 1998). The silvery minnow historically survived low-flow periods because such events were infrequent and of lesser magnitude than they are today. There were also no diversion dams to block repopulation of upstream areas, the fish had a much greater geographical distribution, and there were oxbow lakes, cienegas, and sloughs associated with the Rio Grande that supported fish until the river became connected again.

Water management and use has resulted in a large reduction of suitable habitat for the silvery minnow. Agriculture accounts for 90 percent of surface water consumption in the Middle Rio Grande (Bullard and Wells 1992). The average annual diversion of water in the Middle Rio Grande by the MRGCD was 535,280 af (65,839 hectare-meters) for the period from 1975 to

1989 (Reclamation 1993). In 1990, total water withdrawal (groundwater and surface water) from the Rio Grande Basin in New Mexico was 1,830,628 af, significantly exceeding a sustainable rate (Schmandt 1993). Water withdrawals have not only reduced overall flow quantities, but also caused the river to become locally intermittent and/or dry for extended reaches. Irrigation diversions and drains significantly reduce water volumes in the river. However, the total water use (surface and groundwater) in the Middle Rio Grande by the MRGCD may range from 28 – 37 percent (S.S. Papadopulos & Associates, Inc. 2000; U.S. Geological Survey 2002). A portion of the water diverted by the MRGCD returns to the river and may be re-diverted (in some cases more than once) (Bullard and Wells 1992; MRGCD, *in litt*. 2003).

River reaches particularly susceptible to drying are immediately downstream of the Isleta Diversion Dam (river mile 169), a 5 mile (8 km) reach near Tome (river miles 150-155), a 5 mile (8 km) reach near the U.S. Highway 60 Bridge (river miles 127-132), and an extended 36 mile (58 km) reach from near Brown's Arroyo (downstream of Socorro) to Elephant Butte Reservoir. Extensive fish kills, including tens of thousands of silvery minnows, have occurred in these lower reaches when the river has dried (C. Shroeder, Service, *pers. comm.* 2002). Since 1996, an average of 32 miles of the Rio Grande has dried, mostly in the San Acacia Reach. The most extensive drying occurred in 2003 and 2004 when 60 and 68.7 miles, respectively, were dewatered. Most documented drying events lasted an average of two weeks, before flows returned.

Predatory birds have been observed hunting and consuming fish from isolated pools during river intermittence (J. Smith, NMESFO, *pers. comm.* 2003). Although the number of fish present in any pool is unknown, it must be assumed that many of the fish preyed upon in these pools are silvery minnows. Thus, while some dead silvery minnows were collected during the shorter drying events, it is assumed that many more mortalities occurred than were documented.

Changes to Size and Duration of Peak Flows

Water management has also resulted in a loss of peak flows that historically initiated spawning. The reproductive cycle of the silvery minnow is tied to the natural river hydrograph. A reduction in peak flows and/or altered timing of flows may inhibit reproduction. Since completion of Elephant Butte Dam in 1916, four additional dams have been constructed on the Middle Rio Grande, and two have been constructed on one of its major tributaries, the Rio Chama (Scurlock 1998). Construction and operation of these dams, which are either irrigation diversion dams (Angostura, Isleta, San Acacia) or flood control and water storage dams (Elephant Butte, Cochiti, Abiquiu, El Vado), have modified the natural flow of the river. Mainstem dams store spring runoff and summer inflow, which would normally cause flooding, and release this water back into the river channel over a prolonged period of time. These releases are often made during the winter months, when low-flows would normally occur. The releases depart significantly from natural conditions, and can substantially alter the habitat. In spring and summer, artificially low-flows may limit the amount of habitat available to the species and may also limit dispersal of the species (U.S. Fish and Wildlife Service 1999).

In the spring of 2002 and 2003, there was concern that silvery minnow would not spawn because of a lack of spring runoff due to an extended drought. River discharge was artificially elevated through short duration reservoir releases during May to induce silvery minnow spawning. In response to the releases, significant silvery minnow spawning occurred and was documented in all reaches except the Cochiti Reach (S. Gottlieb, UNM, *in litt.* 2002; Dudley *et al*. 2005). Fall populations in 2003 and 2004 continued to decrease despite large spawning events, indicating a lack of recruitment.

Mainstem dams and the altered flows they create can affect habitat by preventing overbank flooding, trapping nutrients, altering sediment transport regimes, prolonging summer base flows, modifying or eliminating native riparian vegetation, and creating reservoirs that favor non-native fish species. These changes may affect the silvery minnow by reducing its food supply, altering its preferred habitat, preventing dispersal, and providing a continual supply of non-native fish that may compete with or prey upon them. Altered flow regimes may also result in improved conditions for other native fish species that occupy the same habitat, causing those populations to expand at the expense of the silvery minnow (U.S. Fish and Wildlife Service 1999).

In addition to providing a cue for spawning, flood flows also maintain a channel morphology to which the silvery minnow is adapted. The changes in channel morphology that have occurred from the loss of flood flows are discussed below.

Changes in Channel Morphology

Historically, the Rio Grande was sinuous, braided, and freely migrated across the floodplain. Changes in natural flow regimes, narrowing and deepening of the channel, and restraints to channel migration (i.e., jetty jacks) adversely affected the silvery minnow. These effects result directly from constraints placed on channel capacity by structures built in the floodplain. These anthropogenic changes have and continue to degrade and eliminate spawning, nursery, feeding, resting, and refugia areas required for species' survival and recovery (U.S. Fish and Wildlife Service 1993a).

The active river channel within occupied habitat is being narrowed by the encroachment of vegetation, resulting from continued low-flows and the lack of overbank flooding. The lack of flood flows has allowed non-native riparian vegetation such as salt cedar and Russian olive to encroach on the river channel (Reclamation 2001). These non-native plants are very resistant to erosion, resulting in narrowing of the channel. When water is confined to a narrower cross-section, its velocity increases. Fine sediments such as silt and sand are carried away leaving coarser bed materials such as gravel and cobble. Habitat studies during the winter of 1995 and 1996 (Dudley and Platania 1996), demonstrated that a wide, braided river channel with low velocities resulted in higher catch rates of silvery minnows, and narrower channels resulted in fewer fish captured. The availability of wide, shallow habitats that are important to the silvery minnow is decreasing. Narrow channels have few backwater habitats with low velocities that are important for silvery minnow fry and YOY.

Within the current range of the silvery minnow, human development and use of the floodplain have greatly restricted the width available to the active river channel. A comparison of river area between 1935 and 1989 shows a 52 percent reduction, from 26,598 acres (10,764 ha) to 13,901 acres (5,626 ha) (Crawford *et al.* 1993). These data refer to the Rio Grande from Cochiti Dam downstream to the "Narrows" in Elephant Butte Reservoir. Within the same stretch, 234.6 mi (378 km) of levees occur, including levees on both sides of the river. Analysis of aerial photography taken by Reclamation in February 1992, for the same river reach, shows that of the 180 mi (290 km) of river, only 1 mi (1.6 km), or 0.6 percent of the floodplain has remained undeveloped.

Development in the floodplain, makes it difficult, if not impossible, to send large quantities of water downstream that would create low velocity side channels that the silvery minnow prefers. As a result, reduced releases have decreased available habitat for the silvery minnow and allowed encroachment of non-native species into the floodplain.

Water Quality

Both point (pollution discharges from a pipe) and non-point (diffuse sources of pollution) sources affect the Middle Rio Grande. Major point sources are waste water treatment plants (WWTPs) and feedlots. Major non-point sources include agricultural activities (e.g., fertilizer and pesticide application, livestock grazing), storm water run off, and mining activities.

Effluents from WWTPs contain contaminants that may affect the water quality of the river. It is anticipated that WWTP effluent may be the primary source of perennial flow in the lower portion of the Angostura Reach during extended periods of intermittency. For that reason the water quality of the effluent is extremely important. In the project area, the largest WWTP discharges are from Albuquerque, followed by Rio Rancho (2 WWTP) and Bernalillo (mean annual discharge flows are 80.4, 2.5, 0.9, and 0.7 cfs, respectively) (Bartolino and Cole 2002). Since 1998, total residual chlorine (chlorine) and ammonia, as nitrogen (ammonia), have been discharged unintentionally at concentrations that exceed protective levels for the silvery minnow.

Albuquerque WWTP effluent discharge records show that during November 1999, the monthly maximum chlorine concentration in the outfall was 0.49 milligrams per liter (mg/L). Additionally, on February 23, 2003, the concentration of chlorine in the outfall was reported to be 0.70 mg/L (C. Abeyta, Service, *in litt.* 2003; D.S. Dailey, City, *in litt*. 2003). Chlorine concentrations of 0.013 mg/L can be harmful to the silvery minnow. Records also show that the monthly maximum concentration of ammonia during July 2001 was 14 mg/L. At pH 8 and water temperature of 25 °C, ammonia concentrations as low of 3.1 mg/L can be harmful to larval fathead minnow (U. S. Environmental Protection Agency 1999). The fathead minnow has been suggested as a surrogate to evaluate the effects of various chemicals on the silvery minnow (Buhl 2002).

Although we do not have complete records for the other WWTPs, in the summer of 2000, the Rio Rancho WWTP released approximately one million gallons of raw sewage into the Rio Grande. Chlorine treatment was maximized in an attempt to reduce the public health risk.

Ammonia was reported at 37 mg/L on July 13, 2000, and at 17.1 mg/L on July 27, 2000 (City of Rio Rancho, *in litt.* 2000). Nonetheless, no violations of chlorine or ammonia effluent limits were recorded. This suggests that averaging measurements and/or the frequency of water quality measurements is insufficient to detect water quality situations that would be toxic to silvery minnow. The Rio Rancho WWTP now uses ultraviolet disinfection (Dee Fuerst, City of Rio Rancho, *pers. comm.* 2003). However, high concentrations of ammonia could still be discharged during an upset. Spills from the Rio Rancho City sewage system are treated with chlorine, which may lead to chlorine being flushed to the Rio Grande.

In addition to chlorine and ammonia, WWTP effluents may also include cyanide, chloroform, organophosphate pesticides, semi-volatile compounds, volatile compounds, heavy metals, and pharmaceuticals and their derivatives, which can pose a health risk to silvery minnow when discharged in concentrations that exceed the protective water quality criteria (J. Lusk, Service, *in litt*. 2003). Even if the concentration of a single element or compound is not harmful by itself, chemical mixtures may be more than additive in their toxicity to silvery minnow (Buhl 2002). The long-term effects and overall impacts of chemicals on the silvery minnow are not known.

Large precipitation events wash sediments and pollutants into the river from surrounding lands through storm drains and intermittent tributaries. Contaminants of concern to the silvery minnow that are frequently found in storm water include the metals aluminum, cadmium, lead, mercury, and zinc, organics such as oils, the industrial solvents trichloroethene and tetracholoroethene (TCE), and the gasoline additive methyl tert-butyl ether (U.S. Geological Survey 2001).

Harwood (1995) studied the North Floodway Channel (Floodway) of Albuquerque, which drains an urban area of about 90 square miles and crosses Pueblo of Sandia lands. He found that storm water contributions of dissolved lead, zinc, and aluminum were significant and posed a threat to the water quality of the Rio Grande. Because the Floodway crosses lands of the Pueblo of Sandia and enters their portion of the Rio Grande, they requested that the Environmental Protection Agency conduct toxicity tests on water in the Rio Grande collected below the Floodway. Aquatic crustaceans exposed to this water were found to have significant reproductive impairment and mortality when compared with controls. Additionally, larval fish also experienced significant mortality and/or narcosis when exposed to water and bed sediment collected from this same area on April 22, 2002 (http://oaspub.epa.gov/enviro/pcs det_reports. detail_report?npdesid=NM0022250). This study indicates that storm water runoff can impact the water quality of the Rio Grande and the aquatic organisms that live in the river.

In a cooperative study, the New Mexico Environment Department (NMED) detected elevated polychlorinated biphenyl (PCBs) contamination of the San Jose Drain (NMED DOE Oversight Bureau Correspondence and Transmittal Letter, signed S. Yanicak, to G. Turner, DOE, Subject: 2002 – 2003 Cooperative Polychlorinated Biphenyl (PCB) Study Data, Dated June 6, 2006). The San Jose Drain empties into an area near the confluence of the Tijeras Arroyo (and SDC) with the Rio Grande. The PCB pollution was detected in sediment and storm water runoff and in fish tissue collected downstream. Concentrations of PCBs in fish tissues were elevated above

the threshold by which fish consumption advisories would recommend that no fish be eaten by people (R. Ford-Schmid, NMED, electronic communication, June 24, 2004). The San Jose Drain empties into the Rio Grande in close proximity of the SDC Island Site increasing the probability that sediment forming the island may be contaminated with PCBs as well.

Sediment is the sand, silt, organic matter, and clay portion of the river bed, or the same material suspended in the water column. Ong *et al.* (1991) recorded the concentrations of trace elements and organochlorine pesticides in suspended sediment and bed sediment samples collected from the Middle Rio Grande between 1978 and 1988. These data were compared to numerical sediment quality criteria (Probable Effects Criteria [PEC]) proposed by MacDonald *et al.* (2000). According to MacDonald *et al.* (2000) most of the PEC provide an accurate basis for predicting sediment toxicity to aquatic life and a reliable basis for assessing sediment quality in freshwater ecosystems. Although the PEC were developed to assess bed (bottom) sediments, they also provide some indication of the potential adverse effects to organisms consuming these same sediments when suspended in the water column.

Semi-volatile organic compounds are a large group of environmentally important organic compounds. Three groups of compounds, polycyclic aromatic hydrocarbons (PAHs), phenols, and phthalate esters, were included in the analysis of bed sediment collected by the USGS (Levings *et al.* 1998). These compounds were abundant in the environment, are toxic and often carcinogenic to organisms, and could represent a long-term source of contamination. The analysis of the PAH data by Levings *et al.* (1998) show one or more PAH compounds were detected at 14 sites along the Rio Grande with the highest concentrations found below Albuquerque and Santa Fe. Polycyclic aromatic hydrocarbons and other semi-volatile compounds affect the sediment quality of the Rio Grande and may affect silvery minnow behavior, habitat, feeding, and health.

Pesticide contamination occurs from agricultural activities, as well as from the cumulative impact of residential and commercial landscaping activities. The presence of pesticides in surface water depends on the amount applied, timing, location, and method of application. Water quality standards have not been set for many pesticides, and existing standards do not consider cumulative effects of several pesticides in the water at the same time. Roy *et al.* (1992) reported that DDE, a degradation product of DDT, was detected most frequently in whole body fish collected throughout the Rio Grande. He suggested that fish in the lower Rio Grande may be accumulating DDE in concentrations that may be harmful to fish and their predators.

In addition to the compounds discussed above, several other constituents are present and affect the water quality of the Rio Grande. These include nutrients such as nitrates and phosphorus, total dissolved solids (salinity), and radionuclides. Each of these also has the potential to affect the aquatic ecosystem and health of the silvery minnow. As the river dries, pollutants will be concentrated in the isolated pools. Even though these pollutants do not cause the immediate death of silvery minnows, the evidence suggests that the amount and variety of pollutants present in the Rio Grande, could compromise their health and fitness (Rand and Petrocelli 1985).

Silvery Minnow Propagation and Augmentation

In 2000, the Service identified captive propagation as an appropriate strategy to assist in the recovery of the silvery minnow. Captive propagation is conducted in a manner that will, to the maximum extent possible, preserve the genetic and ecological distinctiveness of the silvery minnow and minimize risks to existing wild populations.

Silvery minnow are currently housed at four facilities in New Mexico including: the Dexter Fish Hatchery; New Mexico State University Coop Unit (Las Cruces); the Service's New Mexico Fishery Resources Office (NMFRO), and the City of Albuquerque's propagation facilities. These facilities are actively propagating and rearing silvery minnow. Silvery minnow are also held in South Dakota at the U.S. Geological Survey, Biological Resources Division Lab, but there is no active spawning program at this facility.

Since 2000 over 1,000,000 silvery minnow have been propagated using both adult wild silvery minnows and wild caught eggs and then released into the wild. Wild gravid adults are successfully spawned in captivity at the City's propagation facilities. Eggs are raised and released as larval fish. Marked fish have been released by the NMFRO since 2002 under a formal augmentation effort funded by the Collaborative Program. Silvery minnows are released into the Angostura Reach of the river near Alameda Bridge to ensure downstream repopulation. Eggs left in the wild have a very low survivorship and this ensures that an adequate number of spawning adults are present to repopulate the river each year. While hatcheries continue to successfully spawn silvery minnow, wild eggs are collected to ensure genetic diversity within the remaining population.

Ongoing Research

There is ongoing research by the NMFRO and University of New Mexico (UNM) to examine the movement of silvery minnow. Augmented fish are marked with a visible fluorescent elastomer tag and released in large numbers in a few locations. Crews sample upstream and downstream from the release site in an attempt to capture the marked fish. Preliminary results indicate that the majority of silvery minnows disperse a few miles downstream. One individual was captured 15.7 mi (25.3 km) upstream from its release site (Platania *et al*. 2003). Monitoring within 48 hours after the release of the 41,500 silvery minnows resulted in the capture of 937 fish. Of these, 928 were marked and 927 were collected downstream of the release point. The farthest downstream point of recapture was 9.4 mi (15.1 km).

In 2002, a hybridization study involving the plains minnow and silvery minnow was conducted to determine the genetic viability of hybrids. Plains minnow are found in the Pecos River where reintroduction of silvery minnow is being considered. The results are preliminary because the number of trials was low and because there is some question about the fitness of the females used in the experiments. The plains minnow and silvery minnow did spawn with each other and the hybrid eggs hatched. However, none of the larvae lived longer than 96 hours. The control larvae (non-hybrids) for both the plains minnow and silvery minnow lived until the end of the study (24 days) (Caldwell 2002).

Due to the increased efforts in captive propagation, recent studies by UNM have focused on the genetic composition of the silvery minnow. This research indicates that the net effective population size (Ne) (the number of individuals that contribute to maintaining the genetic variation of a population) of the silvery minnow in the wild is between 60-250 fish (T. Turner, UNM, *pers. comm*. 2003). It has been suggested that a Ne of 500 fish is needed to retain the long-term adaptive potential of a population (Franklin 1980). No significant genetic differences have been found in populations isolated in the different reaches of the Rio Grande (D. Alo UNM, *pers. comm*. 2002). Because the number of wild fish in the river appears to be low, the addition of thousands of silvery minnows raised in captivity could impact the genetic structure of the population. The propagation effort should be sufficient to maintain 100,000 to 1,000,000 fish in the wild (T. Turner, UNM, *pers. comm.* 2003). For instance if it were determined that 50,000 silvery minnow were in the wild, a minimum of 50,000 adult fish should be in propagation facilities. We do not know how many fish are in the wild so it is difficult at this time to determine the exact number needed in propagation facilities. However, to insure against a catastrophic event where most wild fish are lost, it is suggested that 100,000 to 1,000,000 silvery minnow should be kept in propagation facilities to maintain a sufficient amount of genetic variability for propagation efforts (T. Turner, UNM, *pers. comm*. 2003). Approximately 150,000 silvery minnows are currently being maintained in captivity (M. Ulibarri, Service, *pers. comm*. 2007).

Permitted and/or Authorized Take

Take is authorized by section 10, and incidental take is permitted under section 7. These permits and/or authorizations are issued by the Service. Applicants for section 10 permits must also acquire a permit from the State to "take" or collect silvery minnows. Many of the permits issued under section 10 allow take for the purpose of collection and salvage of silvery minnows and eggs for captive propagation. Eggs, larvae, and adults are also collected for scientific studies to further our knowledge about the species and how best to conserve the silvery minnow. Because of the population decline from 2002-2004, the Service has reduced the amount of take permitted for voucher specimens in the wild.

Incidental take of silvery minnows is authorized through section 7 consultation associated with the March 2003, programmatic biological opinion on water operations and maintenance in the Middle Rio Grande, the City of Albuquerque Drinking Water project, the Isleta Island Removal Project, the Tiffany Plug Removal Project, and the Interstate Stream Commission's (ISC) Habitat Restoration Project.

Factors Affecting Species Environment within the Action Area

On the Middle Rio Grande, the following past and present federal, state, private, and other human activities, in addition to those discussed above, have affected the silvery minnow and its critical habitat:

1. Release of Carryover Storage from Abiquiu Reservoir to Elephant Butte Reservoir: The Army Corps of Engineers (Corps) consulted with the Service on the release of water during the winter of 1995. Ninety-eight thousand af (12,054 hectare-meters) of water

was released from November 1, 1995 to March 31, 1996, at a rate of 325 cfs (9.8 cm). This discharge is above the historic winter flow rate. Substantial changes in the flow regime that do not mimic the historic hydrograph can be detrimental to the silvery minnow.

2. Corrales, Albuquerque, and Belen Levees: These levees contribute to floodplain constriction and habitat degradation for the silvery minnow. Levees at these sites result in a reduction in the amount and quality of suitable habitat for the silvery minnow.

3. Santa Ana River Restoration Project: In August 1999, Reclamation consulted with the Service on a restoration project located on Santa Ana Pueblo in an area where the river channel was incising and eroding into the levee system. This project included a Gradient Restoration Facility (GRF), channel re-alignment, bioengineering, riverside terrace lowering, and erodible bank lines. The primary component of the Santa Ana Restoration Project is the GRF, which should control river hydraulics upstream of its location and also river bed control. The GRF was designed to: (1) store more sand sediments at a stable slope for the current sediment supply; (2) decrease the velocities and depths and increase the width in the river channel upstream; (3) be hydraulically submerged at higher flows while simultaneously increasing the frequency and duration of overbank flows upstream; (4) provide velocities and depths suitable for passage of the silvery minnow through the structure; and (5) halt or limit further channel degradation upstream of its location. The channel re-alignment involved moving the river away from the levee system and over the grade control structure, and involves excavation of a new river channel and floodplain. Another significant component of the Santa Ana Restoration project is riverside terrace lowering for the creation of a wider floodplain. The bioengineering and deformable bank lines also assist in establishing the new channel bank and regenerating native species vegetation in the floodplain.

4. Creation of a Conservation Pool for Storage of Native Water in Abiquiu and Jemez Canyon Reservoirs and Release of a Spike Flow: The City created space (100,000 af) in Abiquiu Reservoir and the Corps created space in Jemez Canyon Reservoir to store Rio Grande Compact credit water for use in 2001, 2002, and 2003 for the benefit of listed species. The conservation pool was created with the understanding that the management of this water would be decided in later settlement meetings or during water operations conference calls. In addition, a supplemental release (spike) occurred in May 2001 to accommodate movement of sediment as a part of habitat restoration and construction on the Rio Grande and Jemez River on the Santa Ana Pueblo.

5. Programmatic Biological Opinions on the Effects of Actions Associated with the U. S. Bureau of Reclamation's, U.S. Army Corps of Engineers', and non-federal Entities' Discretionary Actions Related to Water Management on the Middle Rio Grande: In 2001 and 2003, the Service issued jeopardy biological opinions on the effects of water operations and management activities in the Middle Rio Grande on the silvery minnow and flycatcher. In 2002, the Service issued a jeopardy biological opinion for the silvery

minnow. The current opinion, issued on March 17, 2003, contains one RPA with multiple elements. These elements set forth a flow regime in the Middle Rio Grande and describe habitat improvements necessary to alleviate jeopardy to both the silvery minnow and flycatcher.

6. Albuquerque Drinking Water Project: The Drinking Water Project, involves the construction and operation of: (1) A new surface diversion dam north of Paseo del Norte Bridge, (2), conveyance of raw water from the point of diversion to the new water treatment plant, (3) a new water treatment plant on Chappell Road NE, (4) transmission of treated (potable) water to residential and commercial customers throughout the Albuquerque metropolitan area, and (5) aquifer storage and recovery. During typical operations, the project will divert a total of 94,000 acre-feet per year (afy) of raw water from the Rio Grande (47,000 afy of City San Juan-Chama water and 47,000 afy of Rio Grande native water) at a near constant rate of about 130 cubic-feet per second (cfs) (3.68 cms). Peak diversion operations will consist of up to 103,000 afy being diverted at a rate of up to 142 cfs (4.02 cms). A new water treatment plant with a normal operating rate of 84 million gallons per day (mgd) (381.9 million liters per day [mld]) and a peak capacity of about 92 mgd (418.2 mld) or 142 cfs (4.02 cms) will be constructed as part of the proposed action. Consultation on this project was completed in October, 2003. Construction is currently underway.

7. Los Lunas Habitat Restoration Project: On February 6, 2002, the Service completed this consultation, which tiered from the programmatic biological opinion on water management on the Middle Rio Grande issued June 29, 2001. This project is intended to partially fill element J of the Reasonable and Prudent Alternative from the programmatic biological opinion to conduct habitat/ecosystem restoration projects in the Middle Rio Grande to benefit the silvery minnow and flycatcher. Approximately 37 acres of native riparian and 40 acres of aquatic habitat have been created by this project. This project includes side-channels resulting in increased inundation frequency and will result in inundation of the area at flows greater than or equal to 2,500 cfs. A variety of substrate elevations will also allow inundation of some areas when flows are less than 2,500 cfs.

8. Temporary Channel to Elephant Butte: This Reclamation project involves the construction of a temporary channel through the delta area of Elephant Butte Reservoir to increase the efficiency of sediment and water conveyance. An additional project goal was to initiate some degradation of the river bed through the San Marcial Reach to increase overall channel capacity and potentially allow for higher peak releases from Cochiti dam during subsequent spring runoff periods.

9. Silvery minnow salvage and relocation: During river drying, the Service's silvery minnow salvage crew captures and relocates silvery minnow. Since 1996, approximately 770,000 silvery minnow have been rescued and relocated to wet reaches, the majority of which were released in the Angostura Reach. Studies are being conducted to determine survival rates for salvaged fish.

10. Habitat Restoration Projects: Several habitat restoration projects have been completed in the Albuquerque reach through the Collaborative Program. These projects include two woody debris installation projects to encourage the development of pools and wintering habitat, and a river bar modification project south of the I-40 Bridge designed to create side and backwater channels on an existing bar as well as modify the top surface of the bar to create habitat over a range of flows. Additionally, in 2005, the ISC started a multi-year habitat restoration program that implements several island, bar, and bank line modification techniques throughout the Albuquerque Reach. Approximately 24 acres of habitat were restored in the Phase I. Phase II is scheduled to begin in winter 2007.

Summary

The remaining population of the silvery minnow is restricted to approximately 5 percent of its historic range. Every year since 1996, there has been at least one drying event in the river that has negatively affected the silvery minnow population. The population is unable to expand its distribution because poor habitat quality and Cochiti Dam prevent upstream movement and Elephant Butte Reservoir blocks downstream movement (Service 1999). Augmentation of silvery minnows with captive-reared fish will continue, however, continued monitoring and evaluation of these fish is necessary to obtain information regarding the survival and movement of individuals.

Water withdrawals from the river and water releases from dams severely limit the survival of silvery minnows. The consumption of shallow groundwater and surface water for municipal, industrial, and irrigation uses continues to reduce the amount of flow in the Rio Grande and eliminate habitat for the silvery minnow (Reclamation 2003). However, under state law, the municipal and industrial users are required to offset the effects of groundwater pumping on the surface water system. The City for example, has been offsetting their surface water depletions with 60,000 af per year (Reclamation 2003). The effect of water withdrawals means that discharge from WWTPs and irrigation return flows will have greater importance to the silvery minnow and a greater impact on water quality. Lethal levels of chlorine and ammonia have been released from the WWTPs in the last several years. In addition, a variety of organic chemicals, heavy metals, nutrients, and pesticides have been documented in storm water channels feeding into the river and contribute to the overall degradation of water quality.

Various conservation efforts have been undertaken in the past and others are currently being carried out in the middle Rio Grande. Silvery minnow abundance has increased over 2002-2003 population levels. However, the threat of extinction for the silvery minnow continues because of increased reliance on captive propagation, the fragmented and isolated nature of currently occupied habitat, and the absence of silvery minnows in other parts of the historic range. The increased abundance of silvery minnow from 2004-2006 is a positive sign. Nevertheless, the threats that endanger this species are still present.

IV. EFFECTS OF THE ACTION

'Effects of the Action' refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Silvery minnows are present in the Albuquerque Reach (Dudley et al. 2006) and are expected to be present within the action area. The primary adverse effects of the proposed action on the silvery minnow will result from the placement of coffer dams around the channel openings and the mobilization of sediment during construction.

Direct Effects
The proposed action is likely to have direct short-term adverse effects on silvery minnows during final construction activities involved in creating the north and south embayments of the ephemeral channel. Silvery minnows may be harmed or harrassed as the coffer dam or porta dam is installed above the ordinary high water mark. Fleeing from disturbance represents an expenditure of energy that the fish would not have without the project. However, this form of harassment would be short in duration. The potential number of individuals within the immediate vicinity of the equipment affected will likely be relatively low.

Additionally, channel excavation will mobilize sediments and may expose contaminants, impairing water quality. Direct effects to the silvery minnow from excess suspended sediments include: alarm reaction, abandonment of cover, avoidance response, reduction in feeding rates, increase in coughing rate, increased respiration, physiological stress, poor condition, reduced growth, delayed hatching, and mortality (Newcombe and Jensen 1996).

Occasional adverse effects are still likely beyond the construction period. High flows may deposit sediment in or at the openings of constructed channels so that isolated pools containing silvery minnows would be formed. Silvery minnows may become stranded in these isolated pools and die. However, the Route 66 Project is incorporating lessons learned from the Rio Grande Nature Center Project to minimize the potential for isolated pools.

Indirect effects
Sediment disturbance may result in indirect effects to the silvery minnow including the potential smothering and mortality of algae and aquatic invertebrates, depressed rates of growth, reproduction, and recruitment or reduced physiological function of invertebrates. Decreases in primary production are associated with increases in sedimentation and turbidity and produce negative cascading effects through depleted food availability to zooplankton, insects, mollusks, and fish.

Beneficial Effects
The proposed action is expected to establish diverse mesohabitats that support the silvery minnow. Such habitat benefits the species through improved egg and larval retention, increased recruitment rates, and increased survival of both YOY and adult minnows. In the long term, the

project is anticipated to have a beneficial effect on the silvery minnow and its habitat, contributing to the improvement of the status of silvery minnow into the future.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Cumulative effects include:

- Increases in development and urbanization in the historic floodplain that result in reduced peak flows because of the flooding threat. Development in the floodplain makes it more difficult, if not impossible, to transport large quantities of water that would overbank and create low velocity habitats that silvery minnow prefer. Development also reduces overbank flooding favorable for the silvery minnow.

- Increased urban use of water, including municipal and private uses. Further use of surface water from the Rio Grande will reduce river flow and decrease available habitat for the silvery minnow.

- Contamination of the water (i.e., sewage treatment plants, runoff from small feed lots and dairies, and residential, industrial, and commercial development). A decrease in water quality and gradual changes in floodplain vegetation from native riparian species to non-native species (i.e., saltcedar) could adversely affect the silvery minnow and its habitat. Silvery minnow larvae require shallow, low velocity habitats for development. Therefore, encroachment of non-native species results in less habitat available for the silvery minnow.

- Human activities that may adversely impact the silvery minnow by decreasing the amount and suitability of habitat include dewatering the river for irrigation; increased water pollution from non-point sources; habitat disturbance from recreational use, suburban development, and removal of large woody debris.

The Service anticipates that these types of activities will continue to threaten the survival and recovery of the silvery minnow by reducing the quantity and quality of habitat through continuation and expansion of habitat degrading actions.

V. CONCLUSION

After reviewing the current status of the silvery minnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Route 66 Project, as proposed in the May 30 BA and additional correspondences, is not likely to jeopardize the continued existence of the silvery minnow.

Recent sampling data have shown significant increases in numbers of silvery minnow. The restoration project is likely to have a short-term adverse effect on individual silvery minnows, which may be present in the Action Area, but impacts will be minimal. In addition, the proposed action is anticipated to have a long-term positive impact on the species through improvements to quality and availability of suitable habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

Amount or Extent of Take Anticipated

The Service has developed the following incidental take statement based on the premise that the Route 66 Project will be implemented as proposed. Take of silvery minnows is expected in the form of harm and harass during ephemeral channel restoration.

The Service anticipates that up to 394 silvery minnows may be taken during construction of the north and south embayments of the ephemeral side channel during the installation of coffer or porta dams. We base this figure on the assumptions that up to 1.5 acres (6070 m^2) of wetted area may be affected by the deployment of the coffer dams and that silvery minnows are present in the project area at a density of 6.50/100 m^2. Take is likely to occur in the form of harassment.

Additionally, the Service anticipates that up to 1577 silvery minnows may be taken in the channel that is created. Based on the project description we assume that 24,281 m^2 of channel will be constructed. In the event that up to 24,281 m^2 of isolated habitats form in the ephemeral channel, approximately 1577 silvery minnow could be trapped if high flows recontour these channels, block entrances or exits, and strand silvery minnows within the constructed channel. If more than 1577 silvery minnows are found dead in this channel, the level of anticipated take will have been exceeded.

Estimated incidental take may be modified from the above estimated number should other silvery minnow monitoring information, data from silvery minnow rescue operations, or other research indicate substantial deviations from estimated values. In this case, further consultation may be necessary.

Effect of Take
The Service has determined that this level of anticipated take is not likely to result in jeopardy to the silvery minnow. The restoration project is likely to have minimal short-term adverse effects on individual silvery minnows and beneficial long term effects to silvery minnow habitat.

Reasonable and Prudent Measures
The Service believes the following reasonable and prudent measures (RPM) are necessary and appropriate to minimize impacts of incidental take of the silvery minnow:

1. Minimize take of silvery minnow due to habitat restoration activities.
2. Manage for the protection of water quality from activities associated with the restoration project.
3. Continue to work collaboratively with the Service on the Middle Rio Grande Endangered Species Act Collaborative Program.

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

The following terms and conditions will implement RPM 1:

To implement RPM 1, the Corps shall:
1. Report observations of isolation or impending isolation to the Service.
2. Report findings of injured or dead silvery minnows to the Service.
3. The final restoration monitoring report (outlining the results and effectiveness of the side channel restoration and embayment creation) shall be provided to the Service.

To implement RPM 2, the Corps shall:
1. Report to the Service, water quality measurements taken before, during and after construction activity.

2. Schedule, to the extent possible, embayment construction during dry or frozen soil conditions.

To implement RPM 3, the Corps shall:

1. Work to further conduct habitat/ecosystem restoration projects in the Middle Rio Grande to benefit the silvery minnow.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize 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. The Service recommends the following conservation activities:

1. Encourage adaptive management of flows and conservation of water to benefit listed species.

RE-INITIATION NOTICE

This concludes formal consultation on the actions described in the August 2006 biological assessment. As provided in 50 CFR § 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

In future correspondence on this project, please refer to consultation number 22420-2008-F-0125. If you have any questions or would like to discuss any part of this biological opinion, please contact Michelle Cummer of my staff at (505) 761-4715.

Sincerely,

Wally Murphy
Field Supervisor

cc:
Assistant Regional Director (ES), Region 2, U.S. Fish and Wildlife Service, Albuquerque, NM
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Appendix G
Public/Agency Comments and Corps' Response

Commenter	Comment Summary	Corps Response
Bureau of Reclamation (BOR)	"The detailed project report needs to be updated throughout and in key sections like 5.4, with the appropriate language that describes who owns the land and who will manage the project after construction". "In addition, the cost description in section 5.7 mentions how the land will be given a credit value because it is owned by MRGCD, but this could be different if under the ownership of the federal system."	These sections have been updated to reflect the appropriate 'lands agreement' language.
BOR	"Reclamation will wait until the OSE-ISC has reviewed and approved the determinations in the report on net depletions and ET values." "…Reclamation does not have water to meet any net depletions that are determined by the proposed project."	Sections 2.3 and 6.3 regarding Water Quantity have been updated. The New Mexico Interstate Stream Commission (NMISC) is providing water rights for the project.
BOR	"The costs described for the proposed project are mainly for implementation. Reclamation is concerned that other costs for the recurring operation and maintenance of the project, and for costs created from outstanding environmental compliance decisions, and for net depletions are just given a cursory mention." "In section 5.2 of the report it states that the local sponsor will have the responsibility for all operations, maintenance, repair, rebuild, and rehabilitation costs at an estimated $21,000 per year, and we expect that that cost is low." "In section 5.3 there is mention of monitoring and how valuable such is to determine if the new habitat restoration efforts have succeeded, but no costs are mentioned. It also states that the Corps and UNM will be the key entities for the monitoring of the project."	These sections have been updated.
BOR	"The determinations in the BA and the corresponding BO will need to be updated in the EA. For the Rio Grande silvery minnow the determination in the report/EA is	The sections regarding ESA have been updated in coordination with documents received from the Service – the Fish and Wildlife Coordination Act Report and the Biological

	different than what is stated in the BA. The Corps has consulted previously with the Service on other similar projects, including a high flow channel, and will need to incorporate requirements created under the ESA section 7 process, especially if they cause additional costs for the project."	Opinion. These documents are available in Appendices B and F.
BOR	"Both the report/EA and the BA that were reviewed have species description with information that is based on up to the year 2005. Both documents could use updated information from 2006 and 2007."	Both documents have been updated.
New Mexico Interstate Stream Commission (ISC)	"The Rio Grande Compact limits the amount of water that can be depleted in the Middle Rio Grande. Ecosystem restoration projects, such as the Bosque Restoration @ Route 66 project, have the potential to increase depletions from the river system. Any increase in net depletions has the potential to jeopardize the ability of the State of New Mexico to meet its downstream delivery obligations. Therefore, the ISC requires that new projects demonstrate that they will not result in any increases in net water depletions, or that any increases are offset by purchased or leased water rights."	Surface water depletions associated with this project have been estimated and were provided to NMISC for consideration. This information is provided in Sections 2.3 and 6.3.
ISC	"The ISC is particularly concerned about increased evaporation from constructed open water areas including ponds and side channels that divert water from the main river channel. The predicted result of the project described in the Recommended Plan includes high flow side channels that promote water spreading out of the existing river channel during high flows, increased backwater areas, and increased wetland area." "The Final Environmental Assessment (final EA) should address the increased evaporative loss from these actions (the range of and estimated long-term average annual losses), the proposed methods for offsetting those losses, not including theoretical net gains to the system from changes in vegetation,	Surface water depletions associated with this project have been estimated and were provided to NMISC for consideration. This information is provided in Sections 2.3 and 6.3.

	and the entity responsible for offsetting the project depletions." "…ISC staff has recommended to its Director that the ISC become a sponsor for the Bosque Restoration @ Route 66 project…"	
ISC	"The final EA should provide a more comprehensive discussion of projects that have been completed in the area. Several of the project features described in the Draft DPR/EA are proposed for areas where the ISC recently conducted habitat restoration work with Middle Rio Grande Endangered Species Collaborative Program. Coordination with the ISC and the Program will be necessary during development of the final EA to address such issues."	This information has been added.
ISC	"…the ISC suggest that the proposed high-flow side channel that is currently shown starting north of the Central Avenue bridge and then extending beneath the south of the bridge before returning to the river be modified. The USGS maintains a long-term river gaging station at the Central Avenue bridge. So as not to affect the quality of the gage data in the future, we recommend two side channels be constructed rather than one. One side channel would begin and end north of the bridge; the other would begin just south of the bridge."	The Route 66 Habitat Restoration Project high flow channels were modified and are described as follows: Channel 1 - The northernmost channel is upstream of the Central Avenue Bridge in the left overbank and is approximately 1,400 feet long. Channel 2 - The middle channel is downstream of the Central Avenue Bridge in the left overbank and is approximately 1,450 feet long. Channel 3 - The southernmost channel is upstream of the Bridge Street Crossing in the left overbank and is approximately 3,350 feet long. Channels 1 and 2 were originally proposed as one continuous channel beginning upstream of the Central Avenue Bridge and ending downstream of the Central Avenue Bridge. However, there currently exists an important USGS stream gage on the Rio Grande at the Central Avenue Bridge (USGS 08330000 Rio Grande at Albuquerque, NM). Some flow would have bypassed this gage with the originally proposed continuous high flow channel. Therefore, it was important to return all flow to the Rio Grande in channel 1 upstream of

		this stream gage and then flow could again be diverted in channel 2 downstream of this stream gage.
ISC	"…the ISC suggests the project design include additional work along the banks of the river that increase potential silvery minnow recruitment habitat. One example is the area of bosque north of Bridge Street. Bank lowering in the area is one technique that, in addition to the high-flow side channels, could provide better recruitment habitat for the Rio Grande silvery minnow."	Rio Grande bank lowering and bank line destabilization would require removal of bank line jetty jacks. This area was cleared for Jetty Jack Removal via a three party agreement between MRGCD, BOR & USACE. It was deemed that all jetty jacks, except bank line jetty jacks, could be safely removed. The agreement included the condition that the bank line jetty jacks remain. It was further discussed, though not written, that the bank line jetty jacks would be considered for removal at a later time under separate agreement and that some form of mitigation would likely be required. An agreement for removal of bank line jetty jacks has not been reached at this time. This effort will be considered further as part of the ongoing Middle Rio Grande Bosque Restoration Project (currently in feasibility phase).
West Central Alliance of Neighbors (WeCAN!)	"Substantially reduce the extent of crusher-fine improved trails. Especially on the west side of the river, reduce extent of crusher-fine improved trails and replace with soft trails. We request a meeting to review the precise trail plans in order to provide you as precise as possible recommendations for location of soft versus hard surfaced trails."	Crusher fine trails are only proposed at access points. Internal trails will remain 'natural surface.' This has been clarified in Section 5.1.1.d
WeCAN!	"Diminish or eliminate herbicide use. We would like to see a greater emphasis placed on physical control of resprouting non-native vegetation and eliminate the use of herbicide. This would be especially feasible if an ongoing summer youth employment project were used to provide the labor, and this approach would dovetail with education and outreach programs."	Where possible, extraction of root systems of non-native vegetation will be performed. However, in order to treat resprouts of non-natives in the area, and stumps of non-native trees that will be cut, it is imperative to treat them with herbicides in order to reach the ultimate goal of a greatly reduced population of non-native vegetation.
WeCAN!	"Inclusion of area ditches and drains in the Plan. The ditches in our neighborhoods are our connections—literally—to the Rio. Our historic, social, cultural, religious, and recreational ties to the river are practiced and played out via the ditches and we strongly desire the acequias and riverside drains to be	This work was not considered for this project and is beyond the Scope of Work. This issue will be forwarded to MRGCD for their consideration as discussed at a meeting with WeCAN! and the City of Albuquerque on May 23, 2008.

	included in the Plan. To operationalize this, we ask for a full characterization of the social and environmental values of the drains and ditches, and for the Plan to address measures to ensure the improvement and the maintenance of these resources toward the full measure of their potential. Much of this work has already been done and we look forward to working with you on this critical element."	
WeCAN!	"Remove weather/etc. data collection stations. These stations, surrounded by their hostile fences and concertina wire, are inappropriate intrusions in a peaceful place. We desire their removal and the space on which they are located restored to its natural state."	This work was not considered for this project and is beyond the Scope of Work. This issue has been forwarded to the City of Albuquerque Open Space discussed at a meeting with WeCAN! and the City of Albuquerque on May 23, 2008.
WeCAN!	"Storm runoff carried trash. Design and place filters over storm drainage inlets on streets to prevent trash from being flushed into the bosque and river."	This work was not considered for this project and is beyond the Scope of Work. This issue has been forwarded to the City of Albuquerque Open Space discussed at a meeting with WeCAN! and the City of Albuquerque on May 23, 2008. The Corps is working with the City Public Works to look at these areas for improvement under the Middle Rio Grande Bosque Restoration Project (currently in Feasibility Study phase).
WeCAN!	"Provide storm drainage to flow from the Vecinos Park to the drainage ditch and to the river. This would allow more space to be dedicated to the park and minimize the need to dedicate a larger retention pond area in the park."	This work was not considered for this project and is beyond the Scope of Work.
WeCAN!	"Further consideration of boardwalks. In the Plan, the location and engineering of the boardwalks are unclear and we request a more detailed description (perhaps best done in a meeting) so that we may better react to this important feature; we request deferring our reaction to the boardwalks until we better understand the details."	The location and detail of the boardwalk design was shared with WeCAN! at the May 23, 2008 meeting. Positive feedback was received.
WeCAN!	"Clarification of Plan boundaries. Precise boundaries of the Plan area are in places unclear. We wish to	The boundaries of the project are the 121 acres within the bosque as shown on Figure 5.1. The

	ensure the boundaries are clearly and appropriately set to ensure, for example, removal of dumps and residue piles in the area."	boundaries are the riverside drains on either side of the river. This has been clarified in Section 5.
WeCAN!	"In Section 2.10 and Figure 2.16 you label Census Tract 24.01 as the 'Alamosa' neighborhood and the 'Alamosa Census Tract.' Please refer to it in some other way. Alamosa is another neighborhood and has a different Census Tract. Neighborhoods have pride of identity and prefer not being labeled incorrectly."	This section has been updated.
WeCAN!	"In Section 2.11 the text states 'West of the river on the south side of Central Avenue there are still isolated areas of irrigated farmland, pasture and other rural uses.' Please change this to read: 'West of the river on both sides of Central Avenue there are still significant areas of irrigated farmland, pasture and other rural uses. Neighborhoods are working to preserve remaining agricultural open spaces in the face of pressures to develop."	This sentence has been updated.
Middle Rio Grande Conservancy District (MRGCD)	"On Page 65, Section 4.1.1.c, we understand the interest in using a historic reference condition to generate a target mosaic of habitats for the bosque in the project area and the lack of documentation on the specifics of that historic condition prior to 1935. However, there is documentation that the river and floodplain conditions in the Middle Rio Grande by 1935 had been significantly altered by increases in irrigated agriculture and aggradation of the river bed, resulting in waterlogging and, possibly, more wetland and marsh communities than might have existed under more natural conditions. It is important, therefore, that the target mosaic meet current management objectives, conditions and constraints."	Concur. The project is being designed with current constraints and management objectives in mind. This section has been updated.
MRGCD	"Section 4.2.1: Are there any flood control issues with removal of non-bankline jetty jacks adjacent to Bridge Blvd. river crossing?"	This area was cleared for Jetty Jack Removal via a three party agreement between MRGCD, BOR & USACE. It was deemed that all jetty jacks, except bank line jetty jacks, could be safely removed. The agreement included the condition that the bank line jetty jacks remain. It was further

		discussed, though not written, that the bank line jetty jacks would be considered for removal at a later time under separate agreement and that some form of mitigation would likely be required. An agreement for removal of bank line jetty jacks has not been reached at this time. This effort will be considered further as part of the ongoing Middle Rio Grande Bosque Restoration Project (currently in feasibility phase).
MRGCD	"Section 4.2.1.c: I am not clear on which of the areas targeted for debris removal are or could be MRGCD stockpile sites. Coordination with MRGCD staff is needed to identify which sites could have debris removed and relocated or disposed."	These areas have been identified and coordinated with MRGCD. This has been clarified in this section.
MRGCD	"I would like to see some analysis on whether the design of proposed high flow channels could be modified to allow seasonal flooding of larger areas outside the channel and the impacts to flood control structures and depletions. This could increase the habitat value and sustainability of the restoration project."	All three channels were designed for a target design flow of 3,500 cfs in the Rio Grande. All three channel sections will have a bottom width of 10 feet with 3:1 side slopes. The resulting flow rates in the Route 66 Habitat Restoration Project Channels are approximately 10 cfs with velocities that average one (1) fps. Under this condition water depths in the Route 66 Habitat Restoration Project Channels will vary from one half (.5) to one (1) foot. All three channels were also evaluated at flows in the Rio Grande of 6,000 cfs (Rio Grande bank full flow) and 7,750 cfs (100 year regulated peak at Albuquerque). These flows were evaluated for the Route 66 Habitat Restoration Project Channels to determine flow depths and/or channel overtopping. The results of these evaluations are summarized in Sections 2.2 and 6.2 As shown in the analysis, the channels will overtop during high flow events above 6000 cfs. This will induce fairly extensive overbank flooding between the levee and active channel of the Rio Grande. This area would not otherwise flood because the Rio Grande bankline is built up by jetty jacks and vegetation. As has been discussed in earlier meetings, it is recommended that during construction any excess excavation be spoiled in low areas next to the

		levee to prevent levee saturation.
MRGCD	"One MRGCD outfall (Sunset) is targeted in the Preferred Alternative for modification to improve their habitat value. In general, the MRGCD has rejected requests to make improvements within, and modify the structures of, return flow channels or 'wasteways' due to the potential for necessary MRGCD maintenance and operations to negatively impact the restoration project or ESA species. This is an important point because the removal of this project from the proposed action would reduce wetted habitats and could reduce the overall habitat value of the project. The specifics of the project need to be discussed and approved by the MRGCD."	In coordination with MRGCD, this feature of the project will move ahead as part of the Preferred Alternative.
MRGCD	"Section 4.2.2.b: If the proposed high flow side channels would be inundated at 2500-3500 cfs, what are the estimated channel capacities?"	The proposed high flow channels are expected to flow at approximately 10 cfs when the Rio Grande is flowing at 3500 cfs.
MRGCD	"Same section: Has the proposed Atrisco Diversion Channel project been eliminated due to the ISC's planned work in that area?"	Partly. It was actually eliminated due to cost during the run of the Incremental Cost Analysis (Section 4).
MRGCD	"Section 4.2.3: Salt grass and Yerba mansa may not establish from seed. I would also include Vine mesquite and Muhlenbergia grasses for areas with high water tables."	These species can be included in the seed mix.
MRGCD	"Same section: Has 500 stems per acre been determined to be the optimal planting densities for habitat where no native understory currently exists? What is this number based on?"	This is based on previous projects, especially willow swale construction, and is still being monitored to help determine optimal densities for various animal groups.
MRGCD	"I don't believe fuel breaks need to or should be void of woody plants. Perhaps some low growing shrubs could be seeded along with grasses or sparse shrubs or trees could be added after grass establishment. I also don't believe a 150 foot fire break is optimal, especially for emergency access and to stop a fire. I would prefer to see larger areas of 2-5 acres of bosque savanna/grasslands, especially adjacent to bridges and high or emergency access points, which are large enough to provide some habitat."	These areas will be chosen based upon what is naturally there. Areas of native grasses could be greater than 2-5 acres and could be utilized as a fire break. No native woody vegetation would be cleared in order to make a fuel break since a fair amount of thinning on non-native vegetation has taken place.
MRGCD	"Section 4.2.3.b: Parametrix in some	The willow swales will be made as

	recent projects is advocating developing shrub thickets and swales of 8-10 acres."	large as they can be made between existing native cottonwoods and other native trees. Shrub thickets will be created under the canopy and again, size will vary depending upon available space.
MRGCD	"Same section: I would include wolfberry in the planting list for open areas with more clay and saline soils."	This species is included in the shrub planting list.
MRGCD	"Page 94 Figure 4.16: I can't discern stabilized from unstabilized trails. I recommend removing the middle, north-south trail at Central NE – in my opinion there are too many trails proposed for that small area."	This figure has been left in for background information but the trails can be better viewed in the Preferred Alternative figure which has been updated, Figure 5.1.
MRGCD	"Section 4.2.4: Stabilized trails too close to the river bank or high flow channel may have to be relocated. Is it possible to create a wildlife watching area at the Tingley wetlands?"	Some trails (in coordination with high-flow channel location) have been relocated through future design.
MRGCD	"Same section: Two boardwalks in Solution Area H. seem excessive in terms of proximity and effects to the levees and MRGCD operations. The best location needs further discussion."	There is only one boardwalk planned in this area. This section has been updated.
MRGCD	"Same section: I would still advocate for information kiosks at major bosque access points that provide regulatory, seasonal, interpretive and emergency information. I thought we had this discussion in previous meetings?"	Informational interpretive signs will be provided throughout the project area at key locations.
MRGCD	"Section 5.1: The preferred alternative (Best Buy Plan #5) proposes restoration features in only 5 of 11 Solution areas. How did Plan #5 fare in terms of geographic scope and impact compared with other plans."	The information is available in Technical Appendix E.
MRGCD	"Section 5.5.1: The ISC has expressed interest in using credit water from Elephant Butte and storing it upstream to offset depletions from proposed restoration features. How will depletions be offset if no credit water is available?"	The NMISC has agreed to offset depletions.
MRGCD	"Section 5.1.1.d: What will be the procedure for rehabbing unwanted trails?"	Seeding and revegetation.
MRGCD	"Section 5.1.3: I think chipping woody material and leaving it on the forest floor is not a viable option	Corps specifications dictate that mulch left on the ground should be no more than 2 inches deep. This has

	from a fire management standpoint. I would only support this in very limited sections with protection for trees and separated by areas with no mulch. I also believe that 4 inches is too deep for mulch, 2 inches or less is optimal."	been updated.
MRGCD	"Same section: What is the effect of root ripping on annual weeds?"	Root ripping/extraction would only be used in ideal locations. Annual weeds and monitoring/management of them will be an issue for all types of treatment and would occur as part of the Operations, Maintenance and Monitoring by the local sponsor.
MRGCD	"Same section: Did MRGCD or Open Space Division agree to take dirt spoil or other waste generated by these projects? A contingency plan needs to be developed in case material is not needed or can't be stored by the managing agencies."	Spoil from construction will be the property of the contractor to be disposed of.
MRGCD	"Section 5.3: What role will the Corps of Engineers play in monitoring and adaptive management for this project and for how many years? What is the local sponsor's fiscal and other responsibilities for these activities, including writing a monitoring plan? Does the federal funding request include funding for the Bosque Ecosystem Monitoring Program (BEMP)?"	Under the 1135 program, the Corps can participate in monitoring and adaptive management for 3-5 years at a 1% cost of the construction costs. Funding of particular monitoring programs has been accomplished through various bosque restoration project sources in the past.
MRGCD	"Table 6.1: If we increase the acreage of grasslands for fuel breaks, is it possible to increase the acreage of wetted habitat considering depletions and cost?"	This section and the net depletions discussion have been updated and do not include vegetation in the calculations (per the State Engineer's Office).
MRGCD	"Section 6.6.1: I believe we should remove Siberian elm as is it a prolific seeder. If we desire to leave non-natives, Russian olive and mulberry should be targeted due to their wildlife food value."	Concur. This section has been updated (and is now Section 6.7.1).
MRGCD	"Same section: What is the estimated impact in terms of habitat value, of wetted habitats on other proposed community types?"	Due to a lack of wet habitat (types 5 and 6), these vegetation types were given great habitat unit values. Therefore, there would be a higher habitat value in these areas by implementing the proposed project.
MRGCD	"Section 6.6.2: This section recommends clustering small patches to create larger, contiguous habitats and reducing the number of edges adjacent to open areas to reduce the	Yes, this matches up with the landscape mosaic guidelines as well.

	threat of cowbird parasitism. Does the preferred alternative mosaic accomplish this?"	
MRGCD	"Section 6.9.1: I would like to see more description of the economic benefits currently accruing from the Biopark and Tingley Ponds and how the project would enhance that."	Since the preferred alternative only includes areas on the west side of the river and the small area at Central NE, there will be no direct link to the BioPark project and therefore, economic benefit in relation to that project was not analyzed.
MRGCD	"Section 6.11: What is the effect of reducing trail mileage on recreation access and use?"	The reduction in overall mileage is to merely create a single consistent trail system within the project area, rather than a number of 'spur' trails that don't all connect.
MRGCD	"Section 6.13: Trails should be designed to give users a good visual, recreational and ecological experience and/or meet specific interpretive goals."	Concur.
MRGCD	"Section 6.15: I would like to see a reference to the Albuquerque weed management plan and recommendations produced by Parametrix."	Concur. This section has been updated.
MRGCD	"Section 6.18: Cumulative impacts – I would like to see the following addressed: a. Cumulative effects of this project and others on water quantity (at least how will it be addressed and by whom?) b. A description of how much revegetation has already taken place and how this was factored into future plant community and stand structure estimates. Given the current state of the plant communities in the project area, how would additional proposed treatments affect other resources? c. A description of how this plan is being coordinated with other management plans and activities. I think this discussion and a more complete picture of the	This Section was updated.

	range of activities is missing from section 6.18.1."	
MRGCD	"Section 9 references: I'm a bit surprised that the Bosque Landscape Alteration Strategy itself and the Fuels Reduction Study (Finch et al.) were not referenced."	These references (and some other newer ones) have been added.
New Mexico Department of Game and Fish (NMDGF)	"The EA should describe how the Route 66 Bosque Restoration Project is consistent with, and meets, MRGESA Collaborative Program goals, objectives, and priorities. A reader unfamiliar with the Collaborative Program would probably not be able to determine how this project relates to the Program."	The Ecosystem at Route 66 Project is a Corps 1135 Ecosystem Restoration funded project and is not an MRGESCP funded project. It does overlap geographically with MRGESCP projects and is coordinated with the appropriate entities.
NMDGF	"The anticipated effects of climate change on water availability in the Rio Grande is not analyzed or mentioned in the EA. Failure to address climate change is a major defect in the analysis."	A study of this magnitude is well beyond the Scope of Work for this project. The design flow hydrograph used for design was developed from a flow frequency study based on post Cochiti gage data. Surface water depletions associated with this project have been estimated and provided to NMISC for consideration. Adaptive management of constructed features may need to consider this in the future as it affects water availability and compact deliveries.
NMDGF	"Page19/Flood Control Act of 1948/first Paragraph: This paragraph was already presented on Page 15. If the information is pertinent here, NMDGF suggests paraphrasing the original paragraph."	This section has been updated.
NMDGF	"Page 20-21/Miscellaneous Projects: Would it be informative to indicate projected completion dates for the Drinking Water Project? Pipelines are scheduled for completion in 2007, water treatment plant scheduled for completion in 2008, according to the San Juan-Chama Drinking Water Project web site: http://www.sjcdrinkinwater.org/"	Noted.
NMDGF	"Page 25/Section 2.2.3.c Hydrology/Paragraph 2: Drain return flows also affect river flow below outfalls. This effect should be noted, since these return flows are considered important to the Rio Grande silvery minnow."	The project includes reactivation of the Gonzales Drain Wasteway to the Rio Grande. The return flow would be active during the irrigation season (typically late March to early October) or on average 180 days annually. The Gonzales Drain Wasteway within the Bosque that

		will be reactivated is approximately 850 feet long by 20 feet wide. This results in a total water surface area of approximately 0.4 Acres. This feature could provide benefit for the Rio Grande silvery minnow. The surface water depletion associated with this feature was estimated and provided to NMISC for consideration as noted above. This section has been updated.
NMDGF	"Page 25/Section 2.2.3.c Hydrology/Paragraph 5/ last sentence: The inclusion/meaning of this section is unclear."	This section has been updated.
NMDGF	"Page 28/Section 2.2.3.c Hydrology/Paragraph 2/ first sentence: Suggested editing: 'The last major flood in the Study Area was in 1941, and the existing mature cottonwoods' age structure indicates that most cottonwood trees in the bosque along the Albuquerque reach of the MRG germinated following that flood event.'"	Concur. The sentence has been updated.
NMDGF	"Page 28/Section 2.2.3.c Hydrology/Paragraph 2: Is there evidence/documentation that the 1985, 1992 and other overbanking events resulted in cottonwood regeneration?"	These flows may or may not have resulted in cottonwood regeneration and therefore, it is not stated as such.
NMDGF	"Page 28/Section 2.2.3.c Hydrology/last paragraph: There are consumptive uses other than crops that result in depletions."	Noted.
NMDGF	"Page 39/Section 2.7.2 Fish and Wildlife/Paragraph One/first sentence: Suggested editing: 'An estimated 407 species of vertebrates may occur in aquatic, semi-aquatic, or riparian habitat in Bernalillo County, based on a query of the Biota Information System of New Mexico (accessed March 2008).' Chuck Hayes, BISON Coordinator for the Department, ran a query to verify the number."	Concur. Sentence updated.
NMDGF	Page 39/Section 2.7.2 Fish and Wildlife/Paragraph 4: "The correct taxonomy for 'New Mexican jumping mouse' is: New Mexico meadow jumping mouse (*Zapus hudsonius luteus*). This reference and all other references to this mouse in the EA need to be corrected."	Concur. Updated.

NMDGF	Page 39/Section 2.7.2 Fish and Wildlife: "Several reports have been published since those cited on herpetofauna of the Middle Rio Grande bosque (these studies encompassed the Study Area, although not all did sampling within the Study Area). This literature should be reviewed by the authors of the EA": Stuart, J.N. 1995. Notes on aquatic turtles of the R Io Grande drainage, New Me3xico. Bull. Maryland Herpetological Society 31:147-156. Stuart, J.N. 2000. Additional notes on native and non-native turtles of the Rio Grande drainage basin, New Mexico. Bull. Chicago Herp. Soc. 35:229-235. Chung-MacCoubrey, A.L. and H.L. Bateman. 2006. Herpetological Communities of the Middle Rio Grande Bosque: What Do We Know, What Should We Know, and Why? Pg. 57-66. In Aguirre-Bravo, C.; Pellicane, Patrick J.; Burns, Denver P.; and Draggan, Sidney, Eds. 2006. Monitoring Science and Technology Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere. 2004 September 20-24; Denver, CO. Proceedings RMRS-P-42CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 990 pp. Chung-MacCoubrey, A. and H. Bateman. 2006. Bosque Restoration Effects on Bats and Herpetofauna. Final Report to Joint Fire Sciences Program. USDA Forest Service Rocky Mountain Research Station, Albuquerque. In Finch, D.M., A. Chung-MacCoubrey, R. Jemison, D. Merritt, B. Johnson, and M. Campana, Principal Investigators. Effects of Fuel Reduction and Exotic Plant Removal on Vertebrates, Vegetation and Water Resources in the Middle Rio Grande, New Mexico. Final Report to the Joint Fire Sciences Program. Prepared by	Concur. This section has been updated with some of these more recent references.

	the USFS Rocky Mountain Research Station, Albuquerque. Bateman, H.L., A. Chung-MacCoubrey, and H.L. Snell. 2008. Impact of non-native plant removal on lizards in riparian habitats in the Southwestern United States. Restoration Ecology 16:180-190. Several reports have been published in the last few years on birds of the Middle Rio Grande bosque: Finch, D.M. and D. Hawksworth. 2006. Bird Species and Densities in Relation to Fuel Removal Treatments. Final Report to Joint Fire Sciences Program. In Finch, D.M., A. Chung-MacCoubrey, R. Jemison, D. Merritt, B. Johnson, and M. Campana, Principal Investigators. Effects of Fuel Reduction and Exotic Plant Removal on Vertebrates, Vegetation and Water Resources in the Middle Rio Grande, New Mexico. Final Report to the Joint Fire Sciences Program. Prepared by the USFS Rocky Mountain Research Station, Albuquerque. Smith, D.M., J.F. Kelly, and D.M. Finch. 2006. Wildlife, Exotic Vegetation, and Breeding Bird Habitat in the Rio Grande Bosque. Pg. 230-237. In Aguirre-Bravo, C.; Pellicane, Patrick J.; Burns, Denver P.; and Draggan, Sidney, Eds. 2006. Monitoring Science and Technology Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere. 2004 September 20-24; Denver, CO. Proceedings RMRS-P-42CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 990 pp. <u>Additionally</u>: • Gail Garber (Hawks Aloft) has conducted bird surveys at Tingley Ponds. • Elizabeth Milford, TNC, may have done bird surveys associated with riparian	

	surveys in the Study Area.	
NMDGF	Page 42/Section 2.8 Special-Status Species/Neotropic Cormorant: Suggested editing: "American Ornithologists' Union, not Ornithology Union."	Concur. Updated.
NMDGF	Page 42/Section 2.8 Special-Status Species/Common Black-Hawk: "What is the date of one occurrence of nesting Common Black-Hawk in the vicinity of the Study Area?" The following paper should be used and cited: Sadoti, G. 2008. Nest-site selection by Common Black-Hawks in the southwestern New Mexico. J. Field Ornithology 79:11-19.	The last known nest occurred in 1989 in the south end of the Rio Grande Valley State Park (south of Rio Bravo). This section has been updated.
NMDGF	Page 42/Section 2.8 Special-Status Species/Black Tern: "The Black Tern migrates along the Middle Rio Grande through the Study Area, but does not nest in the Study Area."	Concur. Section updated.
NMDGF	Page 43/Secion 2.8 Special-Status Species/Southwestern Willow Flycatcher: "This flycatcher occurs in other drainages in addition to those listed, such as the Mimbres River and Ponil Creek. The Corps should check recently published articles and reports for the most recent count of Southwestern Willow Flycatcher in New Mexico. These data are available on the Southwestern Willow Flycatcher website. Also, a more precise location or description of the nearest known breeding site form the Study Area should be included."	Concur. This section has been updated.
NMDGF	Page 43/Secion 2.8 Special-Status Species/Bell's Vireo: "Based on our understanding of the lower, middle and upper Gila Valley, Bell's Vireo also occur in the middle Gila Valley."	Concur. Section updated.
NMDGF	Page 44/Section 2.8 Special-Status Species/New Mexican Jumping Mouse: "The correct common name is New Mexico meadow jumping mouse. Genus is *Zapus*, not *Zappus*. Specific epithet is *hudsonius*, not *hudsonia*." Paragraph 2: "More recent sampling in the Study Area failed to find the species there (Campbell et al. 1997).	This section has been updated per information from USFWS (see below).

	According to Jim Stuart, who was involved in the Campbell mammal survey, they failed to find the species because they sampled in October, which is after the time that jumping mice go into hibernation."	
NMDGF	Page 70/4.2.1.a Jetty Jack Removal (Measures 1.0-1.10)/Paragraph 2/last sentence: "NMDGF recommends that the Corps describe the earlier types of bank stabilization that are evident in the Study Area."	Noted.
NMDGF	Page 86/4.2.3 Bosque Features (Feature 7, 8)/2) Bare root container or plug planting with native shrubs: "Reconsider the recommendation to plant chamisa (*Chrysothamnus nauseosus*), as it will likely spread and prevent the growth of other native species."	Disagree. Since the focus of the project is 'riparian restoration' the area will be replanted with native riparian shrubs. Chamisa is not present in the bosque in this area and is considered an upland species.
NMDGF	Page 97/Section 4.3 Habitat Units/first paragraph: "Assigning on Habitat Unit for each acre of restoration is not a valid accounting method for quantification of expected improvements in targeted functions related to the project objectives. It is a simple calculation, but is not accurate because is assumes all restoration measure produce the same habitat value on each acre. An appropriate methodology would be use of Habitat Evaluation Procedures developed by the U.S. Fish and Wildlife Service, or Hydrogeomorphic (HGM) assessment models (none exists for the Middle Rio Grande), or a rapid assessment method (non exists for the Middle Rio Grande). Development and application of a HGM model, rapid assessment model or HEP would require a considerable commitment of time and resources." "If the Corps is not willing to use a valid method, this section should explain the exclusion and provide justifications for using a 'one HU for one acre' approach."	Though not described in this summary, features with a 'water' component were weighted to have a higher value. The habitat value justification is supported by a HEP type of analysis. These weights were added during the run of the Incremental Cost Analysis. This is future described in Technical Appendix E. This is a valid approach per Corp's regulations.
NMDGF	Page 99/Secion 4.4.1.a Process/first paragraph/line 6-8: "The process of combining the average annual habitat acreage created and the average annual dollar cost of the restoration activities makes it difficult to achieve	Again, this is a valid assessment that has been approved by the South Pacific Division of the Corps. A higher level of evaluation and detail has been considered and is being used in the Middle Rio Grande

	habitat improvement/restoration objectives. If all acres of restoration are considered equal in habitat value, then it appears that the decision comes down to choosing the combination that is the least costly, with no regard for the value of the restored habitat." "NMDGF is disappointed that a valid habitat assessment method is not considered, which would represent responsible management, good stewardship and sound restoration."	Bosque Feasibility Study. We appreciate your input.
NMDGF	Page 115/Section 5.1.3 Implementation Process/ Paragraph 4/Line 6: "Rather than 'waste,' a better term would be 'overburden' or 'excavated material.'"	Concur. Updated.
NMDGF	Page 115/Section 5.2 Operation and Maintenance Considerations/Item 2) Replacement of native plants that fail to become established: "What percent survival does the Corps plan to use in monitoring mortality and deciding to replant? On page 86, it is mention that AOSD obtained 90 percent success rate of pole plantings. This level of survival likely represents the maximum possible to obtain for pole plantings in the bosque in this reach. The Corps will need to apply some measure of survival in order to know when replanting is necessary. NMDGF suggests using a level of survival less than 90 percent, measured over the duration of the establishment period, for pole plantings. Survival of bare root container of plug plantings may differ from survival of pole plantings and may need a different measure of survival." "The measure of plant survival used should reflect site productivity, which is largely dependent on distance to the water table for phreatophytes. If the Corps is planting poles across the bosque in sites where the distance to the water table varies, then the applicable measures of plant survival should also vary. Adjusting the measure of success applied to reflect distance to	Concur. The exact percentage of survival for monitoring and replacement purposes will be determined during the development of the Operations, Maintenance, Repair, Rebuild and Rehabilitate (OMRR&R) Manual. We appreciate your input.

	water table and other applicable environmental variables that affect plant survival may be necessary. Survival of planted material also depends not only on the condition of the plants at the time of planting but also how the material is planted. Therefore, both the plant condition prior to planting and the planting technique should be monitored."	
NMDGF	Page 116/5.3 Monitoring and Adaptive Management: "Adaptive management needs to be described in more detail. For example, will monitoring results be used to identify needed maintenance of a restoration element on the project?"	Again, this will be developed in the OMRR&R Manual.
NMDGF	Page 122/Table 6.1 Net Depletion Analysis: "Is the State Engineer going to accept this analysis? The State Engineer has indicated that riparian ET is a minor issue in net depletion, but that evaporation from newly created water surfaces is a significant source of depletion. The High-Flow Channels will increase water surfaces and evaporation and Swales may increase water surface and evaporation. Section 4.2.2.b High-Flow Channels (Measures 5.0-5.6) (Pages 80-81) indicates that proposed High-Flow Channels would be located outside the active channel. If so, these features would be subject to a net depletion analysis. If a net depletion results, the Corps or MRGCD will need to cover the depletion with a water right, or use water from the Strategic Water Reserve to cover the depletion. The likelihood and consequences of net depletions resulting from High-Flow Channels should be discussed."	This section has been updated based upon coordination with the NMISC.
NMDGF	Page 127/Section 6.6.2 Fish and Wildlife/Paragraph 4: "The statement about threats to Southwestern Willow Flycatcher from the Brown-headed Cowbird cites references from 1995 and 1998. Recent research conducted by the BOR on the MRG provides a clearer understanding or perceived threats from Cowbirds to Southwestern Willow Flycatchers. This discussion should be updated based on that recent information."	Concur. This section has been updated.

NMDGF	Page 129: Rio Grande Silvery Minnow/Paragraph one: "What is the meaning of the following statement: 'blocking of work zones to the river when constructing the High-Flow Channels?' Potential impacts to RGSM could take place when the upper and lower ends of High-Flow Channels are opened to the river channel because opening the channel would allow access by fish into the work site. NMDGF recommends discussion with the BOR about how they prevent access by RGSM into High-Flow Channels when opening the upper and lower ends. If this statement means 'blocking of work zones' to implement measures that the BOR uses, then the language used needs to clear. It is not likely that the U.S. Fish and Wildlife would consider the existing description of effects and BMPs to be adequate."	This section has been updated based upon construction of the high-flow channel at the Rio Grande Nature Center.
NMDGF	Page 129/Southwestern Willow Flycatcher/Paragraph one: "This paragraph should be moved to, or repeated on, Page 43, Section 2.8 Special-Status Species, Southwestern Willow Flycatcher."	Concur. This section has been updated.
NMDGF	Page 136/Paragraph 3/Line 4-5: "The statement 'Removal of the non-native vegetation and construction of water-related features may allow the floodplain to expand' is not correct. The floodplain extends laterally beyond the levees and its extent will not be affected by this project."	Concur. Updated.
NMDGF	Page 137/Section 6.18.3 Water Quality: "Sentence reads: 'For this Preferred Alternative to have cumulative effects on water quality in the Rio Grande, a threshold in concentration of some pollutant, due to the effects of the Preferred Alternative, would have to be exceeded. In this scenario, the additive effect of a pollutant due to actions taken in the Preferred Alternative combined with existing water quality conditions would have to exceed a toxicity level or water quality standard.'" "NMDGF has not seen this approach to cumulative effects analysis before.	Concur. Section updated.

	What is the source of this approach (it is not found in NEPA regulations)? The purpose of a cumulative effects analysis is to identify chronic, slowly increasing effects from combined piecemeal actions that would not reach a threshold of significance. The above statement suggests confusion between cumulative effects and significant effects."	
United States Fish and Wildlife Service (USFWS)	"In section 2.4 – there are other relevant water quality standards that are applicable and they should be noted or referenced – such as the general criteria set out in Subsections A, B, C, D, E, G, H and J of 20.6.4.13 NMAC, and the provision set out in Subsection E of 20.6.4.14 NMAC are applicable and relevant."	Noted as applicable.
USFWS	"The use of silt fences when working adjacent to the bank of the river are anticipated. The US Fish and Wildlife Service (Service) recommends use of silt fences without lead weights. The use of silt fences (without lead weights) would be one measure to comply with the Best Management Practices and with all applicable Federal, state and local regulations that should result in no adverse impact to water quality."	Concur. This language was added.
USFWS	"The Service designated the jumping mouse as a "candidate species" on December 6, 2007 (72 FR 69034). We request that the U.S. Army Corps of Engineers (USACE) use this designation in section 2.8 (page 41 and 44) and analysis throughout the next version of the DPR/EA."	Concur. Language related to the New Mexico meadow jumping mouse has been updated.
USFWS	"In section 6.6.2, the Draft DPR/EA states 'The amount of habitat for mammal species associated with wetlands in the bosque would expand. These species include western harvest mouse, plains harvest mouse, house mouse, tawny-bellied cotton rat, and New Mexican jumping mouse.' However, in section 6.7 the Draft DPR/EA states the 'The Preferred Alternative would not impact existing wetland habitat. Therefore, the Preferred Alternative would not affect the New Mexican jumping mouse.' The Service contends that if the amount of	Concur. Updated.

	jumping mouse habitat expands, it would be beneficial for the jumping mouse, rather than have 'no effect.'"	
USFWS	"The definition of 'non-functional jetty jacks' in section 4.2.1 (page 71) should be moved to section 2.2.2 (before the last sentence of the second paragraph, page 16)."	Concur. Moved.
USFWS	"The formation of backwater and side channels would create minnow habitat, but could also create areas that become disconnected from the main channel and trap minnows. The Service recommends that periodic maintenance and monitoring of backwater and side channels be included to identify and reduce impacts to minnows that may be trapped in the created habitat."	Concur. Period maintenance is anticipated and the design of the channels has been updated per lessons learned at the Rio Grande Nature Center channel. Therefore, interior embayments would not be constructed in these high-flow channels (see USFWS Biological Opinion, Appendix F).
USFWS	"Periodic dredging and dirt work planned throughout the life of the project could increase sediment in the water for a short period of time. The Draft DPR/EA mentioned that there will not be work in the main channel, but it is not clear if periodic dredging will be done in the wetted channel throughout the life of the project. The Service recommends that specific information be given regarding any work that could increase sedimentation and impact water quality or create areas that could trap minnows."	Concur. Sediment may accrue and have to be removed to allow the channel to function properly. This sediment removal would take place in the winter time when there are no flows in the channel. Sediment would be removed from the site.
USFWS	"Vegetation removal would need to be completed outside of migratory bird and flycatcher migration season (April 15-September 15). Areas where migrant flycatchers have been recorded should be evaluated closely to determine if the vegetation should remain. The Service recommends that the restoration plan consider establishing alternative habitat in areas where non-native vegetation is currently providing habitat. The native habitat should be available for migrating flycatchers prior to removing all non-native vegetation. The Service also recommends that USACE consider using a phased approach in removing non-native and crating native flycatcher habitat."	Concur. The 'willow swale' feature is one of the main tools for replacing non-native mid-canopy vegetation with native vegetation preferred by bird species, especially the Southwestern Willow Flycatcher. Much of the non-native vegetation (large trees and mid-canopy) has been removed over the past 4-5 years. Some native vegetation has been planted and some is coming back on its own. The implementation of this project will be the next phase to increasing the amount of native plants in the area.

NEW MEXICO INTERSTATE STREAM COMMISSION

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April 18, 2008

U.S. Army Corps of Engineers
Albuquerque District
Environmental Resources Section
Attn: CESPA-PM-LE; Mrs. Ondrea Hummel
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435

Re: New Mexico Interstate Stream Commission Comments on the Draft Detailed Project Report and Environmental Assessment for the Bosque Revitalization @ Route 66 Project, Albuquerque, Bernalillo County, New Mexico

Dear Mrs. Hummel:

The New Mexico Interstate Stream Commission (ISC) submits the following comments on the Draft Detailed Project Report and Environmental Assessment for the Bosque Revitalization @ Route 66 Project, Albuquerque, Bernalillo County, New Mexico (Draft DPR/EA). The ISC supports the proposed project with the few caveats outlined below. A number of the proposed project habitat restoration features will build on and potentially increase the success of habitat restoration work planned or already constructed by the ISC in nearby areas.

As you are aware from earlier correspondence on the Rio Grande Nature Center Project, the ISC is charged by New Mexico law with investigation, protection, conservation and development of New Mexico's water resources, both interstate and intrastate. In the Rio Grande basin, the ISC performs numerous activities, some of which may be affected by the proposed project. Those activities include, but are not limited to, monitoring water operations of the Bureau of Reclamation and U.S. Army Corps of Engineers, conducting annual accounting of native Rio Grande and San Juan Chama Project water, assessing and determining Rio Grande Compact compliance, and addressing federal natural resource policy issues that may impact the river system. We reviewed the Draft DPR/EA with the above activities in mind.

The Rio Grande Compact limits the amount of water that can be depleted in the Middle Rio Grande. Ecosystem restoration projects, such as the Bosque Restoration @ Route 66 project, have the potential to increase depletions from the river system. Any increase in net depletions has the potential to jeopardize the ability of the State of New Mexico to meet its downstream delivery obligations. Therefore, the ISC requires that new projects demonstrate that they will not result in any increases in net water depletions, or that any increases are offset by purchased or leased water rights.

The ISC is particularly concerned about increased evaporation from constructed open water areas including ponds and side channels that divert water from the main river channel. The predicted result of the project described in the Recommended Plan includes high flow side channels that promote water spreading out of the existing river channel during high flows, increased backwater areas, and increased wetland area.

The Final Environmental Assessment (final EA) should address the increased evaporative loss from these actions (the range of and estimated long-term average annual losses), the proposed methods for offsetting those losses, not including theoretical net gains to the system from changes in vegetation, and the entity responsible for offsetting the project depletions. As you are aware, ISC staff have recommended to its Director that the ISC become a sponsor for the Bosque Restoration @ Route 66 project specifically by offsetting up to 20 acre-feet of depletions per year for at least 10 years. ISC staff will recommend that the ISC approve such a sponsorship at its May 2008 meeting.

The final EA should provide a more comprehensive discussion of projects that have been completed in the area. Several of the project features described in the Draft DPR/EA are proposed for areas where the ISC recently conducted habitat restoration work with the Middle Rio Grande Endangered Species Collaborative Program. Coordination with the ISC and the Program will be necessary during development of the final EA to address such issues.

Additionally, the ISC suggests that the proposed high-flow side channel that is currently shown starting north of the Central Avenue bridge and then extending beneath and south of the bridge before returning to the river be modified. The USGS maintains a long-term river gaging station at the Central Avenue Bridge. So as not to affect the quality of the gage data in the future, we recommend two side channels be constructed rather than one. One side channel would begin and end north of the bridge; the other would begin just south of the bridge.

Lastly, the ISC suggests the project design include additional work along the banks of the river that increase potential silvery minnow recruitment habitat. One example is the area of bosque north of Bridge Street. Bank lowering in the area is one technique that, in addition to the high-flow side channels, could provide better recruitment habitat for the Rio Grande silvery minnow.

Please do not hesitate to contact me at (505) 827-6160 or Grace Haggerty at 505-765-2053 should you have any questions. Thank you for the opportunity to comment on this project.

Sincerely,

Rolf Schmidt-Petersen

Rolf Schmidt-Petersen, Chief, Rio Grande Basin Bureau
New Mexico Interstate Stream Commission

cc:

Estevan R. López, NM ISC Director
Kevin Flanigan, NMISC-
Peter Wilkinson, NMISC
Page Pegram, NMISC
Grace Haggerty, NMISC
Rio Grande file
Linda Tenorio, NMISC

Hummel, Ondrea C SPA

From: Yasmeen Najmi [Yasmeen@mrgcd.us]

Sent: Friday, April 18, 2008 7:35 PM

To: Hummel, Ondrea C SPA

Cc: Subhas Shah; Schmader, Matthew F.; Jake Grandy; David Gensler; Ray Gomez; Lundahl, Anders; Haggerty, Grace M., OSE

Subject: MRGCD comments on Rte. 66 project report and EA

Ondrea,

Thanks for the opportunity to comment on the ***Bosque Revitalization at Route 66 Draft Detailed Project Report and Environmental Assessment.*** The following comments are submitted by me on behalf of the Middle Rio Grande Conservancy District (MRGCD).

1. On Page 65, Section 4.1.1.c, we understand the interest in using a historic reference condition to generate a target mosaic of habitats for the bosque in the project area and the lack of documentation on the specifics of that historic condition prior to 1935. However, there is documentation that the river and floodplain conditions in the Middle Rio Grande by 1935 had been significantly altered by increases in irrigated agriculture and aggradation of the river bed, resulting in waterlogging and, possibly, more wetland and marsh communities than might have existed under more natural conditions. It is important, therefore, that the target mosaic meet current management objectives, conditions and constraints.

2. Section 4.2.1: Are there any flood control issues with removal of non-bankline jetty jacks adjacent to Bridge Blvd. river crossing?

3. Section 4.2.1.c: I am not clear on which of the areas targeted for debris removal are or could be MRGCD stockpile sites. Coordination with MRGCD staff is needed to identify which sites could have debris removed and relocated or disposed.

4. I would like to see some analysis on whether the design of proposed high flow channels could be modified to allow seasonal flooding of larger areas outside the channel and the impacts to flood control structures and depletions. This could increase the habitat value and sustainability of the restoration project.

5. One MRGCD outfall (Sunset) is targeted in the Preferred Alternative for modification to improve their habitat value. In general, the MRGCD has rejected requests to make improvements within, and modify the structures of, return flow channels or "wasteways" due to the potential for necessary MRGCD maintenance and operations to negatively impact the restoration project or ESA species. This is an important point because the removal of this project from the proposed action would reduce wetted habitats and could reduce the overall habitat value of the project. The specifics of the project need to be discussed and approved by the MRGCD.

6. Section 4.2.2.b: If the proposed high flow side channels would be inundated at 2500-3500 cfs, what are the estimated channel capacities?

7. Same section: Has the proposed Atrisco Diversion Channel project been eliminated due to the ISC's planned work in that area?

8. Section 4.2.3: Salt grass and Yerba mansa may not establish from seed. I would also include Vine mesquite and Muhlenbergia grasses for areas with high water tables.

9. Same section: Has 500 stems per acre been determined to be the optimal planting densities for habitat where no native understory currently exists? What is this number based on?

10. I don't believe fuel breaks need to or should be void of woody plants. Perhaps some low growing shrubs could be seeded along with grasses or sparse shrubs or trees could be added after grass establishment. I also don't believe a 150 foot fire break is optimal, especially for emergency access and to stop a fire. I would prefer to see larger areas of 2-5 acres of bosque savanna/grasslands, especially adjacent to bridges and high or emergency access points, that are large enough to provide some habitat.

11. Section 4.2.3.b: Parametrix in some recent projects is advocating developing shrub thickets and swales of 8-10 acres.

12. Same section: I would include wolfberry in the planting list for open areas with more clay and saline soils.

13. Page 94 Figure 4.16: I can't discern stabilized from unstabilized trails. I recommend removing the middle, north-south trail at Central NE – in my opinion there are too many trails proposed for that small area.

14. Section 4.2.4: Stabilized trails too close to the river bank or high flow channel may have to be relocated. Is it possible to create a wildlife watching area at the Tingley wetlands?

15. Same section: Two boardwalks in Solution Area H. seem excessive in terms of proximity and effects to the levees and MRGCD operations. The best location needs further discussion.

16. Same section: I would still advocate for information kiosks at major bosque access points that provide regulatory, seasonal, interpretive and emergency information. I thought we had this discussion in previous meetings?

17. Section 5.1: The preferred alternative (Best Buy Plan #5) proposes restoration features in only 5 of 11 Solution areas. How did Plan #5 fare in terms of geographic scope and impact compared with other plans.

18. Section 5.5.1: The ISC has expressed interest in using credit water from Elephant Butte and storing it upstream to offset depletions from proposed restoration features. How will depletions be offset if no credit water is available?

19. Section 5.1.1.d: What will be the procedure for rehabbing unwanted trails?

20. Section 5.1.3: I think chipping woody material and leaving it on the forest floor is not a viable option from a fire management standpoint. I would only support this in very limited sections with protection for trees and separated by areas with no mulch. I also believe that 4 inches is too deep for mulch, 2 inches or less is optimal.

21. Same section: What is the effect of root ripping on annual weeds?

22. Same section: Did MRGCD or Open Space Division agree to take dirt spoil or other waste generated by these projects? A contingency plan needs to be developed in case material is not needed or can't be stored by the managing agencies.

23. Section 5.3: What role will the Corps of Engineers play in monitoring and adaptive management for this project and for how many years? What is the local sponsor's fiscal and other responsibilities for these activities, including writing a monitoring plan? Does the federal funding request include funding for the Bosque Ecosystem Monitoring Program (BEMP)?

24. Table 6.1: If we increase the acreage of grasslands for fuel breaks, is it possible to increase the acreage of wetted habitat considering depletions and cost?

25. Section 6.6.1: I believe we should remove Siberian elm as is it a prolific seeder. If we desire to leave non-natives, Russian olive and mulberry should be targeted due to their wildlife food value.

26. Same section: What is the estimated impact in terms of habitat value, of wetted habitats on other proposed community types?

27. Section 6.6.2: This section recommends clustering small patches to create larger, contiguous habitats and reducing the number of edges adjacent to open areas to reduce the threat of cowbird parasitism. Does the preferred alternative mosaic accomplish this?

28. Section 6.9.1: I would like to see more description of the economic benefits currently accruing from the Biopark and Tingley Ponds and how the project would enhance that.

29. Section 6.11: What is the effect of reducing trail mileage on recreation access and use?

30. Section 6.13: Trails should be designed to give users a good visual, recreational and ecological experience and/or meet specific interpretive goals.

31. Section 6.15: I would like to see a reference to the Albuquerque weed management plan and recommendations produced by Parametrix.

32. Section 6.18: Cumulative impacts – I would like to see the following addressed:

    a. Cumulative effects of this project and others on water quantity (at least how will it be addressed and by whom?)
    b. A description of how much revegetation has already taken place and how this was factored into future plant community and stand structure estimates. Given the current state of the plant communities in the project area, how would additional proposed treatments affect other resources?
    c. A description of how this plan is being coordinated with other management plans and activities. I think this discussion and a more complete picture of the range of activities is missing from section 6.18.1.

33. Section 9 references: I'm a bit surprised that the Bosque Landscape Alteration Strategy itself and the Fuels Reduction Study (Finch et al.) were not referenced.

Thanks for all your hard work and support on this project. We're getting there!

Yasmeen

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"Diplomacy is the art of letting someone have your way."

Danielle Vare, Italian diplomat

Comments from the Bureau of Reclamation on the Draft Detailed Project Report and Environmental Assessment for the proposed "Bosque Revitalization at Route 66, Albuquerque, New Mexico, Section 1135 Project"

April 17, 2008

Reclamation is offering some general comments on the report/EA. The proposed project will incorporate habitat restoration features and improve the recreational opportunities for the local population.

Land Ownership – In the last couple of weeks there have been several meetings to discuss the issue of land ownership and what land use permits will be required to implement the proposed project. The Corps, MRGCD, Reclamation, and the COA-Open Space are all parties to the implementation and subsequent operation/management of the proposed project.

The detailed project report needs to be updated throughout and in key sections like 5.4, with the appropriate language that describes who owns the land and who will manage the project after construction. In addition, the cost share description in section 5.7 mentions how the land will be given a credit value because it is owned by MRGCD, but this could be different if under the ownership of the federal system. It is mentioned in the report/EA that MRGCD signed the cost share letter of intent on December 2001, and the land ownership decisions by the court pertaining to MRGCD and Reclamation occurred in July 2005.

Net Depletions – Reclamation will wait until the OSE-ISC has reviewed and approved the determinations in the report on net depletions and ET values. Our only comment at this time is that Reclamation does not have water to meet any net depletions that are determined by the proposed project.

Cost of the proposed project - The costs described for the proposed project are mainly for implementation. Reclamation is concerned that other costs for the recurring operation and maintenance of the project, and for costs created from outstanding environmental compliance decisions, and for net depletions, are just given cursory mention.

In section 5.2 of the report it states that the local sponsor will have the responsibility for all operations, maintenance, repair, rebuild, and rehabilitation costs at an estimated $21,000 per year, and we expect that that cost is low. In section 5.3 there is mention of monitoring and how valuable such is to determine if the new habitat restoration efforts have succeeded, but no costs are mentioned. It also states that the Corps and UNM will be the key entities for the monitoring of the project.

Species biological information – The Corps by now has probably submitted to the Fish and Wildlife Service a Biological Assessment for the proposed project. The determinations in the BA and the corresponding BO will need to be updated in the EA. For the Rio Grande silvery minnow the determination in the report/EA is different than

what is stated in the BA. The Corps has consulted previously with the Service on other similar projects, including a high flow channel, and will need to incorporate requirements created under the ESA section 7 process, specially if they cause additional costs for the project.

Both the report/EA and the BA that were reviewed have species description with information that is based on up to the year 2005. Both documents could use updated information from 2006 and 2007.

WeCAN!
West Central Alliance of Neighbors
Respect for the history and heritage of our neighborhoods through positive redevelopment.

Pat Baca Jr, Chair, WeCAN Policy Committee
1206 Riverview Dr. NW
Albuquerque, NM 87105

US Army Corps of Engineers
Albuquerque District
Environmental Resources Section
Attn: CESPA-PM –LE (Mrs. Ondrea Hummel)
Albuquerque, NM 87109-3435

April 16, 2008

Re: Comments on Route 66 Project Report Draft

Dear Ms Hummel:

Thank you for meeting with us April 2, at the National Hispano Cultural Center to discuss the proposed work in the Bosque between I-40 and Bridge Blvd. The three Directors of WeCAN who were able to attend, Dianne Souder, Barbara Baca, and myself, were all impressed by the enthusiasm we sensed from you and your colleagues to listen and garner input from the community.

As we discussed at the April 2 meeting, the West Central Alliance of Neighbors (WeCAN) is a non-profit 501(c)(3) Community Development Corporation, incorporated in the State of New Mexico. Our initial purpose for organizing was the successful opposition to the proposed development of an amusement park at the intersection of Atrisco and Central. Our continuing mission focuses on ensuring positive redevelopment of the built environment in and around the area where Central Avenue crosses the Rio Grande, as well as the protection and preservation of the natural, historic, and cultural environment that makes this area special. Membership of WeCAN is comprised of six Neighborhood Associations, from both sides of the river, extending from I-40 in the north to Bridge Blvd to the south.

General Reactions to the Plan:

In general, our reaction to the Draft Route 66 Project Report (henceforth, the Plan) is positive, especially regarding removal and control of exotic species of trees, the removal of jetty jacks, the removal of dumps, the improvement of habitat for the increase and protection of wildlife, and the improved pedestrian access to the bosque via a foot-bridge from the Vecinos del Bosque neighborhood south of Central.

Also, in general, our concerns regarding the Plan can be considered as fitting two categories: 1) appropriate scope, and 2) a tendency for overemphasis of and overreliance on engineered efforts to attain objectives that can be met with a less imposing and less forceful remedy. It is our consensus that some parts of the plan overemphasize built improvements to the detriment of the goals of restoration, preservation, and protection of the natural environment; consequently this would also decrease the quality of the bosque experience for recreational and other passive visitors. We are confident that with

a few modest adjustments (e.g., changing much of the crusher-fine paths to soft paths) the Plan will be much improved, more cost effective, and the results on the ground much more in tune with community preferences and needs.

Specific Recommended Changes or Additions to the Plan:

1. Substantially reduce the extent of crusher-fine improved trails. Especially on the west side of the river, reduce extent of crusher-fine improved trails and replace with soft trails. We request a meeting to review the precise trail plans in order to provide you as precise as possible recommendations for location of soft versus hard surfaced trails.
2. Diminish or eliminate herbicide use. We would like to see a greater emphasis placed on physical control of resprouting non-native vegetation and eliminate the use of herbicide. This would be especially feasible if an ongoing summer youth employment project were used to provide the labor, and this approach would dovetail with education and outreach programs.
3. Inclusion of area ditches and drains in the Plan. The ditches in our neighborhoods are our connections—literally—to the Rio. Our historic, social, cultural, religious, and recreational ties to the river are practiced and played out via the ditches and we strongly desire the acequias and riverside drains to be included in the Plan. To operationalize this, we ask for a full characterization of the social and environmental values of the drains and ditches, and for the Plan to address measures to ensure the improvement and the maintenance of these resources toward the full measure of their potential. Much of this work has already been done and we look forward to working with you on this critical element.
4. Remove weather/etc. data collection stations. These stations, surrounded by their hostile fences and concertina wire, are inappropriate intrusions in a peaceful place. We desire their removal and the space on which they are located restored to its natural state.
5. Storm runoff carried trash. Design and place filters over storm drainage inlets on streets to prevent trash from being flushed into the bosque and river.
6. Provide storm drainage to flow from the Vecinos Park to the drainage ditch and to the river. This would allow more space to be dedicated to the park and minimize the need to dedicate a larger retention pond area in the park.
7. Further consideration of boardwalks. In the Plan, the location and engineering of the boardwalks are unclear and we request a more detailed description (perhaps best done in a meeting) so that we may better react to this important feature; we request deferring our reaction to the boardwalks until we better understand the details.
8. Clarification of Plan boundaries. Precise boundaries of the Plan area are in places unclear. We wish to ensure the boundaries are clearly and appropriately set to ensure, for example, removal of dumps and residue piles in the area.

Corrections and Clarifications to the Plan:

1. In Section 2.10 and Figure 2.16 you label Census Tract 24.01 as the "Alamosa" neighborhood and the "Alamosa Census Tract." Please refer to it in some other way. Alamosa is another neighborhood and has a different Census Tract. Neighborhoods have pride of identity and prefer not being labeled incorrectly.
2. In Section 2.11 the text states "*West of the river on the south side of Central Avenue there are still isolated areas of irrigated farmland, pasture and other rural uses.*" Please change this to read: "*West of the river on both sides of Central Avenue there are still significant areas of*

Deleted: *the south*

Deleted: *isolated*

irrigated farmland, pasture and other rural uses. Neighborhoods are working to preserve remaining agricultural open spaces in the face of pressures to develop."

In a nutshell the above points are our comments and recommended improvements to the draft Plan. I hope that in our effort to be succinct we have not sounded strident. We are very confident that every one of the items listed above can be integrated into the draft Plan quite easily and that the result will be a very much improved product that will satisfy the goals of the project while reducing cost and improving community appreciation and positive participation.

I hope to hear from you soon so that we may arrange a meeting and discuss the above points. They represent longstanding community hopes, concerns and preferences and so we are already prepared to discuss and describe the likely courses of action that will allow their successful fruition.

Sincerely,

Pat Baca Jr.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
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Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

April 7, 2008

Cons. # 22420-2008-I-0072

Ms. Ondrea Hummel
Environmental Resources Section
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109

Dear Ms. Hummel:

Thank you for your March 19, 2008, electronic correspondence requesting comments for the Draft Detailed Project Report and Environmental Assessment for the Bosque Revitalization at Route 66 Project, Albuquerque, Bernalillo County, New Mexico (Draft DPR/EA). The Draft DPR/EA evaluates the effects of removing jetty jacks and non-native vegetation, such as salt cedar (*Tamarix ramosissima*), Russian olive (*Elaeagnus angustifoia*), and Siberian elm (*Ulmus pumila*); enhancing existing high-flow channels, outfall wetlands and other alterations of the floodplain that would increase function between Interstate 40 and Bridge Boulevard on the Rio Grande silvery minnow (minnow) (*Hybognathus amarus*) and its critical habitat, the endangered Southwestern Willow Flycatcher (flycatcher) (*Empidonax traillii extimus*), the candidate Yellow-Billed Cuckoo (cuckoo) (*Coccyzus americanus occidentalis*) and the candidate New Mexican meadow jumping mouse (jumping mouse) (*Zapus hudsonius luteus*). The Draft DPR/EA indicated that the preferred alternative (plan 5) "may affect but is not likely to adversely affect" the minnow, the flycatcher, or the cuckoo. The Draft DPR/EA indicated that the preferred alternative "is not likely to adversely modify designated critical habitat for the minnow." The Draft DPR/EA also indicated that the preferred alternative would not affect the jumping mouse.

We agree with most of the analysis presented in the Draft DPR/EA and have the following specific comments.

- In section 2.4 – there are other relevant water quality standards that are applicable and they should be noted or referenced – such as the general criteria set out in Subsections A, B, C, D, E, G, H and J of 20.6.4.13 NMAC, and the provision set out in Subsection E of 20.6.4.14 NMAC are applicable and relevant.
- The use of silt fences when working adjacent to the bank of the river is anticipated. The US Fish and Wildlife Service (Service) recommends use of silt fences without lead weights. The use of silt fences (without lead weights) would be one measure to comply with the Best Management Practices and with all applicable Federal, state and local regulations that should result in no adverse impact to water quality.

- The Service designated the jumping mouse as a "candidate species" on December 6, 2007 (72 FR 69034). We request that the U.S. Army Corps of Engineers (USACE) use this designation in section 2.8 (page 41 and 44) and analysis throughout the next version of the DPR/EA.
- In section 6.6.2, the Draft DPR/EA states "The amount of habitat for mammal species associated with wetlands in the bosque would expand. These species include western harvest mouse, plains harvest mouse, house mouse, tawny-bellied cotton rat, and New Mexican jumping mouse." However, in section 6.7 the Draft DPR/EA states the "The Preferred Alternative would not impact existing wetland habitat. Therefore, the Preferred Alternative would not affect the New Mexican jumping mouse." The Service contends that if the amount of jumping mouse habitat expands, it would be beneficial for the jumping mouse, rather than have "no effect."
- The definition of "non-functional jetty jacks" in section 4.2.1 (page 71) should be moved to section 2.2.2 (before the last sentence of the second paragraph, page 16).
- The formation of backwater and side channels could create minnow habitat, but could also create areas that become disconnected from the main channel and trap minnows. The Service recommends that periodic maintenance and monitoring of backwater and side channels be included to identify and reduce impacts to minnows that may be trapped in the created habitat.
- Periodic dredging and dirt work planned throughout the life of the project could increase sediment in the water for a short period of time. The Draft DPR/EA mentioned that there will not be work in the main channel, but it is not clear if periodic dredging will be done in the wetted channel throughout the life of the project. The Service recommends that specific information be given regarding any work that could increase sedimentation and impact water quality or create areas that could trap minnows.
- Vegetation removal would need to be completed outside of migratory bird and flycatcher migration season (April 15-September 15). Areas where migrant flycatchers have been recorded should be evaluated closely to determine if the vegetation should remain. The Service recommends that the restoration plan consider establishing alternative habitat in areas where non-native vegetation is currently providing habitat. The native habitat should be available for migrating flycatchers prior to removing all non-native vegetation. The Service also recommends that USACE consider using a phased approach in removing non-native and creating native flycatcher habitat.

The Service is aware that some of the management solutions in the Preferred Alternative (Plan 5) may partially fulfill requirements of the "Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of the Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico," for both the minnow and the flycatcher. The USACE will coordinated with the Service on its section 7 consultation and a Fish and Wildlife Coordination Act Report when USACE completes its final DPR/EA. This concludes the Service's comments for the Draft DPR/EA.

We appreciate the thorough analyses provided in the Draft DPR/EA and your efforts to protect endangered and threatened species. In future communications regarding this project please refer to Consultation #22420-2008-I-0072. If we can be of further assistance, please contact Santiago R. Gonzales of my staff at 505-761-4720.

Sincerely,

Wally Murphy
Acting State Administrator

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico

Received 4/18/08

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April 9, 2008

Ondrea C. Hummel
Chief, Environmental Resources Section
Department of the Army
Albuquerque District, Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109

Re: Bosque Revitalization at Route 66, Albuquerque, New Mexico, Section 1135 Project
NMDGF No. 12041

Dear Ms. Hummel:

In response to your letter dated March 19, 2008, the Department of Game and Fish has submitted an attachment with our comments and suggestions regarding the above referenced project.

Thank you for the opportunity to review and comment on the Bosque Revitalization Project at Route 66 in Albuquerque, NM. If you have any questions, please contact Randy Floyd, Aquatic Habitat Specialist, at (505) 476-8091 or randy.floyd@state.nm.us.

Sincerely,

Matthew Wunder, Ph.D.
Chief, Conservation Services Division

MW/rf

attachment

xc: Wally Murphy, Ecological Services Field Supervisor, USFWS
Brian Gleadle, NW Area Operations Chief, NMDGF
Mark Olson, NW Area Habitat Specialist, NMDGF

Route 66 Bosque Restoration Project Bosque Revitalization @ Route 66, Albuquerque, New Mexico Section 1135 Project Draft Detailed Project Report and Environmental Assessment (EA)

Review Comments, Randy Floyd, NMDGF Conservation Services Division, 25 March 2008

The EA should describe how the Route 66 Bosque Restoration Project is consistent with, and meets, MRGESA Collaborative Program goals, objectives, and priorities. A reader unfamiliar with the Collaborative Program would probably not be able to determine how this project relates to the Program.

The anticipated effects of climate change on water availability in the Rio Grande is not analyzed or mentioned in the EA. Failure to address climate change is a major defect in the analysis.

Page 19/Flood Control Act of 1948/First paragraph:
This paragraph was already presented on Page 15. If the information is pertinent here, NMDGF suggests paraphrasing the original paragraph.

Page 20-21/Miscellaneous Projects:
Would it be informative to indicate projected completion dates for the Drinking Water Project? Pipelines are scheduled for completion in 2007, Water treatment plant scheduled for completion in 2008, according to the San Juan-Chama Drinking Water Project web site: http://www.sjcdrinkingwater.org/

Page 25/Section 2.2.3.c Hydrology/Paragraph 2:
Drain return flows also affect river flow below outfalls. This effect should be noted, since these return flows are considered important to the Rio Grande silvery minnow.

Page 25/Section 2.2.3.c Hydrology/Paragraph 5/last sentence:
The inclusion/meaning of this sentence is unclear.

Page 28/Section 2.2.3.c Hydrology/Paragraph 2/First sentence:
Suggested editing:

> "The last major flood in the Study Area was in 1941, and the existing mature cottonwoods' age structure indicates that most cottonwood trees in the bosque along the Albuquerque reach of the MRG germinated following that flood event."

Page 28/Section 2.2.3.c Hydrology/Paragraph 2:
Is there evidence/documentation that the 1985, 1992 and other overbanking events resulted in cottonwood regeneration?

Page 28/Section 2.2.3.c Hydrology/Last paragraph:
There are consumptive uses other than crops that result in depletions.

Page 39/Section 2.7.2 Fish and Wildlife/Paragraph One/First sentence:

Suggested editing:

> "An estimated 407 species of vertebrates may occur in aquatic, semi-aquatic, or riparian habitat in Bernalillo County, based on a query of the Biota Information System of New Mexico (accessed March 2008)." Chuck Hayes, BISON Coordinator for the Department, ran a query to verify the number.

Page 39/Section 2.7.2 Fish and Wildlife/Paragraph 4:

The correct taxonomy for "New Mexican jumping mouse" is: New Mexico meadow jumping mouse (*Zapus hudsonius luteus*). This reference and all other references to this mouse in the EA need to be corrected.

Page 39/Section 2.7.2 Fish and Wildlife:

Several reports have been published since those cited on herpetofauna of the Middle Rio Grande bosque (these studies encompassed the Study Area, although not all did sampling within the Study Area). This literature should be reviewed by the authors of the EA:

> Stuart, J.N. 1995. Notes on aquatic turtles of the Rio Grande drainage, New Mexico. Bull. Maryland Herpetological Society 31:147-156.
>
> Stuart, J.N. 2000. Additional notes on native and non-native turtles of the Rio Grande drainage basin, New Mexico. Bull. Chicago Herp. Soc. 35:229-235.
>
> Chung-MacCoubrey, A.L. and H.L. Bateman. 2006. Herpetological Communities of the Middle Rio Grande Bosque: What Do We Know, What Should We Know, and Why? Pg. 57-66. In Aguirre-Bravo, C.; Pellicane, Patrick J.; Burns, Denver P.; and Draggan, Sidney, Eds. 2006. Monitoring Science and Technology Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere. 2004 September 20-24; Denver, CO. Proceedings RMRS-P-42CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 990 pp.
>
> Chung-MacCoubrey, A. and H. Bateman. 2006. Bosque Restoration Effects on Bats and Herpetofauna. Final Report to Joint Fire Sciences Program. USDA Forest Service Rocky Mountain Research Station, Albuquerque. In Finch, D.M., A. Chung-MacCoubrey, R. Jemison, D. Merritt, B. Johnson, and M. Campana, Principal Investigators. Effects of Fuel Reduction and Exotic Plant Removal on Vertebrates, Vegetation and Water Resources in the Middle Rio Grande, New Mexico. Final Report to the Joint Fire Sciences Program. Prepared by the USFS Rocky Mountain Research Station, Albuquerque.
>
> Bateman, H.L., A. Chung-MacCoubrey, and H.L. Snell. 2008. Impact of non-native plant removal on lizards in riparian habitats in the Southwestern United States. Restoration Ecology 16:180-190.

Several reports have been published in the last few years on birds of the Middle Rio Grande bosque:

> Finch, D.M. and D. Hawksworth. 2006. Bird Species and Densities in Relation to Fuel Removal Treatments. Final Report to Joint Fire Sciences Program. In Finch, D.M., A. Chung-MacCoubrey, R. Jemison, D. Merritt, B. Johnson, and M. Campana, Principal

Investigators. Effects of Fuel Reduction and Exotic Plant Removal on Vertebrates, Vegetation and Water Resources in the Middle Rio Grande, New Mexico. Final Report to the Joint Fire Sciences Program. Prepared by the USFS Rocky Mountain Research Station, Albuquerque.

Smith, D.M., J.F. Kelly, and D.M. Finch. 2006. Wildfire, Exotic Vegetation, and Breeding Bird Habitat in the Rio Grande Bosque. Pg. 230-237. In Aguirre-Bravo, C.; Pellicane, Patrick J.; Burns, Denver P.; and Draggan, Sidney, Eds. 2006. Monitoring Science and Technology Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere. 2004 September 20-24; Denver, CO. Proceedings RMRS-P-42CD. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 990 pp.

Additionally:

- Gail Garber (Hawks Aloft) has conducted bird surveys at Tingley Ponds.
- Elizabeth Milford, TNC, may have done bird surveys associated with riparian surveys in the Study Area.

Page 42/Section 2.8 Special-Status Species/Neotropic Cormorant:

Suggested editing:

American Ornithologists' Union, not Ornithology Union.

Page 42/Section 2.8 Special-Status Species/Common Black-Hawk:

What is the date of the one occurrence of nesting Common Black-Hawk in the vicinity of the Study Area? The following paper should be used and cited:

Sadoti, G. 2008. Nest-site selection by Common Black-Hawks in southwestern New Mexico. J. Field Ornithology 79:11-19.

Page 42/Section 2.8 Special-Status Species/Black Tern:

The Black Tern migrates along the Middle Rio Grande through the Study Area, but does not nest in the study area.

Page 43/Section 2.8 Special-Status Species/Southwestern Willow Flycatcher:

This flycatcher occurs in other drainages in addition to those listed, such as the Mimbres River and Ponil Creek. The Corps should check recently published articles and reports for the most recent count of Southwestern Willow Flycatchers in New Mexico. These data are available on the Southwestern Willow Flycatcher web site. Also, a more precise location or description of the nearest known breeding site from the Study Area should be included.

Page 43/Section 2.8 Special-Status Species/Bell's Vireo:

Based on our understanding of lower, middle, and upper Gila Valley, Bell's Vireos also occur in the middle Gila Valley.

Page 44/Section 2.8 Special-Status Species/New Mexican Jumping Mouse:

The correct common name is New Mexico meadow jumping mouse. Genus is *Zapus*, not *Zappus*. Specific epithet is *hudsonius*, not *hudsonia*.

Paragraph 2:
"More recent sampling in the Study Area failed to find the species there (Campbell et al. 1997)" According to Jim Stuart, who was involved in the Campbell mammal survey, they failed to find the species because they sampled in October, which is after the time that jumping mice go into hibernation.

Page 70/ 4.2.1.a Jetty Jack Removal (Measures 1.0-1.10)/Paragraph 2/last sentence:
NMDGF recommends that the Corps describe the earlier types of bank stabilization that are evident in the Study Area.

Page 86/4.2.3 Bosque Features (Feature 7, 8)/ 2) Bare root container or plug planting with native shrubs:
Reconsider the recommendation to plant chamisa (*Chrysothamnus nauseosus*), as it will likely spread and prevent the growth of other native species.

Page 97/Section 4.3 Habitat Units/First paragraph:
Assigning one Habitat Unit for each acre of restoration is not a valid accounting method for quantification of expected improvements in targeted functions related to the project objectives. It is a simple calculation, but it is not accurate because it assumes all restoration measures produce the same habitat value on each acre. An appropriate methodology would be use of Habitat Evaluation Procedures developed by the U.S. Fish and Wildlife Service, or Hydrogeomorphic (HGM) assessment models (none exists for the Middle Rio Grande), or a rapid assessment method (none exists for the Middle Rio Grande). Development and application of a HGM model, rapid assessment model or HEP would require a considerable commitment of time and resources.

If the Corps is not willing to use a valid method, this section should explain the exclusion and provide justifications for using a "one HU for one acre" approach.

Page 99/Section 4.4.1.a Process/First paragraph/Line 6-8:
The process of combining the average annual habitat acreage created and the average annual dollar cost of the restoration activities makes it difficult to achieve habitat improvement/ restoration objectives. If all acres of restoration are considered equal in habitat value, then it appears that the decision comes down to choosing the combination that is the least costly, with no regard for the value of the restored habitat.

NMDGF is disappointed that a valid habitat assessment method is not considered, which would represent responsible management, good stewardship and sound restoration.

Page 115/Section 5.1.3 Implementation Process/Paragraph 4/Line 6:
Rather than "waste," a better term would be 'overburden' or 'excavated material.'

Page 115/Section 5.2 Operation and Maintenance Considerations/Item 2) Replacement of native plants that fail to become established:
What percent survival does the Corps plan to use in monitoring mortality and deciding to replant? On Page 86, it is mentioned that AOSD obtained 90 percent success rate of pole plantings. This level of survival likely represents the maximum possible to obtain for pole plantings in the bosque in this reach. The Corps will need to apply some measure of survival in order to know when replanting is necessary. NMDGF suggests using a level of survival less than

90 percent, measured over the duration of the establishment period, for pole plantings. Survival of bare root container or plug plantings may differ from survival of pole plantings and may need a different measure of survival.

The measure of plant survival used should reflect site productivity, which is largely dependent on distance to the water table for phreatophytes. If the Corps is planting poles across the bosque in sites where the distance to the water table varies, then the applicable measure of plant survival should also vary. Adjusting the measure of success applied to reflect distance to water table and other applicable environmental variables that affect plant survival may be necessary. Survival of planted material also depends not only on the condition of the plants at the time of planting but also how the material is planted. Therefore, both the plant condition prior to planting and the planting technique should be monitored.

Page 116/5.3 Monitoring and Adaptive Management:
Adaptive management needs to be described in more detail. For example, will monitoring results be used to identify needed maintenance of a restoration element on the project?

Page 122/Table 6.1 Net Depletion Analysis:
Is the State Engineer going to accept this analysis? The State Engineer has indicated that riparian ET is a minor issue in net depletion, but that evaporation from newly created water surfaces is a significant source of depletion. The High-Flow Channels will increase water surface and evaporation and Swales may increase water surface and evaporation. Section 4.2.2.b High-Flow Channels (Measures 5.0 - 5.6) (Pages 80-81) indicates that proposed High-Flow Channels would be located outside the active channel. If so, these features would be subject to a net depletion analysis. If a net depletion results, the Corps or MRGCD will need to cover the depletion with a water right, or use water from the Strategic Water Reserve to cover the depletion. The likelihood and consequences of net depletions resulting from High-Flow Channels should be discussed.

Page 127/Section 6.6.2 Fish and Wildlife/Paragraph 4:
The statement about threats to Southwestern Willow Flycatcher from the Brown-headed Cowbird cites references from 1995 and 1998. Recent research conducted by the BOR on the MRG provides a clearer understanding of perceived threats from Cowbirds to Southwestern Willow Flycatchers. This discussion should be updated based on that recent information.

Page 129/Rio Grande Silvery Minnow/Paragraph one:
What is the meaning of the following statement: "blocking of work zones to the river when constructing the High-Flow Channels?" Potential impacts to RGSM could take place when the upper and lower ends of High-Flow Channels are opened to the river channel because opening the channel would allow access by fish into the work site. NMDGF recommends discussion with the BOR about how they prevent access by RGSM into High-Flow Channels when opening the upper and lower ends. If this statement mean "blocking of work zones" to implement measures that the BOR uses, then the language used needs to clear. It is not likely that the U.S. Fish and Wildlife Service would consider the existing description of effects and BMPs to be adequate.

Page 129/Southwestern Willow Flycatcher/Paragraph one:
This paragraph should be moved to, or repeated on, Page 43, Section 2.8 Special-Status Species, Southwestern Willow Flycatcher.

Page 136/Paragraph 3/Line 4-5:
The statement "Removal of the non-native vegetation and construction of water-related features may allow the floodplain to expand" is not correct. The floodplain extends laterally beyond the levees and its extent will not be affected by this project.

Page 137/Section 6.18.3 Water Quality:
"For the Preferred Alternative to have cumulative effects on water quality in the Rio Grande, a threshold in concentration of some pollutant, due to the effects of the Preferred Alternative, would have to be exceeded. In this scenario, the additive effect of a pollutant due to actions taken in the Preferred Alternative combined with existing water quality conditions would have to exceed a toxicity level or water quality standard."

NMDGF has not seen this approach to cumulative effects analysis before. What is the source of this approach (it is not found in NEPA regulations)? The purpose of a cumulative effects analysis is to identify chronic, slowly increasing effects from combined piecemeal actions that would not reach a threshold of significance. The above statement suggests confusion between cumulative effects and significant effects.

Appendix H
Memorandum of Agreement between USACE and the NMISC for the purposes of project coordination and water depletions offset for the Ecosystem Revitalization @ Route 66 Project

MEMORANDUM OF AGREEMENT

between the

UNITED STATES OF AMERICA
U.S. ARMY CORPS OF ENGINEERS AND THE NEW MEXICO INTERSTATE STREAM COMMISSION

for the Purposes of Project Coordination and Water Depletions Offset
For the
Ecosystem Revitalization @ Route 66 Project

This Agreement ("Agreement") is between the UNITED STATES OF AMERICA, acting through the U.S. Army Corps of Engineers ("USACE) under Section 1135 of the Water Resources Development Act of 1986 (Public Law 99-662) and the New Mexico Interstate Stream Commission (the "Commission"), a statutory agency of the State of New Mexico ("State") authorized to investigate, conserve develop and protect the waters of the State (collectively "the Parties").

The USACE is responsible for constructing the Ecosystem Revitalization @ Route 66 Project (the Project), located in the Middle Rio Grande between I-40 and Bridge Boulevard in Albuquerque, New Mexico. The Project contributes to meeting Reasonable and Prudent Alternative Element S in the United States Fish and Wildlife Service March 2003 Biological and Conference Opinions for water and river maintenance operations, flood control operations, and related non-federal actions on the Middle Rio Grande, by attempting to establish additional habitat for the endangered Rio Grande silvery minnow by creating three high-flow channels. The project also addresses overall ecosystem function by enhancing native vegetation, creating swales, removing debris and dysfunctional jetty jacks, and other incidental features. The Middle Rio Grande Conservancy District is a local sponsor to the Project.

A. For the purposes of this Agreement, the Commission will offset any increase in water depletions as a result of this project to the maximum amount of 20 acre-feet per year for a period of ten (10) years. The source of this water will be derived from the authority provided in the Emergency Drought Water Agreement between the States of Texas and New Mexico, dated 2008 (attached here as Exhibit "A") or other source acceptable to the State Engineer.
B. The value of any water used to offset depletions may be used by the Commission as cost-sharing for their participation in the Middle Rio Grande Endangered Species Collaborative Program, which seeks to prevent the extinction and contribute to the recovery of endangered species in the Middle Rio Grande without impairing current water uses. Depletions associated with

the Project and any offset credit will be quantified annually by the Commission and agreed upon by the USACE.

C. The parties agree to work together to develop a long-term agreement to offset depletions for this project, beyond the 10 year limit set forth above, in accordance with applicable laws and authorities.

D. In the event of a dispute between the parties regarding this Agreement, the parties shall meet in good faith and attempt to resolve such dispute. In addition, as a condition precedent to a party bringing suit for breach of this Agreement, that party must first notify the other party in writing of the nature of the purported breach and seek in good faith to resolve the dispute. If the parties cannot resolve the dispute, they may agree to an acceptable method of non-binding alternative dispute resolution consistent with the New Mexico Governmental Dispute Resolution Act, N.M. Stat. Ann. 12-8A-1 et seq. (2007). Nothing in this agreement shall be construed as a commitment of funds in advance of appropriations by any party hereto. In the event the parties agree to seek non-binding alternative dispute resolution, each party will be responsible for its associated costs.

Bruce Estok
LTC, EN
Commanding

12 JUN 08
Date

Estevan López
Director
New Mexico Interstate Stream Commission

6/12/08
Date

EMERGENCY DROUGHT WATER AGREEMENT

The Parties to this Emergency Drought Water Agreement ("Agreement") are the State of New Mexico ("New Mexico") acting through the New Mexico Interstate Stream Commission ("NMISC") and the New Mexico Attorney General, and the United States of America ("United States"), acting through the Army Corps of Engineers ("Corps") and the United States Department of the Interior, Bureau of Reclamation ("BOR"). This Agreement amends the Conservation Water Agreement of June 29, 2001, entered into by the Parties.

1. The purposes of this Agreement are to:

A. Provide water for any Reasonable and Prudent Alternatives ("RPAs") or Reasonable and Prudent Measures ("RPMs") for Biological Opinions issued by the United States Fish and Wildlife Service ("FWS") regarding BOR and the Corps' proposed federal actions related to water management operations and river maintenance activities in the Middle Rio Grande and non-federal water management operations in the Middle Rio Grande.

B. Reduce the risk that conditions in the Middle Rio Grande for the next ten years will result in a finding that these actions are likely to jeopardize the continued existence of species listed under the Endangered Species Act ("ESA"), 16 U.S.C. § 1531 et seq. At this time those species are the Rio Grande Silvery Minnow (*Hybognathus amarus)* and the Southwestern Willow Flycatcher (*Empidonax traillii extimus*).

C. Promote the recovery of the listed species and further efforts to populate the silvery minnow in the Middle Rio Grande above San Acacia.

D. Contribute to and support the efforts of the Middle Rio Grande ESA Collaborative Program Workgroup (ESA Workgroup).

E. Address and protect the interests, needs, and rights of Indian Pueblos and Tribes and of all other Middle Rio Grande stakeholders.

F. Recognize the hydrologic realities and the limitations on the water supply that exist in the Middle Rio Grande Basin in a manner consistent with the provisions of applicable state and federal law and the relevant interstate compacts.

2. Term. Except as expressly provided herein in paragraph 8, this Agreement shall expire on February 28, 2013.

3. Definition. "Emergency Drought Water" is water stored and made available by New Mexico consistent with the relevant interstate compacts and with state and Federal law as a conservation pool above Elephant Butte Reservoir. Water that is native to the Rio Grande basin may be stored in reservoirs upstream of Elephant Butte following relinquishment of New Mexico's Rio Grande Compact credits, and upon acceptance of the relinquishment by the State of Texas under Article VII of the Rio Grande Compact. Emergency Drought Water consists of water for needs of the Middle Rio Grande Project ("Project") and to benefit the listed species.

4. Obligations of New Mexico.

A. Provided that the conditions specified in paragraph 8 of this Agreement are met, New Mexico shall make available to the United States up to 70,000 acre-feet of Emergency Drought Water over the term of this Agreement. A maximum of 20,000 acre-feet of Emergency Drought Water made available by New Mexico may be released by the United States in any one calendar year; provided that the United States may release a maximum of 30,000 acre-feet of Emergency Drought Water in 2003. New Mexico further agrees that the United States shall have the right to carry over for release in a future year of this Agreement any portion of a particular year's allocation of the Emergency Drought Water that the United States does not release in that year, in which case the United States shall not be responsible to pay for evaporative losses on such water.

B. The NMISC shall be the lead non-federal agency responsible for obtaining any approvals or agreements from non-federal agencies or entities which are required for the storage of Emergency Drought Water above Elephant Butte Reservoir, including, without limitation, any consent of the Rio Grande Compact Commission which may be required under applicable law, except with respect to any agreement with the Middle Rio Grande Conservancy District ("MRGCD") as further described herein. The NMISC shall be the lead state agency for coordination of implementation of this Agreement with the federal agencies.

C. New Mexico agrees to use payments received from the United States pursuant to this Agreement for purposes of conservation and recovery of the listed species in the Middle Rio Grande Basin, including for purposes of optimizing MRGCD operations.

D. New Mexico will administer the non-Indian water rights in the Rio Chama so as to ensure that releases of Emergency Drought Water are protected. In the event that Emergency Drought Water flows are not protected from diversion, the United States may elect to terminate this Agreement.

5. Emergency Drought Water shall be made available to the United States only for the following purposes:

A. To satisfy the provisions of a RPA or RPM of a Biological Opinion (BO) issued by the FWS, and accepted by BOR and the Corps.

B. To fulfill terms and conditions of permits issued to the United States by the New Mexico Office of the State Engineer for the pumping of water from the Low-Flow Conveyance Channel into the Rio Grande regarding the offset of additional depletions resulting from the operation of such pumps.

C. To fulfill terms and conditions of permits issued to the United States by the New Mexico Office of the State Engineer for the pumping of water from existing or new wells or for other activities for the benefit of the listed species regarding the offset of additional depletions resulting from such pumping or activities.

D. Release to the Rio Grande for beneficial uses occurring in the Rio Grande between two specified locations consistent with a permit issued by the New Mexico Office of the State Engineer pursuant to paragraph 6B with such flows being protected from diversion pursuant to paragraph 4D.

E. Provide to MRGCD, the six Middle Rio Grande Pueblos, or other water users in exchange for water willingly provided by such entities for the benefit of the silvery minnow during bypass operations or emergency situations as may be requested by the United States.

F. To offset new or additional net depletions, if any, resulting from Rio Grande habitat restoration projects by the United States pursuant to an agreement with the State Engineer.

6. Obligations of the United States

A. For purposes of this Agreement only, New Mexico and the United States agree that the value of the release of Emergency Drought Water pursuant to the terms of this Agreement is One Hundred Dollars ($100.00) for each acre-foot released on behalf of the listed species. Payment therefore shall be made to New Mexico no later than February 28 of the year following when such water was released. Under the Article VII dry-year scenario in the BO, when MRGCD storage has been exhausted, Jemez Canyon Dam outflow is negligible, and MRGCD is diverting all the direct flow of the river at Angostura diversion dam to meet irrigation demand within the Albuquerque Division, New Mexico and the United States will meet to negotiate as to payment on that portion of the water released by BOR to flow over Angostura diversion dam to meet the Albuquerque gage flow target that is thereafter diverted by the MRGCD at Isleta diversion dam.

B. The United States agrees to join with the NMISC to apply for any required permits from the New Mexico Office of the State Engineer to store and release any Emergency Drought Water. In the event that a permit is required and the permit issued does not provide for storage and releases of Emergency Drought Water in a manner consistent with the BO from the FWS or with this Agreement, the United States may elect to terminate this Agreement. The parties agree that the release of water stored on behalf of the listed species is an extraordinary action taken under the authority of New Mexico through the relinquishment of New Mexico's Rio Grande Compact credits. When water is stored in El Vado Reservoir under Permit No. 1690 consistent with existing agreements, the six Middle Rio Grande Pueblos have rights to benefit from that storage. Nothing herein is intended to affect Permit No. 1690.

C. The United States shall be responsible for determining the timing, amount, and manner of the storage and release of the Emergency Drought Water in accordance with paragraphs 4A and 6E and in coordination with the six Middle Rio Grande Pueblos through the Bureau of Indian Affairs' Designated Engineer and with the MRGCD.

D. The United States shall perform the hydrologic accounting for all Emergency Drought Water stored and released pursuant to this Agreement in accordance with all current water accounting methods approved by the Rio Grande Compact Commission.

E. Subject to the completion of all necessary approvals and regulatory requirements, the United States will seek to capture, store, and release up to 210,000 acre-feet of Emergency Drought Water over the term of this Agreement, to be allocated as follows: 70,000 acre-feet to the United States, 140,000 acre-feet to the MRGCD, or *pro rata* if due to insufficient runoff such capture, storage and release is not possible. A maximum of 66,667 acre-feet may be released in any one year, with an exception for 2003, and allocated on the same *pro rata* basis, subject to the terms and conditions in this Agreement. A maximum of 76,667 acre-feet may be released in 2003 with a maximum of 30,000 acre-feet released on behalf of the listed species. A maximum of 120,000 acre-feet can be captured and stored under this Agreement in 2003. Such capture, storage and release is to be done in accordance with permits issued by the New Mexico Office of the State Engineer. The United States shall inform the NMISC on a regular basis regarding the status of storage activities.

F. For a period of five years from the date of this Agreement, the emphasis for silvery minnow habitat restoration projects shall be placed on river reaches north of the San Acacia Diversion Dam.

G. The United States shall continue to cooperate in good faith with representatives of New Mexico that apply for permits or authorizations to monitor, collect, and participate in research and data collections and evaluations concerning the silvery minnow.

7. Avoidance of New Depletions.

A. The United States acknowledges that habitat restoration activities done to benefit listed species may cause depletions to the Rio Grande and that such depletions may adversely affect New Mexico's ability to meet its Rio Grande Compact obligations or may impair senior water rights holders. The United States further acknowledges that the NMISC and the New Mexico State Engineer are entrusted under state law with administering the

laws of New Mexico so that New Mexico's Compact obligations may be met and so that senior water rights holders are not impaired.

B. The United States and New Mexico agree:

1. the United States will submit annual reports to the State Engineer outlining all habitat restoration projects, including estimated net depletions resulting from such projects; and

2. to work together so that all future projects that the United States, New Mexico and/or the ESA Workgroup finance or conduct will be designed or constructed so that net depletions will not increase; however, New Mexico acknowledges that certain projects may be of such value to the listed species and that offsetting depletions at that site may not be feasible, in which case the United States agrees to use its best efforts to otherwise offset depletions caused by such projects.

8. Conditions for Availability of Emergency Drought Water. The Parties recognize that the contents and conclusions of Biological Opinions are not subject to this Agreement. However, the parties also recognize that New Mexico will only make Emergency Drought Water available under certain conditions, and the Parties explicitly agree that if any of the following occur, this Agreement may be terminated by New Mexico or the United States:

A. If the FWS issues and BOR and the Corps accept a Biological Opinion for discretionary water management operations and river maintenance activities by BOR and the Corps which does not contain incidental take statements that authorize take that may result from the diversion and use of the waters of the Rio Grande, San Juan-Chama Project water or hydrologically connected groundwater pursuant to valid existing uses of water, the exercise of activities associated with the use of valid and existing water rights, permits issued by the New Mexico Office of the State Engineer, or other uses authorized within the limits of the Rio Grande Compact;

B. If a final Biological Opinion that is not contrary to paragraph 8A above is issued, but the final Biological Opinion is determined to be inadequate or invalid by a court of law or is not accepted by BOR and the Corps;

C. If the United States is required to reinitiate consultation pursuant to 50 C.F.R. Section 402.16, and New Mexico provides written notification to the Parties that it chooses to terminate the Agreement rather than participate in the re-initiation of inter-agency consultation;

D. If a specific federal action implemented to avoid the likelihood of jeopardy to listed species causes any beneficial user of water in the Middle Rio Grande or San Juan-Chama contractor to be prevented, without its consent, from diverting, storing, or using water to which it is entitled;

E. If, prior to April 22, 2003, the United States fails to reach an agreement with the MRGCD satisfactory to New Mexico for the storage, diversion, use, and consumption of water by the MRGCD in a manner that optimizes MRGCD's operations to provide water to farmers for the entire irrigation season and to efficiently satisfy the provisions of a RPA or RPM of a Biological Opinion; or

F. If, by the close of business on April 24, 2003, New Mexico fails to enter into an agreement satisfactory to New Mexico with the State of Texas pursuant to which the State of Texas agrees to accept relinquishment of New Mexico's Rio Grande Compact credits for an amount of up to 217,500 acre-feet of water for the purposes of (i) providing up to 210,000 acre-feet of Emergency Drought water, and (ii) allowing the City of Santa Fe to store up to 7,500 acre-feet of water. If the total amount of water available for storage by New Mexico pursuant to relinquishment of its Rio Grande Compact credits is less than 217,500 acre-feet of water, then the actual amount so available shall be allocated *pro rata* between Emergency Drought Water and City of Santa Fe water.

9 Upon expiration or termination of this Agreement or of the Agreement between the United States and MRGCD referenced in paragraph 8F, any Emergency Drought Water previously stored pursuant to this Agreement will be released as directed by the NMISC.

10. Nothing in this Agreement shall be construed as an admission or concession of any issue of fact or law by any Party.

11. No member of or delegate to Congress shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

12. It is the United States's position that implementation of this Agreement is contingent on specific and sufficient Congressional appropriations to carry out the terms of this Agreement. It is New Mexico's position that implementation of this Agreement is contingent on specific and sufficient appropriations by the New Mexico Legislature to carry out the terms of this Agreement. This Agreement is also contingent upon approval of the NMISC.

13. Nothing in this Agreement may be construed to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. This Agreement is subject to the requirements of the federal Anti-Deficiency Act, and the parties acknowledge that the United States will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

14. Nothing in this Agreement shall affect or be construed or applied in a manner that is inconsistent with New Mexico law, including the State's authority to regulate and control non-Indian depletions. Nothing in this Agreement shall affect or be construed or applied in a manner that is inconsistent with federal law, or the Rio Grande Compact of 1938, which states:

> "Nothing in this compact shall be construed as affecting the obligations of the United States of America to Mexico under existing treaties, or to the Indian tribes, or as impairing the rights of the Indian tribes."

This Agreement shall not be construed or implemented in a manner that affects or impairs rights of the Pueblos or the obligations of the United States to the Pueblos. This Agreement does not affect the United States' existing obligations with respect to storage and delivery of water to the six Middle Rio Grande Pueblos.

Dated this 23 day of April, 2003.

United States Department of the Interior

Jennifer Gimbel, Department of the Interior

United States Army Corps of Engineers

Dana R. Hurst, Lt. Col., Commander, Albuquerque District

State of New Mexico

Estevan R. Lopez, Director
New Mexico Interstate Stream Commission

Patricia A. Madrid, New Mexico Attorney-General

to be allocated as follows: 82,000 to the United States, 150,000 to the MRGCD, or *pro rata* if due to insufficient runoff such capture, storage and release is not possible.

Except as specifically provided above, this amendment shall not modify the Agreement, the terms of which shall remain in full force and effect.

Dated this 31st day of March, 2008.

State of New Mexico

Estevan R. Lopez
Director, New Mexico Interstate Stream Commission

for
Gary King, New Mexico Attorney-General

United States Department of the Interior

Larry Walkoviak, Regional Director
Department of the Interior

United States Army Corps of Engineers

Bruce Estok, Lt. Col., Commander, Albuquerque District

United States Department of the Interior
BUREAU OF RECLAMATION
Albuquerque Area Office
555 Broadway Blvd. NE, Suite 100
Albuquerque, NM 87102-2352

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

ALB-441
WTR-4.03

APR 17 2008

CERTIFIED - RETURN RECEIPT REQUESTED

Mr. Kevin Flanigan
New Mexico Interstate Stream Commission
121 Tijeras Ave NE, Ste. 2000
Albuquerque, NM 87102

Subject: Transmittal of Amendment No. 1 to the 2003 Emergency Drought Water Agreement

Mr. Flanigan:

Amendment No. 1 to the 2003 Emergency Drought Water Agreement was executed on March 31, 2008. Enclosed, please find one (1) original of the amendment for your records.

Should you have any questions regarding this amendment, please contact Ms. Tammie Padilla at 505-462-3590.

Sincerely,

James P. Wilber, Manager
Facilities and Lands Division

Enclosure

United States Department of the Interior
BUREAU OF RECLAMATION
Albuquerque Area Office
555 Broadway Blvd. NE, Ste. 100
Albuquerque, NM 87102-2352

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

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APR 17 2008

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