

Appendix A: Collaborative Program Habitat Rehabilitation Projects

Velarde to Rio Chama

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
BOR River restoration/ River Maintenance Program, Velarde Reach	BOR	Velarde Rio Chama confluence		Preserving and creating habitat, expanding the active floodplain, creating wetlands	2001
BO Velarde reach	FWS	Velarde Rio Chama confluence	Approx. 60 acres	Habitat/ecosystem restoration for RGSM and WIFL recovery.	
Riparian and Wetland Restoration at San Juan Pueblo	San Juan Pueblo and EPA	San Juan Pueblo	3 areas, 75 acres total	Habitat restoration: Vegetation removal, wetland excavation, planting of cottonwoods, native shrubs and grasses.	2002

Information needs - Width change and location analysis, incision, stable bed material, conceptual model evaluation, techniques assessment

Rio Chama to Otowi

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
BOR River Restoration/ River maintenance Program, Espanola Reach	BOR	Rio Chama confluence with Otowi		Preserving and creating habitat, expanding the active floodplain, creating wetlands	2001
Archuleta Ranch Project	RGR	Rio Chama	160 acres river terrace		2001-2002

Information needs - Width change and location analysis, incision, stable bed material, conceptual model evaluation, techniques assessment

Cochiti to Angostura

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Cochiti Wetfields Project	Corps	Cochiti Pueblo		Habitat restoration: Underground drains below dam, vegetation plantings.	

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
The restoration of the Bosque Ecosystem from the Cochiti Dam Outlet to the Southern Reservation Boundary, Pueblo de Cochiti, Cochiti NM	Pueblo de Cochiti	Pueblo de Cochiti			
Pueblo of Cochiti Restoration Project	Pueblo of Cochiti	Pueblo of Cochiti	2,730 acres along 5 river miles.	Habitat restoration	2001
Santo Domingo River Restoration Project	Santo Domingo Pueblo	Santo Domingo Pueblo		Development of restoration program on Santo Domingo Pueblo.	2002

Information needs- SIAM (sediment load trends w/comparison to agdeg & stable bed material analysis for incision) Width change and location analysis (1997 widths to evaluate stable width assumption), conceptual model evaluation, techniques assessment

Angostura to Isleta

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Alameda/Rio Grande wetland	Alb OS, FWS, BOR, Intel, Phillips	Albuquerque	34 acres		2001
Montano wetland	Alb. Open Space	Albuquerque	0.25 acres	Recreate wetland habitat: Excavate and install lining, native plantings	2001
Albuquerque Overbank Project	Alb. OS, BOR, UNM, MRGCD, NM natural Heritage Program, Corps, FWS	Albuquerque	8 acres	Bosque restoration: bank lowering, vegetation removal, native plantings.	2001
BOR River Restoration/River Maintenance Program, Cochiti reach	BOR	Cochiti Dam to Hwy 44 bridge Bernalillo			2001
BOR River Restoration/River Maintenance Program, middle reach	BOR	Cochiti Dam to Hwy 44 bridge Bernalillo			2001
Point Bar Modification	BOR	Albuquerque		Create side channels and	2005

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				shelves to enhance RGSM habitat on point bar south of I-40, east bank of river	
Candelaria Farm	BOR, FWS, Friends of Rio Grande Nature Center, GE	Albuquerque	5 acres	Recreate wetland habitat: Excavate and install lining, native plantings	2001
Bosque Fuel Reduction Project	City of Albuquerque Open Space Division	Rio Grande Valley State Park	50 acres/150 acres	Reduction of wildfire potential in the Rio Grande Valley State Park (RGVSP). Removal of fuel loads around bridges; herbicide treatment of exotic species; planting of native understory.	2001
Bosque Fuel Reduction Project	City of Albuquerque Open Space Division	Rio Grande Valley State Park	50 acres/150 acres	Reduction of wildfire potential in the Rio Grande Valley State Park (RGVSP). Removal of fuel loads around bridges; herbicide treatment of exotic species; planting of native understory.	2001, 2002
Bosque Fuel Reduction Project	City of Albuquerque Open Space Division	Rio Grande Valley State Park	50 acres/150 acres	Reduction of wildfire potential in the Rio Grande Valley State Park (RGVSP). Removal of fuel loads around bridges; herbicide treatment of exotic species; planting of native understory.	2003, 2004
Habitat Restoration Projects	City of Albuquerque Open Space Division			Improve riparian and riverine habitat north and south of Rio Bravo	2006
San Antonio Oxbow Wetland and Riparian Restoration	City of Albuquerque Open Space	San Antonio Oxbow, Albuquerque	26 acres	Restore the structure and function of the	

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Project	Division			San Antonio Oxbow Wetland through removal of sediment/dam material and cattail and trenching for creation of a continuous waterway through the oxbow to the river.	
San Antonio Oxbow	City of Albuquerque Open Space Division, Ducks Unlimited	San Antonio Oxbow, Albuquerque	54 acres		
Los Poblanos Field Wetland	City of Albuquerque Open Space Division	Los Poblanos Farm Open Space	5 acres	Create a 5-acre wetland for use by migrating and resident birds and other wildlife species. Add permanent water source, lined wetland, native plantings, public viewing area.	
Corrales Levee Project	Corps	Corrales		Bosque restoration through vegetation plantings.	
Abiquiu and Jemez Reservoirs Supplemental Water Storage and Release	Corps	Jemez Reservoir		Sediment passage through dam.	
Rio Grande Nature Center, Habitat Restoration Project	Corps			Enhance remnant drain in RGNC to create side channel at high flows to provide RGSM habitat and improve native vegetation. Excavate drain at upstream and downstream ends to provide river connectivity, install larger	

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				culverts under RGNC bosque trail.	
BO Cochiti Reach	FWS	Hwy 44 bridge Bernalillo to Isleta Diversion Dam	App. 60 acres	Habitat/ecosystem restoration for RGSM and WIFL recovery.	
BO Middle Reach	FWS	Hwy 44 bridge Bernalillo to Isleta Diversion Dam	App. 60 acres	Habitat/ecosystem restoration for RGSM and WIFL recovery.	
McCauley family wetland restoration	FWS	Corrales		Wetland restoration	
Lewis Family Wetland Restoration in South Valley	FWS, Fish and Wildlife Partners	Albuquerque		Wetland restoration	
Perennial Pools	Middle Rio Grande Conservancy District/Habitech	Albuquerque		Create scour pools for fish habitat below Bridge Blvd on east bank of river, use large, anchored, woody debris.	2004
Demonstration Project: Regeneration of Bosque Cottonwood with SPRED	Minimal Access Technologies, Inc.	Corrales Bosque Preserve		Habitat enhancement. Transplant up to 100 cottonwood seedlings following removal of excess fuel and exotic species; demonstration of SPRED groundwater system.	
MRG Riverine Restoration, RGSM habitat restoration	ISC	Albuquerque		Modify islands, point bars and banklines to provide nursery and other habitat for RGSM	
Jemez-USFW Bosque Improvement Project	Pueblo of Jemez	Jemez river and riparian corridor	200 acres	Habitat enhancement: Conduct baseline surveys of flora and fauna; removal and treatment of salt cedar and Russian olive	2001, 2002

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Pueblo of Sandia Restoration Project/Bosque Pond Restoration	Pueblo of Sandia	Pueblo of Sandia	?	Habitat restoration: Removal of non-native species and the re-establishment of native species.	2001, 2002
Sandia Pueblo	Pueblo of Sandia, BOR, FWS, NRCS	Pueblo of Sandia			2001
Albuquerque Biopark	Rio Grande Restoration, Corps / section 1135	Albuquerque Tingley Beach	5 acres	Bosque restoration, wetlands recreation, and fuel reduction. Non-native vegetation removal, native seed and pole planting.	2002
Stream habitat restoration on Las Huertas Creek near Placitas, New Mexico, a tributary to the Rio Grande north of Albuquerque (Private Land Project]	US Fish and Wildlife Partners for Fish and Wildlife Program	Placitas, NM	2600 river feet	Halt erosion occurring on a 2,600 foot section of Las Huertas Creek, stabilize the channel bottom and stream banks, and restore native vegetation to maintain a stable channel	2001

Other Habitat Restoration Projects in the Reach:

- COE Bosque Feasibility Study– looking at riparian habitat restoration from the 550 bridge south to the I-25 bridge as part of the Corps’ Section 1135 program – Ondrea Hummel and Fritz Blake are contacts at the Corps for more information.
- Albuquerque diversion – Marsha Carra has NEPA documents, 2 mitigation sites from Alameda to Paseo del Norte & south – Joseph Fluter SWCA

ISC is implementing island modification, creating ephemeral side channels on islands and point bars, and performing bankline lowering from the 550 bridge south to the I-25 bridge. This project is primarily funded by the Collaborative Program with the State contributing some funds and in-kind services. Phase I construction was completed in April, 2006. Root-plowing left coyote willow “twigs” on the islands which sprouted this year. Phase II construction is expected to start in January, 2007 and go through April, 2008. Data from November cross section surveys of modified islands should be available in January. A comparison will be made of the geomorphological changes occurring on the modified islands and several control islands. Additional

monitoring for fish presence, vegetation growth, and physical features is planned through April. Monitoring is expected to provide information about which island modification techniques are most effective for improving and creating silvery minnow habitat. Ref other info

Information needs- Jemez operations change effects, island investigations, SIAM (sediment load trends w/comparison to agdeg & stable bed material analysis for incision), transition keys?, width change and location analysis w/migration potential, conceptual model evaluation, techniques assessment

Isleta to Rio Puerco

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Los Lunas Habitat Restoration Project, Biological Opinion, Belen Reach4	BOR	Isleta Diversion Dam to Rio Puerco Confluence			2001, 2002
Los Lunas Habitat Restoration Project, Biological Opinion, Belen Reach3	BOR, Corps	Los Lunas	6000' river bank, 40 acres floodplain	Habitat/ecosystem restoration for silvery minnow and willow flycatcher recovery: Jetty Jack removal, non-native vegetation removal, bank lowering.	2001
Tinnin Family Salt Cedar Removal	FWS, FWP	Bernardo	100 acres	Habitat restoration: Salt cedar removal	
Fire Rehabilitation/Habitat Enhancement	MRGCD/ISC/ Corps	Los Lunas, NM			
Restoration along Los Chavez Drain near Los Lunas	Valencia County SWCD	Los Lunas, NM	1 drain mile	Habitat restoration and ditch reconstruction: Removal of non-native vegetation and reshape the ditch along a 1-mile section of the Los Chavez Drain.	2002

Information needs – width/thalweg depth analysis, more detail on terrace heights, island growth and side channel fill – what will it take to destabilize? (including channel narrowing and velocity analysis), natural levee deposition and bankfull flow changes (incision or vertical accretion or both), bed material coarsening, SIAM (sediment load trends w/comparison to agdeg & stable bed material analysis for incision), relative importance of arroyos and uplift to channel slope, conceptual model evaluation, techniques assessment

Rio Puerco to San Acacia

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
BOR River Restoration/River Maintenance Program, Rio Puerco Reach	BOR	Rio Puerco to San Acacia Dam			2001
San Acacia Fish Passage Study	BOR	San Acacia Dam		Silvery minnow passage	2001
BOR River Restoration/River Maintenance Program, Socorro reach	BOR	San Acacia Dam to River Mile 78			2001
La Joya River Enhancement Projects #1 and #2	BOR	La Joya Wildlife Refuge		Floodplain and channel habitat restoration: Vegetation removal and bank lowering.	2001, 2002
Brush Removal and Fire Break Project	Sevilleta NWR	Sevilleta NWR	700 acres	Preservation of mature cottonwood stands, Removal of exotic species growing beneath mature cottonwood stands and the creation of a firebreak.	2002
Removal of Salt Cedar and Other Exotics	Sevilleta NWR	Sevilleta NWR	20 acres	Habitat restoration: Removal of exotic species from San Lorenzo Canyon on the Sevilleta National Wildlife Refuge in order to improve wildlife habitat and recreational use of the area.	2002
San Lorenzo wash Levee setback project	BOR			Expand floodplain area to improve protection of levee system and provide more floodplain habitat, reconnect wash to river, relocation of LFCC and flood control levee, replanting of native veg	ongoing
Fire Rehabilitation/Habitat Enhancement	MRGCD/ISC/ Corps	Los Lunas, NM			
BO Socorro Reach	FWS	San Acacia Dam to River Mile 78	Approx. 60 acres	Habitat/ecosystem restoration for RGSM and WIFL recovery.	

BO San Acacia Reach	FWS	Rio Puerco to San Acacia Dam	Approx. 60 acres	Habitat/ecosystem restoration for RGSM and WIFL recovery.
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San Acacia to Arroyo Cañas

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
San Acacia to San Marcial Reach of the Rio Grande; Restoration and Rehabilitation Plan	Socorro Save Our Bosque Task Force	San Acacia Reach	46 river miles	Consolidate existing restoration and rehabilitation plans and biotic and abiotic information for the Rio Grande "active" floodplain from San Acacia to San Marcial; product is a comprehensive conceptual restoration plan.	2002 to 2004
Saltcedar control on Private Land in the active floodplain (Epstein Kernberger Property)	Socorro Soil and Water Conservation District			Mechanical of control non-native Saltcedar	2003
Saltcedar control on Private Land in the active floodplain (Muncy Property)	Socorro Soil and Water Conservation District			Aerial application of herbicide to control non-native Saltcedar	2003
Pilot Restoration Project (Mitchell) on the Rio Grande, Socorro County	Socorro Save Our Bosque Task Force	Pueblito	25 acres	Demonstrate to local landowners with lands on the active flood plain that restoration converting exotic tree species to native vegetation is possible and desirable. Remove exotics and plant native species as needed.	2002
Socorro County Bosque Rehabilitation/Protection Project	Socorro Save Our Bosque Task Force	Socorro County, NM	46 river miles	Habitat restoration and fuels reduction. Exotic species	1996 to present

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				control and fuel reduction in cottonwood and willow stands between San Acacia Dam and the northern boundary of Bosque del Apache NWR using manual and mechanical removal techniques and individual herbicide application.	
Escondida Bridge Fire Break (north)	Socorro Save Our Bosque Task Force			Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation in heavy public use area.	2003-2004
Escondida Bridge Fire Break (south)	Socorro Save Our Bosque Task Force			Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation in heavy public use area.	2003-2004

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Arroyo de Tio Bartolo Fire Break	Socorro Save Our Bosque Task Force			Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	2003-2004
Arroyo de la Presilla Fire Break	Socorro Save Our Bosque Task Force			Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	2003-2004
Tajo Arroyo Fire Break	Socorro Save Our Bosque Task Force			Preservation of mature stands of cottonwood and willow stands by reducing the	2003-2004

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	
Fire Breaks on Flood Plain of Rio Grande, Socorro County	Socorro Save Our Bosque Task Force	East side flood plain of the Rio Grande in Socorro County	46 river miles	Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	planned
Confluence River Park fuel break	Socorro Save Our Bosque Task Force	East side flood plain of the Rio Grande in Socorro County	46 river miles	Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks	

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	
Stumps River Park fuel break	Socorro Save Our Bosque Task Force	East side flood plain of the Rio Grande in Socorro County	46 river miles	Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	
Other River Parks fire breaks (19 total)	Socorro Save Our Bosque Task Force	East side flood plain of the Rio Grande in Socorro County	46 river miles	Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and	

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	
Otero Street River Park fire break	Socorro Save Our Bosque Task Force	East side flood plain of the Rio Grande in Socorro County	46 river miles	Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in arroyo mouths to reconnect arroyo flow with river flow.	
NM Tech Riparian forest rehabilitation project	Socorro Save Our Bosque Task Force	East side flood plain of the Rio Grande in Socorro County	46 river miles	Preservation of mature stands of cottonwood and willow stands by reducing the threat of wildfire in the bosque. Construction of 200-foot wide firebreaks around designated forests, clearing of exotic vegetation and planting of native grasses in forest stands; clearing of exotic vegetation in	2004

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				arroyo mouths to reconnect arroyo flow with river flow.	
Polvadera Wetland	U.S. Fish and Wildlife Partners for Wildlife	Polvadera, NM	1 acre	Habitat restoration. Creation of a wetland and associated riparian and upland habitat on the former Rio Grande floodplain .	2002

Arroyo Cañas to San Antonio

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Pilot Restoration Project (Conklin) on the Rio Grande, Socorro County	Socorro Save Our Bosque Task Force	Bosquecito, NM	17 acres	Demonstrate to local landowners with lands on the active flood plain that restoration converting exotic tree species to native vegetation is possible and desirable. Remove exotics and plant native species as needed.	2001, 2002

San Antonio to RM 78

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Phase II Saltcedar Control - Unit 32	Bosque del Apache NWR	Bosque del Apache NWR	200 acres	Habitat restoration: Salt cedar control, aerial clearing, root plowing and root raking for conversion to native riparian and moist soil habitats.	2001
Protect Native Forests from Wildfire	Bosque del Apache NWR	Bosque del Apache NWR	300 acres	Protect large, native forests from catastrophic wildfire by constructing firebreaks and removing exotic vegetation that can create 'fire ladders'. Mechanical removal of salt cedar from 100-foot wide firebreaks and treatment of salt cedar regrowth.	2001, 2002

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Unit 34A Riparian Wetland Development	Bosque del Apache NWR	Bosque del Apache NWR	30 acres	Develop quality southwestern willow flycatcher habitat on Bosque del Apache NWR. Removal of salt cedar; creation of 10 acre wetland; management of wetland water levels; planting and promotion of native vegetation.	2001, 2002
Unit 10 Riparian Forest and Grassland Development	Bosque del Apache NWR	Bosque del Apache NWR	4 acres	Improve and protect a four-acre native riparian salt grass meadow and savannah forest from wildfire and introduce the public to rehabilitation techniques and this diverse plant community.	2001, 2002
Restoration Plan for the Active Floodplain on Bosque del Apache NWR	FWS (s) / Bosque Initiative, Bosque del Apache NWR (f)	Bosque del Apache NWR	10 river miles; approx. 4,000 acres	The refuge will be pursuing funding and opportunities for habitat enhancement, river function improvement on the active floodplain portion of its lands. The first step in the refuge's efforts to improve conditions on the active floodplain of the Rio Grande.	
Bosque del Apache NWR Habitat Restoration (Past)	FWS (s) / FWS and non-federal grantmaking organizations (f)	Bosque del Apache NWR	Approx. 2200 acres	The purpose of the refuge is to improve and maintain quality habitat requirements for wildlife species, especially wintering waterfowl. To accomplish this, the refuge has developed extensive wetland management and riparian restoration programs. Water management is key to the success of this program on the portion of the refuge that is no longer connected to river processes.	

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
Bosque del Apache NWR South End Habitat Restoration (Present & Future)	FWS (s) / NAWCA & non-federal partners (f)	Bosque del Apache NWR	800 acres of refuge lands outside the levee system	This project will convert 800 acres dominated by monotypic stands of saltcedar to a mosaic of native habitats including a mixture of grassland, wetland, and forests for the purpose of providing migratory and resident wildlife species with quality habitat. Mimic natural hydrologic conditions to the extent possible in the historic floodplain of the Rio Grande; grassland creation upland where water delivery impossible; wetland creation in areas of lower elevation.	
Restoration Plan for the Active Floodplain on Bosque del Apache NWR	FWS (s) / Bosque Initiative, Bosque del Apache NWR (f)	Bosque del Apache NWR	10 river miles; approx. 4,000 acres	To develop a plan to guide opportunities for habitat enhancement and improved river processes on the active floodplain portion of its lands. Plan preparation, NEPA, and environmental clearance.	2005
Bosque del Apache NWR Habitat Restoration (Past)	FWS (s) / FWS and non-federal grantmaking organizations (f)	Bosque del Apache NWR	Approx. 2200 acres	To improve and maintain quality habitat requirements for wildlife species, especially wintering waterfowl. To convert extensive Tamarisk areas to a mosaic of wetland, native forest and grassland habitats . Develop water delivery infrastructure and active management capability for historic floodplain areas.	ongoing
Bosque del Apache NWR South End Habitat Restoration (Present & Future)	FWS (s) / NAWCA & non-federal partners (f)	Bosque del Apache NWR	800 acres of refuge lands outside the levee system	To convert 800 acres dominated by monotypic stands of saltcedar to a mosaic of native grassland, wetland, and forest habitats for migratory and resident wildlife species. Develop	ongoing

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
				water delivery infrastructure and active management capability for historic floodplain areas, artificially plant or mimic flooding to promote native plants.	
Bosque del Apache NWR South End Habitat Restoration (Present & Future)	FWS (s) / NAWCA & non-federal partners (f)	Bosque del Apache NWR	800 acres of refuge lands outside the levee system	To convert 600 acres dominated by monotypic stands of saltcedar to a mosaic of native grassland, wetland, and forest habitats for migratory and resident wildlife species. Develop water delivery infrastructure and active management capability for historic floodplain areas.	ongoing
Phase II Saltcedar Control - Unit 32	Bosque del Apache NWR	Bosque del Apache NWR	200 acres	Habitat restoration. Salt cedar control, aerial clearing, root plowing and root raking for conversion to native riparian and moist soil habitats.	2001
Protect Native Forests from Wildfire	Bosque del Apache NWR	Bosque del Apache NWR	300 acres	Protect large, native forests from catastrophic wildfire by constructing firebreaks and removing exotic vegetation that can create 'fire ladders'. Mechanical removal of salt cedar from 100-foot wide firebreaks and treatment of salt cedar regrowth.	2001, 2002
Unit 34A Riparian Wetland Development	Bosque del Apache NWR	Bosque del Apache NWR	30 acres	Develop quality southwestern willow flycatcher habitat on Bosque del Apache NWR. Removal of salt cedar; creation of 10 acre wetland; management of wetland water levels; planting and promotion of native vegetation.	2001, 2002
FWS (s) / FWS and non-federal grantmaking	Bosque del Apache NWR	Approx. 2200 acres	Habitat	To improve and maintain quality habitat requirements for wildlife species, especially	past projects

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
organizations (f)				wintering waterfowl. To convert extensive Tamarisk areas to a mosaic of wetland, native forest and grassland habitats . Develop water delivery infrastructure and active management capability for historic floodplain areas, artificially plant or mimic flooding to promote native plants.	
Unit 10 Riparian Forest and Grassland Development	Bosque del Apache NWR	Bosque del Apache NWR	4 acres	Protect a 40 acre native riparian salt grass meadow and savannah forest from wildfire and exotic plant encroachment. To introduce the public to rehabilitation techniques and this diverse plant community. Removal of Tamarisk, follow up control, revegetation with native grasses and interpretive path establishment.	ongoing
North Boundary Fire Break	Bosque del Apache NWR			To protect native habitats on refuge and allow access for fire fighters if necessary. Removal of Tamarisk in dense stands and in understory of native forest, maintain road.	2005
High Flow Side Channel Project Phase I	Bosque del Apache NWR			To allow establishment of new age classes of native forest and grasslands and maintenance of an existing wetland in an area of monotypic Tamarisk and monitor overbank flows. Remove Tamarisk, follow up control and monitor hydrology and plant establishment.	2004-

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
ET Tower Transition Project	Bosque del Apache NWR			To allow establishment of new age classes of native forest and grasslands in an area of monotypic Tamarisk and monitor water use by exotic and native plants. Remove Tamarisk, follow up control and monitor evapotranspiration and plant establishment.	2004-
Channel Widening Project	BOR, Bosque del Apache NWR			To relocate and widen the river to diversify aquatic habitat for endangered fish, establish new age classes of native forest and grasslands in an area of monotypic Tamarisk and monitor channel formation and native plants. Dig new pilot channel, fill old channel, berm upstream end and create backwater at downstream end of project area, remove Tamarisk, follow up control and monitor channel characteristics and plant establishment.	2001 to 2005

RM 78 to Elephant Butte Reservoir

PROJECT NAME	SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
BOR River Restoration/River Maintenance Program, San Marcial reach	BOR	RM 78 to Headwaters of Elephant Butte Reservoir			2001
Habitat Enhancement from Tiffany Junction to Elephant Butte Reservoir	BOR	Tiffany Junction to Elephant Butte			2001, 2002
BO San Marcial reach	FWS	RM 78 to Headwaters of the	Approx. 60 acres	Habitat/ecosystem restoration for RGSM and WIFL recovery.	

		Elephant Butte Reservoir			
South Boundary Fire Break	Bosque del Apache NWR			Protect native habitats on refuge and allow access for fire fighters if necessary through removal of Tamarisk in dense stands and in understory of native forest, maintain road	planned

Elephant Butte Reservoir to Caballo Reservoir

SPONSORS	LOCATION	EXTENT	PURPOSE AND PHYSICAL FEATURES	YEAR
BOR	Elephant Butte Reservoir to Headwaters of Caballo Reservoir			2001

The following table is a list of reasonable and prudent actions required by the 2003 Biological Opinion.

Analysis of Reclamation role in proposed Collaborative Program reorganization
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RPA Element	Reasonable and Prudent Alternative [These elements are non-discretionary agency actions and are required.]	Reclamation lead under proposed reorganization?
A (all years)	Provide a one-time increase in flows (spawning spike) between April 15 - June 15	YES
B (all years)	Release supplemental water in a manner that will most benefit listed species	YES
C (all years)	Conduct routine monitoring of flows when flows are <=300cfs at San Acacia and report this information through water ops conference calls and meetings	YES
D (all years)	Support active flycatcher territories by pumping from LFCC June 15 - Sept 1. Possible pursuit of other options, e.g., providing water from drains.	YES
E (Dry)	Continuous flow from Cochiti to southern boundary RGSM critical habitat (Nov 16 - June 15)	YES
F (Dry)	Continuous, year-round flow from Cochiti Dam to Isleta Diversion Dam w/ 100cfs minimum flow at Central Bridge	YES
G (Dry)	Pump from LFCC to manage river recession. Continue pumping when it will benefit the flycatcher and its habitat. Survey for breeding flycatchers and continue pumping if present.	YES
H (Avg)	Continuous flow from Cochiti to southern boundary RGSM critical habitat (Nov 16 - June 15)	YES
I (Avg)	From June 16 - July 1 ramp down flows over San Acacia Diversion Dam to maintain target of 50 cfs through Nov 15	YES

RPA Element	Reasonable and Prudent Alternative [These elements are non-discretionary agency actions and are required.]	Reclamation lead under proposed reorganization?
J (Avg)	Continuous, year-round flow from Cochiti Dam to Isleta Diversion Dam w/ target of 100cfs over Isleta Diversion Dam.	YES
K (Avg)	Pump LFCC if needed to manage river recession and maintain connectivity. Continue pumping when it will benefit the flycatcher and its habitat. Survey for breeding flycatchers and continue pumping if present.	YES
L (Wet)	Continuous flow from Cochiti Dam to southern boundary RGSM critical habitat (Nov 16 - June 15) w/ 100 cfs target flow at San Marcial floodway gage	YES
M (Wet)	From June 16 - July 1 ramp down flows to achieve target flow of 100 cfs over San Acacia Diversion Dam through Nov 15	YES
N (Wet)	Continuous, year-round flow from Cochiti Dam to Isleta Diversion Dam w/ target flow of 150 cfs over Isleta Diversion Dam	YES
O (Wet)	Pump from LFCC if needed to manage river recession and maintain river connectivity	YES
	HABITAT IMPROVEMENT	
P	Prevent/minimize destruction of potential or suitable flycatcher habitat when installing pumps or groundwater wells	NO
Q	Improve gaging and real-time monitoring of water ops (including diversions, drains, returns and main ditches)	YES
R	Complete fish passage at San Acacia Diversion Dam by 2008; at Isleta Diversion Dam by 2013. Implement monitoring plan for each year of operations. Implement all feasible short-term fish passage/river reconnected actions.	NO
S	Habitat restoration (1600 acres by 2013; monitor annually for 10 years). Environ. Eval. process for 2 projects started by 5/23/2003. Complete projects fulfilling RPA element J from the 2001 BiOp. Examine projects for depletions.	NO
T	For river maintenance projects w/o bioengineering - implement habitat restoration plan to offset adverse environmental impacts	YES
U	Collaborate on river realignment and railroad bridge relocation at San Marcial. Construction for bridge relocation to begin Sept 30, 2008.	NO
V	Provide for overbank flooding when April 1 streamflow forecast is at or above average at Otowi and when flows are physically and legally available	NO
W	Investigate and increase sediment transport through Jemez Canyon Dam; investigate same for Galisteo Dam; baseline study for Cochiti Lake by Dec 31, 2007	NO
X	Prevent encroachment of saltcedar and destabilize islands when channel is dry in Angostura, Isleta and San Acacia reaches.	NO
	SALVAGE AND PROPAGATION	
Y	Provide \$300,000/yr to NMESFO for distribution to propagation facilities	NO
Z	Provide \$200,000/yr for first 3 years to expand	NO

RPA Element	Reasonable and Prudent Alternative [These elements are non-discretionary agency actions and are required.]	Reclamation lead under proposed reorganization?
	propagation facilities	
AA	Construct two new naturalized refugia (1st by May 31, 2005; 2nd by May 31 2006). One in Cochiti or Angostura reach; the other in Isleta or San Acacia reach.	NO
BB	Provide \$100,000/yr for five years (beginning 2008) for monitoring and augmentation of experimental populations	NO
CC	Surveys and habitat assessment studies for silvery minnow above Cochiti Lake (NMDGF). Complete by Dec 31, 2004.	NO
	WATER QUALITY	
DD	Water quality in Angostura reach (emphasis on waste water and chlorine and ammonia) (City of Albuquerque)	NO
EE	Fund comprehensive water quality assessment and monitoring program	NO
	REPORTING	
FF	Annual consolidated report (due Dec 31 each year)	NO

Appendix B: Memorandum of Coordination

for

River Maintenance and Restoration Activities for the

Middle Rio Grande Project

Bureau of Reclamation

Albuquerque Area Office

December 2004

Purpose

This document addresses and defines the coordination and responsibilities for all river maintenance and associated restoration activities authorized under the Middle Rio Grande Project for the Bureau of Reclamation, Albuquerque Area Office. These activities involve the River Analysis Branch Team, Design and Construction Branch Team, Water Management Division, Environment Division, Facilities and Land Division, and the Socorro Field Division.

With the increasing complexity of river maintenance work along the Middle Rio Grande, associated endangered species concerns, and other environmental compliance requirements, it is necessary to clearly define the steps and responsibilities for each project. The coordination, planning, and implementation process is crucial for sound project achievement. This planning process requires a “partnering” between Albuquerque Office Divisions and the Socorro Field Division to achieve successful project completion. The roles and responsibilities of each division are defined within the document and must be acknowledged and incorporated into the project planning steps. All partners are crucial and play significant roles individually and cumulatively in achieving the goals set forth herein.

The project’s size determines essentially the work effort needed for successful project completion. Larger projects look at a broader scale, focusing on implementing improvements for an entire river reach. These projects will follow the guidance provided under Heading III. Medium-sized projects generally focus on small reaches with a more limited scope than the large projects, but have enough issues to warrant the preparation of an Environmental Assessment (EA). These projects will follow the process identified in Heading III, except that Section 2 will have a less extensive geomorphic analysis than larger projects. Smaller-sized projects focus on localized site-specific needs that can generally be achieved under a Categorical Exclusion Checklist (CEC), and will follow requirements identified in Heading IV, “Step Outline for Smaller Projects.” Heading V contains information for collecting data and performing planning studies to evaluate long-term sediment transport and geomorphic trends.

This memorandum was developed and coordinated with the necessary team and division staff listed above, and approved by the associated Albuquerque Area Office managers (see cover letter to this memorandum dated January 7, 2005). This memorandum

supersedes the December 15, 1992, “Memorandum of Coordination for River Maintenance Activities” and the August 13, 2002, cover letter and “Memorandum of Coordination for River Maintenance and Restoration Activities for the Middle Rio Grande Project – July 2002.” Any future amendments to this memorandum should be approved at the same management levels (i.e., ALB-100, ALB-150, ALB-200, ALB-240, ALB-400, ALB-430, and S-10).

I. Roles and Responsibilities

- The Division or Team, when listed singly, is responsible for taking the task lead and is designated in parenthesis: i.e., ALB-220 = (220), ALB-240 = (240), ALB-210 = (210), ALB-150 = (150), ALB-400 = (400), ALB-420 = (420), ALB-430 = (430), Socorro = (S), and Inspector = (210, 220, or 240). The NEPA Team is identified as (NT). If more than one division or team is listed, the division or team **boldfaced** will assume the lead for that particular task. All divisions/teams will be responsible to provide data, feedback, and cooperation with the designated lead.
- Albuquerque Area Office (AAO) Management must concur with the proposed project and the associated scope of work before the project proceeds forward. As part of this, management must sign off on the final Project Initiation Form (PIF) (Appendix A). All divisions/teams will exercise caution to ensure that no commitments are made outside their realm of authority.
- The AAO River Maintenance/Restoration Flowchart (Figure 1) illustrates and defines, in a simplified fashion, the process and necessary coordination required for successful project completion.

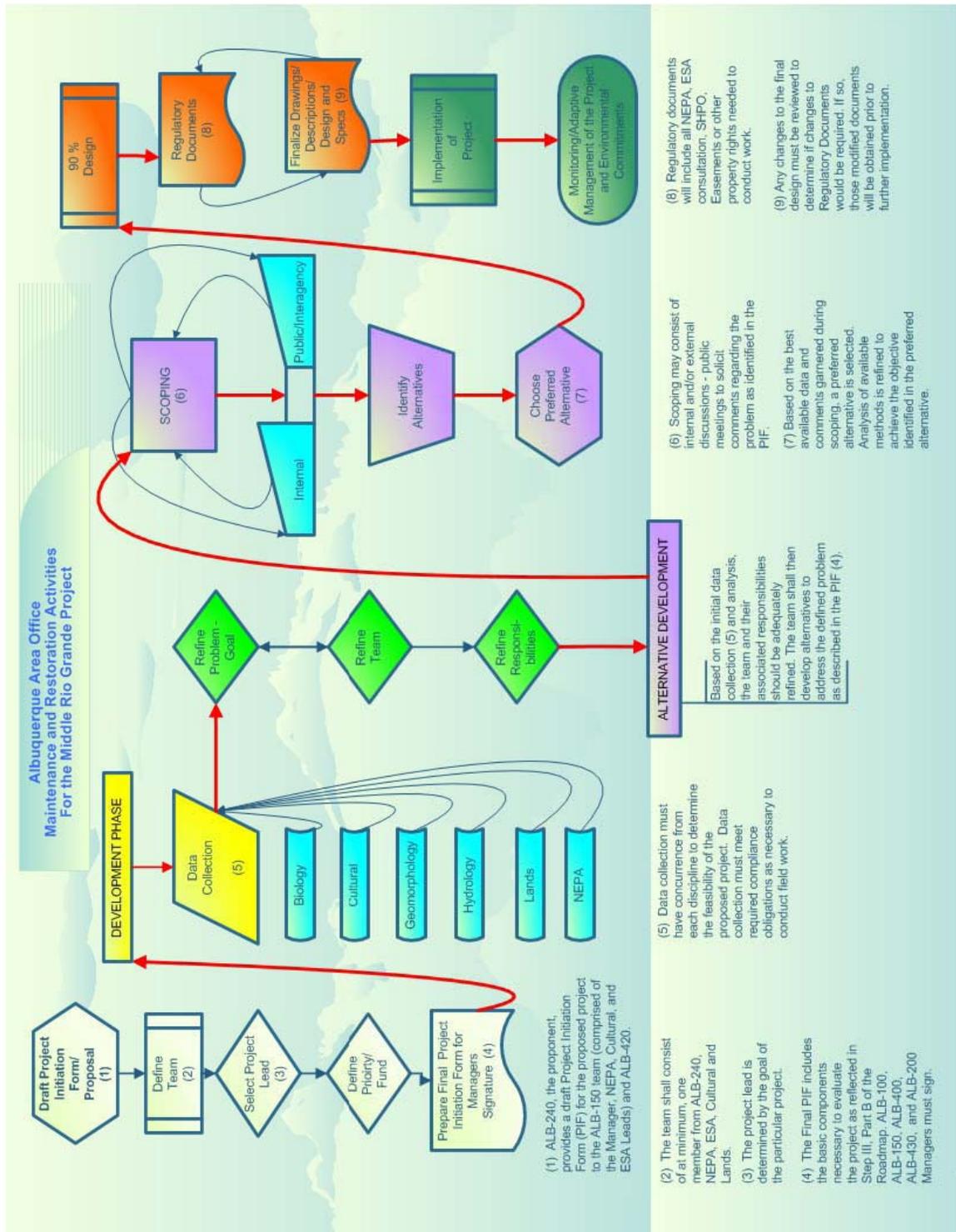


Figure 1

- A. The River Analysis Team (240) provides overall leadership, program management, development, and coordination of river maintenance activities as well as the development and coordination of river project activities. This includes:
1. Preparing the River Analysis Status Reports, River Project Schedule (which includes identifying project priorities) in consultation with 150, 420, and S. 150 and 420 will input for site selection based on environmental priorities and land issues. 240 will also be responsible for coordination the RO&M schedule with 430.
 2. 240 will prepare a draft Project Initiation Form (PIF) (Appendix A). Listed below are the steps involved in completing a PIF:
 - a.) 240 prepares a draft PIF.
 - b.) 240 presents the draft PIF at the Project Initiation Meeting.
 - c.) 240 updates the draft PIF with information gained at the Project Initiation Meeting and then finalizes the PIF. This process normally takes approximately one to five days.
 - d.) 240 submits the final PIF to 185.
 - e.) Once the PIF is received from 240, 185 assigns a project number on the form and fills in anticipated level of NEPA and ESA required for the project (based on input from NEPA Team Leader and ESA Team Leader).
 - f.) 185 routes the PIF and obtains the necessary management signatures which should take no more than ten days.
 - g.) 185 notifies the project leader and team members when PIF is approved by management
 - h.) A signed approved PIF is complete and is never reopened.
 - i.) Scanned copies of signed PIFs and other project related information can be found at: G:\USER\ELD_Shared.
 3. Analyzing Rio Grande sediment transport/geomorphic data.
 4. Designing, drafting, and analyzing river maintenance/restoration sites.
 5. Developing mitigation and/or restoration features jointly with 150 and providing design coordination.
 6. Providing project information and drawings as needed for the following associated compliance work: Endangered Species Act (ESA), National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and the Clean Water Act (CWA) – Sections 404, 402, 401. Provide drawings necessary for environmental compliance.
 7. Performing river data collection.
 8. Providing construction inspection for force-account river maintenance work. Inspections may also be performed by 220.

9. Preparing the multi-year general river project schedule and budgets, coordination 150, 420, and S (S-10). Coordinating/scheduling shall also take place with 430 on the RO&M Program.

10. Making project presentations, as a team effort (240 and 150), to federal and state agencies and other stakeholders. 240 will be responsible for describing the project's purpose and design, the geomorphic and hydraulic effects, and determining the length of effects. (Note: Prior to presenting or consulting with any agencies on a new project, AAO Management first needs to approve the proposed work and sign off on the final PIF).

B. The Design and Construction Team (210) will perform contract administration and some of the design functions. This includes:

1. Construction management of Public Law 93-638 or other construction/supply contracts. This involves contract administration and inspection. Prepare and administer contracts including administering and inspection of Public Law 93-638 or other construction/supply contracts.
2. Perform geotechnical land or hydraulic analysis and design as required for river maintenance work.

C. Field Construction Team (220) Based on workloads, inspectors from 220 may assist 240 in inspecting river maintenance/restoration projects.

D. The Environment Division (150) has the lead role in the collection and analyses of data and preparation of all environmental compliance. 150 will coordinate with 420 on land clearances. This includes:

Environmental Compliance (150)

1. Upon receiving the final PIF from 240, 185 will assign the project number, determine the anticipated level of NEPA and ESA, and obtain management's signatures indicating concurrence with the project proposal. The proposed project shall not proceed forward until management has signed off on the final PIF. 185 will be responsible for notifying the Project Leader and all team members (including 240) when approval has been obtained.
2. Providing NT leadership and environmental coordination including feedback on the PIF.
3. As needed, preparing and obtaining ESA, NEPA, NHPA (archaeological assessments), CWA-Sections 404, 402, 401 permits and compliance.
4. Providing biological analysis for each project.
5. Developing mitigation and/or enhancement features during project design in coordination with 240.
6. Providing project biological monitoring and necessary environmental data collection.
7. Preparing environmental compliance and monitoring budget documents based upon the multi-year general river maintenance schedule prepared by 240;

furnishing 200 with FTE estimates for budget documents and coordinating this budget with 200/240 and S.

8. Making project presentations, as a team effort (150 and 240), to federal and state agencies and other stakeholders. 150 will be responsible for describing the project's environmental aspects, including, but not limited to, the environmental effects analysis, project enhancement features and commitments, monitoring, biological data/status, etc.

Land Clearances (420)

1. Obtaining all necessary land interest for project implementation, i.e., ingress, egress, staging, borrow, storage, project site construction area, and mining permits (420).

2. Providing feedback on PIF.

E. The Socorro Field Division (S) will provide project construction. This includes:

1. Providing schedule requirements during planning and construction stages; project design input for preferred access routes, staging areas, construction methods, and construction design needs.

2. Constructing the projects according to the following permits or compliance documents: ESA, NEPA, NHPA, and CWS-Sections 404, 402, 401.

3. Preparing budget estimates based on the multi-year general river maintenance schedule prepared by 240, and coordinating the budget with 200/240 and 150.

F. The Water Management Division (430) will provide current and potential river flows during construction periods and coordinate reservoir releases if necessary.

G. Facilities and Lands Division (400) has primary responsibility for all land activities and associated land clearances and the RO&M Program. 240 will coordinate with 400 for inclusion of river maintenance activities.

II. COORDINATION ACTIVITIES

A. Project Initiation Meeting

At the onset of a new project, 240 will fill out a **draft** PIF and provide project location maps to 150 and 420 during a Project Initiation Meeting. The Project Initiation Meeting will be scheduled at a time agreeable to 150 and 420.

During the meeting, information on the project would be discussed, general questions answered, and a 'NEPA Team Leader' identified as well as the associated 'Team Members'. Immediately following the meeting, it will be the responsibility of the 240 Project Leader to incorporate any new information from the meeting or subsequent discussions and prepare a **final** PIF. Once completed, the final PIF will be emailed to 185. 185 will assign the project number, determine the anticipated level of NEPA and ESA, and obtain management's signatures indicating concurrence with the project proposal. The proposed project shall not proceed forward until management has signed off on the Final PIF. 185 will be responsible for notifying all signatories (including 240)

when approval has been obtained. NOTE: The 240 Project Leader is responsible for scheduling any necessary follow-up meetings with the team members and assuring the project moves forward in a positive direction.

B. Annual Priority/Schedule Review Meeting

An annual meeting to establish near and long-term priorities for the river maintenance and restoration activities authorized under the Middle Rio Grande Project will be held in the first quarter of the fiscal year in preparation for the next river maintenance season (July 1 to June 30). The meeting participants will include river maintenance managers and essential staff of 200, 210, 240, 150, 420, and S. Discussion topics will include the budget and staff workload for the next season and for several future river maintenance seasons (based on the priority list for the river maintenance and restoration projects). The meeting will be initiated by 240, although any division working on river maintenance activities may initiate a meeting based upon their particular need.

C. River Scheduling Meeting

A river project schedule will be prepared by 240. A coordination meeting shall be scheduled monthly or a minimum of every two months that is chaired by 240. Every third meeting will be held in Socorro. At each meeting, the dates for accomplishing each item necessary for project implementation will be discussed and updated. Representatives from 240, 220, 210, 150, 420, and S shall attend the meetings to brief all attendees on the status of their work items, and make decision and commitments about upcoming schedules and activities for their respective division or team.

D. Initial NEPA Decision

For projects prioritized and scheduled at the meeting in item B above, an initial assessment will be made of whether an EA or CEC is needed for NEPA compliance under the umbrella of the June 1993, "Final Supplement of the Final Environmental Impact Statement – River Maintenance Program for the Rio Grande – Velarde to Caballo Dam, Rio Grande, and Middle Rio Grande Projects, New Mexico." In addition, consideration will be given to the 'Reasonable and Prudent Alternatives' (RPAs) that are within the 2003 Final Programmatic Biological Opinion on the Middle Rio Grande water and river maintenance operations.

E. Biological, Sediment Transport, and Geomorphic Studies

A meeting will be held at least two times per year to share the status and results of various studies on the Middle Rio Grande. 150 will present information involving Endangered Species Act (ESA) compliance, river ecology, and biology. 240 staff will present information relating to the sediment transport, river mechanics, river maintenance status, and geomorphic analysis. 240 and 150 will alternate the lead roles in initiating these meetings (150, 240).

III. OUTLINE FOR LARGE/MEDIUM PROJECTS

A. INTRODUCTION

The FLOWCHART STEPS listed below (also see Figure 1) will serve as a guide for large/medium river maintenance or restoration projects along the Middle Rio Grande. To ensure successful project accomplishment, past experience recognizes implementing ten essential STEPS. The STEPS below reference Roadmap Sections which provide the guidelines and specifics for proper project implementation.

FLOWCHART

STEP 1: Draft Project Initiation Form (PIF)

STEP 2: Define Team, Project Lead, and Priority Fund

STEP 3: Prepare the Final Project Initiation Form for Managers' Signatures

STEP 4: Developmental Phase (Sections 1, 2, and 3)

STEP 5: Alternative Development Phase (Sections 4 and 5)

STEP 6: 90% Design Phase (Section 6)

STEP 7: Obtaining Regulatory Documentation (Section 7)

STEP 8: Finalize Drawings/Descriptions/Design and Specs (Sections 7 and 8)

STEP 9: Project Implementation (Sections 9 and 10)

STEP 10: Monitoring and Adaptive Management (Section 11)

ROADMAP

Section 1: Initiation of Large/Medium Project Studies

Section 2: Reach Background Analysis

Section 3: Initiate NEPA Process

Section 4: Public Involvement Process

Section 5: Analysis of Alternatives

Section 6: Preferred Alternative – 90% Design

Section 7: Finalize Design, Drawings, and Environmental Documents

Section 8: Finalize Construction Drawings

Section 9: Preconstruction

Section 10: Construction – Guidelines and Protocols

Section 11: Adaptive Management

Each of the Sections comprises various components, i.e., Goals, Key Meetings, External Coordination, and End Products. Each Section and its components are described in greater detail. The distribution of paperwork is described below and is identified within the document as such:

- Internal Distribution: Copies of minutes/reports/drawings shall be sent internally to all Reclamation team members assigned to the project. A mailing list of team members will be established for each project. 240 will be responsible for distributing those minutes/reports/drawings they produce, and likewise for 150, 210, and other divisions. All documents designated “Internal” will be identified as a “Restricted - Internal Use Only” and are intended to remain as an internal document within Reclamation.
- External Distribution: Prior to any external distribution, ensure that documents have been internally distributed and reviewed. Copies of reports shall be sent to outside parties, i.e., stakeholders, etc. as identified and as appropriate. 240 will be responsible for distributing the reports they produce, and likewise for 150, 210, and other divisions.

B. Section 1: INITIATION FOR LARGE/MEDIUM PROJECTS

• GOALS:

- Complete final PIF.
- Establish the proposed work reach and project goals (240, 150, 420).
- Determine the location and number of new cross sections or other hydrographic data collection needs for the study reach (240).
- Perform ESA, NEPA, and NHPA compliance for the new cross sections, test pits, or other hydrographic data collection needs (150).
- Obtain necessary land access clearances for data collection needs (240, 150, 420).
- Perform hydrographic data collection (24).
- Identify initial project milestone target dates (240, 210, 150).

•

KEY MEETINGS:

- A Project Initiation Meeting will take place to develop and discuss the PIF with 150, 420 and obtain feedback. Discussions will include describing the proposed work and project goals, locations of new cross sections, or other hydrographic data collection needs (240).
- Once the project’s PIF is approved by management, field trips will take place as needed as part of the ESA compliance associated with establishing new cross sections (150, 420, 240).

- EXTERNAL COORDINATION (once PIF is signed by management):
 - If needed, 240 obtain any initial environmental compliance and/or land clearances for data collection or planning activities (**150**, 420).
 - Obtain land access permits for cross sections and hydrographic data collection (420). As necessary, obtain land access for cross sections and hydrographic data collection on pueblo/tribal or federal lands (420). NOTE: In general, Reclamation does not need a formal clearance under New Mexico Statute for land access to perform hydrographic data collection or establish cross sections which are on private or state lands.
 -
- END PRODUCTS:
 - Finalize and get a signed PIF.
 - Complete ESA, NEPA, NHPA compliance for hydrographic data collection (150).
 - Approval for land access obtained for cross sections and hydrographic data; collection on pueblo/tribal or federal lands (420), private or state lands, most likely do not need a formal clearance.
 - Obtain land access for cross sections and hydrographic data collection (420).
 - Establish cross sections and perform hydrographic data collection (240).

C. Section 2: REACH BACKGROUND ANALYSIS

- GOALS:
 - Document and analyze historic and current channel sediment transport and geomorphology (240, **150**).
 - Estimate future geomorphic trends (240, 150).
 - Identify land ownership interests (420).
 - Document and analyze historic and current biological and cultural resource conditions (150).
 - Identify potential constraints on project development (**150**, 240).
 - Review, and modify as necessary, project milestone target dates (150, **240**).
- KEY MEETINGS:
 - Internal office meeting to coordinate activities, identify roles and responsibilities, and reach boundaries followed by a field meeting if needed (**240**, 420, 150).
 - Identify general project NEPA requirements (150).

- Internal meeting to finalize the Summary Reach Background Report (240).
- Transmit this report and a memorandum to the Albuquerque Area Manager (240, 150).

• **EXTERNAL COORDINATION:**

Meet with landowners adjacent to the proposed project area as needed (420, 240).

• **END PRODUCTS:**

- Produce a joint “Summary Reach Background Report.” This is a reconnaissance-level investigative report to be submitted for internal distribution and a copy provided to the Albuquerque Area Manager (150, 420, 240).
- Produce a sediment transport and geomorphic analysis report as appropriate (240).

D. Section 3: INITIATE NEPA PROCESS

• **GOALS:**

- Identify and screen the potential alternative (150, 420, 240).
 - Identify screening criteria, i.e., purpose, needs, and goals (150, 420, 240).
 - The screening criteria used will be based on land issues/access, cultural resources, environmental resources, geomorphic conditions, lateral constraints, program funding, construction techniques, schedule, etc.
- Perform gross appraisal level economic analysis of alternatives (240, 150).
- Define NEPA Team (NT) members, roles, and responsibilities (including public involvement personnel) (150, 240).
- Identify the level of environmental compliance needed (NT).
- Identify area of potential effects, i.e., biological, cultural, etc. (NT)
- Identify stakeholders (NT).
- Establish target milestone dates for NEPA process (150, 240, NT).

KEY MEETINGS:

- Internal meetings to address, as appropriate, the bullets under “Goals” above (150, 420, 240).

- NT meetings as needed.
- EXTERNAL COORDINATION:
 - As needed (150, 420, 240, NT).
- END PRODUCTS:
 - Produce an “Internal Scoping Report: that summarizes the historic, current, and future reach geomorphology and biology, purpose and need, range of alternatives considered, and the screening process used. This report will be a brief description of the outcome from the discussion detailing the sideboards, identifying known controversy and potential areas of focus (150, 240).
 - Determine the external stakeholders (agencies, groups, and landowners) that will be involved in the scoping process (NT).

E. Section 4: PUBLIC INVOLVEMENT PROCESS

- GOALS:
 - Create documents necessary for external public scoping process (NT).
 - Develop the public/stakeholder involvement process appropriate for each project (NT).
 - Present project purpose and needs, environmental and geomorphology information to resource management agencies and the public (NT).
 - Obtain stakeholder and public comments (NT).
 - Review project target milestone dates (150, 420, 240, NT).
 - Coordinate internally with Public Involvement Specialist (ALB-510).
- KEY MEETINGS:
 - Initial Scoping Meeting(s) (NT).
 - NT Meetings (NT) as needed.
- EXTERNAL COORDINATION:
 - Review project target milestone dates (150, 420, 240, NT).
 - Meet with landowners prior to and during meetings as necessary (420).
 - External coordination varies according to the project proposed.
 - Agencies and the public most likely involved include the following:

- Fish and Wildlife Service (FWS)
- Corps of Engineers (COE)
- State of New Mexico
 - New Mexico Environment Department (NMED)
 - New Mexico Department of Game and Fish Department (NMDGF)
 - New Mexico Interstate Stream Commission (ISC)
 - New Mexico State Historic Preservation Office (NMSHPO)
- Bureau of Indian Affairs (BIA)
- Native American Pueblos and Tribes consultation (required if there is a potential to affect Indian Trust Assets [ITAs] or cultural resources)
- Middle Rio Grande Conservancy District (MRGCD)
- Environmental groups, etc.

• **END PRODUCTS:**

- Summarize activities, public comments; produce Public Involvement Summary (NT).

F. Section 5: ANALYSIS OF ALTERNATIVES

• **GOALS:**

- Incorporate public comments, where appropriate, into alternative analysis process, then rescreen alternatives to arrive at a final array of alternatives (NT).
- Perform systematic engineering/geomorphic/economic analysis of the screened alternatives; include net depletion analysis if needed, geomorphic and hydraulic parameter values (240) and summarize in terms of the environmental values (**150**, 240).
- Evaluate environmental condition (150) and land issues pertaining to each alternative (420). Identify the positive benefits to fish and wildlife resources pertaining to each alternative (150).
- Select and define preferred alternative including projects location(s) and impact area, quarry sites, access routes, staging areas, storage locations, disposal sites, and monitoring requirement needs (pre-, during, and post-construction), etc. (150, 240, 420, S, Inspector, **NT**).

- Begin compliance with ESA, NEPA, NHPA, CWS-Sections 404, 402, and 401 and any other consultation/permitting documents (include project location(s) and impact area, quarry sites, access routes, staging areas, storage locations, and disposal sites, etc.) (**150**, 420).
- Circulate Administrative Environmental Assessment (EA) for internal review (NT).
- Review project target milestone dates (150, 420, **240**, NT, S).
- **KEY MEETINGS:**
 - After the Administrative EA is prepared, schedule an internal meeting to discuss and plan an internal field review (**240**, 150, 420, NT, S).
- **EXTERNAL COORDINATION:**
 - As needed.
- **END PRODUCTS:**
 - Produce and ‘Administrative Draft EA’ for internal distribution and review by 150, 420, 240, S, and the Inspector. This EA will summarize the project and reach geomorphology, analyze and evaluate the alternatives (including environmental and net depletion benefits) and their feasibility, and define the preferred alternative (NT).
 - Produce an Alternative Analysis Report (240).

G. Section 6: PREFERRED ALTERNATIVE – 90% DESIGN

- **GOALS:**
 - Select and define the preferred alternative (150, 420, 240, NT).
 - Complete the engineering design and analysis for the preferred alternative to the 90% level. This includes design drawings with construction requirements, quantities and alignments, construction methods, project locations and impact area(s), quarry sites, access routes, staging areas, storage locations, disposal areas, environmental mitigation/enhancement restoration features, monitoring and all other pertinent project details (completion of remaining design work is dependent on final negotiations and stipulations from regulatory agencies, and input from public/stakeholders) (240).
 - Determine the preferred alternative monitoring (pre-, during, post-construction) (150) and construction costs and the Socorro Field Division activities (240).
 - Incorporate internal comments; prepare Public Draft EA (NT).
 - Review project target milestone dates (150, 420, **240**, NT, S).
 - Identify project procurement needs (210, 240, Inspector, S).

- **KEY MEETINGS:**

- Internal field trip to finalize the 90% design (150, 420, **240**, NT, S).
 - A meeting summary will be prepared by the designers and forwarded to all involved Reclamation staff (240).
- Land owner meeting(s) to present the 90% design and obtain land owner input and resolve any outstanding issues (150, **420**, 240, S).
- Procurement/coordination meeting shall be held (210, 240, Inspector, **S**).

- **EXTERNAL COORDINATION:**

- If needed, meet with stakeholders and resource agency staff to discuss the preferred design alternative (150, 420, 240, **NT**). If needed, have a presentation and/or field meeting(s) with stakeholders, resource agency staff to discuss the preferred design alternative (**150**, 420, 240, NT).

- **END PRODUCTS:**

- Produce a 'Project Description Report' (240). This report summarizes the previous reports and details the preferred design alternative, including stipulations from regulatory agencies, stakeholders, 150, 420, and S.
 - At the '90% Design' stage, the design drawings shall include the identified access routes, staging areas, all project and environmental mitigation/enhancement features, monitoring, and all other pertinent project details (240).
 - Provide 8.5" x 11" project description drawings to 150 for environmental compliance documents (240).
- Complete 90% Design Construction drawings and include all information in Project Description Report (240).
- Prepare Final Draft EA (NT).
- Complete acquisition/contract plan (210, 240, Inspector, **S**).

H. Section 7: FINALIZE DESIGNS, DRAWINGS, AND ENVIRONMENTAL DOCUMENTS

- **GOALS:**

- Address public comments, finalize EA, and, if appropriate, issue Finding of No Significant Impact (FONSI) (NT).
 - Once the FONSI is signed, the NT's role and function is considered completed.
- Complete all environmental compliance activities (150).

- Finalize project description, design, and construction drawings after final acceptance and review of project by stakeholders and regulatory agencies (240).
- Obtain necessary land instruments for the project (420).
- Review permit time frames (**240**, S).

- **KEY MEETINGS:**
 - As needed to perform final coordination (**150**, 420, 240).

- **EXTERNAL COORDINATION:**
 - As needed.

- **END PRODUCTS:**
 - Obtain all necessary permits and approvals from the appropriate state and federal agencies to construct the project (**150**, 420). Copies provided t 240 and S (150).
 - Complete land documents (420).
 - Finalize EA and issue FONSI (NT) (External Distribution).

I. Section 8: FINALIZE CONSTRUCTION DRAWINGS

- **GOALS:**
 - Finalize construction drawings prior to construction to the maximum extent possible (240) (Internal Distribution).
 - Final review of construction drawings (150, **240**, S, Inspector).

- **KEY MEETINGS:**
 - Perform final review of the construction drawings with 150 and S (240).

- **EXTERNAL COORDINATION:**
 - As needed.

- END PRODUCTS:

- Complete final construction drawings (240).
 - Final design drawings will detail all project information necessary for construction and shall incorporate all land and environmental commitments.

J. Section 9: PRECONSTRUCTION

- GOALS:

- The Construction Supervisor shall contact 240 to schedule the preconstruction meeting. At the preconstruction meeting, the Construction Supervisor and his assigned crew (Engineer Equipment Operators), inspector, safety officer, designer, and a representative(s) from 150, 420 shall be in attendance. If the job involves designs and/or inspections by 210, or a Public Law 93-638 contract, representatives from 210 shall also attend.

Follow the 'Guidelines and Protocols During Construction' given in Step 10.

- KEY MEETINGS:

- The preconstruction meeting will be held prior to commencing construction work to hand out and review the construction drawings, site conditions, environmental commitments, etc. (150, **240**, 420, S [including Engineer Equipment Operators], Inspector).
- Prior to work being performed within the floodplain, coordination shall take place in advance with 430 to provide river flow information for worker safety. This information is particularly crucial during spring runoff and prior to and/or during thunderstorm events. 430 will coordinate if reduced reservoir releases are necessary (240, 430, **S**).
- During the meeting, the lines of communication will be established as well as the inspection schedule. This will include inspections of environmental features accomplished during the main project construction.

- Items to be accomplished at the preconstruction meeting:

- ❖ Any questions concerning the construction drawings will be resolved.
- ❖ The Construction Supervisor will be prepared to discuss any job access time agreements that may affect the job, provide an overall schedule for construction operations, and a tentative schedule of inspections.
- ❖ Determine construction survey requirements for the project and a staking schedule.

- ❖ Discuss all environmental/land commitments and features pertaining to the proposed project. The designer, Construction Supervisor, and inspector shall be knowledgeable with all environmental and land commitments, ensuring all land commitments, construction measures, and environmental restoration features are incorporated into the project during construction.
- ❖ The designer (240) shall prepare a brief report summarizing the preconstruction meeting and route a copy to the inspector, 150, 420, 240, and 200. Copies will be sent to S (S-14) and the Construction Supervisor.
- ❖ Designer/Project Engineer, in cooperation with Construction Supervisor and inspector, shall determine schedule for Joint Policy Safety Meetings.

- **EXTERNAL COORDINATION:**

- As needed, potential stakeholder and landowner review may be needed (evaluate and determine on a case-by-case basis) (240, **420**, S).

- **END PRODUCTS:**

- All key parties involved in the construction process are informed and knowledgeable about the project, construction features, associated environmental commitments, required inspections, site conditions, safety aspects, etc. (150, 420, 240, S [including Engineer Equipment Operators], and Inspector).

K. Section 10: CONSTRUCTION – GUIDELINES AND PROTOCOLS

- **GOALS:**

- Construct the project and all enhancement features as described within the project description and shown on the design drawings within the allowed permitting time frame (S, 240).
- Resolve construction, field engineering, environmental and/or land issues with the designer (240) as they develop through good communications and regular construction inspections by 240 or the inspector (150, 420, **240**, S, Inspector).
- Follow the ‘Guidelines and Protocols During Construction’:

- **Field Visits**

- ❖ Any personnel that will visit a field construction site should contact the Construction Supervisor prior to arriving at the site.

- Regular Inspections

- ❖ At each inspection, the Construction Supervisor shall verbally update the projected construction schedule and the next inspection date shall be jointly agreed upon (both of which shall be noted in the inspector's report). (S, Inspector)
- ❖ The designer shall perform inspections if the inspector is not available.
- ❖ The Construction Supervisor will give the weekly fill or excavation quantities to the inspector during field inspections.
- ❖ Anytime a project is stopped and equipment removed prior to completion, the Construction Supervisor will call the inspector 48 hours prior to stopping the job to provide the new schedule for completion.
- ❖ The project inspector shall route all inspection reports to the Construction Supervisor, designer, 240, 200, and S (S-14).
- ❖ If during the course of construction, the Construction Supervisor develops questions concerning the drawings or thinks a deviation from the drawings is necessary, the first point of contact shall be the inspector to gain the appropriate approval prior to beginning work on such changes. It will be the inspector's responsibility to relay the problem, if necessary, to the designer for resolution. The designer will discuss any significant problems and solutions with the Construction Supervisor and 240. Any significant changes or additions to the construction drawings will be reviewed and approved by S (S-10), the Construction Supervisor, 420, 150, 240, and the inspector. Minor changes and clarifications may be handled verbally by the inspector and documented on the inspection report and marked on the construction drawings.

- Environmental/Land Commitments

- ❖ At no time shall environmental or land access deviate from the agreed upon commitments discussed within the CWA-Section 404, 402, 401 permits, ESA consultation, NHPA, or NEPA documents.
- ❖ If any environmental concerns surface in the field during a construction project, the Construction Supervisor or designer will communicate the need for changes or corrective action within 48 hours to 150 and 420 and the inspector to resolve the matter.
- ❖ If any change is deemed necessary, 150 and 420 staff will review the request, and when appropriate, contact the pertinent regulatory agency for clearance. No work modifications can be made until approval is received from 150 and concurrence from 240.

If any concerns arise about land interests during construction, 240 will be immediately contacted. Any actions taken by 420 shall be coordinated with the Construction Supervisor, inspector, and/or designer.

- Issue Resolution

- ❖ If the Construction Supervisor has an immediate problem and the inspector is unavailable, the Construction Supervisor shall then contact the designer directly. If the designer is also not available, contact 240 Team Leader (if River Analysis Project), or 210 Team Leader (if Design and Construction Project) for concurrence.
- ❖ If the Construction Supervisor desires an interim inspection prior to the next scheduled inspection, he shall immediately notify the inspector to arrange for the inspection. If at all possible, the Construction Supervisor should allow for a 48 hour response time, although in some cases a quicker response time can be met. Again, in the absence of the inspector, the Construction Supervisor shall follow the protocol outlined above. When any of the secondary persons are contacted directly, they will update the inspector as soon as possible.

- Safe Working Conditions

- ❖ On an ongoing basis during spring runoff, and prior to and/or during thunderstorm events, 430 will provide river flow information for worker safety to 240 and S (430). The inspector shall be informed of this information. 430 will coordinate reduced reservoir releases if necessary. It is unlikely that any reservoir releases will be altered during construction of a river maintenance project.

- Final Inspections

- ❖ Near the end of construction, the Construction Supervisor shall provide at least 48 hours notice to the inspector or designer of the proposed final inspection date. The Construction Supervisor, the inspector, the designer, 150, 420, and 210 if necessary, shall attend the final inspection. Any punch list items identified during the final inspection will be documented in the inspector's report, and the Construction Supervisor shall verbally provide the inspector a schedule (noted in the inspector's report) to accomplish the entire punch list items within a reasonable time frame. All environmental features shall be completed according to an agreed upon schedule. Jobs will be considered finished based upon a satisfactory inspection and concurrence by all parties, i.e., 150, 420, 240, and S.

- ❖ The inspector will follow up and document completion of all work, and prepare a final construction report. The final construction report shall include a description of the work; actual quantities; changes made during construction; as-built drawings including enhancement features; and before, during, and after construction photographs.

- **KEY MEETINGS:**

- Weekly safety meeting (S).
- Monthly Joint Policy Safety Meetings (150, 240, S, Inspector).
- Reclamation personnel will meet as needed to resolve construction, field engineering, and environmental and/or land issues with the designer (240) as they develop through good communications and regular construction inspections (S, **240**, 220 – if assigned).
- Final Inspection Review (150, 420, **240**, 210 – if assigned, 220 – if assigned, S).
- Post-construction Review (150, 210, 240, 420, **Inspector**).

- **EXTERNAL COORDINATION:**

- Potential stakeholder and landowner review (evaluate and determine the need for on a case-by-case basis (240, **420**, S).

- **END PRODUCT:**

- Within the allotted permitting time frame, complete construction and all environmental features described within the project description and shown on the design drawings. (S, 240).
- A final project inspection will be held to ensure all features of the project are constructed in accordance with the design drawings. (**240**, 150, 420, S).
- Complete final construction report (Inspector).

L. Section 11: MONITORING AND ADAPTIVE MANAGEMENT

To achieve desired project geomorphic and biological responses, it is necessary to monitor for both the successes and failures. When needed, adaptive management practices may be necessary.

Adaptive management may be defined as “management in the face of uncertainty, with a focus on reduction of uncertainty.” Natural river systems such as the Rio Grande and its associated aquatic and riparian habitats are dynamic and responsive to multiple variables and complex interactions between variables.

The following is a description of adaptive management from the Bureau of Reclamation's NEPA Handbook (May 1997):

“Sometimes there is not sufficient scientific data or knowledge available to make an accurate prediction regarding the social, economic, and ecological impacts of a proposed action or alternatives, or from proposed mitigation. If the impacts could be significant and there is considerable controversy over the outcome, the decision maker should consider developing an adaptive management program to monitor the results of the decision. Adaptive management formalizes the process and provides for the redirection of projects and programs based on new information. Adaptive management may be carried out according to the following steps: participants determine measurable goals for management and then: 1) outline their understanding of system functions and outputs, 2) establish quantified objectives and controls, 3) initiate the action, 4) monitor and evaluate the outcomes, 5) review goals and objectives, and 6) redirect the action, if necessary.

- **GOALS:**

- Monitor geomorphic (**150**, 240), and biologic (150) response to the project and environmental enhancement features.
- Adaptive management may or may not be needed for projects and must be evaluated on a case-by-case basis. Adaptive management goals should be identified within the BA and/or NEPA documentation. Establish, as necessary, an Adaptive Management Team and define membership and responsibilities (**150**, 240).
- To the extent reasonably possible, achieve river restoration (the creation of natural and sustainable channel which maximizes the potential biodiversity of the riverine environment).

- **KEY MEETINGS:**

- Meetings will occur on an “as needed basis” unless otherwise previously determined.

- **EXTERNAL COORDINATION:**

- The adaptive management team's membership and responsibilities may be identified within the BA and/or NEPA documentation, or later in a separate document. The team may include membership from Reclamation, regulatory agencies, and stakeholders as appropriate (**150**, 240).

- **END PRODUCTS:**

- Meet all agreed upon environmental commitments and/or other related obligations (**150**, 240, S).

IV. OUTLINE FOR SMALLER PROJECTS

These projects can generally be achieved under a Categorical Exclusion Checklist (CEC).

A. STEP 1: Project Initiation

- A Project Initiation Meeting will take place to discuss the draft PIF (Appendix A) with 150, 420 and obtain feedback. Discussions will include describing the proposed work and project goals, locations of new cross sections, or other hydrographic data collection needs (150, 420, **240**)
- Finalize PIF by including any new information obtained from the Project Initiation Meeting (240) and provide to 150. 150 shall then initiate environmental project compliance.

B. STEP 2: Initial Field Review (150, 420, **240, Socorro, Inspector)**

C. STEP 3: Complete 90% Design (240)

D. STEP 4: 150/420 will determine the required permitting/approvals for land access or other environmental compliance requirements.

- 150 may need to meet with Fish and Wildlife Service on ESA concerns before making a final call on whether or not this work would be satisfactory to keep at a CEC level. In general, 150 will follow up with the Project Lead within 10 working days or less concerning the requirements. The following are compliance requirements that may or may not be needed for project accomplishments:

- Environmental Compliance/Permits:
 - Corps of Engineers, Clean Water Act (CWA), Section 404
 - State of New Mexico or Environmental Protection Agency, CWA, Section 401
 - Fish and Wildlife Service, Endangered Species Act (ESA), Section 7 Consultation
 - New Mexico State Historic Preservation Office (NMSHPO), Archaeological Clearance, Section 106
 - National Environmental Policy Act (NEPA)
 - National Pollution Discharge Elimination System (NPDES); CWA, Section 402
- 420 Land Permits/Approvals:
 - Access permits
 - Material permits
 - Storage
 - Staging

- E. STEP 5: As needed, internal and/or external field review with agency personnel (150, 420, **240**, Socorro, Inspector)
- F. STEP 6: Obtain the necessary environmental and land clearances/approvals (150, 420)
- G. STEP 7: Finalize Construction Drawings (240)
- H. STEP 8: Preconstruction Meeting (**240**, 150, 420, Socorro, Inspector, Safety Officer)
- I. STEP 9: Construction (Socorro)
- J. STEP 10: Final Inspection Review (**240**, 150, 420, Socorro, Inspector, Safety Officer)

V. DATA COLLECTION AND PLANNING STUDIES

Compliance-related activities may require collecting field data for project design work which may include studies associated with assessing sediment transport and geomorphologic river trends. Activities may include conducting broader-based sediment transport and geomorphic studies. These studies may or may not lead to maintenance and/or restoration projects in the future. Generally, this work can be achieved under a CEC.

- GOALS:
 - Determine the location and number of new cross sections and other data collection needed for the study area reach (**240**, 150).
 - Perform ESA, NEPA, and NHPA compliance (150).
 - -Provide a work description and 8.5" X 11" map showing locations of proposed data collection and provide three (3) copies to 150 and one (1) copy to 420 (240).
 - Obtain necessary land access clearances (420).
- KEY MEETINGS:
 - Schedule an internal meeting with 150/420 on the number and location of cross sections and other data collection (240).
- EXTERNAL COORDINATION:
 - For pueblo or tribal lands, 240 staff will contact BIA lands office (via email, if possible) at the appropriate office (Northern or Southern Pueblo Agency) about their requirements for data collection activities. 240 and 420 will meet with the pueblo/tribal personnel to describe the project purpose and obtain the necessary access permission required by the pueblo or tribe.

- On private lands, 240 will meet with 420 to determine the extent of required landowner approval. To the extent possible, 240 will meet with the landowner to seek approval. Any commitments regarding resources, i.e., to get access from landowners, needs to be in writing (420)
- For federal lands, 240 will meet with 420 to determine the extent of required documentation to complete the proposed work. Any commitments regarding resources needs to be in writing (420).

150 will coordinate NHPA activities with BIA, if necessary.

• END PRODUCTS:

- Provide completed NEPA document to 240 (150).
- Approved cross sections will be established and hydrographic and other data collected.

Appendix i Project No. _____

(Assigned by ALB-185)

Technical Services Division
PROJECT INITIATION FORM

BUREAU OF RECLAMATION
ALBUQUERQUE AREA OFFICE
555 BROADWAY NE, SUITE 100
ALBUQUERQUE, NM 87102

Check One: Draft _____ or Final _____

Date:

Project Name:

Cost Authority(s) and source of funding:

Project Leader:

NEPA Team Leader: (Leave blank until preparing final version of form):

Team Members (Leave blank until preparing final version of form): 24

1. Project Purpose and Need - (also, identify if it is a Priority Site; Collaborative Program work; meets a Biological Opinion requirement, etc.)

2. Location Information - Provide a site map; 8.5" x 11". Draw the general project location onto the appropriate aerial map. Also, write the 1) USGS quad name and include township/range/section(s) of the project area on the map, and 2) provide the drive, file path, and folder name of where to locate the map being utilized.

3. Anticipated Data Needs

4. Initial Proposed Access Info – Show access routes on map - existing or new; Equipment needs (basic info ok here)

5. Initial Temporary Use Area(s) needed (if applicable) -Include on map: site location(s), impact area, storage, stockpile, and staging areas, disposal sites, etc.

6. Initial Long Term Use Requirements (if applicable—include on site map) - Identify access roads, areas necessary to meet anticipated monitoring, adaptive management needs following construction completion (i.e., replanting vegetation, watering plants, etc.).

7. Estimated Materials Requirements (if applicable) - Materials required for the job (e.g., riprap, fill material, etc.) and proposed material sources.

8. Identification of Stakeholders, Cooperating Entities, and/or Landowners - Explain nature of involvement or interest.

9. Anticipated Level of NEPA and ESA (leave blank on draft and fill out on final; to be determined by ALB-150)

10. Anticipated Schedule (best estimates) – provide dates for the following: design completion, environmental compliance completion, construction start and finish.

11. Estimated Project Cost Range

Final Form ONLY—obtain the following signatures concurring with the above project proposal:

Karl Martin, Manager Date

Technical Services Division

Lori Robertson, Manager Date

Environment Division

Jim Wilber, Manager Date

Facilities and Lands Division

A. Jack Garner Date

Area Manager

AppendixC: ESA and Species Specific to the Maintenance Plan

I. Endangered Species Act – Section 7

Section 7 of the Endangered Species Act (Act) provides some of the most valuable and powerful tools to conserve listed species, assist with species' recovery, and help protect critical habitat. It mandates all Federal agencies to determine how to use their existing authorities to further the purposes of the Act to aid in recovering listed species, and to address existing and potential conservation issues.

Section 7(a)(1) directs the Secretary (Secretary of the Interior/Secretary of Commerce) to review other programs administered by them and utilize such programs to further the purposes of the Act. It also directs all other Federal agencies to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of species listed pursuant to the Act.

This section of the Act makes it clear that all Federal agencies should participate in the conservation and recovery of threatened and endangered species. Under this provision, Federal agencies often enter into partnerships and Memoranda of Understanding with the Fish and Wildlife Service or the National Marine Fisheries Service for implementing and funding conservation agreements, management plans, and recovery plans developed for listed species.

Section 7(a)(2) states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. In fulfilling these requirements, each agency is to use the best scientific and commercial data available. This section of the Act sets out the consultation process, which is further implemented by regulation (50 CFR §402). By law, section 7 consultation is a cooperative effort involving affected parties engaged in analyzing effects posed by proposed actions on listed species or critical habitat(s).

II. Species specific to the Maintenance Plan

A) Southwestern Willow Flycatcher (Endangered)

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a small Neotropical migratory bird, whose nesting habitat is restricted to relatively dense growths of trees and shrubs in riparian ecosystems in the arid southwestern United States and possibly extreme northwestern Mexico. These riparian habitats are associated with rivers, swamps, and other wetlands, including lakes and reservoirs (Bent 1960). Most of these habitats are classified as wetlands in the legal sense: palustrine and lacustrine forested wetlands and scrub-shrub wetlands (Cowardin et al. 1979). Some are non-wetland riparian forests. Surface water or saturated soil are typically, but not always, present year-round or seasonally and ground water is generally at a depth of less than 2 or 3 meters (6.5 to 9 ft) within or adjacent to nesting habitat.

A final rule was published in the February 27, 1995 Federal Register to list the southwestern U.S. population of the Willow Flycatcher as an endangered species under the ESA with proposed

critical habitat. However, the final rule designating critical habitat for the species range-wide did not include the Rio Grande (U.S. Fish and Wildlife Service 1995) at that time. A proposal to list critical habitat was published October 12, 2004 (U.S. Fish and Wildlife Service 2004), with a final designation published October 19, 2005 (U.S. Fish and Wildlife Service 2005). The species occurs in southern California, Arizona, New Mexico, southern portions of Nevada and Utah, western Texas, and possibly southwestern Colorado (U.S. Fish and Wildlife Service 1995). Arizona, New Mexico, and California account for the greatest number of known Southwestern Willow Flycatcher sites (93%) in this region and 88% of the total known territories located in 2001. Within these states, the largest known population of Willow Flycatcher territories is found along the Gila River drainage while the Rio Grande in Colorado and New Mexico contribute the second largest number of territories to the overall population (Sogge et al. 2002).

In New Mexico, the Willow Flycatcher has been observed in the Rio Grande, Rio Chama, Zuni, San Francisco, and Gila River drainages. Willow Flycatchers were first reported at Elephant Butte State Park in the 1970s, although the exact locations of the sightings were not documented (Hubbard 1987). Because surveys have not been consistent or extensive prior to the listing of this species, a comparison of historic numbers to current status is not possible, however, the available native riparian habitat overall along the Rio Grande has declined and it is assumed populations may have declined from historic numbers as well.

Since the initial surveys of the Rio Grande Valley in the 1990s, breeding pairs have been found within the Middle Rio Grande Project area from Elephant Butte Reservoir upstream to the vicinity of Española. Several locations along the Rio Grande have consistently held breeding flycatchers. These areas have one or more Willow Flycatcher pairs that have established a territory in an attempt to breed, with most birds returning annually. In some locations, these local populations appear to be expanding with increased number of territories being detected. Some local populations have remained small (10-15 territories, or fewer) but stable; other sites have become extirpated and no longer contain territorial flycatchers.

In the Middle Rio Grande, surveys for Willow Flycatchers in selected areas occurred because of environmental compliance activities for various projects. Although a systematic survey effort throughout the riparian corridor of the Middle Rio Grande has not occurred, reaches of the river with the most suitable habitat for flycatchers have been surveyed fairly thoroughly. Presence/absence surveys and nest monitoring along selected areas of the Rio Grande have been conducted from 1993 to 2005. With expanded or increased survey efforts during this 12-year period, several sites have been located where flycatcher territories have consistently been established. Once located, most of these core breeding areas have been monitored annually. The most recent surveys were conducted during the 2005 breeding season and, along with those data and data obtained subsequent to the 2001 and 2003 BAs, are considered the environmental baseline for the current population of breeding flycatchers in the Middle Rio Grande for this Amendment to the Programmatic Biological Assessment. These survey data are further discussed below.

Six general locations of flycatcher populations have been established throughout the Middle Rio Grande (Figure 1). These areas have consistently held several territories; however, the number of territories, pairs, nest attempts and successful nests has changed through the years.

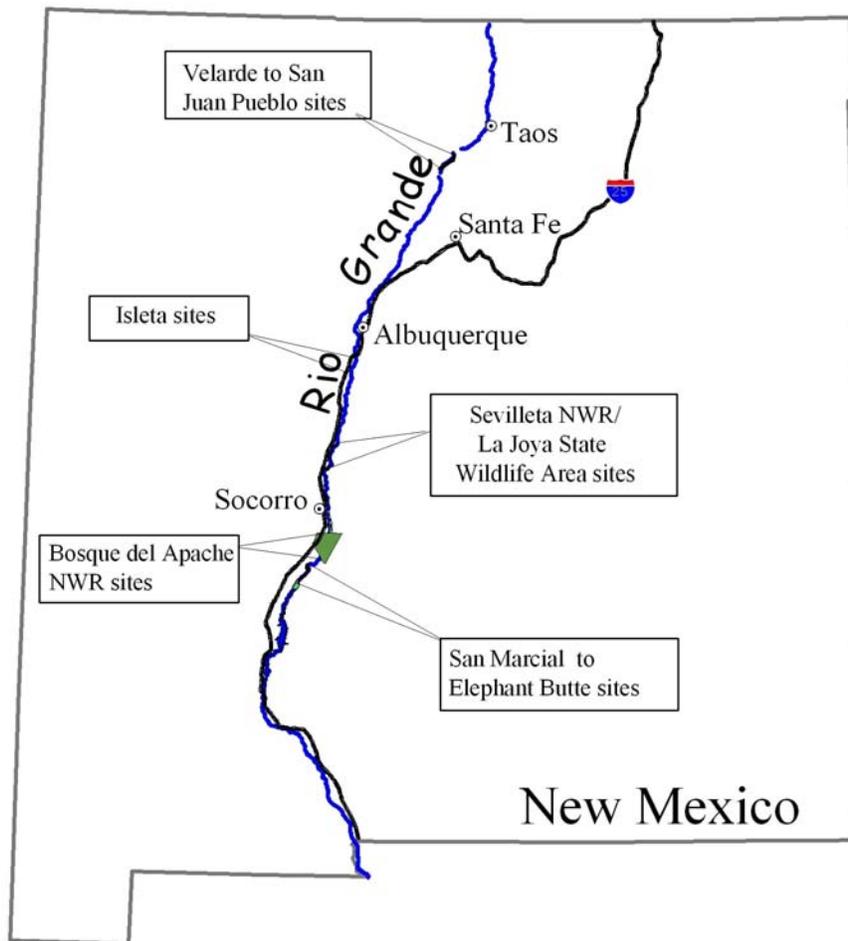


Figure 1. Six general locations of flycatcher populations in the Middle Rio Grande of New Mexico.

The Southwestern Willow Flycatcher breeds in different types of dense riparian habitats, across a large elevational and geographic area. Although other Willow Flycatcher subspecies in cooler, less arid regions may breed more commonly in shrubby habitats away from water (McCabe 1991), the Southwestern Willow Flycatcher usually breeds in patchy to dense riparian habitats along streams or other wetlands, near or adjacent to surface water or underlain by saturated soil. Common tree and shrub species comprising nesting habitat include willows (*Salix* spp.), seepwillow (aka mulefat; *Baccharis* spp.), boxelder (*Acer negundo*), stinging nettle (*Urtica* spp.), blackberry (*Rubus* spp.), cottonwood (*Populus* spp.), arrowweed (*Tessaria sericea*), tamarisk (aka saltcedar; *Tamarix ramosissima*), and Russian olive (*Eleagnus angustifolia*) (Grinnell and Miller 1944, Phillips et al. 1964, Hubbard 1987, Whitfield 1990, Brown and Trosset 1989, Brown 1991, Sogge et al. 1993, Muiznieks et al. 1994, Maynard 1995, Cooper 1996, Skaggs 1996, Cooper 1997, McKernan and Braden 1998, Stoleson and Finch 1999, Paradzick et al. 1999). Habitat characteristics such as plant species composition, size and shape of habitat patch, canopy structure, vegetation height, and vegetation density vary across the subspecies' range. However, general unifying characteristics of flycatcher habitat can be

identified. Regardless of the plant species composition or height, occupied sites usually consist of dense vegetation in the patch interior, or an aggregate of dense patches interspersed with openings. In most cases this dense vegetation occurs within the first 3 - 4 m (10-13 ft) above ground. These dense patches are often interspersed with small openings, open water, or shorter/sparser vegetation, creating a mosaic that is not uniformly dense. In almost all cases, slow-moving or still surface water and/or saturated soil is present at or near breeding sites during wet or non-drought years.

Thickets of trees and shrubs used for nesting range in height from 2 to 30 m (6 to 98 ft). Lower-stature thickets (2- 4 m or 6-13 ft) tend to be found at higher elevation sites, with tall stature habitats at middle and lower elevation riparian forests. Nest sites typically have dense foliage from the ground level up to approximately 4 m (13 ft) above ground, although dense foliage may exist only at the shrub level, or as a low dense canopy. Nest sites typically have a dense canopy, but nests may be placed in a tree at the edge of a habitat patch, with sparse canopy overhead. The diversity of nest site plant species may be low (e.g., monocultures of willow or tamarisk) or comparatively high. Nest site vegetation may be even- or uneven-aged, but is usually dense (Brown 1988, Whitfield 1990, Muiznieks et al. 1994, McCarthy et al. 1998, Sogge et al. 1997a, Stoleson and Finch 1999).

Historically, the Southwestern Willow Flycatcher nested in native vegetation such as willows, buttonbush, boxelder, and *Baccharis*, sometimes with a scattered overstory of cottonwood (Grinnell and Miller 1944, Phillips 1948, Whitmore 1977, Unitt 1987). Following modern changes in riparian plant communities, the flycatcher still nests in native vegetation where available, but also nests in thickets dominated by the non-native tamarisk and Russian olive and in habitats where native and non-native trees and shrubs are present in essentially even mixtures (Hubbard 1987, Brown 1988, Sogge et al. 1993, Muiznieks et al. 1994, Maynard 1995, Sferra et al. 1997, Sogge et al. 1997a, Paradzick et al. 1999).

B) Rio Grande Silvery Minnow (Endangered)

Critical habitat was designated by the Fish and Wildlife Service (Service 2005) as the river corridor inside levees or within 300' of river from Cochiti Reservoir to the powerlines upstream of Elephant Butte Reservoir. Collaborative Program funded surveys cover the Rio Grande from Angostura Diversion Dam downstream to the powerlines upstream of Elephant Butte Reservoir (Dudley and Platania 2007; Dudley et al 2007). A survey by the Service in the Elephant Butte Reservoir temp channel area has found silvery minnows (Porter, pers. comm.: awaiting trip report from Service). These surveys followed a change in construction to leave point bars in the Temp Channel where possible. Habitat at these point bars is being utilized by silvery minnows. Population increases in 2004 & 2005 throughout their current range correlated with overbank flows creating inundated habitat for recruitment (Dudley and Platania 2007). Data from ongoing Reclamation electrofishing surveys from Bernalillo to Socorro provide ecological insights (Porter and Dean 2006). Augmentation of silvery minnows by Service appears to contribute less than 1 percent of population (Remshardt 2006).

There is a strong positive correlation between peak discharge and duration of high flows during the spawning season (May-June) with the Rio Grande silvery minnow mean October catch rates (Dudley and Platania 2007). This correlation supports the concept that silvery minnows utilize floodplain habitat for spawning and rearing of larval fish. Inundated point bars, islands and

riparian habitats on a recurring basis appear essential for silvery minnow recruitment (Pease, 2004). Short (< 5 days), low magnitude (<1500 cfs) spawning pulses are ineffective for recruitment while slightly higher duration (5-7 days), moderate magnitude (2500-3000 cfs) flows support good recruitment. The population survey numbers increased three orders of magnitude from October 2003 to October 2005. Channel incision reduces floodplain connectivity on point bars and islands by increasing the flow magnitude required for inundating these surfaces (Porter and Massong 2004). Alternative hypotheses to floodplain spawning include egg transport to inundated surfaces (Widmer pers. comm.). Doctoral research at the University of New Mexico suggests that silvery minnows may be omnivorous (Citations are pending).

A number of biological constraints and needs have been identified that should be considered in planning and management. Each of these parameters needs to be maintained over a large enough area on an annual basis to sustain the populations of Rio Grande silvery minnow.

1. *Natural flow regimes.* The historic hydrograph includes extended periods of desiccation that may have had a substantial negative impact on the species, although available evidence (Wesche et al. 2005) shows that periods of river desiccation have declined since the 1930s.

2. *Periodic flood events during spring and summer to initiate breeding.*

Successful reproduction of the Rio Grande silvery minnow may be tied to flood events within the basin, although there is contradictory evidence to suggest multiple reproductive events in both wild and captive populations of Rio Grande silvery minnow. Periodic floods need to be maintained in order for the species to successfully reproduce in the natural environment.

3. *Appropriate habitat for early life-history stages, including floodplain and other shallow, quiet water environments.* These habitats have been identified as important to survival of larvae and juveniles. There is a further need to maintain connections with the river proper to allow the young and juveniles back into fluvial habitats for later life stages.

4. *Suitable water quality.* Suitable water quality should be maintained to sustain the Rio Grande silvery minnow and its food supply. No description of “suitable” water quality currently exists, however. One limited study (Buhl 2004) found no chronic or acute toxicological effects on Rio Grande silvery minnows from wastewater treatment plant discharges or drain-water discharges in the middle Rio Grande.

5. *Unimpeded flows to allow for movement of various life stages.* Dams, diversions, and river impediments can have negative impacts on the downstream movement of eggs and larvae and on the ability of subadult and adult fish to move upstream. There is no evidence to date to suggest optimal timing, periodicity, or geographic extent of upstream movement.

Critical habitat for the Rio Grande silvery minnow was designated in 2003, under section

4(a)(3)(A) of the Endangered Species Act (68 FR 8088). Critical habitat was designated for the species in New Mexico, only in the middle Rio Grande. Critical habitat extends from Cochiti Dam, in Sandoval County, downstream to the utility line that crosses the river (a permanent landmark) in Socorro County (approximately 252 km (157 mi)). Excluded from this designation were the Pueblo lands of Santo Domingo, Santa Ana, Sandia, and Isleta. Because each of these Pueblos submitted management plans that provide for special management considerations or

protections for the silvery minnow these lands were not included in the final critical habitat designation. The Service determined that the benefits of exclusion outweigh those of including the Pueblos of Santa Domingo, Santa Ana, Sandia, and Isleta as part of the critical habitat designation. A major factor in this determination was that, even if excluded, these river reaches owned and managed by the Pueblos will nonetheless receive special management and protection through the Pueblos' management plans.

Under these management plans, the silvery minnow will benefit from monitoring, restoration, enhancement, and survey efforts. The critical habitat designation also includes a portion of the Jemez River, a tributary of the Rio Grande north of Albuquerque. Critical habitat includes the Jemez River from the Jemez Canyon Dam to the upstream boundary of the Santa Ana Pueblo (it does not include Jemez watershed lands within the Pueblo).

The width of the critical habitat designation, in areas of the river that are bound by existing levees, is defined as extending to those levees. The designation of critical habitat will not result in the removal of existing levees. While areas outside of the existing levees may be important for the overall health of the Rio Grande ecosystem, these areas have almost no potential for containing the primary constituent elements (see below) because they are separated from the river by the levees and are rarely inundated with water. Therefore, they were not considered essential to the conservation of the species. (Nevertheless, these and other areas outside of the critical habitat designation will continue to be subject to conservation actions that may be implemented under section 7(a)(1) of the ESA, the regulatory protections afforded by the jeopardy standard in section 7(a)(2) of the ESA, and take prohibitions in section 9 of the ESA.)

In areas without levees, the width of the critical habitat designation is defined as the area of bankfull width plus 91.4 meters (300 ft) of riparian zone on each side of the banks. The bankfull width is the width of the river at bankfull stage (the flow at which the river begins to leave the channel and move into the floodplain). Bankfull stage, while a function of the size of the stream, is a fairly consistent feature related to the formation, maintenance, and dimensions of the stream channel. The 91.4-meter-width defines the lateral extent of the areas believed to be essential to the conservation of the species. Although the Rio Grande silvery minnow cannot be found in these areas when they are dry, they likely provided backwater habitat and were sometimes flooded in the past. Therefore, they may provide habitat during high-water periods.

The 91.4 meter width was selected for several reasons:

1. The biological integrity and natural dynamics of the river system are maintained within this area. The floodplain and its riparian vegetation: provide space for natural flooding patterns and latitude for necessary natural channel adjustments to maintain appropriate channel morphology and geometry; store water for slow release to maintain base flows; provide side channels and other protected areas for larval and juvenile fish; allow the river to meander within its main channel in response to large flow events; and recreate the mosaic of habitats necessary for the conservation of the species.
2. Conservation of the adjacent riparian zone helps provide essential nutrient recharge and protection from sediment and pollutants, which contributes to successful spawning and recruitment of Rio Grande silvery minnow.
3. Vegetated lateral zones are widely recognized as providing a variety of aquatic habitat functions and values (e.g., aquatic habitat for fish and other aquatic organisms, moderation of

water temperature changes, and detritus for aquatic food webs) and help improve or maintain local water quality.

The critical habitat designation takes into account the naturally dynamic nature of riverine systems and recognizes that floodplains (including riparian areas) are an integral part of the stream ecosystem.

Although it was determined that other areas also are essential to the conservation of the Rio Grande silvery minnow, these areas were not designated as critical habitat because of the Service's analysis under section 4(b)(2) of the ESA. That analysis found that the benefits of excluding these areas from critical habitat designation outweighed the benefits of including them. They include the middle Pecos River from immediately downstream of Sumner Dam to Brantley Dam, New Mexico, and the Rio Grande from the upstream boundary of Big Bend National Park to the Terrell/Val Verde county line, Texas. A discussion of the benefits of excluding or including these areas can be found in the 2003 critical habitat designation (68 FR 8088).

The area of the middle Rio Grande designated as critical habitat contains all of the primary constituent elements that are essential to the conservation of the species during some or all of the year, and can provide for the physiological, behavioral, and ecological requirements of the Rio Grande silvery minnow.

The primary constituent elements of critical habitat for the Rio Grande silvery minnow were determined based on several studies of its habitat and population biology (see 68 FR 8088 for a listing of the studies).

The primary constituent elements are as follows:

1. A hydrologic regime that provides sufficient flowing water with low to moderate currents capable of forming and maintaining a diversity of aquatic habitats such as, but not limited to, the following: backwaters (a body of water connected to the main channel, but with no appreciable flow), shallow side channels, pools (the portion of the river that is deep with relatively little velocity compared to the rest of the channel), eddies (a pool with water moving opposite to that in the river channel), and runs (flowing water in the river channel without obstructions) of varying depth and velocity. All of these are necessary for particular Rio Grande silvery minnow life-history stages in appropriate seasons.

The Rio Grande silvery minnow requires habitat with sufficient flows from early spring (March) to early summer (June) to trigger spawning, flows in the summer (June) and fall (October) that do not increase prolonged periods of low or no flow, and a relatively constant winter flow (November through February).

2. The presence of low-velocity habitat (including eddies created by debris piles, pools, backwaters, or other refuge habitat) within unimpounded stretches of flowing water of sufficient length (i.e., river miles) to provide a variety of habitats with a wide range of depth and velocities.
3. Substrates of predominantly sand or silt.
4. Water of sufficient quality to maintain natural, daily and seasonally variable water temperatures in the approximate range of greater than 1°C (35°F) and less than 30°C (85°F), and to reduce degraded water quality conditions (decreased dissolved oxygen).

These primary constituent elements of critical habitat provide for the physiological, behavioral, and ecological requirements of the Rio Grande silvery minnow.

The first element provides water of sufficient flows to reduce the formation of isolated pools. This element is essential to the conservation of the species because it cannot withstand permanent drying (loss of surface flow) of long stretches of river. Water is a necessary component for all life stages and provides for hydrologic connectivity to facilitate fish movement.

The second element provides habitat necessary for development and hatching of eggs and the survival of the species from larvae to adult. Low-velocity habitat provides food, shelter, and sites for reproduction, which are essential for the survival and reproduction of Rio Grande silvery minnow.

The third element provides appropriate silt and sand substrates, which are important in creating and maintaining appropriate habitat and life requisites such as food and cover.

The fourth element provides protection from degraded water quality conditions. When water quality conditions degrade (e.g. water temperatures are too high or dissolved oxygen concentrations are too low), Rio Grande silvery minnow are likely to be injured or die.

C) Bald Eagle (Threatened)

The southwestern population of the Bald Eagle (*Haliaeetus leucocephalus*) was federally-listed as endangered in 11 March 1967 (U.S. Fish and Wildlife Service 1967). The species has been proposed for removal from the list of threatened and endangered wildlife in 1999 (U.S. Fish and Wildlife Service 1999).

Looking for open water with roosts like inundate cottonwood snags. Found in reservoirs with some in transit between, generally south boundary of the Bosque del Apache to Caballo, though they can be found on the non-reservoir portions of the Rio Grande all winter.

D) Pecos Sunflower (Threatened)

Pecos sunflower (*Helianthus paradoxus*) is a wetland plant that was known only from a single population near Fort Stockton, Pecos County, Texas when it was proposed as a candidate for listing as endangered under the ESA on December 15, 1980 (45 FR 82480). Subsequent field surveys for this plant found additional populations in New Mexico and Texas. It is presently known to occur in two widely separated locations in the Pecos River valley in eastern New Mexico, two locations on the Rio San Jose and one on the Rio Grande in west-central New Mexico, and two desert springs in west Texas. These populations occur on a variety of State and Federal lands and several private land holdings. The subsequently discovered populations were also determined to have a moderate degree of threat. Spring seeps, or wet meadow (ciénega) habitats are very rare in the dry regions of New Mexico and Texas. There is evidence these habitats have historically, and are presently, being reduced or eliminated by aquifer depletion, or severely impacted by agricultural activities and encroachment by alien plants (Poole 1992, Sivinski 1996). The southwestern United States is currently experiencing a period of prolonged drought that is exacerbating this habitat degradation. The trend of decreasing habitat availability and suitability justified listing Pecos sunflower as a threatened species. Recovery actions to

reverse or stabilize this trend and ensure the long-term sustainability of this species include identifying the ecological parameters of Pecos sunflower habitat, and enlisting the cooperation of the various habitat owners in the long-term conservation of the species. Pecos sunflower was given threatened species status under the ESA on October 20, 1999 (64 FR 56582-56590). Critical habitat for this plant was proposed on March 27, 2006 (FR 72:14328-14366) and includes many of the marshes on the west side of the Rio Grande, and west of the drains, at La Joya State Wildlife Area.

E) Western Yellow-billed Cuckoo (Candidate)

Major declines among western populations of the Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) in the twentieth century are due to habitat loss and fragmentation, local extinctions, and low colonization rates to where it is now extremely rare in most areas (Laymon and Halterman 1989). New Mexico populations likely peaked in 1960s, but have declined sharply due to inundation from water management projects, lowering water table, land clearing (21,850 ha from 1967–1971), and cattle grazing. Such intrusions during 1960s to 1980s caused loss of habitat for up to 1,000 pairs along Pecos River (Howe 1986). Likely <100–200 pairs remaining in New Mexico, and 100–200 pairs in adjacent w. Texas. In the Program area, the San Marcial area holds the greatest population in New Mexico in part because of the abundant riparian vegetation in the area. Once considered common nester in Arizona river bottoms; however, severe declines statewide; estimates suggest <200 pairs remained by 1986 (Laymon and Halterman 1987), and <50 pairs 5 yr later (Ehrlich et al. 1992). Perhaps greatest declines observed in California which supported an estimated 15,000 pairs in late nineteenth century (Howe 1986). From 1977 to 1987, populations declined by 65–96% in California due to massive loss of riparian gallery forest (<1% of original remaining) and eggshell thinning (Gaines and Laymon 1984, Laymon and Halterman 1987). However, declines also noted where habitat is not degraded; extirpated from breeding areas occupied by ≤ 4 pairs in 1977 survey (Laymon and Halterman 1987). Extensive surveys between 1986 and 1987 indicated only 30–33 pairs and 31 unmated males remain in California. The reason for high numbers of unmated males is unknown (Laymon and Halterman 1989). Status in Mexico is uncertain, but believed to be low; at least two-thirds of appropriate breeding habitat there has been removed or degraded, particularly in Sonora. Perhaps no more than 400–600 pairs remain in Mexico (Laymon and Halterman 1987).

F) Whooping Crane

An effort to create a wild flock with an alternate migratory route was initiated in 1975, using Sandhill Cranes (*Grus canadensis*) as “foster parents” (considered a Section 10(j) experimental population). Whooping Crane eggs were placed in the nests of Sandhill Cranes on their nesting grounds at the Grays Lake National Wildlife Refuge in Idaho. The Sandhills reared the chicks as their own, teaching them feeding habitats and ultimately a new 850-mile migratory path to the Bosque Del Apache National Wildlife Refuge in New Mexico. However, these Whooping Cranes became so accustomed to their Sandhill parents that they would not mate with other Whooping Cranes. Today, there are no Whooping Cranes left in this flock.

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Appendix D: Overview of Environmental Legal Requirements

NEPA – National Environmental Policy Act

The National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.] was signed into law on January 1, 1970. The Act establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and it provides a process for implementing these goals within the federal agencies. The Act also establishes the Council on Environmental Quality (CEQ).

Title I of NEPA contains a Declaration of National Environmental Policy which requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony. Section 102 requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. Specifically, all federal agencies are to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment. These statements are commonly referred to as environmental impact statements (EISs). Section 102 also requires federal agencies to lend appropriate support to initiatives and programs designed to anticipate and prevent a decline in the quality of mankind's world environment.

Title II of NEPA establishes the Council on Environmental Quality (CEQ). The Council on Environmental Quality, which is headed by a fulltime Chair, oversees NEPA. A staff assists the Council. The duties and functions of the Council are listed in Title II, Section 204 of NEPA and include: gathering information on the conditions and trends in environmental quality; evaluating federal programs in light of the goals established in Title I of the Act; developing and promoting national policies to improve environmental quality; and conducting studies, surveys, research, and analyses relating to ecosystems and environmental quality.

The NEPA process consists of an evaluation of the environmental effects of a federal undertaking including its alternatives. There are three levels of analysis depending on whether or not an undertaking could significantly affect the environment. These three levels include: categorical exclusion determination; preparation of an environmental assessment/finding of no significant impact (EA/FONSI); and preparation of an environmental impact statement (EIS).

At the first level, an undertaking may be categorically excluded from a detailed environmental analysis if it meets certain criteria which a federal agency has previously determined as having no significant environmental impact. A number of agencies have developed lists of actions which are normally categorically excluded from environmental evaluation under their NEPA regulations.

At the second level of analysis, a federal agency prepares a written environmental assessment (EA) to determine whether or not a federal undertaking would significantly affect the environment. If the answer is no, the agency issues a finding of no significant impact (FONSI).

The FONSI may address measures which an agency will take to reduce (mitigate) potentially significant impacts.

If the EA determines that the environmental consequences of a proposed federal undertaking may be significant, an EIS is prepared. An EIS is a more detailed evaluation of the proposed action and alternatives. The public, other federal agencies and outside parties may provide input into the preparation of an EIS and then comment on the draft EIS when it is completed.

If a federal agency anticipates that an undertaking may significantly impact the environment, or if a project is environmentally controversial, a federal agency may choose to prepare an EIS without having to first prepare an EA.

After a final EIS is prepared and at the time of its decision, a federal agency will prepare a public record of its decision addressing how the findings of the EIS, including consideration of alternatives, were incorporated into the agency's decision-making process.

The role of a federal agency in the NEPA process depends on the agency's expertise and relationship to the proposed undertaking. The agency carrying out the federal action is responsible for complying with the requirements of NEPA. In some cases, there may be more than one federal agency involved in an undertaking. In this situation, a lead agency is designated to supervise preparation of the environmental analysis. Federal agencies, together with state, tribal or local agencies, may act as joint lead agencies.

A federal, state, tribal or local agency having special expertise with respect to an environmental issue or jurisdiction by law may be a cooperating agency in the NEPA process. A cooperating agency has the responsibility to assist the lead agency by participating in the NEPA process at the earliest possible time; by participating in the scoping process; in developing information and preparing environmental analyses including portions of the environmental impact statement concerning which the cooperating agency has special expertise; and in making available staff support at the lead agency's request to enhance the lead agency's interdisciplinary capabilities.

ESA – Endangered Species Act

Congress overwhelmingly passed the Endangered Species Act in 1973 to "provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservation of these species."

The Department of the Interior, acting through the U.S. Fish and Wildlife Service, is responsible for protecting most threatened and endangered species. The Department of Commerce, through the National Marine Fisheries Service (NMFS), is responsible for marine species, including marine mammals and anadromous fish such as salmon.

The Endangered Species Act provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the U.S. or elsewhere. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, and contains exceptions and exemptions. The Act can be broken down

into four parts: 1) Listing species and designating critical habitat; 2) Recovery plans; 3) Prohibitions; and 4) Exceptions to prohibitions.

A more detailed discussion of the ESA and species specific to this study can be found in Appendix B.

CWA – Clean Water Act

The Clean Water Act of 1972 is the principal federal statute protecting navigable waters and adjoining shorelines from pollution. Since its enactment, the Act has formed the foundation for regulations detailing specific requirements for pollution prevention and response measures.

In 1972, amendments to the Federal Water Pollution Control Act added what is commonly called Section 404 authority (33 U.S.C. 1344) to the program. The Secretary of the Army, acting through the Chief of Engineers, is authorized to issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into waters of the United States at specified disposal sites. Selection of such sites must be in accordance with guidelines developed by the Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army; these guidelines are known as the 404(b)(1) Guidelines. The discharge of all other pollutants into waters of the U. S. is regulated under Section 402 of the Act which supersedes the Section 13 permitting authority mentioned above. The Federal Water Pollution Control Act was further amended in 1977 and given the common name of "Clean Water Act" and was again amended in 1987 to modify criminal and civil penalty provisions and to add an administrative penalty provision.

MBTA – Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful.

Executive Order 13186 further directs departments and agencies to take certain actions to further implement the MBTA. Specifically, the Order directs Federal agencies, whose direct activities will likely result in the take of migratory birds, to develop and implement a Memorandum of Understanding with the U.S. Fish and Wildlife Service that shall promote the conservation of bird populations.

FWCA – Fish & Wildlife Coordination Act

The Act provides that whenever the waters or channel of a body of water are modified by a department or agency of the U.S., the department or agency first shall consult with the U.S. Fish and Wildlife Service and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur, with a view to the conservation of wildlife resources. The Act provides that land, water and interests may be acquired by federal construction agencies for wildlife conservation and development. In addition, real property under jurisdiction or control of a federal agency and no longer required by that agency can be utilized for wildlife conservation by the state agency exercising administration over wildlife resources upon that property.

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Appendix E: Acquisition of Interests for Activities Related to Maintenance of the Middle Rio Grande

Albuquerque Area Office Acquisition of Interests for Activities Related to Maintenance of the Middle Rio Grande

Middle Rio Grande Project **Functional Statement – Roles and Responsibilities:**

The Secretary of the Interior has, by and through the Commissioner of the Bureau of Reclamation, delegated the authority of the Regional Director to, among other things, acquire property in the name of the United States as authorized. The acquisition of property is an obligation of the United States, and, as such, this right is strictly regulated through both the Department of the Interior and the Department of Justice. The Middle Rio Grande Project is, as derived from the Flood Control Act of 1948, a unique Federal reclamation project.

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Realty/Lands must be involved in all project phases regarding any planned maintenance activity on the Middle Rio Grande Project. This provides a degree of assurance that Reclamation's interests are protected through the proper acquisition and documentation of legal and physical access for planned and necessary maintenance activities.

A variety of land ownership patterns exist within the Middle Rio Grande Project. These various land ownerships include Tribal/Pueblo lands, numerous Land Grants, various Federal holdings, state lands, lands held by municipalities, and business and private holdings. Obtaining access from these various land owners and land management entities requires significant records research, analysis of access options, and, often, close coordination with other Federal, state, county and municipal entities.

Current Albuquerque Area Office policy requires coordinating any operational or maintenance work within the Middle Rio Grande Project which may affect the interests and operations of the Middle Rio Grande Conservancy District (MRGCD) with MRGCD.

Albuquerque Area Office
Acquisition of Interests for Activities
Related to Maintenance of the Middle Rio Grande

<u>Project:</u>	Middle Rio Grande
<u>Purpose:</u>	Define the process for acquiring certain land interest(s) determined necessary for the continued operation and maintenance of the Middle Rio Grande Project.
<u>Authority:</u>	<p>Rights-of-Ways Reserved to the United States for Canals and Ditches, Act of August 30, 1890, (26 Stat. 391).</p> <p>“In all patents for lands hereafter taken up under any of the land laws of the United States or on entries or claims validated by this act, west of the one hundredth meridian, it shall be expressed that there is reserved from the lands in said patent described, a right of way thereon for ditches or canals constructed by the authority of the United States. (26 Stat. 391; 43 U.S.C. § 945)”</p> <p>The Reclamation Act of June 17, 1902 – Section 7 (excerpt below) and Acts amendatory thereof and supplemental thereto.</p> <p>“Where in carrying out the provisions of this act it becomes necessary to acquire any rights or property, the Secretary of the Interior is hereby authorized to acquire the same for the the United States by purchase or condemnation under judicial process, and to pay from the reclamation fund the sums which may be needed for that purpose, and it shall be the duty of the Secretary of the Interior, under this act, to cause proceedings to be commenced for condemnation within thirty days of the receipt of the application at the Department of Justice. (33 Stat. 389; 43 U.S.C. § 421)”</p> <p>Rio Grande Canalization Project, Act of June 4, 1936, ch. 500, 46 Stat. 1463</p> <p>Flood Control Act of 1936, Act of June 22, 1936, ch. 688, 49 Stat. 1570</p> <p>Reclamation Project Act of 1939, Act of August 4, 1939, ch. 418, 53 Stat. 1187</p> <p>Flood Control Act of 1948 Rio Grande Basin [Middle Rio Grande Project], Act of June 30, 1948, ch. 771, 62 Stat. 1171</p> <p>“In carrying out the provisions of this Act, the Secretary of the Interior shall be governed by and have the powers conferred upon him by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388), and Acts amendatory thereof or supplementary thereto, except as is otherwise provided in this Act or in the reports referred to above. This Act shall be deemed a supplement to said Federal reclamation laws.”</p>

Albuquerque Area Office
Acquisition of Interests for Activities
Related to Maintenance of the Middle Rio Grande

Flood Control Act of 1950, Act of May 17, 1950, ch. 188, 64 Stat. 163

Compensation for Canal Rights-of-Way, Act of September 2, 1964, Public Law 88-531, 78 Stat. 808

Watershed Control Works, Rio Grande Canalization Project, Act of September 18, 1964, Public law 88-600, 78 Stat. 956

National Environmental Policy Act of 1969, Act of January 1, 1970, Public Law 91-190, 83 Stat. 852

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Act of January 2, 1971, Public Law 91-646, 84 Stat. 1894

Federal Land Policy and Management Act of 1976, Act of October 21, 1976, Public Law 94-579, 90 Stat. 2743

Reclamation Safety of Dams Act of 1978, Act of November 2, 1978, Public Law 95-578, 92 Stat. 2471

(Note: Not a comprehensive list. Appropriation Acts and specific project authorizing legislation may contain acquisition and/or disposal authorities.)

Regulations: 43 CFR Part 8, Joint Policies of the Departments of the Interior and the Army Relative to Reservoir Project Lands

49 CFR Part 24, Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs; Final Rule and Notice.

Departmental Manual, Pre-Acquisition Environmental Site Assessments (602 DM 2)

March 9, 1992 Memorandum from the Acting Assistant Attorney General, Environment and Natural Resources Division, Subject: "Federal Land Acquisition" and its enclosures

Reclamation Manual, Land Acquisition, LND-06-01, June 11, 1999

Albuquerque Area Office
Acquisition of Interests for Activities
Related to Maintenance of the Middle Rio Grande

Definitions*: (Sources [in part]: Glossary of Public Land Terms, Bureau of Land Management, Washington, 1949; Black's Law Dictionary, Third Edition, 1933; Webster's Seventh New Collegiate Dictionary, 1961)

Access: Permission, liberty, or ability to enter, approach, communicate with, or pass to and from or to make use of; the action of going to or reaching. In real property law, access denotes the right vested in the owner of land which adjoins a road or other highway to go and return from his own land to the highway without obstruction.

Accretion: The increase of land by the gradual or imperceptible action of natural forces.

Acquired Lands: Lands in Federal ownership which are not public lands, having been obtained by the Government by purchase, condemnation, or gift or by exchange for such purchase, condemned, or donated lands or for timber on such lands.

Approved Survey: A cadastral survey, the field notes, and plat of which have been approved by the proper supervising officer.

Avulsion: A sudden cutting off of land by flood, current, or change in the course of a body of water.

Base Line: a line which runs in an east-west direction from an initial point and from which are initiated other lines for the cadastral survey of the public lands within the area governed by the principal meridian that runs through the same initial point.

Bundle of Rights: The degree, quantity, nature and extent of a person's interest in, or ownership of, land; all the rights that go with real property.

Cardinal Points: The astronomical directions of the surface of the earth, i.e., north, south, east, and west.

Ceded Indian Lands: Public lands, Indian tribal title to which was relinquished by the United States by the Indians on condition that part of all of the proceeds from their sale or other disposition would be covered into the Treasury in trust for the Indians.

Classification Withdrawal: A withdrawal of public lands which is made pending examination of the lands to determine their suitability for certain purposes and for classification for those purposes.

Albuquerque Area Office
Acquisition of Interests for Activities
Related to Maintenance of the Middle Rio Grande

Color-of-Title Entry: A cash entry made by an entryman (entryperson) who, relying upon erroneous evidence of title, has held, by himself/herself or through his/her ancestors or grantors, public lands for a specified period in good faith.

Contiguous Land: Generally speaking, two parcels of land having a common boundary line.

Dependent Resurvey: A cadastral survey which identifies, re-establishes, and remarks the land boundaries that were established by a prior cadastral survey.

Duration: Unless expressly limited in time, a less than fee interest continues until terminated by abandonment.

Easement: A non-possessory interest in land or another that entitles the owner of the easement to limited use of the other's land without interference. The land crossed by the assessment is referred to as the servient estate since it is burdened by the easement.

Easement as Appurtenant: An easement that benefits a specific parcel of land and is inseparable from the land to which it is appurtenant. The right of the easement as appurtenant is conveyed when the benefited property is conveyed.

Easement in Gross: An easement unrelated to possession or ownership of any particular property which cannot be assigned.

Encroach: To enter by gradual steps or stealth into the possessions or rights of another; to trespass; intrude.

Encumbrance: A claim, lien, charge, or liability attached to and binding real property. Any right to, or interest in, land which may exist in one other than the owner, but which will not prevent the transfer of title.

Exclusive Use: Unless the instrument creating an easement or interest expressly creates an exclusive interest, the rights of the holder are non-exclusive. The rights of the easement holder and the servient landowner are relative to each other, not absolute. If use of the servient landowner was or should have been contemplated by both parties when the easement was created, it is considered a type of use that is reasonable and should be allowed.

Fee Title: Rights to the property that are senior to all other rights.

First Form Reclamation Withdrawal: A reclamation withdrawal that embraces public lands that are, or may be needed in connection with the construction and maintenance of a reclamation project. (See second form withdrawal.)

Albuquerque Area Office
Acquisition of Interests for Activities
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Free-use Permit: A permit which authorizes removal of timber or other resources on the public lands free of charge.

General Orders of Withdrawal: Executive Order Nos. 6910 of November 26, 1934, and 6964 of February 5, 1935, which withdrew for classification all vacant public lands in the states of Alabama, Arizona, Arkansas, California, Colorado, Florida, Idaho, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, Wisconsin, and Wyoming.

Grant: A gift of public lands, either in quantity or in place.

Half Section: Any two quarter sections within a section which have a common boundary; usually identified as the North half, south half, east half, or west half of a particular section, e.g., W½ Sec. 32 (the west half of Section 32).

Independent Resurvey: A cadastral survey which supersedes a prior cadastral survey and which creates and establishes new land boundaries. The new boundaries may, to some extent, be identical with the superseded boundaries.

Indian Allotment: An allocation of a parcel of public lands or Indian reservation lands to an Indian for his/her individual use.

Land Status: With respect to any particular parcel of land, its legal description, its cadastral survey status (surveyed or unsurveyed), the non-Federal rights or privileges which attach to it or its resources, the withdrawals or special laws which apply to it, and other pertinent information which may influence the operation of the public land laws so far as its use or disposition is concerned.

Legal Land Description: The description of any particular parcel of land according to the official plat of its cadastral survey, e.g., Lot 3, SENW Sec. t, T. 8 N., R. 20 W., 5th P.M., Arkansas, is the legal description of the following lands in Arkansas: Lot 3 of Section 6 and the southeast quarter of the northwest quarter of Section 6 of the township which is 8 townships north of the base line of the Fifth Principal Meridian and 20 townships west of the Fifth Principal Meridian.

Legal Subdivision: A subdivision of a township, such as a section, quarter section, lot, etc., which is authorized under the public land laws.

Less than Fee Title: An interest in property that is subservient to the rights of the underlying fee title holder.

License: a document authorizing a certain act or series of acts upon another's land, without possessing any estate therein.

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Lot: A subdivision of a section which is not described as an aliquot part of the section but which is designated by number, e.g., Lot 2. A lot is ordinarily irregular in shape and its acreage varies from that of a regular subdivision.

Original Public Domain: All the lands, regardless of whether they are still in Federal ownership or not, which the Federal Government obtained by cession from the 13 Original States (1789-1802), by the Louisiana Purchase (1803), by the cession from Spain (1819), by the occupation of the Oregon Territory (1846), by the Mexican Cession (1848), by the purchase from Texas (1850), by the Gadsden Purchase *1853), and by the purchase of Alaska (1867). The drainage basin of the Red River of the North, south of the 49th parallel and west of the cessions by the 13 Original States, is a part of the original public domain. Authorities differ as to the method and to the exact date of its acquisition by the United States, some holding that it was part of the Louisiana Purchase. The area included within the present boundaries of the State of Tennessee, although included in the cessions of the 13 Original States, is usually not considered a part of the original public domain because, by the terms of its cession, the State of North Carolina passed title to only a small acreage in that area to the United States. The United States in turn ceded its unappropriated lands to the State of Tennessee

Permit: a document, usually of short duration (3 years or less) or of a special nature, authorizing a certain act or series of acts upon another's land.

Principal Meridian: A line which runs in a north-south direction from an initial point and from which are initiated other lines for the cadastral survey of the public lands within a specified area. Each principal meridian has a correlated base line that runs through the same initial point. Every principal meridian has a distinctive name, e.g., Huntsville Meridian, Fourth Principal Meridian, New Mexico Principal Meridian, etc.

Property: Any interest in property except the public domain.

Public Land Order: An order, effecting, modifying, or canceling a withdrawal or reservation, which has been issued by the Secretary pursuant to powers of the President delegated to the Secretary by Executive Order No. 9146 of April 24, 1942, or No. 9337 of April 24, 1943.

Public Lands or Public-Domain Lands: Original public domain lands which have never left Federal ownership; also, lands in Federal ownership which were obtained by the Government in exchange for public lands or for timber on such lands; also, original public domain lands which have reverted to Federal ownership through operation of the public land laws.

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Reclamation Fund: A Federal Treasury account to which certain earned moneys are credited for use in financing reclamation projects.

Reclamation Project: A water development project for irrigation of arid lands and for other purposes which is administered by the Bureau of Reclamation, United States Department of the Interior.

Reclamation States: The public lands States in which the Bureau of Reclamation is authorized to function, viz., Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming.

Reclamation Withdrawal: A withdrawal of public lands in connection with a reclamation project (see first form and second form reclamation withdrawals).

Rectangular System of Surveys: The system of cadastral surveys by which means the original public domain has been, and is being, subdivided into townships, sections, and sectional subdivisions.

Regular Subdivision: Generally, a subdivision of a section which is an aliquot part of 640 acres, such as a half section of 320 acres, quarter section of 160 acres, and quarter-quarter section of 40 acres.

Reliction: The gradual recession of water leaving permanently uncovered land.

Reservation: A withdrawal, usually of a more or less permanent nature; also, any Federal lands which have been dedicated to a specified public purposes.

Restoration: A revocation of a withdrawal which also effects the opening of the public lands in the withdrawal; also an action which returns the ceded Indian lands to tribal ownership.

Revocation: Generally, an action which cancels a previous official act; specifically an action which cancels a withdrawal.

Riparian Rights: The rights of the owners of land on the banks of watercourses, relating to the water, its use, ownership of soil under the stream, accretions, etc.

Right: A general term which encompasses those things a person may do unopposed even though a burden on another occurs, e.g., right of tenant, holder of an easement, etc.

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Right-of-way: A license which authorizes the use of public lands for certain specified purposes, commonly for pipe lines, roads, telephone lines, etc.; also the lands covered by such an easement or permit.

Second Form Reclamation Withdrawal: A reclamation withdrawal which embraces public lands that are susceptible to irrigation from a reclamation project.

Section: The major subdivision of a township; normally a quadrangle approximately one mile square containing approximately 640 acres and identified by number, e.g., Sec.36 (Section 36).

Special Land Use Permit: A permit which authorizes the use of public lands for purposes not specially authorized, or forbidden, by law.

Supplemental Survey: A survey plat which shows new or corrected features for a portion of an area covered by a previous survey plat.

Surface Rights: Rights to land exclusive of mineral rights.

Survey Monument: A physical object, such as an iron post or stone, which marks the location of a point that was established by a cadastral survey.

Survey Plat: A drawing which shows the boundaries, subdivision, acreage, and often topography, improvements, and other features of an area included in a cadastral survey.

Temporary Right of Entry Permit: Temporary Use Permit or other temporary acquired interest which are limited in scope and available for surveys and testing, such as for transect lines.

Township: The major subdivision of the public lands under the rectangular system of surveys; normally a quadrangle measuring approximately 6 miles on each side and containing approximately 23, 040 acres and identified by its relation to a base line and principal meridian, e.g., Township 5 North Range 4 West, Boise Meridian, Idaho, or T. 5 N., R. 4 W., B.M., Idaho (the township which is 5 townships north of the Boise Meridian base line and 4 townships west of the Boise Meridian).

Trespass: Unauthorized use of Federal lands or resources.

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Tribal Property: Land or any interest therein held by the United States in Trust for a Tribe, Band, Community, Group or Pueblo of Indians and land that is held by a Tribe, Band, Community, Group, or Pueblos of Indians subject to Federal restrictions against alienation or encumbrance, and includes such land reserved for Indian Bureau Administrative purposes when it is not immediately needed for such purposes. This term also includes lands held by the United States in Trust for an Indian Corporation chartered under Section 17 of the Act of June 18, 1934 (48 Stat. 984; 25 U.S.C. 476).

Trust Property: Property held by the United States for an individual Indian or Indian Tribe. Trust Property does not have the same rights as Fee Property in that any transaction affecting the title requires the approval of the Secretary of the Interior.

Withdrawal: An action which restricts the disposal of public lands and which holds them for specific public purposes; also, public lands which have been dedicated to public purposes.

Appendix F: Project Authorization

Middle Rio Grande Authorization for River Maintenance

The Middle Rio Grande Project is authorized by the Flood Control Acts of 1948 and 1950. The 1948 Act approves plans for engineering and flood control for the Rio Grande basin set forth in reports of the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation (later denoted as House Documents 243 and 653, respectively). These documents describe a comprehensive plan that includes river channel maintenance, reservoir construction, and other related activities. Agency responsibilities for implementation of these plans are specified in a joint agreement between the Secretary of the Army and the Secretary of the Interior.

Project Concept and Authorizations

Primary goals of the Middle Rio Grande Project included flood control, reduction of problems associated with aggradation, and improving water delivery efficiency. To accomplish these goals, the House Documents advocated a diverse program of activities. Dam construction would provide flood control and reduce the sediment load in the Rio Grande, and levee rehabilitation would reduce the probability of flooding. Throughout the Middle Rio Grande, the river would be straightened and narrowed; this channelization would slow or reverse the aggradation that was occurring. Near the upstream end of Elephant Butte Reservoir, the channel would be dredged to improve water delivery efficiency.

House Document 243

House Document 243 describes the “Rio Grande floodway project,” which addresses the river “throughout the Española and Middle Valleys and below Elephant Butte Reservoir to the upper end of Caballo Reservoir.” The project provides for “channel rectification” and “levee enlargement and construction.” Design floods are specified for the Rio Grande that vary by geographical area from 20,000 cfs to 40,000 cfs. The channel rectification activities “would provide an improved and degraded channel...to ultimately secure a stabilized channel of the desired depth and location, having a nominal capacity of at least 5,000 cubic feet per second.” Additionally, “the stabilized channel supplemented by levee enlargement and construction would provide...adequate capacity to safely pass uncontrolled flash-flood inflows.” Channel rectification includes “dredging” between “the northern boundary of Bosque del Apache and the head of Elephant Butte Reservoir.” It also includes “supplemental control works, consisting of the pile dikes, sills, revetments, and groins or such other structures as are required to adequately control the channel.” House Document 243 notes the unusual requirements of construction and maintenance on a project of this nature, stating, “Because it will be impossible to differentiate between the new work and maintenance it is considered that maintenance of the channel should be a responsibility of the Federal Government.”

House Document 653

House Document 653 recommends that “[channel rectification in the Middle Rio Grande Valley] be authorized to be constructed, operated, and maintained by the Bureau of Reclamation” and specifies that cost for channel rectification “must be treated as a maintenance item” and “is considered to be nonreimbursable because of its general benefits to the Rio Grande Basin.” Channel capacity and configuration are also addressed: “degradation of the river channel through

the Middle Rio Grande Conservancy District would be obtained by providing a stabilized channel with an average bottom width of 600 feet and a nominal capacity of not less than 5,000 second-feet, together with a floodway having capacity to safely pass uncontrolled flash-flood inflows.” An ongoing program of river maintenance is envisioned in the stipulation that “supplementary levee construction and modification of existing levees and protective works would be made as they were found necessary for floodway maintenance.” In addition to construction of permanent features, “removal of sand and detrital plugs thrown into the floodway and channel by uncontrolled side-stream inflow...would be included in the corrective maintenance program.”

Reclamation’s Assigned Activities

In a joint agreement dated July 25, 1947, the Secretary of the Interior and Secretary of the Army specified responsibilities for implementation of activities. In this agreement, Reclamation was designated as the “responsible agency” for channel rectification, irrigation and project rehabilitation, drainage rehabilitation and extension, and El Vado Reservoir rehabilitation. Reclamation’s current river maintenance program is a reflection of this designation of responsibility, implementing the activities specified as part of channel rectification in the House Documents.

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Appendix G: External Population Growth, Land & Water Use Impacts

Socioeconomics of the Rio Grande

The project area covers a 286-mile stretch of the Rio Grande in New Mexico from Velarde to Caballo Reservoir. This stretch of river borders eight central New Mexico counties including Rio Arriba, Santa Fe, Los Alamos, Sandoval, Bernalillo, Valencia, Socorro, and Sierra. Since socioeconomic information is seldom available for geographic areas smaller than the county level, the study area is defined as the entire eight-county region. However, communities and counties in New Mexico have the legal authority to manage growth using such measures as: performance zoning, urban growth boundaries, development and impact fees, designating open space and agricultural land, clustered development, density and development transfers, conditions of water availability, acquisition of land for future development or open space, adequate public facilities, and/or minimum density requirements. Popular land use strategies currently being implemented in the study region include infill development to encourage expansion where infrastructure already exists; intergovernmental agreements, infrastructure requirements and impact fees, and long-range planning.

The objectives of this section are to describe the economic environment within the study area, as measured by current population and economic activity. Economic activity within a region follows regional population trends. As a result, this section includes the following information: 1) population, 2) economic activity (by sector) and 3) resources (land and water use). Sectors reflect components of the economy including: agriculture, manufacturing, mining, construction, transportation, communication, utilities, wholesale and retail trade, finance, insurance, real estate, services, and government. Populations worthy of special consideration include Native American Pueblos and economically disadvantaged populations.

Consumers

Regional economic activity is partially dependent on the population within the project area; the greater the population within an economy, the greater the economic activity.

Population

According to 2000 U.S. Census data, the population of the eight-county study region is 905,885. This reflects about 50 percent of New Mexico's total year 2000 population of 1.827 million residents. This reflects a population growth of more than 20 percent more people than counted in 1990. Bernalillo County has the highest persons per square mile in the study area at over 400, which is a substantially higher population density than the ___ persons per square mile for the state as a whole. Bernalillo County alone, which includes the City of Albuquerque, represents 30 percent of the state's total population.

The trends in population growth for the study region since 1970 have surpassed the growth of the state as a whole. The metropolitan areas of Albuquerque and Santa Fe, as well as smaller counties such as Sierra County experienced higher than average

population growth. Based on U.S. Census data, the study area population growth rates through the year 2050 are summarized in Table G -1. Population growth in the study region is illustrated on Table G -1

Table G -1. Distribution and Annual Average Growth Rate of Historical Population

Table G-1. Distribution and Annual Average Growth Rate of Historical Population											
April 1, 1970 to April 1, 2000											
Data From Water Planning Regions: Santa Fe/Los Alamos; Middle Rio Grande; Socorro/Sierra											
Reference: BBER, 2003											
Population by Region and County											
Census Year	New Mexico	Total Regional Population	Rio Arriba County	Los Alamos County	Santa Fe County	Bernalillo County	Sandoval County	Valencia County	Socorro County	Sierra County	
1970	1,017,055	454,997	16,020	15,198	54,315	314,693	17,342	20,477	9,763	7,189	
1980	1,303,303	615,851	20,039	17,599	73,999	418,653	33,772	30,769	12,566	8,454	
1990	1,515,069	746,511	24,102	18,115	95,039	477,216	62,128	45,235	14,764	9,912	
2000	1,826,800	905,885	29,386	18,343	120,285	551,109	88,812	66,152	18,078	13,270	
2010	2,112,986	1,064,035	34,842	19,122	145,125	616,065	124,058	86,670	21,472	16,700	
2020	2,383,116	1,208,381	39,249	20,099	171,229	666,289	159,162	107,906	24,673	19,774	
2030	2,626,553	1,341,330	42,674	20,866	197,690	708,817	192,745	128,527	27,527	22,485	
2040	1,462,315	1,462,315	45,117	21,224	226,121	742,378	224,259	148,563	30,086	24,567	
2050	1,575,982	1,575,982	46,440	21,636	257,133	770,681	253,746	168,242	32,333	25,772	
Population by Region and County											
Census Year	Percent of State	Rio Arriba County	Los Alamos County	Santa Fe County	Bernalillo County	Sandoval County	Valencia County	Socorro County	Sierra County		
1970	44.74%	3.52%	3.34%	11.94%	69.16%	3.81%	4.50%	2.15%	1.58%		
1980	47.25%	3.25%	2.86%	12.02%	67.98%	5.48%	5.00%	2.04%	1.37%		
1990	49.27%	3.23%	2.43%	12.73%	63.93%	8.32%	6.06%	1.98%	1.33%		
2000	49.59%	3.24%	2.02%	13.28%	60.84%	9.80%	7.30%	2.00%	1.46%		
2010	50.36%	3.27%	1.80%	13.64%	57.90%	11.66%	8.15%	2.02%	1.57%		
2020	50.71%	3.25%	1.66%	14.17%	55.14%	13.17%	8.93%	2.04%	1.64%		
2030	51.07%	3.18%	1.56%	14.74%	52.84%	14.37%	9.58%	2.05%	1.68%		
2040		3.09%	1.45%	15.46%	50.77%	15.34%	10.16%	2.06%	1.68%		
2050		2.95%	1.37%	16.32%	48.90%	16.10%	10.68%	2.05%	1.64%		
Population Growth Rate of Region and Counties											
Census Year	State of New Mexico	Average Study Region Growth Rate	Rio Arriba County	Los Alamos County	Santa Fe County	Bernalillo County	Sandoval County	Valencia County	Socorro County	Sierra County	
1970-1980			3.07	2.24	1.47	3.09	2.85	6.66	4.07	2.52	1.62
1980-1990			2.39	1.85	0.29	2.50	1.31	6.10	3.85	1.61	1.59
1990-2000			2.30	2.13	0.13	2.36	1.44	3.57	3.80	2.03	2.92
2000-2010			1.83	1.52	0.41	1.83	1.09	3.25	2.62	1.68	2.24
2010-2020	1.46		1.49	1.20	0.50	1.65	0.79	2.49	2.19	1.39	1.69
2020-2030	0.98		1.16	0.84	0.38	1.44	0.62	1.92	1.75	1.09	1.29
2030-2040			0.93	0.56	0.17	1.35	0.47	1.52	1.57	0.89	0.89
2040-2050			0.73	0.29	0.19	1.29	0.38	1.23	1.25	0.72	0.48

Notes Data for years designed by bold, italic indicate projected data

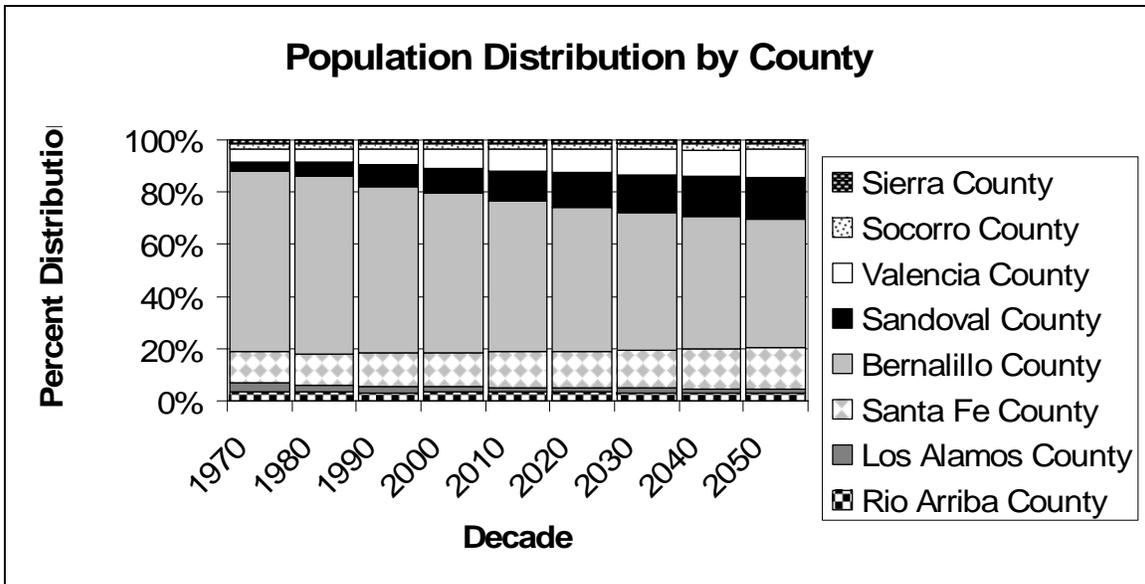


Figure G -1. Population Distribution

Native American Pueblos

The fifteen Native American Pueblos found within the eight-county study region require special mention. The Pueblos, listed from north to south include: Ohkay Owingeh, Santa Clara, San Ildefonso, Pojoaque, Nambe, Tesuque, Jemez, Zia, Santa Ana, Cochiti, Santo Domingo, San Felipe, Sandia, Laguna, and Isleta. With fairly extensive land areas, many of these Pueblos rely on subsistence farming and ranching. Land and water issues are critically important. Many of the Pueblos can generally be characterized as economically depressed areas with high unemployment rates and low per capita incomes. People identified as Native American represent 5 percent of the study area population, with Rio Arriba, Sandoval, and Socorro Counties claiming higher percentages of Native Americans. With respect to water use decisions, the Pueblos may significantly affect water management as they hold priority water rights.

Economic Activity

Retail trade accounts for the largest portion of sales and business receipts in most of the region. The large impact from retail trade is in part due to the strength of tourism, as reflected in the healthy accommodations/food services sectors. Other robust sales in the study region include manufacturing, wholesale trade, health care, social services, and professional and technical services. Manufacturing and wholesale trade are particularly important in the counties that include the larger cities such as Bernalillo (Albuquerque), Santa Fe (Santa Fe), and Sandoval (Rio Rancho) counties. Agriculture remains an important part of the regional economy. Hay, wheat, and corn are the predominant crops north of Albuquerque, while hay and chiles predominate to the south. According to the 1997 Census of Agriculture, the total value of agricultural products was \$135 million in New Mexico, while total farm expenses were approximately \$106 million.

Data on income, employment, and gross receipts provide indications of the level of economic activity within the economy.

Income

According to 2000 census date per capita income figures, per capita income in the study region was about \$19,400. This exceeded the state average of about \$17,300. The relatively urban counties of Los Alamos, Santa Fe, Sandoval, and Bernalillo lead the way with per capita incomes of approximately \$34,650, \$23,600, \$19,200 and \$20,800, respectively. The remaining four counties had incomes below the state average as shown in Table G -2. Similar trends were observed for the percent of population living below the poverty level.

Table G -2. Study area income levels

Income Levels in the Study Area Reference: URGWOPS FEIS, 2006			
	Median Household Income	Per Capita Income	Population Below Poverty
United States	\$41,994	\$21,587	12%
New Mexico	\$34,133	\$17,261	18%
Counties in the Study Region			
Rio Arriba County	\$29,429	\$14,263	20%
Los Alamos County	\$78,993	\$34,646	3%
Santa Fe County	\$42,207	\$23,594	12%
Sandoval County	\$44,949	\$19,174	12%
Bernalillo County	\$38,788	\$20,790	14%
Valencia County	\$30,099	\$14,747	17%
Socorro County	\$23,439	\$12,826	32%
Sierra County	\$24,152	\$15,023	21%
Municipalities in the Study Region			
Santa Fe	\$40,392	\$25,454	12%
Bernalillo	\$30,864	\$13,100	18%
Rio Rancho	\$47,169	\$20,322	5%
Albuquerque	\$38,272	\$20,884	14%
Los Lunas	\$36,240	\$14,992	14%
Belen	\$26,754	\$12,999	25%
Socorro	\$22,530	\$13,250	32%
Elephant Butte	\$31,705	\$21,345	11%
Truth or Consequences	\$20,986	\$14,415	23%

Employment

Information on employment will be provided Part 2 of the Maintenance Plan.

Gross Taxable Receipts

The study area economy is strong, with growth provided in local and state government and service sectors. Manufacturing, mining, and construction were fairly weak, but growth in government and service sectors have compensated for this slack. In addition to

reviewing employment statistics, it is useful to consider gross receipts when evaluating major economic sectors. Specific information on gross taxable receipts will be provided in Part 2 of the Maintenance Plan.

Resources

Regional economic activity is dependent on availability of resources including land and water.

Land Use

The eight-county area covers 24,617 square miles and represents 20 percent of the entire state land area. Land uses vary considerably from urban population centers (Albuquerque, Santa Fe) to Native American Pueblos, national forests (Carson, Cibola, Santa Fe), to agricultural and range lands, to national wildlife refuges (Sevilleta and Bosque del Apache). Typically, lands adjacent to the river and interior to the riverside drains are under federal, tribal, irrigation district, or state ownership. Lands exterior to the riverside drains are often in public and private hands, with a wide variety of land uses.

Zoning and land use are handled at the community and/or county levels. Legal authorities to manage growth include the following: urban growth boundaries, performance zoning, fee-based development, open and agricultural land preservation, clustered development, intergovernmental growth management agreements, density and development transfers, water availability conditioned building permits, and infrastructure requirements. Most counties limit development within Federal Emergency Management Agency (FEMA) floodplains by not issuing building permits for structures within floodplains. Despite controls, in some areas, encroachment onto the floodplain occurs and there is some risk from water operations during high flow periods. Major urban areas (Santa Fe, Albuquerque, Rio Rancho) and smaller municipalities (Española, Bernalillo, Belen, Socorro, and Truth or Consequences) include river floodplains within their corporate boundaries. Development of these floodplains is guided by comprehensive plans and controlled through zoning ordinances and subdivision regulations. These determine the type and extent of land use allowable in specific areas. Along the river, irrigation districts and acequias have rights-of-way to perform duties associated with distribution of water to growers and to maintain equipment, ditches, and diversion structures.

In 1989, total acres irrigated by the Middle Rio Grande Project totaled 56,331. Total crop values were estimated to be over \$31 million, or \$550 per acre. Major crops in terms of acreage and value included alfalfa hay, irrigated pasture, peppers, and corn. In the entire eight-county study region, a total of 113,630 acres of land were irrigated in 1989 including the totals cited for the Middle Rio Grande Project.

Recreational access along the river corridor also offers opportunities for river maintenance access. About one third of the land is federally or state owned and generally open to the public for dispersed recreation. Recreational access is afforded for rafting,

fishing, camping, walking, birding, biking, hiking, wildlife viewing, and picnicking. Fishing also occurs along MRGCD irrigation ditches and drains.

Pueblo and Tribal Lands

Pueblos and tribes control and manage sovereign lands and infrastructure along the river. Within 5 km of the river, about 320,000 acres of sovereign land are managed by 16 pueblo and tribal entities. Sovereign land accounts for a substantial portion of land immediately adjacent to the river from the confluence with the Rio Chama south to Isleta Pueblo. Pueblos and tribes manage their lands according to their own policies and purposes.

Water Use

Water use in the eight-county region is addressed in three Regional Water Plans (RWPs) recently prepared and accepted by the New Mexico Interstate Stream Commission. The Jemez y Sangre Planning Region includes Rio Arriba, Los Alamos, and Santa Fe Counties. The Middle Rio Grande Planning Region considers water use in Sandoval, Bernalillo, and Valencia Counties. The Socorro-Sierra Planning Region includes the two named counties, completing the eight-county study area for this river maintenance plan.

Figure G -2 summarizes water use by planning region and for this eight-county study area. In total, about 992,400 acre-feet of surface and groundwater were withdrawn in the study area. As shown on Figure G -2, the largest categories of water use in the study area included: open water evaporation – primarily from reservoirs (31.43%), agriculture (29.57%), riparian vegetation (25.52%), and public water supply (11.26%). Water use was categorized into urban, rural, irrigated agriculture, livestock, commercial (motels/hotels, restaurants, office buildings, schools, hospitals, and other commercial activities), industrial (manufacturing and construction), minerals, military, power, fish and wildlife, and recreation (evaporation and irrigation) uses. Irrigated agriculture and urban uses comprise 40 percent of water use from 1995-2000. Regional details on water use as described in the RWPs are discussed in the following paragraphs.

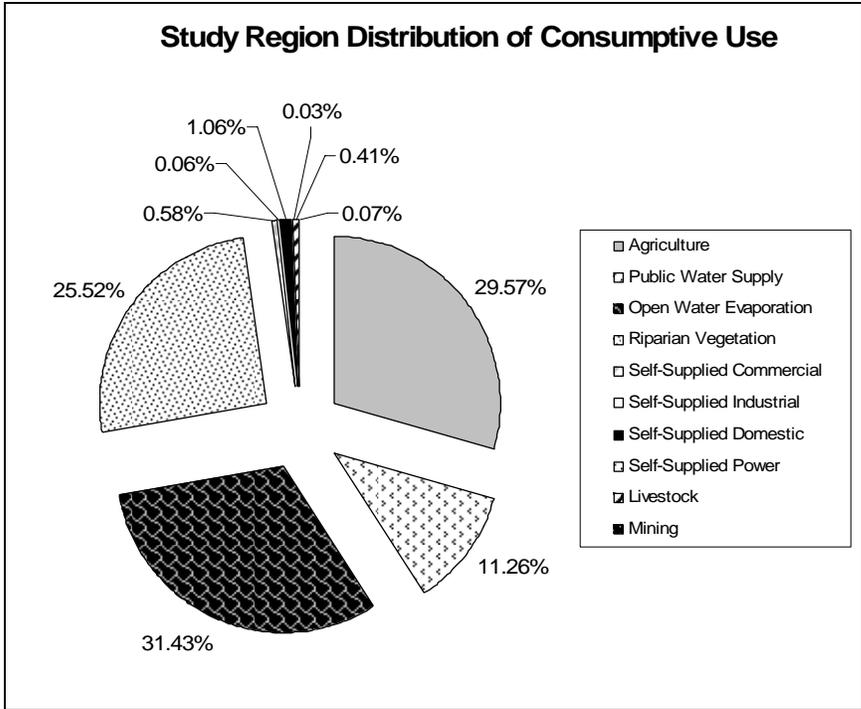


Figure G -2. Consumptive use for study region

Consumptive use data for water withdrawals in 1995 for the Jemez y Sangre Planning Region indicate approximately 182,000 acre-feet of water were used in the three-county area. Categories of water use in the Jemez y Sangre water planning region are shown on Figure G -3. The largest categories of water use include: agriculture (67.17%), public water supply (12.92%), and open water evaporation (16.33%).

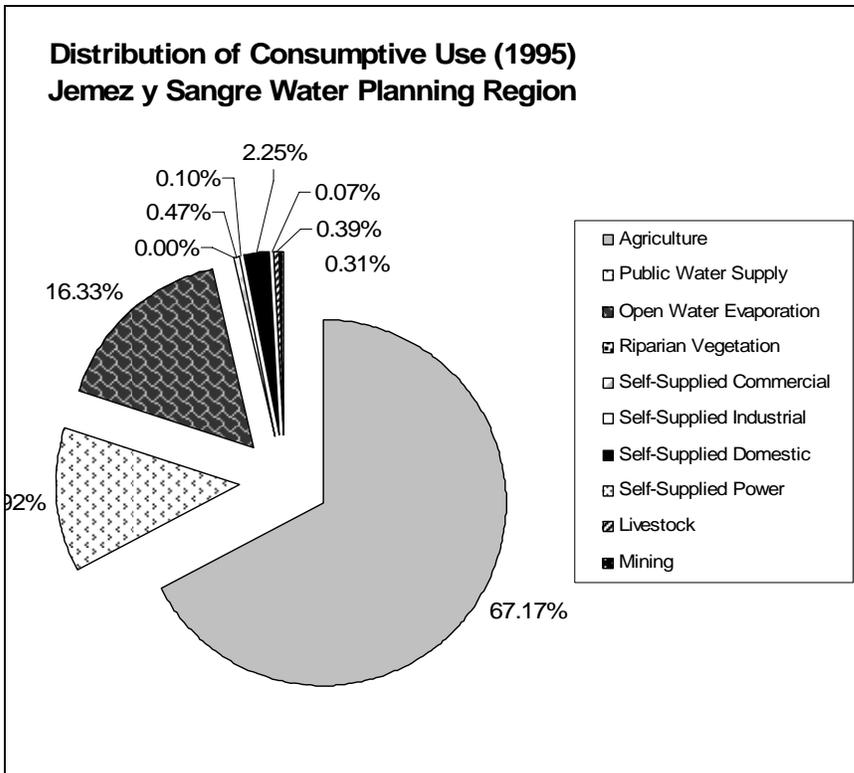


Figure G -3. Consumptive use of Jemez y Sangre Water Planning Region

Data on water withdrawals for 1995 indicate approximately 340,000 acre-feet of water were used in the Middle Rio Grande Water Planning Region. Categories of water use in the Middle Rio Grande water planning region are shown in Figure G -4. The largest categories of water use include: agriculture (27.52%), municipal/public water supply (25.20%), open water evaporation (16.26%) and riparian vegetation (28.12%).

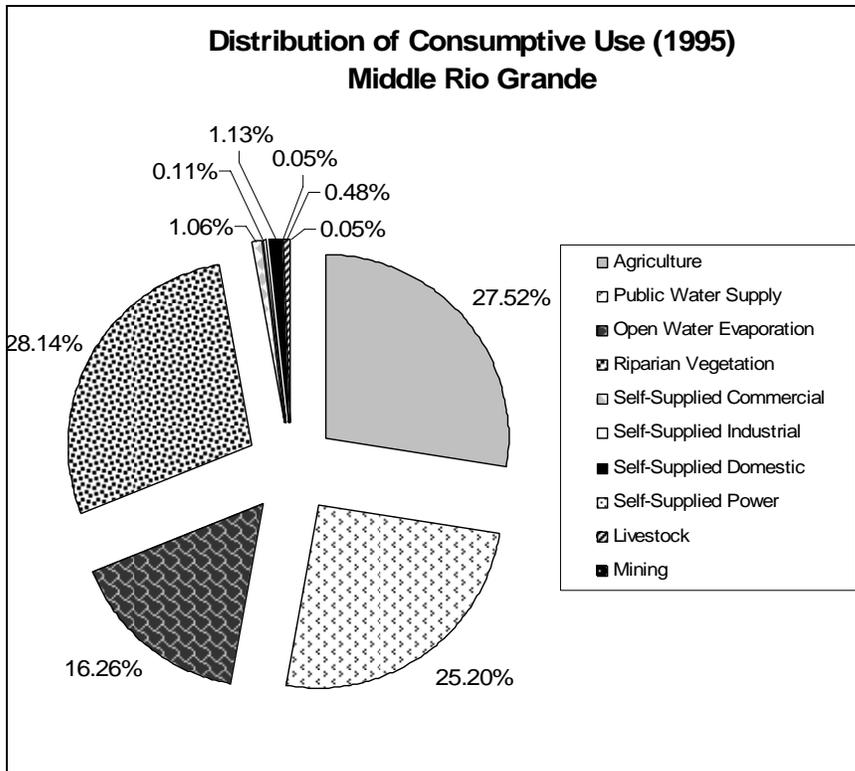


Figure G -4. Consumptive use in Middle Rio Grande

Information on the recent history of irrigation water diversions by the Middle Rio Grande Conservancy District will be provided in Part 2 of the Maintenance Plan. In the face of recent historic drought, the District has been implementing water measuring, metering, and conservation measures resulting in decreases in diversions from storage.

The largest categories of water consumptive uses in the Socorro-Sierra water planning region include: open water evaporation – largely from Elephant Butte Reservoir (66.73%), riparian vegetation (46.36%), and agriculture (22.82%). Public and industrial uses of water contribute the remaining

The following counties were the largest water users within the study area: Bernalillo, Valencia, Socorro, and Rio Arriba. Agriculture was the dominant water user in three of the four counties, with Bernalillo County showing heavy urban usage.

Issues Associated with River Maintenance Activities

Total population in the study area is expected to increase 75% by the year 2050 with similar increases projected in water demand. Water resources are under stress as the sustainability of supplies is questioned. Many of the Pueblos and municipalities in the study area hold contracts for San Juan-Chama project water. This water can be consumptively used in its entirety. Thus, to accommodate projected population growth, municipalities are constructing and/or considering new water diversions in the river

channel to take beneficial use of their San Juan-Chama water. In some cases, Reclamation has been a significant contributor and partner with the various municipalities, contributing up to 25% of the construction costs for some of these water diversions facilities.

As populations grow, wastewater treatment needs also increase, with additional discharges contributing to river flows down-gradient of wastewater treatment plant outfalls. Table G -3 shows the various water diversion, water treatment, and river crossings in the study area.

Table G -3. Water diversion, water treatment, and river crossings in the study area.

Reaches	River Miles	Water Diversions	Water Returns/ Outfalls	Habitat Restoration	Utility/Pipeline Crossings
Velarde to Rio Chama	285 to 272	--		Ohkay Owingeh	
Rio Chama to Otowi	272 to 258	City of Espanola (SJC diversion planned)			
		City of Santa Fe (Ranney Well -SJC Diversion Planned)	City of Santa Fe WWTP	Santo Domingo	
				Santa Clara	
Cochiti to Angostura	233 to 210	City of Albuquerque (Inflatable Dam - under construction)		Santa Ana	
Angostura to Isleta	210 to 169	City of Albuquerque (Ranney Well - non-potable water diversion)	Bernalillo WWTP		
			Rio Rancho WWTP	Minnow Sanctuary	
			Albuquerque WWTP		
Isleta to RioPuerco	169 to 127	--	Los Lunas WWTP	Isleta Pueblo	Aerial Gas Line
				Corps - Los Lunas Project	
Rio Puerco to San Acacia	127 to 116.2	MRGCD - La Joya Siphon (proposed)			

Reaches	River Miles	Water Diversions	Water Returns/ Outfalls	Habitat Restoration	Utility/Pipeline Crossings
San Acacia to Arroyo Canas	116.2 to 95	--			
Arroyo Canas to San Antonio	95 to 87.1	--	Neil Cupp LFCC Pumping		
San Antonio to RM 78	87.1 to 78	--	North BdA LFCC Pumping		
RM 78 to Elephant Butte Reservoir	78 to 50	--	South BdA LFCC Pumping		
			Ft Craig LFCC Pumping		
Elephant Butte Reservoir to Caballo Reservoir	50 to 12	--			
Low Flow Conveyance Channel	116.2 to 61.4	BOR - LFCC Pumping Stations:			
		Neil Cupp			
		North BdA			
		South BdA			
		Ft Craig			

Some of the newer projects are discussed below. The presence of both bank-side and subsurface structures will require future consideration in planning and implementing river maintenance activities. Issues that will require consideration during river maintenance include the following:

- Bank-side protection of collection, treatment, and discharge facilities
- River-bed elevation controls to protect subsurface diversion structures from excessive scour
- Periodic elevation mapping of the riverbed to monitor aggradation/degradation trends – especially after high flow conditions
- Consideration of underground pipeline crossing protections
- Development of future policy regarding river maintenance activities with regard to subsurface structures within or crossing the riverbed. Consideration should be given to protecting structures constructed with Reclamation funds.
- Consideration of increasing wastewater treatment plant discharges and their contributions to downstream river flows
- Environmental considerations of impacts by others to water quality

The City of Albuquerque (City) is diverting water from the Rio Grande to augment both non-potable and potable supplies.

The non-potable surface water reclamation project includes a new subsurface water diversion facility to capture San Juan-Chama water. The diversion structure is located on the east bank of the Rio Grande, approximately 1,000 feet south of the bridge at Alameda Boulevard. The non-potable water reclamation project diverts water from beneath the riverbed using Ranney collectors and at full capacity is expected to deliver about 2,500 acre-feet per year for turf irrigation and other non-potable purposes. The Ranney collectors consist of four well screens approximately 200 feet long projecting radially from a reinforced concrete caisson located about 80 feet from the existing Rio Grande River floodway. The Ranney collectors arms are jacked out from the caisson approximately 50 feet below grade in order to minimize contamination of diverted water by fines and sediments from the river. Two 500-foot long horizontal well screen collectors are constructed in the river bed about 25 feet below grade, located about 400 feet from the radial collector well caisson – one on each side of the caisson and connected to a reinforced concrete valve box constructed on the river bank. A 24-inch diameter pipeline conveys subsurface water from each valve box to the radial collector well caisson (Parsons, 2001). Reclamation contributed 25% of the non-potable water reclamation project through Title XVI funding.

The City's drinking water project diverts water from the Rio Grande at the site of an inflatable dam north of Alameda Boulevard on the north side of the City of Albuquerque. The drinking water project is expected to divert the City's share of San Juan-Chama project water together with native Rio Grande water, with an expected return flow of about 50% at the City's South Valley Wastewater Treatment facility outfall.

The City of Santa Fe is currently preparing National Environmental Policy Act documents assessing the feasibility of similar diversion structures in the Rio Grande above Otowi. River maintenance issues associated with the Santa Fe's diversion structures are anticipated to be similar in nature to those associated with the City of Albuquerque projects.

References

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- New Mexico Department of Finance and Administration, 1997, Growth in New Mexico: Impacts and Options, Local Government Division, December 11, 1996, second printing March 1997.
- University of New Mexico, Bureau of Business and Economic Research, 2004, Revised Projected Annual Population Growth Rates – New Mexico Counties - 2000 to 2030 and Revised Population Projections for New Mexico and Counties – July 1, 2000 to July 1, 2030. Released August 2002, revised April 2004.
- University of New Mexico, Bureau of Business and Economic Research, 2003, Demographic and Population Study for Regional and Statewide Water Planning – Population Projections for 16 Regions, July 1, 2000 to July 1, 2060, Alcantara, A.N., and E. Lopez, prepared for the Regional Water Planning Program, New Mexico Interstate Stream Commission, October 2003.
- U.S. Bureau of Reclamation, 2003, Middle Rio Grande Project – River Maintenance Program Overview, October 2003.
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**AppendixH: MEMORANDUM OF AGREEMENT
BETWEEN
U.S. BUREAU OF RECLAMATION
AND
MIDDLE RIO GRANDE CONSERVANCY DISTRICT**

I. Purpose

The purpose of this Memorandum of Agreement is to clarify river channel rectification, jetty operation and maintenance, and levee maintenance responsibilities. This clarification has become necessary due to significant physical changes in the river system over the last 25 years as a result of construction of flood control dams and reduced sediment supply. This Memorandum of Agreement clarifies rather than changes any of the legal responsibilities of either party.

II. Background

During the 1940's problems of the Middle Rio Grande Valley included sedimentation (i.e. rising of the river bed due to sediment accumulation) which led to loss of farm lands due to high groundwater tables causing a reduction in crop production. Sedimentation also resulted in progressive increases in flood damages, a general low level of farm income and the inability to deliver water in accordance with the terms of the Rio Grande compact. In recognition of these issues, the Flood Control Acts of 1948, and 1950 authorized Reclamation to construct river rectification and maintenance works and authorized the Corps of Engineers to construct flood control works. The acts also required the Middle Rio Grande Conservancy District to maintain the existing levees and the new levees constructed within the District boundaries as part of the Rio Grande floodway projects.

Under the terms of the Contract, 178r-423, dated September 24, 1951, between the United States and the Middle Rio Grande Conservancy District (District), and as discussed in the letter agreement dated July 29, 1974, "Reserved Works" are defined as "District works, operation and maintenance of which are retained in the United States". Under terms of article 13(a) of the Contract, the United States operated and maintained the District works during the period of construction, from 1951 to 1974. The United States Bureau of Reclamation and the Middle Rio Grande Conservancy District may be in disagreement as to what provisions, if any, remain enforceable under Contract 178r-423. Notwithstanding this current dispute, the parties to the Memorandum of Agreement are committed to completion of the important work contained herein. The signing of this

Memorandum of Agreement shall have no effect on the underlying dispute as to Contract 178r-423 or on any new contract that may be entered into between the parties, except that the division of work to be performed by the parties under this Memorandum of Agreement shall be binding on the parties as specified herein until mutually rescinded by the parties. Once construction was completed, the United States via a letter agreement dated July 29, 1974, and in accordance with terms of article 13(b) of the contract, transferred operation and maintenance actions to the District, with the exception of the "Reserved Works" described in said agreement. These "Reserved Works" included "those parts of the Middle Rio Grande channelization and flood protection works between the Rio Grande levees that have been assigned to the district by the Corps of Engineers, Department of the Army. "Exhibit "A" of that letter identified the channelization and flood protection works classified as "Reserved Works". The "Reserved Works" are jetty fields placed about 100 ft. from the levee toe, constructed by the Corps of Engineers and turned over to the District for operation and maintenance. The letter also stated that "The responsibility for channel rectification referred to in articles 9(c) and 14 of the 1951 contract shall continue to be performed by the United States at no expense to the district."

As a result of the flood control works, river rectification and maintenance, climatic conditions, changed land use practices, and declining sedimentary delivery to the main stem of the Middle Rio Grande, the river has degraded (i.e. lowering of the river bed due to sediment removal by river flows). This has led to increased bank erosion, and meandering of the channel that has undercut the "Reserved Works" jetties, and threatened the levee in numerous locations. The jetties themselves are most often intact while their effectiveness is greatly reduced due to the lower sediment loads in the river. In view of the new conditions on the river and increased environmental awareness, opportunities exist to evaluate alternative river rectification methodologies.

III. Provisions

Under this Memorandum of Agreement, Reclamation will continue to provide river rectification and maintenance, in accordance with articles 9(c), and 14 of the contract, and the District will continue to provide levee maintenance in accordance with the Flood Control Acts of 1948 and 1950. All previous contracts and contract amendments between that United States and the Middle Rio Grande Conservancy District are unchanged by this agreement and remain in full force and effect. This Memorandum of Agreement provides clarifications to all ambiguity that exists surrounding the definition of "Reserved Works" jetty maintenance in view of the system changes as described in paragraph 11 above.

Flood flows for the purpose of this Memorandum of Agreement are defined as river discharges of such a magnitude as to flow overbank to the levee toe; and are due to natural flood events, or releases from Cochiti and Jemez Dams that are not requested by Reclamation as part of San Juan Chama water deliveries. At any sites Reclamation

MEMORANDUM OF AGREEMENT
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AND THE MIDDLE RIO GRANDE CONSERVANCY DISTRICT

performs channel rectification and maintenance resulting in removal of "Reserved Works" jetties, the District's level of responsibility would be unchanged and the District would cease to be responsible for jetty operation and maintenance. The geographic extent remains unchanged from the contract and the July 29, 1974 letter and extends from Cochiti Dam south to San Acacia Diversion Dam. The "Reserved Works" sites remain those shown on Exhibit "A" included in the July 29, 1974 letter. The provisions of this Memorandum of Agreement would not limit the District from performing levee and river bankline protection, provided such actions were taken after full coordination with Reclamation and in compliance with applicable environmental laws and regulations. The following seven cases have been identified that define the maintenance work that would be the responsibility of Reclamation and the maintenance that would be the responsibility of the District in accordance with 9 (c) and 14 of the contract: (cases 1-4 are also shown on the attached drawings):

- A. Case 1 -- Bank erosion occurs that causes the "Reserved Works" jetties to be undercut and fall into the river. This bank erosion continues to progress towards the riverside levee, threatening to erode the levee, or levee erosion occurs. All flows during the development of this condition have been less than flood flows. Reclamation would be responsible for river rectification and maintenance work at such sites, including levee repairs.
- B. Case 2 -- During a flood flow, the levee toe erodes but the river bank does not erode sufficiently to cause the "Reserved Works" jetties to be undercut and fall into the river. The District would be responsible for levee maintenance.
- C. Case 3 -- During a flood flow the levee toe erodes, and the river bank erodes such that the "Reserved Works" jetties are undercut and fall into the river. Reclamation would be responsible for river rectification and maintenance work. The District would be responsible for levee maintenance.
- D. Case 4 -- During a flood flow, the river bank erodes such that the "Reserved Works" jetties are undercut and fall into the river. The river bank continues to erode to the levee and erodes the levee with the edge of the river bank being within the levee. Reclamation would be responsible for river rectification and maintenance work. The District would be responsible for levee repairs and levee toe protection.
- E. Case 5 -- Bank erosion occurs such that the "Reserved Works" jetties are undercut and fall into the river. The bank erosion continues to progress toward the riverside levee, and threatens the river side levee. All flows during the development of this condition have been less than flood flows. Once this condition is reached and a flood flow occurs that erodes the levee: Reclamation would be responsible for river rectification and maintenance work, levee repairs, and/or levee toe protection.

F. Case 6 -- "Reserved Works" jetties come apart, the cables separate, the angles are separated at the center joining points, etc. The District would be responsible for maintenance of the jetties.

G. Case 7 -- Ephemeral tributaries to the Rio Grande carry large sediment laden flows into the river channel, reducing the river capacity. During such an event, there are local flood flows, and the levee erodes. Reclamation would be responsible for river rectification and river maintenance work to restore the river capacity. The District would be responsible for levee maintenance. Any resultant bank erosion that erodes and undercuts the "Reserved Works" jetties would fall under one of the above cases.

IV. Authorities and Contracts

I Reclamation Act of 1902 (32 Stat. 388, and as amended).

Flood Control Act of 1948 (62 Stat. 1179).

Flood Control Act of 1950 (64 Stat. 176).

Letter to the Middle Rio Grande Conservancy District dated July 29, 1974.

V. Other Provisions

A. This Memorandum of Agreement shall become effective when signed by both designated parties hereto and shall remain in force until terminated by mutual agreement. Amendments may be proposed by any signatory party at any time and shall become effective upon mutual agreement.

B. This Memorandum of Agreement is subject to all applicable Federal and State laws and interstate compacts and nothing herein shall be construed to alter, amend, or affect existing law.

MEMORANDUM OF AGREEMENT
BETWEEN
U.S. BUREAU OF RECLAMATION
AND THE MIDDLE RIO GRANDE CONSERVANCY DISTRICT

IN WITNESS THEREOF, each party has caused this Memorandum of Agreement to be executed by an authorized official on the day and year set forth below by their signature.

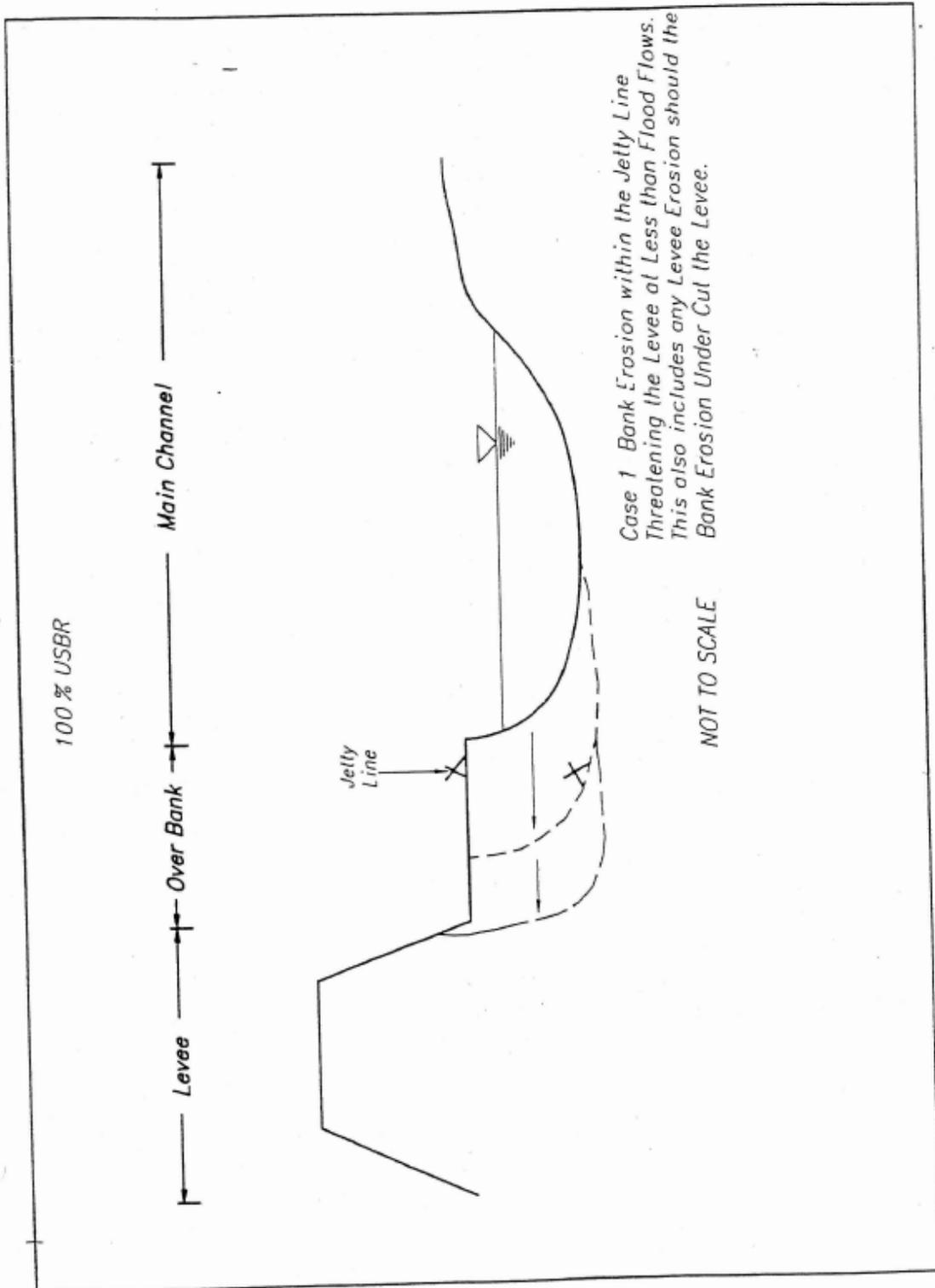
BUREAU OF RECLAMATION

By:  5/23/2000
Area Manager Date

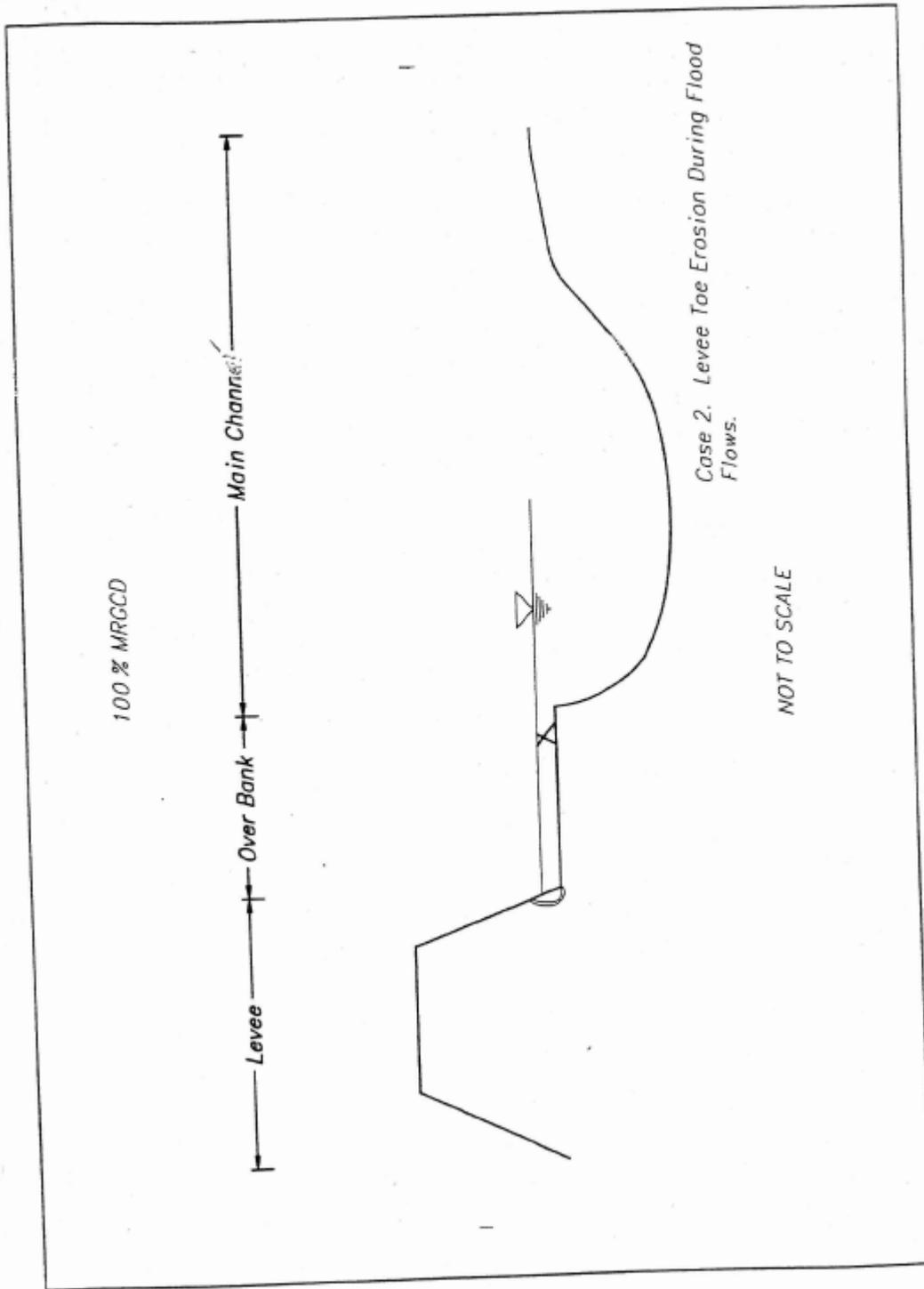
Middle Rio Grande Conservancy District

By:  5/12/2000
District Manager Date

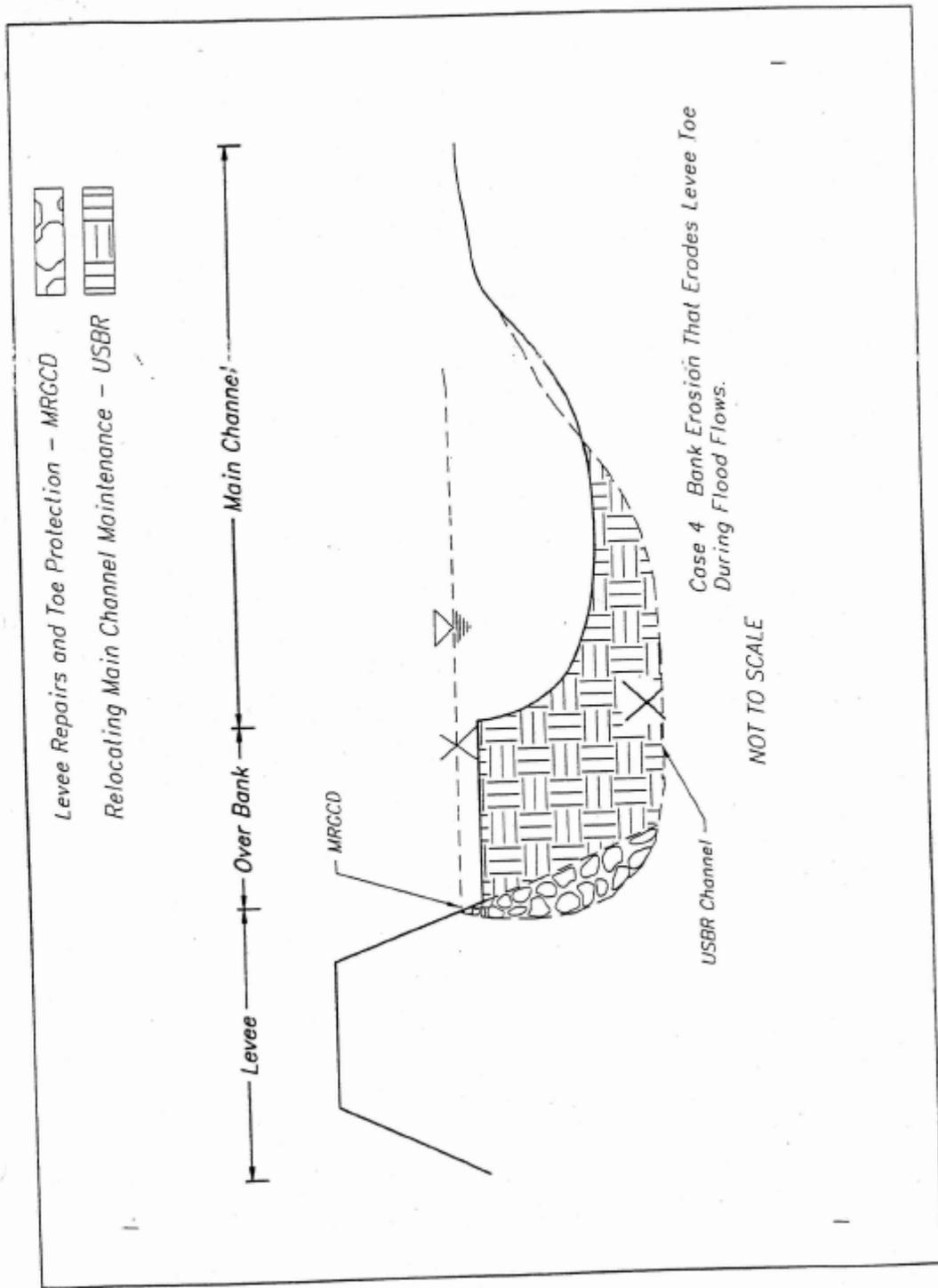
MEMORANDUM OF AGREEMENT
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Appendix I: Existing Levees, Proposed Levees, and Other River Maintenance Programs of Interest to the Middle Rio Grande

The Middle Rio Grande Flood Control Project was authorized by the U.S. Congress with the passage of the Water Resources Development Act of 1986 (Public Law 99-662). The project entails the replacement of existing embankments along both sides of the Rio Grande with structurally competent levees capable of containing high volume, short duration flows up to the design discharge of 42,000 cubic feet per second (cfs), as well as low volume, long duration flows.

The COE has authorization to replace existing embankments with levees, while the MRGCD has responsibility to maintain the levee structures both under the Flood Control Acts of 1948 and 1950, and as the local sponsor under the WRDA of 1986. When bank erosion occurs at less than flood flows, it is Reclamation's authorized role to perform the river maintenance work. When levee damage occurs during flood flows then MRGCD is responsible for maintenance.)

Existing Levee Projects

Albuquerque Levee

This project consisted of the construction of approximately 37.3 miles of engineered levees. It was completed in three phases, from 1953 through 1955. These levees provide valuable protection to property and lives against flooding from the Rio Grande for the Villages of Corrales and Los Ranchos, and the City of Albuquerque.

Phase I consisted of a tie back on the east side of the river at approximately River Mile 195.6, that tied back into high ground to the east. Phase II, in 1954, consisted of approximately 8.4 miles of the levee on the east side of the Rio Grande. Phase II stretched from the end of the tie back at River Mile 195.6 to River Mile 187.2, near the Rio Grande Nature Center.

There were two parts to Phase III construction, which took place in 1955. The first was a levee on the east side of the Rio Grande from the end of Phase II, near River Mile 187.2, to River Mile 177.1, near the current location of AMAFCA's South Diversion Channel Outlet, a total distance of approximately 10.1 Miles. The second part, also in 1955, consisted of approximately 8.2 miles of levee on the west side of the Rio Grande, from approximately River Mile 184.0 to River Mile 175.8. The northern limit is near the Arenal Canal Heading, 3300 feet upstream of Central Avenue. The southern limit is located approximately 6400 feet downstream of the AMAFCA South Diversion Channel Outfall (from an internal Corps document, *WriteUP Albuquerque Levees Location*, obtained from Steve Boberg 3/20/07).

Corrales Levee

This engineered levee was constructed by the Corps in 1996. The Corrales Levee is on the west side of the Rio Grande, and extends from approximately River Mile 199.6 to River Mile 189.0, a total distance of approximately 10.6 Miles. The northern limit of the levee is located at the north end of Corrales, NM, just downstream from the Corrales Siphon. The southern limit of the project is located approximately one mile upstream from the Montano Boulevard Bridge, at the La Orilla Channel Outfall (from an internal Corps document, *WriteUP Albuquerque Levees Location*, obtained from Steve Boberg 3/20/07).

Other Levees

The Corps has not constructed other levees in the area covered by this report.

Planned Levee Projects

Corrales to Belen Levee

In the Belen East Unit, levee reconstruction would begin near the New Mexico Highway 147 bridge on Isleta Pueblo and extend southward approximately 22 miles along the east side of the Rio Grande to a point 0.75 miles downstream of the Atchison, Topeka and Santa Fe (AT&SF) Railroad bridge, south of Belen. In the Belen West Unit, on the west side of the Rio Grande, levee rehabilitation would begin south of Isleta Marsh, and extend approximately 19 miles southward to a point 2.2 miles downstream of the AT&SF Railroad bridge. The average height of the reconstructed levee would increase by approximately four feet. <http://www.epa.gov/fedrgstr/EPA-IMPACT/1995/November/Day-27/pr-1534.html>, accessed 11/20/06

Middle Rio Grande Flood Protection, Bernalillo to Belen, New Mexico

This authorized project is located along the Rio Grande between Corrales and Belen, New Mexico. The project consists of raising and rehabilitating 50 miles of levees to provide the 270-year level of protection, the creation of 75 acres of wetlands from borrow areas within the bosque, and acquisition of 200 acres to satisfy fish and wildlife mitigation requirements.

<http://www.spa.usace.army.mil/ppm/projects/pdf/mrg.pdf>, accessed 11/20/06

San Acacia Levee including the San Marcial Railroad Bridge

The current levee was constructed by Reclamation and is maintained by Reclamation. Should the COE construct a new levee then it will need to be determined who would do the maintenance. A likely division of responsibilities and roles could be the current agreement between MRGCD and Reclamation

Southwest Valley Flood Damage Reduction Study-Albuquerque

Authorizes approximately \$19.5 million to support the construction of flood control infrastructure for Albuquerque's Southwest Valley, which is subject to

flooding. The federal government will fund 65 percent of the project, with 35 percent of the project coming from non-federal sources. The estimated completion date for the project is 2013.

<http://domenici.senate.gov/news/topicrecord.cfm?id=249235&code=ENComm>, accessed 11/20/06

Acequias

Acequias are both the irrigation ditches and the associated community-based water management systems that have supported historic and current land-based culture and community in New Mexico. There are over 1,000 acequias in New Mexico and many are concentrated in the historically agricultural villages of northern New Mexico. Over the years, acequias have formed regional associations and participated in the New Mexico Acequia Association to address common issues including water rights, water marketing and transfers, adjudication, and impacts of endangered species litigation. River maintenance issues with the potential to impact acequias include maintenance of channel capacities that do not threaten the overtopping and destruction of relatively fragile acequia diversion structures.

Bosque Restoration- Bernalillo County

COE & MRGCD Albuquerque Corridor Bosque Rehabilitation and Restoration Act, WRDA 2006 9/19/2006 SEC. 3075. Bosque Restoration: Authorizes a total of \$25 million for the implementation of restoration projects in the middle Rio Grande region, from Cochiti Dam to the headwaters of Elephant Butte Reservoir. The program would allow for the removal of unnecessary jetty jacks, reduction of non-native species, increase of cottonwood woodland, removal of dead and down trees, extension of open meadows to reduce fire hazard, and improvement of recreational and educational opportunities throughout the Middle Rio Grande Bosque. Non-Federal interests must provide 35 percent of the total cost of bosque restoration projects.

<http://domenici.senate.gov/news/topicrecord.cfm?id=249235&code=ENComm> , accessed 11/20/06