

CHAPTER I ADDITIONS AND MODIFICATIONS TO THE DRAFT EIS

This chapter contains sections of the Draft EIS that were updated or modified to address reviewer comments, and two sections added to incorporate information following release of the Draft EIS.

Added and modified sections are presented in subchapters A through G, as follows:

	<u>Page</u>
I.A Table of Contents: A revised version from the Draft EIS is provided, highlighting additions and modifications included in the Final EIS	I-1
I.B Section 1: A more detailed description of USIBWC authority is provided (Subsection 1.1.3).	I-7
I.C Section 2: A new section is included indicating selection of a preferred river management alternative for the RGCP, and the basis for USIBWC’s decision (Section 2.13). The summary comparison of alternatives and effects (2.12) is updated to reflect Section 4 modifications.	I-9
I.D Section 3: An updated section on water quality baseline is provided (Subsection 3.1.3).	I-15
I.E Section 4: Updated sections are provided on the summary of potential effects for water resources and land use (Subsections 4.1.2 and 4.8.2, respectively); revised socioeconomic analysis individually by county (Section 4.9); and updated analysis of cumulative effects of regional plans (Subsection 4.15.1).	I-17
I.F Section 5: A new subsection is included documenting the Draft EIS review period, and the January 27, 2004 public hearing (Subsection 5.1.4).	I-33
I.G An errata table is provided with editorial or non-substantial corrections to the Draft EIS text.	I-34

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- Appendix B Flood Control Improvement Project Summary (USACE 1996)
- Appendix C Aquatic Habitat Evaluation
- Appendix D Scientific Name List
- Appendix E Flood Containment Capacity Analysis
- Appendix F Controlled Water Releases for Overbank Flows
- Appendix G Preliminary Cost Estimates for the Alternatives
- Appendix H Comments to the Reformulation Report and USIBWC Responses
- Appendix I Reformulation of Alternatives Report (CD format)

Appendix J Cross-referencing index of comments and responses <i>(New Final EIS Appendix)</i>

Appendix K Correspondence on Draft EIS <i>(New Final EIS Appendix)</i>

Appendix L Public Hearing Transcript <i>(New Final EIS Appendix)</i>

Appendix M Additional Cultural Resources Consultation <i>(New Final EIS Appendix)</i>
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Appendix N Socioeconomic Effects Analysis Support Documentation <i>(New Final EIS Appendix)</i>
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Appendix O Acts of Congress Authorizing USIBWC to Construct, Operate and Maintain the RGCP <i>(New Final EIS Appendix)</i>

Appendix P USFWS Letter of Concurrence with Findings of the RGCP Biological Assessment <i>(New Final EIS Appendix)</i>

Appendix Q Final EIS and Technical Support Documents <i>(New Final EIS Appendix, in CD Format)</i>

SUBCHAPTER I.B – ADDITIONS AND MODIFICATIONS TO SECTION 1, PURPOSE OF AND NEED FOR ACTION

An expanded version was prepared on the USIBWC's authority for consideration of environmental improvements in the RGCP, and the agency's operational procedures for NEPA compliance (Subsection 1.1.3, page 1-3 of the Draft EIS).

1.1 NEED FOR ACTION

1.1.3 Authority

The USIBWC is the lead federal agency for preparation of this Environmental Impact Statement (EIS). The United States Bureau of Reclamation (USBR, Albuquerque Area Office, New Mexico) is a cooperating agency.

Compliance with the National Environmental Policy Act

Changes under consideration for RGCP operation and maintenance (O&M) and implementation of environmental measures constitute a major federal action requiring preparation of an EIS as stipulated by:

- The National Environmental Policy Act (NEPA) of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, and Pub. L. 94-83, August 9, 1975);
- The Council on Environmental Quality (CEQ), Executive Office of the President, Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508); and
- The USIBWC Operational Procedures for Implementing Section 102 of NEPA as published in the Federal Register on September 2, 1981 (Federal Register 46, No. 170: 44083-44094). These procedures identify actions that constitute categorical exclusions.

Authority to Accomplish Flood Control, Water Delivery, and Operation and Maintenance Activities In A Manner That Enhances Or Restores the Riparian Ecosystem

The USIBWC has the authority and responsibility to evaluate river management alternatives for future operations and maintenance of the RGCP to enhance ecosystem restoration while accomplishing its flood control and water delivery mission. The authority to construct, operate and maintain works for the canalization of the Rio Grande also includes a responsibility to consider environmental improvements in the project area. An Act of Congress authorized legislation for the USIBWC to construct, operate and maintain works for the canalization of the Rio Grande from the Caballo Reservoir site in New Mexico to the international dam in El Paso, Texas. See Appendix O for text of Act of June 4, 1936 (49 Stat. 1463), and Act of August 29, 1935 (49 Stat. 961). The canalization project was authorized in order to facilitate compliance with the Convention between the United States and Mexico concluded May 21, 1906, providing for the

equitable division of the waters of the Rio Grande, and to properly regulate and control the water supply for use in the two countries as provided by treaty. (TS 455; 34 Stat. 2953)

The USIBWC has the authority and responsibility to evaluate environmental benefits in relation to the operation and maintenance of the Rio Grande Canalization Project. The National Environmental Policy Act (NEPA) of 1969 mandates a USIBWC responsibility to evaluate environmental benefits of the project. Under NEPA it is the continuing responsibility of the federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may, among other things, attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences. 42 U.S.C. Sections 4331 (b)

SUBCHAPTER I.C – ADDITIONS AND MODIFICATIONS TO SECTION 2, DESCRIPTION OF ALTERNATIVES

Modifications to potential effects on water resources, land use, and socioeconomics were incorporated into Table 2.12-1 (Section 2.12, pages 2-49 to 2-52 of the Draft EIS). This modification simply summarizes Section 4 update, presented in Subchapter I.E.

Additional text is provided on selection of the Integrated USIBWC Land Management Alternative as the preferred alternative for long-term management of the RGCP (Section 2.13, following page 2-52 of the Draft EIS).

2.12 SUMMARY COMPARISON OF ALTERNATIVES AND EFFECTS

Table 2.12-1 summarizes alternatives and effects identified for each alternative and resource area. A detailed analysis of potential effects is presented in Section 4.

2.13 PREFERRED ALTERNATIVE

During preparation of the Draft EIS, an administrative decision was made not to select a Preferred Alternative. In making this decision, the USIBWC considered that a review of environmental effects and public comment were needed as key elements in selecting a river management alternative for the RGCP.

Having evaluated environmental effects, and comments received on the Draft EIS, the USIBWC concluded that the Integrated USIBWC Land Management Alternative provides the best balance of flood control, water delivery, and habitat enhancement. This alternative is, therefore, selected as the agency's preferred approach for long-term management of the RGCP.

In selecting the preferred alternative, the USIBWC reviewed the predicted environmental, economic, and social impacts of three action alternatives and the No Action Alternative; their anticipated environmental and financial ability to be implemented and quality of life performances, and the risks and safeguards inherent in them. The Integrated USIBWC Land Management Alternative was considered to be the alternative that could bring actual results in the short and medium term as it:

- Allows USIBWC to re-assess floodway management within the context of current functions;
- Gradually develops environmental improvements within its jurisdictional area with manageable water consumption;
- Puts in place some agreements with other agencies and, hopefully, water users and environmental organizations; and
- Would not be cost prohibitive.

A Record of Decision (ROD), indicating selection of a river management alternative for the RGCP and rationale for the decision, will be issued 30 days after the EPA notice that the Final EIS has been filed with the agency.

Table 2.12-1 Summary Comparison of the Effects of the Alternatives

Resource Area	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alternative	Targeted River Restoration Alternative
Water Resources	No-mow zones would be maintained, with a potential consumption of up to 35.3 ac-ft/yr No effects on water delivery or water quality are anticipated as current practices would be maintained.	A potential 1,078 ac-ft/yr increase in water consumption due to environmental measures. Water consumption would increase. No effects on water delivery are anticipated for levee system rehabilitation, or changes in grazing leases in uplands. Water quality could decrease in terms of total suspended solids during construction, but it would improve in the long-term by a reduced sediment load and lower nutrient input from grazing areas with improved vegetative cover.	A potential water consumption increase of 2,203 ac-ft/yr at the end of the 20-year implementation period. This represents 0.34% of EBID full diversion allocation, or 1.5% in severe drought conditions (as in 2003) Riparian vegetation on stream banks would improve water delivery in the long-term by stabilization of stream banks. Short-term increases in debris and sediment would be expected prior to establishment of vegetative cover. Water quality is likely to improve as more extensive vegetative cover on the RGCP floodway and uplands improve erosion control and nutrient release from grazing areas.	A potential for a water consumption increase of approximately 9,461 ac-ft/yr at the completion of the 20-year implementation period. This value would be equivalent to 1.91% of EBID full diversion allocation (releases would not be possible during drought conditions). Effects on water delivery and water quality would be similar to those of the Integrated USIBWC Land Management Alternative.
Flood Control	The risk of flooding and overtopping the levees from the 100-year flood would remain as currently quantified.	Additional protection would be provided to life and public and private property beyond that which is already provided by the existing levee system. The potential freeboard increase in levee deficient areas would be approximately 2 feet.	Similar to the Flood Control Improvement Alternative. There would also be a potential for a small reduction in flood containment capacity due to increased vegetation growth along the floodway. The potential freeboard increase in levee deficient areas would increase to approximately 2.5 feet.	Similar to the Flood Control Improvement Alternative. There would also be a potential for a small reduction in flood containment capacity due to increased vegetation growth along the floodway. The potential freeboard increase in levee deficient areas would increase to approximately 2.5 feet.
Soils	No change from baseline condition.	Levee rehabilitation would mobilize 898 ac-ft of soil for construction. Modified grazing leases would reduce uplands erosion 0.45 ac-ft annually and improved riparian conditions by reducing bank erosion and increasing ground cover.	Levee rehabilitation and modified grazing leases would result in similar effects as the Flood Control Improvement Alternative. An additional 157 ac-ft of soil would be displaced as a result of bank shave-downs. Mitigation procedures were established to reduce erosion.	Levee rehabilitation and modified grazing leases would result in similar effects as the Flood Control Improvement Alternative. An additional 300 ac-ft of soil would be displaced as a result of opening former meanders, excavating arroyos and scour during seasonal peak flows. Mitigation procedures were established to reduce erosion.

Resource Area	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alternative	Targeted River Restoration Alternative
Vegetation and Wetlands	No change from baseline condition.	<p>Modified grazing in uplands and riparian zones would affect 3,552 acres increasing plant species, richness and structural diversity. Levee construction would have a minor effect on vegetation communities.</p> <p>Mowing by USIBWC would continue at the same level as the No Action Alternative.</p>	<p>Effects of modified grazing leases and levee construction would be similar to the Flood Control Improvement Alternative.</p> <p>Mowing by USIBWC would be reduced by 1,983 acres.</p> <p>Restoration of 350 acres of native bosque by bank shavements and plantings, and development of native grasslands (1651 acres) would increase the amount of native vegetation within the ROW.</p> <p>Wetland areas would increase by 13 acres.</p>	<p>Effects of modified grazing leases and levee construction would be similar to the Flood Control Improvement Alternative.</p> <p>Mowing by USIBWC would be reduced by 2,434 acres.</p> <p>Restoration of 1,549 acres of native bosque by seasonal peak flows, opening meanders, plantings and development of native grasslands (1,029 acres) would increase the amount of native vegetation within and outside the ROW.</p> <p>Wetland areas would increase by 96 acres.</p> <p>Conservation easements would add 1,601 acres under management.</p>
Wildlife Habitat	No change from baseline condition.	<p>Wildlife habitat quality would increase 30% due to modified grazing in 3,552 acres of uplands and riparian areas. However, the majority of the ROW would continue to be considered as below average to poor wildlife quality due to mowing of vegetation.</p> <p>Construction associated with levee rehabilitation would be a short minor effect.</p> <p>Modification of salt cedar management in grazing leases methods would result in long-term beneficial effects.</p>	<p>Wildlife habitat quality would increase 51% due to modified grazing in 3,552 acres of uplands and riparian areas, and development of 350 acres of native bosque and 1,641 acres of native grassland.</p> <p>Construction associated with levee rehabilitation and environmental measures would be a short minor effect.</p> <p>Modification of salt cedar management in grazing leases methods would result in long-term beneficial effects.</p>	<p>Wildlife habitat quality would increase 72% due to modified grazing in 3,493 acres of uplands and riparian areas, and development of 1,549 acres of native bosque and 1,929 acres of native grassland.</p> <p>A total of 1,618 acres of conservation easements significantly increases the amount of high quality wildlife habitat.</p> <p>Construction associated with levee rehabilitation and environmental measures would be a short minor effect</p> <p>Modification of salt cedar management methods for grazing leases would result in long-term beneficial effects.</p>

Resource Area	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alternative	Targeted River Restoration Alternative
Endangered and Other Special Status Species	No change from baseline condition.	Levee construction activities would not affect endangered and other special status species . Modified grazing in uplands and riparian would benefit some species of concern (SOCs).	Levee rehabilitation and modified grazing leases would result in similar effects as the Flood Control Improvement Alternative. Development of native bosque using bank shavedowns could potentially create suitable southwestern willow flycatcher habitat and benefit some SOCs.	Levee rehabilitation and modified grazing leases would result in similar effects as the Flood Control Improvement Alternative. Development of native bosque along meanders could potentially create suitable southwestern willow flycatcher habitat and benefit some SOCs. Suitable habitat for listed species may exist within conservation easements outside the ROW.
Aquatic Biota	No change from baseline condition.	No significant change from baseline condition would occur. The RGCP would continue to be characterized as poor aquatic habitat, however modified grazing in the riparian area would beneficially effect stream bank stability, water quality and stream side vegetation.	No significant change from baseline condition would occur. The RGCP would continue to be characterized as poor aquatic habitat, however modified grazing in the riparian area in conjunction with bosque development would beneficially effect stream bank stability, water quality and stream side vegetation.	Aquatic biota would be beneficially affected as a result of diversifying aquatic habitat through modified dredging of arroyos and opening former meanders. A total of 59 acres of backwater habitat would be developed. In addition, modified grazing in the riparian area and bosque development would beneficially effect stream bank stability, water quality and stream side vegetation.
Land Use	Land use in the potential area of influence would remain unaffected relative to current conditions. Beneficial effects are expected from ongoing recreational initiatives. The RGCP operation and maintenance would not change from the current practices.	Levee rehabilitation would be the only action with potential effects on land use adjacent to the RGCP. Up to 50 acres of the approximately 149 acres of borrow sites would be likely located in agricultural areas. Land use change would not be significant relative to 19,020 acres of farmlands in the area adjacent to the ROW. Beneficial effects are expected from ongoing recreational initiatives.	Up to 50 acres of agricultural land would be needed as borrow sites. With implementation of an on-farm water conservation program, no other changes in land use are anticipated. With direct purchase of water rights, environmental measure implementation could result in 734 acres of cropland retirement (0.97% of EBID irrigated acreage). Beneficial effects are expected from ongoing recreational initiatives.	Conservation easements would affect up to 288 acres of cropland in addition to 50 acres of borrow sites (in combination, 1.8% of farmland adjacent to the ROW. Current use would be maintained for another 1,330 acres of remnant bosques. With direct purchase of water rights, measure implementation could result in 3,154 acres of cropland retirement (4.7% of EBID irrigated acreage). Beneficial effects are expected from ongoing recreational initiatives.

Resource Area	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alternative	Targeted River Restoration Alternative
Socioeconomics and Environmental Justice	No change relative to current conditions	Similar to the No Action Alternative, except there would be additional short-term jobs as a result of levee rehabilitation activities.	Similar to the No Action Alternative, with the addition of short-term jobs as a result of an increase in construction activities. With on-farm conservation, no adverse effects on agricultural communities are anticipated. For direct water acquisition, the potential annual loss in crop value would be approximately \$900,000, and \$1.6 million in indirect effects.	Similar to the No Action Alternative, except there would be additional short-term jobs by increase in construction activities. With on-farm conservation, no adverse effects on agricultural communities are anticipated. For direct water acquisition, the potential annual loss in crop value would be approximately \$4 million, and \$7.3 million in indirect effects.
Cultural Resources	No change relative to current conditions	The alternative will not adversely affect, any architectural resources, traditional cultural properties or archaeological resources.	Similar to the No Action Alternative, except there would be a potential for undiscovered sites at two locations near shakedown projects.	Similar to the No Action Alternative, except there would be a potential for undiscovered sites at three sites located near arroyo or meander projects.
Air Quality	Emissions generating activities would be the same as the current ongoing activities.	Criteria pollutant increases in the Air Quality Control Region (AQCR) would range from 0.05 to 0.93 percent and would not be regionally significant.	Criteria pollutant increases in the AQCR would range from 0.01 to 1.25 percent and would not be regionally significant.	Criteria pollutant increases in the AQCR would range from 0.12 to 1.62 percent and would not be regionally significant.
Noise	No change relative to current conditions	No change in noise levels from maintenance and operation activities. Noise from additional construction activities would be intermittent and short-term in duration.	No change in noise levels from maintenance and operation activities. Noise from additional construction activities would be intermittent and short-term in duration.	No change in noise levels from maintenance and operation activities. Noise from additional construction activities would be intermittent and short-term in duration.
Transportation	No change relative to current conditions	The existing level of service (LOS) of all listed roadways would not change from existing conditions.	The LOS of all listed roadways would not change from existing conditions.	The LOS of all listed roadways would not change from existing conditions.

Resource Area	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alternative	Targeted River Restoration Alternative
Cumulative Impacts	No change relative to current conditions	No change relative to current conditions	A 1% increase in EBID irrigated land conversion above 18% anticipated for the El Paso-Las Cruces Regional Sustainable Water Project.	A 4.2% increase in EBID irrigated land conversion above 18% anticipated for the El Paso-Las Cruces Regional Sustainable Water Project.

SUBCHAPTER I.D – ADDITIONS AND MODIFICATIONS TO SECTION 3, AFFECTED ENVIRONMENT

An update is provided on the water quality baseline information (Subsection 3.1.3, page 3-9, of the Draft EIS) on the basis of information provided by the New Mexico Environment Department (NMED).

3.1 WATER QUALITY

3.1.3 Water Quality

Water quality along the RGCP is defined by New Mexico and Texas on the basis of individual reaches for which designated uses have been defined. Both states submit a 305b surface water quality report and a 303d list of impaired segments to the USEPA on a biennial basis. In combination, these reports detail the degree to which designated uses are being attained, and identify potential concerns in terms of water quality.

State of New Mexico. The RGCP segment in New Mexico is contained within two New Mexico Water Quality Standards Segments:

Segment 20.6.4.101 Rio Grande Basin - The main stem of the Rio Grande from the USIBWC sampling station above American Dam upstream to 1 mile below Percha Dam.

Segment 20.6.4.102 Rio Grande Basin - The main stem of the Rio Grande from 1 mile below Percha Dam upstream to the headwaters of Caballo Reservoir, including Caballo Reservoir.

These two Water Quality Standards Segments are further subdivided into several assessment units for sampling and reporting purposes. For 2002, the NMED reported that both reaches were fully supporting the following state-designated uses (NMED 2002, www.nmenv.nm.us/swqb/305b):

- Irrigation;
- Wildlife habitat;
- Limited warmwater fishery;
- Secondary contact; and
- Livestock watering.

State of Texas. The Texas reach of the RGCP is contained in Segment 2314 of the Rio Grande Basin. The 21-mile segment is located in El Paso County, and covers from International Dam to the New Mexico State line. For the year 2002, the Texas Commission on Environmental Quality (TCEQ) reported five designated uses:

- Aquatic life use;
- Contact recreation;
- General use;

- Fish consumption; and
- Public water supply.

The state reported that these uses were fully supported with the exception of contact recreation (TCEQ 2002). The standard was not met in 2002 due to bacterial levels above the designated use. Concerns were also indicated for algal growth and nutrient enrichment (Table 3.1-3). Data for this determination were obtained from two monitoring stations located in the Rio Grande: Station 13276, located immediately upstream of the confluence with Anthony Drain east of La Tuna Prison, near the state line, and Station 13272, located at Courchesne Bridge, 1.7 miles upstream from American Dam. Table 3.1-4 provides a summary of Rio Grande monitoring data for nutrients and suspended solids at El Paso (USGS Station 08364000) from March 2000 to August 2002.

Table 3.1-3 Water Quality Concerns for Segment 2314 of the Rio Grande Basin (TCEQ 2002)

Assessment Area	Concern	Description of Concern
New Mexico State line to upstream of Anthony Drain	Algal Growth	Excessive algal growth
Upstream of Anthony Drain to International Dam	Algal Growth	Excessive algal growth
	Nutrient Enrichment	Ammonia
	Contact Recreational Use	Bacteria

Source: TCEQ 2002 305b

Table 3.1-4 Monitoring Data From Station USGS 08364000 at El Paso (March 2000 to August 2002)

Parameter	Number of Samples Reported	Average Concentration (mg/L)	Lowest Concentration (mg/L)	Highest Concentration (mg/L)
Total Kjeldahl Nitrogen, as N	20	0.349	0.22	1.1
Nitrite plus Nitrate, as N	29	0.480	0.11	1.41
Nitrite, as N	29	0.030*	<0.006	0.162
Ortho Phosphorus, as P	20	0.069	0.008	0.171
Total Suspended Solids	29	481	34	2,350

* Nitrite values below the detection limit were not included in the average.

SUBCHAPTER I.E – ADDITIONS AND MODIFICATIONS TO SECTION 4, ENVIRONMENTAL CONSEQUENCES

Potential effect summaries were updated for the water resources, land use, and socioeconomics sections to address stakeholders' comments, as well as the analysis of cumulative effects. Those modifications are as follows:

- *Water resources: potential effects on water availability are presented individually based on water allocations for each irrigation district. In the Draft EIS, the combined value was used as a reference (Subsection 4.1.2, page 4-2 of the Draft EIS).*
- *Land use: clarifications are made on reference land use values, and potential applicability of the Farm Protection Policy Act (Subsection 4.6.2, page 4-50 of the Draft EIS).*
- *Socioeconomics: revised calculations are provided on the socioeconomic analysis to assess potential effects individually by county, and to adjust for modified assumptions on levee rehabilitation costs. Changes apply to the entire section (starting with Subsection 4.9.1 on page 4-53 of the Draft EIS).*
- *Cumulative effects: a revised evaluation is presented on regional plans (Subsection 4.15.1, page 4-86 of the Draft EIS).*

4.1 WATER RESOURCES

4.1.2 Summary of Potential Effects

Table 4.1-3 presents a comparative summary of potential effects of river management alternatives on water resources. Two reference values are used for potential changes in water consumption:

- A total of 645,000 ac-ft of total annual diversions along the RGCP. This is a combined value of average diversions of 181 cubic feet per second (cfs) at Leasburg Dam, 312 cfs at Mesilla Dam, and 397 cfs at American Dam (data from Figure 3-3).
- Because a large fraction of water consumption would be in the Elephant Butte Irrigation District (EBID) area, the annual supply diversion allocation of 495,000 ac-ft reported for the district (King and Maitland 2003) was also used as a reference.

For the alternative with the greatest potential for water consumption, the Targeted River Restoration Alternative, estimated use would represent approximately 2 percent of the EBID full-supply diversion allocation. Controlled discharges from Caballo Reservoir, the main water use component, would not be feasible during years with a less-than-full supply allocation.

For the Integrated USIBWC Land Management Alternative, estimated water use at full implementation (20-year timeframe) would represent approximately 0.5 percent of the EBID full-supply diversion allocation. During severe drought conditions, such as those prevalent in 2003, water use by environmental measures would represent a higher fraction of the EBID diversion allocation, up to 1.5 percent. This relative increase was calculated based on an allocation reduction to 34 percent reported by USBR for the Rio Grande Project.

Table 4.1-3 Summary of Potential Effects on Water Resources

Evaluation Criteria	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alternative	Targeted River Restoration Alternative
Potential increase in annual water consumption (ac-ft/yr)	0	1,078	2,203	9,461
Change in consumption relative to EBID full diversion allocation	No effect	0.22%	0.45%	1.91%
Change in consumption relative to diversions along the RGCP	No effect	0.17%	0.34%	1.47%
Potential effect on water delivery efficiency	No effect	No effect	Potential adverse short-term effects; long-term improvement	Potential adverse short-term effects; long-term improvement
Potential effect on water quality	No effect	Potential adverse short-term effects; long-term improvement	Potential adverse short-term effects; long-term improvement	Potential adverse short-term effects; long-term improvement

4.8 LAND USE

4.8.2 Summary of Potential Effects

Table 4.8-1 presents a comparative summary of potential effects of river management alternatives under consideration on land use. Two land uses were evaluated for potential effects, farmlands, and recreational areas.

Farmlands

Three issues were analyzed relative to effects on farmlands: 1) potential cropland loss due to material borrow sites for levee rehabilitation and voluntary conservation easements; 2) potential loss due to acquisition of water rights to offset increased water consumption by environmental measures; and 3) applicability of the Farmland Protection Policy Act (FPPA).

Table 4.8-1 Summary of Potential Effects on Farmlands and Recreational Use

Evaluation Criteria	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alternative	Targeted River Restoration Alternative
<i>Changes in Agricultural Land Use</i>				
Changes due to material borrow sites and easements	No change relative to current RGCP management	Up to 50 acres loss due to material borrow sites (0.3% of farmland adjacent to the ROW).	Up to 50 acres loss due to material borrow sites (0.3% of farmland adjacent to the ROW).	Up to 50 acres of borrow sites, plus 288 acres* of voluntary conservation easements. (1.8% of farmland adjacent to the ROW)
Changes due to water rights acquisition (without on-farm water conservation program)	No change relative to current RGCP management	Environmental measure Implementation could result in 359 acres of cropland retirement (0.54% of EBID irrigated acreage)	Environmental measure Implementation could result in 734 acres of cropland retirement (0.97% of EBID irrigated acreage)	Environmental measure implementation could result in 3,154 acres of cropland retirement (4.7% of EBID irrigated acreage)
<i>Changes in Recreational Use</i>				
Ongoing cooperation agreements	Increased use as parks are developed	Same as No Action Alternative	Same as No Action Alternative	Same as No Action Alternative

* Current use would be maintained in another 1,330 acres of easements corresponding to remnant bosques or fallow lands.

Farmland loss due to material borrow sites and voluntary conservation easements. Potential losses of irrigated farmlands are referenced to the corridor outside and adjacent to the ROW where borrow sites and easements would be located. This corridor, extending 0.25 mile on each side of the ROW, includes 19,020 acres of agricultural lands (Table 3.8-1). Potential retirement would represent up to 1.8 percent of farmland adjacent to the ROW. Most of this change would be due to the inclusion of 288 acres of voluntary conservation easements as part of the Targeted River Restoration Alternative.

Farmland loss due to direct water rights acquisition. Sponsoring an on-farm water conservation program is proposed in Section 2.9.2 to minimize farmland retirement potential. If direct water rights acquisition were required, however, it would require conversion of irrigated agricultural land. That conversion was estimated at 1 acre of land per 3 ac-ft of water (typical annual water allocation in the Rio Grande Project).

Since most environmental measures would be implemented in the New Mexico reach of the RGCP, it was assumed for potential effects evaluation that all farmland conversion would occur within this reach. Accordingly, a total of 67,000 acres of EBID irrigated lands was used as a reference for potential farmland loss (EBID data from Table 1, King and Maitland 2003).

At full implementation (20-year timeframe), the potential farmland retirement attributable to water acquisition under the Integrated USIBWC Land Management Alternative would represent approximately 1 percent of the EBID irrigated lands (Table 4.8-1). Potential retirement would increase to 4.7 percent for the Targeted River Restoration Alternative, largely due to the use of controlled water releases from Caballo Dam.

Applicability of the 1996 FPPA. The FPPA is intended to minimize the contribution of federal programs to the conversion of important farmland to non-agricultural uses. No effects on prime farmland, as defined by FPPA, are anticipated as a result of the modified river management alternatives for the following reasons:

- Most measures under consideration, other than voluntary conservation easements, would be conducted in non-agricultural lands currently owned and maintained by the USIBWC.
- The preferred implementation strategy to secure water, as described in Section 2.9-2, is funding on-farm water conservation programs to avoid farmland retirement. This goal was adopted not only to minimize socioeconomic effects, but also because farmlands provide supplemental wildlife habitat along the RGCP that would isolate the riparian corridor from urban expansion.
- Voluntary conservation easements, outside the ROW, would prevent conversion to urban uses, as they would remain as native grasslands or bosques.

If direct water acquisition resulting in loss of irrigated farmlands were eventually required, prior consultation with the Natural Resource Conservation Service (NRCS) will be conducted as required by FPPA. The consultation will ensure that identified water rights sources are not prime farmlands, and that a farmland conversion impact rating is assigned by the agency. This determination would be done by the NRCS once specific lands are identified as a potential water rights source (U.S. Department of Agriculture, Form AD-1006).

Recreational Land Use

Implementation of any of the modified river management alternatives would not result in adverse effects on recreational resources. The USIBWC, along with other agencies which manage and maintain projects along the RGCP, are currently participating in initiatives to create additional recreational opportunities and public access to natural areas within the Rio Grande floodway. As a result, projects currently underway and future ROW enhancements identified would result in the same beneficial effects to recreational resources under all alternatives, including the No Action Alternative (Table 4.8-1).

4.9 SOCIOECONOMIC RESOURCES AND ENVIRONMENTAL JUSTICE

The following evaluation criteria were used in the analysis of effects on socioeconomic resources and environmental justice:

- Changes in population and housing;
- Changes in employment;
- Changes in income and business volume;
- Disproportionate number of minority populations affected;
- Loss of irrigated farmland;
- Value of crop production lost; and
- Decrease in farm laborers

4.9.1 Method of Analysis

Region of Influence (ROI)

A Region of Influence (ROI) was defined to determine the geographic area impacted by construction activity, change in operations, or farmland retirement to secure water right. The ROI for levee construction impacts is considered to be Doña Ana County, New Mexico and El Paso County, Texas as all of the levee construction is within these two counties. The ROI for cropland reduction impacts is considered to be Doña Ana County as it was assumed that, without an on-farm water conservation program, most conversion of irrigated farmland would take place in this county.

Levee System Improvements

The Economic Impact Forecast System (EIFS) Model was used to project the short-term regional and local economic impacts of levee construction, and cropland reduction. The EIFS Model was developed by the U.S. Army Construction Engineering and Research Laboratory (CERL) to provide a systematic method for evaluating regional socioeconomic effects of government actions. Using employment and income “multipliers” developed with a comprehensive regional/local database combined with economic export base techniques, the model estimates the direct and indirect economic impacts of a construction activity and/or operations on changes in the regional/local population and housing; employment; business volume; and income.

A total construction cost of \$55.9 million over a period of 5 years was used as a primary input into the EIFS Model to determine local economic impacts of the construction activity. This total construction cost was distributed between Doña Ana County (63%) and El Paso County (37%) based on the length of levee construction in each county. In addition, an estimate of 62 and 36 construction workers was used, respectively, for Doña Ana and El Paso Counties as inputs into the model. The EIFS Model impacts represent annual impacts during the construction period. Table 4.9-1 summarizes the annual economic impacts of levee construction by county. Appendix N provides socioeconomic effects analysis support documentation.

The EIFS Model also includes a rational threshold value (RTV) profile that is used in conjunction with the forecast model to assess the significance of impacts of a construction activity for a specific geographic area or region. For each variable (e.g., population, housing, employment, business volume, income), the current time-series data available from the Bureau of Economic Analysis are calculated along with the annual change, deviation from the average annual change, and the percent deviation for each variable. This calculation defines a “threshold” for significant annual economic impacts for a variable. If the RTV for a particular variable associated with the impacts of the project exceeds the maximum annual historic deviation for that variable, then the economic impact is considered to be significant. If the RTV for a variable is less than the maximum annual historic deviation for that variable, the regional economic impact is then considered not significant.

Potential Reduction in Irrigated Farmland

The implementation and operational effects of the proposed river management alternative were analyzed using a different methodology. The objective of this analysis was to estimate the impacts on cropland reduction as a result of levee borrow sites, conservation easements, and farmland conversion due to direct water rights acquisition. These impacts include acreage of cropland lost, annual value of crop production lost, and associated decrease in farm laborers under each of the alternatives and associated components/scenarios.

This latter analysis was based on estimates of cropland distribution by type, and per acre value of annual production for the project area. Because of cropland similarities, the cropland distribution for the EBID was used and pro-rated for each alternative and associated component/scenario. Pecans were excluded as a high-value crop not likely to be considered for land conversion. Estimates of annual value of production per acre for each crop was obtained from the New Mexico Department of Agriculture, Agricultural Statistics Service; U.S. Department of Agriculture, U.S. Census of Agriculture, 1997; and Appendix B, Economic Worksheets accompanying the EIS for the El Paso-Las Cruces Regional Sustainable Water Project (CH2M-Hill 2000b). Crop distribution values used, and crop gross revenue are as follows:

- Alfalfa, 30 percent, \$630 per acre;
- Cotton, 28 percent, \$850 per acre;
- Vegetables, 19 percent, \$3,500 per acre;
- Forage, 18 percent, \$235 per acre;
- Grains, hay, and pasture, 5 percent, \$250 per acre.

In addition to loss in crop value, an estimate was made of the direct impact on farm labor as a result of the removal of cropland from production. This estimate was based on the average number of acres per farm worker in Doña Ana County according to the U.S. Census of Agriculture. This value was subsequently inflated to reflect the more labor-intensive character of some of the crops grown in the affected area.

4.9.2 Summary of Potential Effects

Levee System Improvements

Table 4.9-1 summarizes the effects of levee construction in Doña Ana County and El Paso County with respect to changes in population/housing, employment, business sales volume, income, and disadvantaged populations.

Table 4.9-1 Summary of Potential Effects on Socioeconomic Resources and Environmental Justice: EIFS Model Results for Levee Construction

Evaluation Criteria	Doña Ana County	RTV	El Paso County	RTV
Changes in Population and Housing	No Change		No Change	
Direct Changes in Employment	101		55	
Indirect Changes in Employment	64		38	
<i>Total Change in Employment*</i>	165	0.24	93	0.03
Direct Changes in Sales Volume	\$ 6,730,885		\$ 3,943,158	
Indirect Changes in Sales Volume	\$11,173,270		\$ 7,807,452	
<i>Total Change in Sales Volume</i>	\$17,904,150	0.56	\$11,750,610	0.06
Direct Changes in Income	\$ 2,931,083		\$ 1,582,734	
Indirect Changes in Income	\$ 2,390,379		\$ 1,351,582	
<i>Total Change in Income</i>	\$ 5,321,462	0.20	\$ 2,934,316	0.03
Disproportionate number of low-income/ minority populations negatively affected.	No Effect		No Effect	

* Does not include work associated with environmental measures. It was assumed that USIBWC staff would perform environmental measure work over the 20-year implementation timeframe.

The socioeconomic effects of levee construction presented in Table 4.9-1 represent the outputs from the EIFS Model for both Doña Ana County and El Paso County. It was assumed that the majority of the expenditures associated with levee construction would be local expenditures. The EIFS Model estimates that a total of 165 direct and indirect jobs would be created in Doña Ana County, including the 62 construction jobs associated with construction of the levee. Other jobs created include those directly or indirectly associated with levee construction, including jobs in the various industry sectors such as retail/wholesale trade, construction, manufacturing and supplies. Other effects in Doña Ana County include an annual increase of \$17,904,150 in direct and indirect business sales volume, and an annual increase of \$5,321,462 in direct and indirect income. The RTV values generated from the EIFS Model for each of the economic variables associated with levee construction were significantly below the county's maximum annual historic deviation (RTV) for each variable. Thus, this construction activity is not considered to have significant regional/local economic benefits.

The EIFS Model estimates that a total of 93 direct and indirect jobs would be created in El Paso County, including the 36 jobs associated with construction of the levee. Other jobs created include those directly or indirectly associated with levee construction, including jobs in the various industry sectors such as retail/wholesale trade, construction, manufacturing, and supplies. Other effects in El Paso County include an annual increase of \$11,750,610 in direct and indirect business sales volume, and an annual increase of \$2,934,316 in direct and indirect income. The RTV values generated from the EIFS Model for each of the economic variables associated with levee construction were significantly below the county's maximum annual historic deviation (RTV) for each variable. Thus, this construction activity is not considered to have significant regional/local economic benefits

There would be no changes in population or housing as it is assumed that all construction workers would come from the local or regional labor pool. There would be no disproportionate adverse effect on minority or low-income populations as minority populations constitute the majority of the population of each county. Rather, considering composition of the local and regional population, the effects on such disadvantaged populations would be beneficial as it is assumed that the majority of the construction workers would be minority and lower income.

Potential Reduction in Irrigated Farmland

Tables 4.9-2 and 4.9-3 provide summaries of the socioeconomic effect of the removal of irrigated cropland from production. It is assumed that, without implementation of an on-farm water conservation program, most irrigated farmland removed from production would be in Doña Ana County. Consequently, potential conversion of irrigated farmland was attributed entirely to the EBID.

As indicated in Table 4.9-2 the greatest adverse effects on cropland and production and farm labor would be for the Targeted River Restoration Alternative under Scenario 2 (without an on-farm water conservation program). Under this scenario, 3,492 acres of cropland with an annual production value of over \$4 million would be taken out of production. It is estimated that this decrease in cropland could result in a reduction of 35-40 farm workers. This would result in an adverse effect on minority/low income populations since the majority or all of the farm laborers represent this population group.

A lesser adverse effect would be associated with the Integrated USIBWC Land Management Alternative under Scenario 2 which accounts for additional irrigated farmland lost through direct water rights acquisition.

The socioeconomic effects of irrigated cropland reduction in Doña Ana County is presented in Table 4.9-3. The EIFS Model was used to estimate these effects under the Integrated USIBWC Land Management Alternative and the Targeted River Restoration Alternative (Scenario 2, Direct Water Rights Acquisition). Appendix N provides corresponding EIFS support data for each alternative.

Table 4.9-2 Summary of Potential Direct Effects on Socioeconomic Resources: EIFS Model Results for Cropland/Farm Labor in Doña Ana County

Component/Scenario	No Action Alternative	Flood Control Improvement Alternative	Integrated USIBWC Land Mgmt. Alternative	Targeted River Restoration Alternative
Component A: Conservation Easements		N/A	N/A	
Cropland Lost (acres)	No change			288
Value of Production (annual)	No change			\$331,230
Decrease in Farm Workers	No change			3-5
Component B: Materials Borrow Sites				
Cropland Lost (acres)	No change	50	50	50
Value of Production (annual)	No change	\$58,965	\$58,965	\$58,965
Decrease in Farm Workers	No change	1-2	1-2	1-2
Component C: Water Rights Acquisition				
<i>Scenario 1: With On-Farm Water Conservation Program</i>	No change	N/A	N/A	N/A
<i>Scenario 2: Without On-Farm Water Conservation Program</i>		N/A		
Cropland Lost (acres)	No change		784	3,492
Value of Production (annual)	No change		\$899,435	\$4,003,605
Decrease in Farm Workers	No change		7-9	35-40

Table 4.9-3 Summary of Potential Direct and Indirect Annual Impacts on Socioeconomic Resources and Environmental Justice: EIFS Results for Cropland Reduction in Doña Ana County

Evaluation Criteria	Integrated USIBWC Land Mgt. Alternative	RTV	Targeted River Restoration Alternative	RTV
Changes in Population and Housing	No Change		No Change	
Direct Changes in Employment	(16)		(65)	
Indirect Changes in Employment	(10)		(42)	
<i>Total Change in Employment</i>	<i>(26)</i>	<i>(0.04)</i>	<i>(107)</i>	<i>(0.16)</i>
Direct Changes in Sales Volume	(\$ 999,935)		(\$ 4,405,605)	
Indirect Changes in Sales Volume	(\$1,659,892)		(\$ 7,313,304)	
<i>Total Change in Sales Volume</i>	<i>(\$2,659,827)</i>	<i>(0.08)</i>	<i>(\$11,718,909)</i>	<i>(0.37)</i>
Direct Changes in Income	(\$ 317,423)		\$ 1,356,520)	
Indirect Changes in Income	(\$ 355,113)		(\$ 1,564,588)	
<i>Total Change in Income</i>	<i>(\$ 672,536)</i>	<i>(0.03)</i>	<i>(\$ 2,921,108)</i>	<i>(0.11)</i>
Disproportionate number of low-income or minority populations negatively affected.	No Effect		No Effect	

NOTE: Values in parenthesis indicate either a RTV reduction, or losses in employment, sales, or income.

Under the Integrated USIBWC Land Management Alternative, the EIFS Model estimates that a total of 26 direct and indirect jobs would be lost in Doña Ana County, which would include primarily farm laborers and those engaged in the provision of agricultural products and services. Other effects under this alternative include an annual decrease of \$2,659,827 in direct and indirect business sales volume, and an annual decrease of \$672,536 in direct and indirect income.

The negative RTV values generated from the EIFS Model for each of the economic variables associated with crop reduction were significantly below the county's maximum negative annual historic deviation for each variable. Thus, the economic effects from cropland reduction are not considered to have significant regional/local economic effects.

The EIFS Model estimates that a total of 107 direct and indirect jobs, primarily farm laborers and agricultural related, would be lost in Doña Ana County with farmland reduction under the Targeted River Restoration Alternative. Other effects under this alternative include an annual decrease of \$11,718,909 in direct and indirect business sales volume, and an annual decrease of \$2,921,108 in direct and indirect income.

The negative RTV values generated from the EIFS Model for each of the economic variables associated with crop reduction under this alternative were significantly below the county's maximum negative annual historic deviation for each variable. Thus, cropland reduction under this alternative is not considered to have significant regional/local economic effects.

4.9.3 No Action Alternative

Socioeconomic Effects

No additional equipment or personnel would be required if the current O&M practices were continued. Thus, the No Action Alternative would not result in any additional construction or operation costs. There would be no effect on cropland and production, or on farm labor.

Since there would not be a need for additional workers, there would be no effects on population or employment rates. Since the No Action Alternative would not result in relocations to or from the area, housing and community services would not be impacted. An EIFS analysis was not performed for this alternative.

Environmental Justice

There would be no change from the current maintenance practices under the No Action Alternative. Therefore, there would be no effect on minority and low-income populations.

4.9.4 Flood Control Improvement Alternative

Socioeconomic Effects

The Flood Control Improvement Alternative includes 6 miles of new levees, 2.8 miles of floodwalls, and 60.1 miles of raised levees. USIBWC would hire contractors to carry out these activities. The overall capital cost estimate for levee construction is \$59.9 million (March 2001 Alternatives Formulation Report), and the implementation period is 5 years. Based on the necessary equipment and materials for these tasks, a crew of approximately 98 workers was used for an estimate of construction activity requirements.

As a result of the proposed action, the local population would not change. Housing and community services would be unaffected since relocations are not expected. With an unemployment rate of 7.8 percent, the 98 workers required for levee construction could be hired within the community, making relocations unnecessary. Direct and indirect annual employment in the region of impact (Doña Ana County and El Paso County) would increase by 248, or less than 1 percent, significantly below the respective county maximum positive annual historic deviation (RTV) for this variable.

Total sales volume is defined as the total change in business volume due to the proposed action. The proposed action would result in an increase in direct and indirect annual total sales volume of \$17.9 million in Doña Ana County and \$11.7 million in El Paso County, significantly below the respective county maximum positive annual historic deviation (RTV) for this variable. The total direct and indirect annual income in Doña Ana County and El Paso County would increase by \$5.3 million and \$2.9 million respectively, again significantly below the respective county maximum annual historic deviation (RTV) for this variable.

There would be minor adverse effects on cropland as 50 acres, with an estimated annual production value of \$58,965, would be removed from production for the purposes of borrow sites for levee construction.

Environmental Justice

The Flood Control Improvement Alternative would not disproportionately affect low income or minority populations. An increase in business sales volume would contribute to the local economy, therein providing a positive effect for these populations. The increase in employment and income would also be beneficial. Business sectors that disproportionately employ low-income or minority populations would be beneficially affected by the implementation of this alternative.

As discussed in Section 3, colonias are dominated by minority and low-income populations. Approximately 24 percent of employed residents of border colonias are construction workers (Border Low Income Housing Coalition 2001). Any increase in employment due to project construction could benefit colonia residents. There would be no adverse effect on minority and low-income populations as a result of the small amount of cropland removed from production.

4.9.5 Integrated USIBWC Land Management Alternative

Socioeconomic Effects Due to Levee Rehabilitation

Assumptions and costs for this alternative match those of the Flood Control Improvement Alternative. The overall capital cost estimate for levee construction is \$59.9 million (March 2001 Alternatives Formulation Report), the assumed implementation period is 5 years, and the required number of full-time workers during that period is 98 (62 in Doña Ana County, and 36 in El Paso County).

This alternative would not result in a population change. Therefore, housing and community structure, including public protection, education and medical care, would not be affected. No relocations would be expected as the estimated 98 workers could be hired locally. The annual effects from levee construction on business sales volume, employment and income would be the same as under the Flood Control Improvement Alternative.

Socioeconomic Effects Due to Irrigated Farmland Conversion

Potential effects with implementation of a water conservation program (Scenario 1) would be similar to those effects under the Flood Control Improvement Alternative. However, a potential adverse effect would occur by direct water acquisition (Scenario 2), as 784 acres, with an estimated annual production value of \$899,435, would be removed from production. This cropland conversion would include 50 acres of borrow sites for levee material in rural areas. It is assumed all loss of irrigated cropland would occur in Doña Ana County. As a result of this cropland reduction, there would be associated adverse socioeconomic effects. These include a decrease in farm and agricultural related employment (26); a decrease in annual direct and indirect sales or business volume of \$2.6 million; and a decrease in annual direct and indirect income of \$673,000. Relative to Doña Ana County values, none of these effects would be considered significant as their RTV's are significantly below the respective county maximum negative annual historic deviation (RTV) for each variable.

Environmental Justice

The Integrated USIBWC Land Management Alternative would not disproportionately affect low-income or minority populations during the levee construction phase. The increases in sales volume, employment and income associated with construction activities could benefit low-income and minority populations. Also, an increase in construction employment could benefit colonia residents. No displacements would occur, and the business sectors that disproportionately employ low-income and minority populations could be positively affected.

There could potentially be some adverse effects on low-income and minority population as a result of the implementation and subsequent management operations under this alternative. Under Component C, Scenario 2, it is estimated that 7-9 farm labor jobs could be lost because of the removal of cropland from production.

4.9.6 Targeted River Restoration Alternative

Socioeconomic Effects Due to Levee Rehabilitation

Assumptions and costs for this alternative match those of the Flood Control Improvement Alternative. The overall capital cost estimate for levee construction is \$59.9 million, the assumed implementation period is 5 years, and the number of full-time workers during that period is 98 (62 in Doña Ana County, and 36 in El Paso County).

The local population is not expected to change as a result of this alternative. Since relocations are not expected, housing and community structure would remain unaffected. The annual effects from levee construction on business sales volume, employment and income would be the same as under the Flood Control Improvement Alternative.

Socioeconomic Effects Due to Irrigated Farmland Conversion

Adverse socioeconomic effects could be associated with this alternative under both scenarios evaluated due to farmland retirement (Table 4.9-3). With implementation of a water conservation program (Scenario 1), potential cropland conversion would be limited to 388 acres (50 acres of borrow sites and 288 acres of voluntary conservation easements), with an estimated loss in annual production value of \$390,195. With direct water rights acquisition, approximately 3,492 acres with an estimated annual production value of \$4,003,705 would be removed from production. This retired cropland would include 388 acres of borrow sites and voluntary conservation easements, as in Scenario 1, and 3,154 acres due to direct water rights acquisition. This conversion would represent the most adverse effect of all the alternatives under consideration. As a result of this cropland reduction, there would be associated adverse socioeconomic effects. These include a decrease in farm and agricultural related employment (107); a decrease in annual direct and indirect sales or business volume of \$11.7 million; and a decrease in annual direct and indirect income of \$2.9 million. Relative to Doña Ana County values, none of these effects would be considered significant as their RTV's are significantly below the respective county maximum negative annual historic deviation (RTV) for each variable.

Environmental Justice

Low-income and minority populations would not be displaced by the proposed alternative. This socioeconomic group, particularly colonia residents, could benefit from an increase in employment associated with levee construction. Though annual increases in sales volume, employment, and income fall below their respective RTVs, any increase could be potentially beneficial. Business sectors that disproportionately employ low income and minority populations could be positively affected.

There could be potentially adverse effects on low income and minority populations as a result of the implementation and subsequent management operations under this alternative. Under Component C, Scenario 2, it is estimated that 35-40 direct farm labor jobs and additional agricultural-related jobs could be lost as a result of the removal of cropland from production. This potential of farm labor jobs represents the most adverse effects of all the alternatives and associated components/scenarios.

4.15 CUMULATIVE EFFECTS

4.15.1 Regional Plans

El Paso-Las Cruces Regional Sustainable Water Project

The New Mexico-Texas Water Commission proposed securing future drinking water supplies from surface water sources for the El Paso-Las Cruces region through construction and operation of water treatment plants, aqueducts and diversion structures, aquifer storage and recovery, water acquisitions, water conservation, and water banking (El Paso-Las Cruces Regional Sustainable Water Project, or Sustainable Water Project). The USIBWC and El Paso Water Utilities/Public Service Board were co-lead agencies for project planning and evaluation of potential effects (USIBWC & EPWU/PSB 2000). The Sustainable Water Project has not entered the implementation phase because agreements concerning water acquisition have not been reached.

While viability of the Sustainable Water Project remains uncertain, loss of agricultural land will likely continue due to the increased development in the Cities of Las Cruces and El Paso. The cumulative impact analysis addresses potential loss of agricultural lands for water rights acquisition, and associated socioeconomic effects.

Two water rights acquisition water scenarios were considered for cumulative impacts, one with implementation of an on-farm water conservation program, as described in Subsection 2.9.2, and another with direct acquisition of water rights.

Scenario 1: With Adoption of an On-Farm Water Conservation Program

Under this scenario, any of the modified river management alternatives would require a maximum retirement of 338 acres of cropland. This value includes 50 acres of borrow sites for levee construction, and 288 acres for voluntary conservation easements in areas currently in agricultural production (Targeted River Restoration Alternative). This acreage is insignificant relative to the anticipated land conversion under the Sustainable Water Project. For this project, a conversion of 13,569 acres is anticipated in New Mexico, and 14,344 acres in Texas (Table 3.3-1 of USIBWC & EPWU/PSB 2000). These values apply to a 20-year horizon, equivalent to the RGCP implementation timeframe (Phases 1 and 2 of the Sustainable Water Project preferred alternative).

Scenario 2: Without Adoption of an On-Farm Water Conservation Program

Table 4.15-1 summarizes cumulative effects of a modified RGCP river management alternative without adoption of a water conservation program. Under this scenario, acquisition of water rights for environmental measures would require land farm retirement, estimated at a rate of 1 acre for each 3 ac-ft of acquired water rights. Only potential land conversion in New Mexico was used as a reference, since a large number of RGCP environmental measures under consideration would be located in Doña Ana and Sierra Counties.

For the Integrated USIBWC Land Management Alternative, potential water use would increase 5.4 percent relative to the Sustainable Water Project required supply in

New Mexico. In terms of land conversion, a 18 percent reduction of EBID’s irrigated acreage attributable to the Sustainable Water Project, would increase 1 percent with the Integrated USIBWC Land Management Alternative (Table 4.15-1). Potential farm job losses in New Mexico would increase from 7 to 9 over a total of 250 anticipated for the Sustainable Water Project.

A greater cumulative effect would result from long-term implementation of the Targeted River Restoration Alternative. Anticipated values for the Sustainable Water Project preferred alternative would increase by 23.2 percent in terms of required water supply, and 4.2 percent in terms of EBID’s irrigated acreage reduction. Farm job losses, in addition to 250 anticipated for the Sustainable Water Project, would increase by up to 40 as a cumulative effect of the Targeted River Restoration Alternative.

Table 4.15-1 Potential Cumulative Effects of Modified RGCP Management Alternatives and Sustainable Water Project (20-Year Horizon)

Evaluation Criteria	RGCP Management Alternatives*		Regional Sustainable Water Project**	
	Integrated USIBWC Land Management	Targeted River Restoration	Preferred Alternative, New Mexico	Preferred Alternative, Texas
WATER SUPPLY REQUIRED				
Estimated supply required without conservation program (ac-ft/yr)	2,203	9,461	40,706	123,664
Increase over Sustainable Water Project estimates for New Mexico	5.4%	23.2%	N/A	N/A
POTENTIAL LAND CONVERSION				
Acreage conversion	734 ac	3,154 ac	13,569 ac	14,344 ac
Conversion relative to 76,000 acres of EBID irrigated acreage***	0.98%	4.2%	17.9%	N/A
SOCIOECONOMICS				
Potential loss in farm jobs	7-9	35-45	250	262

* Data from Tables 4.1-3, 4.8-1, and 4.9-3 of the Draft EIS.

** Table 3.3-1 of USIBWC & EPWU/PSB (2000). A potential loss of 512 jobs, reported for the 20-year horizon (Phases 1 and 2), was allocated in proportion to land conversion.

*** Reference value from Table 1, King and Maitland (2003).

The potential for competing interests for water acquisition rights exists between the Sustainable Water Project and environmental measures under a modified RGCP management alternative. These potential competing interests were addressed by proposing a different water acquisition strategy for the RGCP. While the Sustainable Water Project would rely on direct purchase of lands for water rights acquisition in New Mexico, funding on-farm water conservation programs would be the management strategy for environmental measures in the RGCP (primarily installation of drip irrigation systems). This water conservation strategy would not only provide participating farmers with irrigation systems better suited for drought conditions, but support a goal adopted in the formulation of RGCP alternatives: retaining farmland in production to minimize socioeconomic effects, and as supplemental wildlife habitat and buffer areas from urban development.

Upper Rio Grande Basin Water Operations Model

A multi-agency task force is currently evaluating more reliable and effective management strategies for the Upper Rio Grande basin through comprehensive hydraulic and hydrological simulation of stream flows, storage, and water demands. As part of an ongoing EIS, alternatives have been developed and evaluated using for the Upper Rio Grande Basin Water Operations Model (URGWOM).

Evaluation of normal operational flows as part of URGWOM has been limited to the Rio Grande reach upstream of Elephant Butte Reservoir. Thus, URGWOM results will not modify the extent or timing of irrigation flows along the RGCP. For this reason, the URGWOM will not have a cumulative effect on modified RGCP management alternatives. The only foreseeable URGWOM effect on RGCP operations is a greater upstream storage and routing of flood peaks with a potential to improve flood control.

New Mexico State Water Plan

On December 23, 2003, the New Mexico Office of the State Engineer (NMOSE) released the 2003 State Water Plan, as adopted in final form by the New Mexico Interstate Stream Commission. Appendix A of this plan lists key water issues for the Rio Grande as well as other major basins [<http://www.ose.state.nm.us/water-info/NMWaterPlanning/state-water-plan.html>].

The State Water Plan lists four major issues for the Lower Rio Grande (defined as the river segment south of Elephant Butte to the Texas border) which includes most of the RGCP: two related to compliance with the Rio Grande Compact; effects of increased ground water pumping; and Texas' pursuit of water importation from New Mexico. Management alternatives for the RGCP would not be in conflict with these issues as, 1) the USIBWC is required to comply with the Compact provisions, and 2) neither increased ground water use, nor inter-state water transfer are under consideration for the RGCP.

Relevant water supply and demand initiatives listed in the State Water Plan for the Lower Rio Grande are the El Paso-Las Cruces Sustainable Water Project; projects by the Cities of Las Cruces and El Paso to secure water; and the Special District Act.

Potential cumulative effects of the Sustainable Water Project Water were discussed above. Similar effects would be associated with other water acquisition initiatives by the Cities of Las Cruces and El Paso. Those new initiatives, in fact, address a water supply need whose near-future solutions no longer appear viable under the Sustainable Water Project.

The 2003 Special District Act, enacted by the New Mexico State legislature, allows creation of special districts with administrative tools for effective water banking to allow efficient and timely transfer of water from one user to another. The legislation was promoted, according to the State Water Plan, by the EBID and communities in the Lower Rio Grande, and its effectiveness as a management tool will first be evaluated in the Lower Rio Grande. Water banking is an option under consideration for water acquisition as part of a modified RGCP management strategy that could facilitate a potential transfer of water saved through on-farm water conservation programs. Administrative regulations for Special Districts are under development by the NMOSE.

SUBCHAPTER I.F – ADDITIONS AND MODIFICATIONS TO SECTION 5, CONSULTATION AND COORDINATION

Additional text is provided on the Draft EIS public review process following its release on December 18, 2003 (New Subsection 5.1.4 following the end of Subsection 5.1.3 on page 5-5 of the Draft EIS).

5.1 DRAFT EIS PREPARATION OVERVIEW

5.1.4 Draft EIS Agency and Public Review Period

The Draft EIS was made available for public review and comment on December 18, 2003. The deadline initially selected for submittal of comments to the Draft EIS was February 10, 2004. In response to a stakeholder's request, this date was extended to March 1, 2004 to allow additional time for review and receipt of written comment.

The USIBWC held a formal public hearing on January 27, 2004. The hearing was held from 6:30 p.m. to 8:30 p.m. at the USIBWC offices in El Paso. A formal presentation of the Draft EIS was given by the USIBWC, followed by verbal comments by hearing attendees. Both the presentation text and comments were taken through transcription by a certified court reporter. Appendix L of the Final EIS provides a copy of the official transcript.

A total of 116 letters were received from commentators during the Draft EIS review period, including 7 from agencies, 10 from non-governmental organizations, and 23 from private business. Copies of all correspondence received during the review period are presented in Appendix K. After close of the review period, 51 additional letters were received, including two from state agencies, and 35 form letters previously submitted by other commentators. The USIBWC agreed to include responses to late submittals providing substantial comments not previously addressed by other reviewers.

In general, key issues expressed during the public comment period included the following:

- Support for the No Action Alternative, in some cases requesting exclusion of conditions contained in the 1999 Memorandum of Understanding between the USIBWC and SWEC;
- Preference for the Targeted River Restoration Alternative with additional measures; and
- Concern regarding the USIBWC's focus on environmental changes rather than the RGCP mission of water delivery and flood protection.

Responses to comments received during the public hearing and Draft EIS review period are provided in Chapter II of the Final EIS. A cross-referencing index is also provided in Appendix J to link detailed responses organized by EIS Section, as presented in Chapter II, with originally submitted comments (Appendix K).

SUBCHAPTER I.G – ADDITIONS AND MODIFICATIONS TO THE DRAFT EIS, TEXT CORRECTIONS

This section includes editorial changes and non-substantial clarifications to the Draft EIS. It does not list changes to updated sections provided in Subchapters I.A through I.F, as the modified text already incorporates any required changes or clarifications.

Page	Item	Change*	Draft EIS Text	Modified Text
xiii	Acronyms and Abbreviations	Editorial correction	NOX; SOX; VOC: Volatile organic carbohydrates	NOx; SOx; VOC: Volatile organic compounds
1-2	Section 1.1.2, first bullet, last sentence	Rephrased in response to comment O8-19c	Baseline conditions used for restoration considerations will be the 1938 period.	Reference conditions for RGCP restoration potential are those at the beginning of project construction in 1938.
2-10	Last sentence, next to last paragraph	Web link updated in response to comment A6-2	Environmental Impact Reduction Checklist for Grazing [http://es.epa.gov/oeca/ofa/pollprev/graze.html]	Environmental Impact Reduction Checklists for NEPA Reviewers [www.inece.org/EIA/3Resouce.htm]
2-11	2 nd paragraph, end of 2 nd sentence	Updated citation in response to comment O7-04d	...is consistent with current BLM guidelines (USDI, BLM 1991)	...is consistent with current BLM guidelines (BLM 2000). <i>[Note: this reference is listed in Section 6.2]</i>
2-16	End of 2 nd paragraph	Corrected as indicated in comment A1-03	...and the Bosque del Apache National Wildlife Reservation.	...and the Bosque del Apache National Wildlife Refuge.
2-40	Last paragraph, 2 nd sentence regarding the Paso del Norte Watershed Council	Modified as recommended in comment O4-2	[The Council] would serve in an advisory capacity regarding selection, planning, and implementation of environmental measures.	[The Council] would serve in an advisory capacity regarding selection, planning, and implementation of environmental measures in accordance with the objectives of the Council, and within the limits of available manpower and resources.
2-41	Section 2.9.2, 1 st paragraph, last sentence	Editorial correction	Any <u>thrid</u> -party water conversion contracts...	Any third-party water conversion contracts...
4-10	Table 4.2-3, River Mile 78, Measure D	Errata	83B* (highlighted text)	78D (not highlighted)
4-5	Last sentence before Sub-section 4.1.6	Modification	... and lessen nutrient release from grazing areas	... and lessen grazing areas' contribution to the stream nutrient load from agricultural lands and Publicly-Owned Treatment Works.
6-12	NMOSE citations in page 3-2, 1 st paragraph, and Figures 3-1 and 3-2.	Errata	References to New Mexico Office of the State Engineer (NMOSE) publications were not included in Section 6.2.	NMOSE 2001. White Paper, New Mexico's Water Supply and Active Water Resource Management. July 23, 2001. NMOSE 2003. Strategic Plan. May 5, 2003.

* Comment numbers are referenced in Appendix J, and text is provided in full in Appendix K.