EXECUTIVE SUMMARY

Purpose of and Need For Action

The United States Section of the International Boundary and Water Commission (USIBWC) is evaluating long-term river management alternatives for the Rio Grande Canalization Project (RGCP), a narrow river corridor that extends 105.4 miles along the Rio Grande, from below Percha Dam in Sierra County, New Mexico to American Dam in El Paso, Texas. The RGCP, operated and maintained by the USIBWC since its completion in 1943, was constructed to facilitate water deliveries to the Rincon and Mesilla Valleys in New Mexico, El Paso Valley in Texas, and Juárez Valley in Mexico, and provide flood control. A levee system for flood control extends 57 and 74 miles over the right and left stream banks, respectively. Figure ES-1 shows the RGCP location.

The USIBWC currently implements operation and maintenance procedures to enhance ecosystem functions within the RGCP. However, the river and floodway will remain highly altered from events pre-dating RGCP construction. Thus, the USIBWC recognizes the need to accomplish flood control, water delivery, and operation and maintenance activities in a manner that enhances or restores the riparian ecosystem.

River management alternatives under consideration address practices such as stream bank stabilization, erosion reduction, and flood control as well as environmental measures intended to support restoration of native riparian vegetation and diversification of aquatic habitats along the RGCP. Potential effects of the alternatives were evaluated in a Draft EIS released for agency and public review on December 18, 2003.

Alternatives Considered in Detail

Throughout an extended public consultation process, an interdisciplinary team considered several river management alternatives and selected four for detailed analysis. Features of these alternatives are described below. Alternatives were initially formulated in a March 2001 report issued following an 18-month stakeholder consultation period, and subsequently modified to address further input from representatives of regulatory agencies, irrigation districts, environmental organizations, and the general public. A Reformulation of River Management Alternatives Report documenting those modifications and the rationale for their adoption was completed in August 2003 as the basis for the Draft EIS.

Table ES-1 presents a comparison of measures by management category for the No Action Alternative and three action alternatives. Levee rehabilitation is the core action of the Flood Control Improvement Alternative, along with changes in grazing leases to improve erosion control. These two measures apply to all action alternatives. Most other measures under consideration are associated with floodway management under the Integrated USIBWC Land Management Alternative and Targeted River Restoration Alternative. The latter alternative also considers measures for aquatic habitat diversification such as modified dredging of arroyos and reopening of meanders, as well as riparian vegetation development by induced overbank flows.

No Action Alternative

The No Action Alternative would continue RGCP operation and maintenance activities as currently conducted by the USIBWC. Those activities are directed toward flood protection and water delivery, with some activities involving environmental improvements. Key features of this alternative are management of the levee system, floodway maintenance through mowing, grazing leases and recreational areas; maintenance of pilot channel and irrigation facilities; and sediment control and disposal.

Mowing of the floodway is conducted annually, or as circumstances warrant, to control weeds, brush, and tree growth, including salt cedar. The USIBWC administers a land lease program that covers approximately 43 percent of the RGCP floodway. Pilot channel maintenance is performed during non-irrigation periods when water levels are lowest by removing debris and deposits, including sand bars. The USIBWC is also responsible for maintaining five NRCS sediment control dams in tributary arroyos and associated access roads. The agency conducts dredging at the mouth of arroyos to maintain grade of the channel bed and ensure the channel conveys irrigation deliveries.

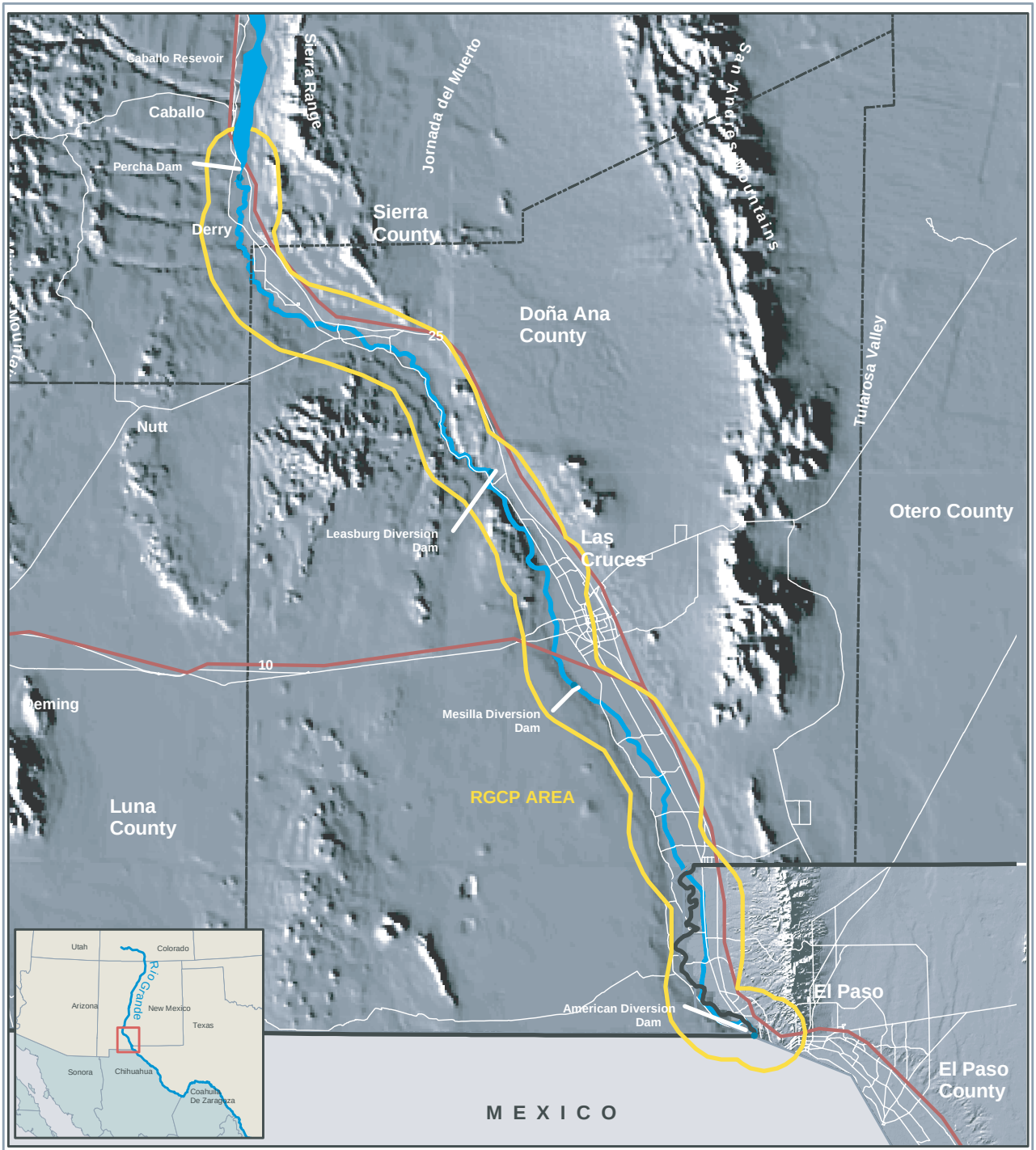
Flood Control Improvement Alternative

This alternative takes into consideration a potential increase in flood containment capacity. A 1996 hydraulic modeling study by the U.S. Army Corps of Engineers (USACE) identified a number of potential deficiencies in the RGCP in the event of a 100-year flood. Those findings were partially re-evaluated as part of the Draft EIS to include potential effects of environmental measures such as additional vegetation growth in the floodway. Most of the potential levee deficiencies were identified within urbanized reaches of the RGCP.

The assumption used for the Draft EIS was that existing levees would be raised as needed to meet a 3-foot freeboard design criteria, and new levees would be constructed in unconfined areas where flood levels could extend past the right-of-way (ROW) boundary. Based on this assumption, levee rehabilitation included 60.1 miles of levees needing a 2-foot average height increase, 6 miles of new levees, and a 2.8-mile long floodwall in the Canutillo area. As part of this alternative, the grazing lease management program would be modified to improve erosion control. The modified program would include a variety of vegetation treatments to control salt cedar in lease areas.

Integrated USIBWC Land Management Alternative

In addition to measures for flood control improvement and erosion protection, this alternative incorporates environmental measures within the floodway. All environmental measures would be limited to lands under USIBWC jurisdiction. A key feature of the Integrated USIBWC Land Management Alternative is development of a riparian corridor for bank stabilization and wildlife habitat by planting and stream bank reconfiguration at selected locations. Stream bank reconfiguration would allow overbank flows within the floodway to provide conditions suitable for establishment of native riparian species, particularly cottonwoods. Under this alternative, currently mowed floodway vegetation would be managed to promote native grass development in combination with salt cedar control treatments.



SCALE = 1 : 1,000,000 or 1 INCH = 83,333 FEET
UTM Zone 13 N / NAD 83

0 5 10 20 30 40 Kilometers

0 3 6 12 18 24 Miles

Figure ES-1
Location of the Rio Grande Canalization Project (RGCP)

United States Section,
International Boundary Water Commission
December 2003

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Table ES-1 Comparison of Alternative Features

Management Category	No Action Alternative	Flood Control Improvement Alternative	PREFERRED ALTERNATIVE: USIBWC Land Management	Targeted River Restoration Alternative
Levee System Management	Routine levee and road maintenance	No change	No change	No change
	n/a	Levee system improvements	Levee system improvements	Levee system improvements
Floodway Management	Unmodified grazing leases	Modified leases for erosion control (3,552 ac)	Modified leases for erosion control (3,552 ac)	Modified leases for erosion control (3,493 ac)
	Continue seasonal mowing (4,657 ac)	No change	Continued mowing (2,674 ac)	Continued mowing (2,223 ac)
			Modified grassland management (1,641 ac)	Modified grassland management (1,641 ac)
			Native vegetation planting (223 ac)	Native vegetation planting (189 ac)
			Steram bank reconfiguration (127 ac)	Seasonal peak flows / bank preparation (516 ac)
	n/a	n/a	n/a	Voluntary conservation easements (1,618 ac)
Channel and Irrigation Facilities Management	Debris removal and channel protection	No change	No change	No change
	America Dam and irrigation structures maintenance	No change	No change	No change
	n/a	n/a	n/a	Reopening of six former meanders (147 ac)
Sediment Management	NRS sediment dam maintenance	No change	No change	No change
	Sediment removal from arroyos / mitigation actions	No change	No change	Modified arroyo dredging for aquatic habitat (12 arroyos)
	Disposal from dredging channel within ROW*	Disposal mainly outside ROW*	Disposal mainly outside ROW*	Disposal mainly outside ROW*
	n/a	n/a	Disposal from environmental measure excavation inside ROW*	Disposal from environmental measure excavation inside ROW*

*ROW of the Rio Grande Canalization Project (lands under USIBWC jurisdiction)

Targeted River Restoration Alternative

This alternative emphasizes environmental measures associated with partial restoration of the RGCP, such as induced overbank flows to promote riparian corridor development, and opening of meanders and modification of the mouth of arroyos to increase aquatic habitat diversification. This alternative includes measures previously identified for flood control improvement and grazing leases modification.

Vegetation management for this alternative includes planting and enhancement of existing native woody vegetation and modified grassland management, as previously indicated for the Integrated USIBWC Land Management Alternative. These measures would be complemented by use of seasonal peak flows to promote natural regeneration of riparian bosque, and the use of conservation easements.

Seasonal peak flows are controlled water releases from Caballo Dam during high storage conditions in Elephant Butte Reservoir to induce overbank flows. Environmental measures would extend beyond the ROW through use of voluntary conservation easements to preserve existing wildlife habitat and encourage native bosque development.

Partial reopening of six former meanders eliminated during construction of the RGCP would be conducted to diversify aquatic habitat required for breeding and spawning of native fish species. In addition, dredging of some arroyos would be modified to create backwaters for diversification of aquatic habitats.

Implementation Strategy

Program Management. Use of adaptive management is anticipated in implementing river management alternatives. Adaptive management is a science-based decision process that leads to better management through a systematic process of prediction, application, monitoring, feedback, and improvement.

It is envisioned that adaptive management would be implemented through coordination with the Paso del Norte Watershed Council established by the New Mexico-Texas Water Commission. 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 the available manpower and resources. It would also recommend policies for cooperation and sharing information concerning planning and management activities of other projects potentially affecting the operation and management of the RGCP. Guidance for future project needs and measures would be provided by an External Advisory Group to obtain impartial, scientifically informed evaluations based on a long-term monitoring and evaluation program.

Water Acquisition and Cooperative Programs. Because a number of environmental measures under consideration would result in water consumption, water rights acquisition and cooperation with the irrigation districts are critical elements in the viability and long-term sustainability of environmental measures. Given that the USIBWC does not have any water rights within the RGCP, options for acquisition were evaluated. Support of water conservation by financing on-farm water conservation

programs, was identified as the most viable strategy to secure water. Conservation programs would not only be consistent with stated interests and ongoing programs of the irrigation districts, but would also facilitate seeking funds from high-priority state and federal programs. Cooperation agreements would be established with other agencies for increased sediment control at a watershed level, and to secure and manage voluntary conservation easements.

Implementation Timetable. Levee rehabilitation, improvements in erosion control, establishment of a riparian corridor and diversification of aquatic habitats are envisioned as long-term processes that will evolve as the effectiveness of individual projects are documented. A 20-year timeline was adopted for implementation of alternatives under consideration. During an initial 5-year phase, implementation plans would be developed and funded, agreements would be reached for interagency cooperation and water acquisition, selected projects would be tested at a pilot scale, and monitoring would be conducted. Priority projects would be implemented during a second 5-year phase. A 10-year final phase would be used for implementation of the remaining projects.

Potential Effects of the Alternatives

Thirteen resource areas were evaluated to assess potential effects of the river management alternatives. For each resource area, evaluation criteria were identified and applied to the various measures under consideration. Table ES-2 presents a comparison of alternatives in terms of potential effects on resources most likely to be affected by changes in river management under consideration.

Preferred Alternative

The USIBWC selected the ***Integrated USIBWC Land Management Alternative*** as the agency's preferred approach for long-term management of the RGCP. In selecting the preferred alternative, the agency 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. It is believed that the Integrated USIBWC Land Management Alternative will bring actual results in the short and medium term as it:

- Allows the 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 published in the Federal Register 1 month after the Final EIS release date for agency and public review.

Table ES-2 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 completion 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) Development of riparian vegetation on stream banks would have a long-term positive effect on water delivery by stabilization of stream banks. Short-term increases in debris and sediment in the river 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.	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. Mowing by USIBWC would continue at the same level as the No Action Alternative.	Effects of modified grazing leases and levee construction would be similar to the Flood Control Improvement Alternative. Mowing by USIBWC would be reduced by 1,983 acres. Restoration of 350 acres of native bosque by bank shavedowns and plantings, and development of native grasslands (1651 acres) would increase the amount of native vegetation within the ROW. Wetland areas would increase by 13 acres.	Effects of modified grazing leases and levee construction would be similar to the Flood Control Improvement Alternative. Mowing by USIBWC would be reduced by 2,434 acres. 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. Wetland areas would increase by 96 acres. Conservation easements would add 1,601 acres under management.
Wildlife Habitat	No change from baseline condition.	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. Construction associated with levee rehabilitation would be a short minor effect. Modification of salt cedar management in grazing leases methods would result in long-term beneficial effects.	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. Construction associated with levee rehabilitation and environmental measures would be a short minor effect. Modification of salt cedar management in grazing leases methods would result in long-term beneficial effects.	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. A total of 1,618 acres of conservation easements significantly increases the amount of high quality wildlife habitat. Construction associated with levee rehabilitation and environmental measures would be a short minor effect Modification of salt cedar management methods for grazing leases would result in long-term beneficial effects.

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 shavedown 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.
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.