Border Environment Cooperation Commission
Gila Gravity Main Canal Water Conservation Project

1. General

1.1 Project Type

The project falls into the BECC's priority area of water conservation. The project consists of improvements to the irrigation system of the Gila Gravity project.

1.2 Project Location

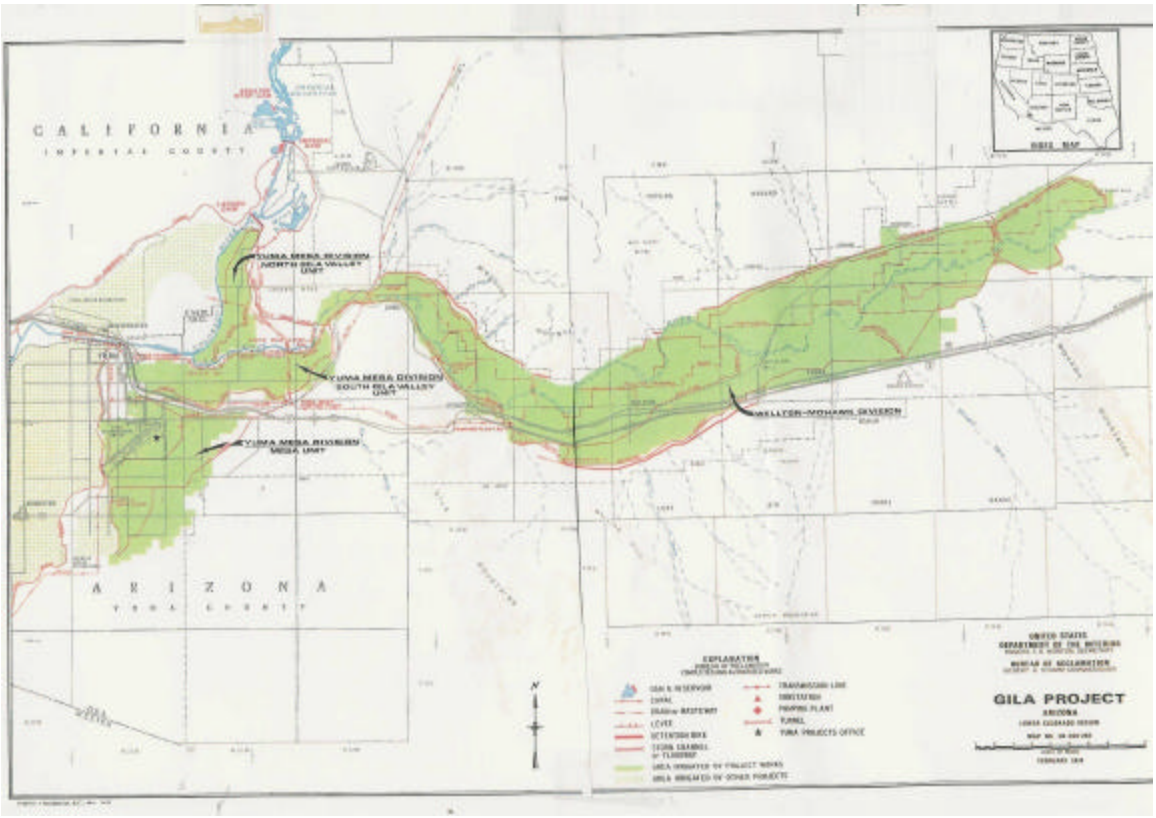
The Gila Gravity Main Canal was constructed to provide water to the Gila Project, Arizona. The primary project beneficiaries include North Gila Valley Irrigation and Drainage District, Wellton-Mohawk Irrigation and Drainage District, Yuma Irrigation District and Yuma Mesa Irrigation and Drainage District. Other beneficiaries of the system include the City of Yuma, Marine Corps Air Station, Unit B Irrigation and Drainage District and the Gila Monster Ranch. The Gila Gravity Main Canal delivers Colorado River water for irrigation and domestic purposes to approximately 100,000 acres in an area located east of the City of Yuma extending to the Mohawk Pass.

Principal crops grown are lettuce and other produce crops in the fall and winter months and wheat, cotton, hay and melons in the spring and summer months. Together with the crops in the Yuma Valley, agriculture in the Gila Project is responsible for more than half of Arizona's total agricultural production.

Domestic water users receiving water through the Gila Gravity Main Canal include Far West Water Company serving the area known as the "Foothills" east of Yuma and the City of Yuma. Eventually, the City of Yuma will rely on the Gila Gravity Main Canal for delivery of a substantial portion of the City's domestic water supply as the City constructs a new water treatment plant east of Yuma.

The Gila Gravity Main Canal Water Conservation Improvement Project (Project) consists of five elements: (1) canal sediment removal; (2) canal efficiency enhancement; (3) a water measurement improvement structure; (4) remote control of canal operations; and (5) conservation of water by canal sealing. Each element of the Project will both conserve water and improve the availability and delivery of water to domestic and agricultural water users.

The following map presents the area served by the districts represented by the Gila Gravity Board.



1.3 Project Description and Work Tasks

(1) Sediment Removal

The sediment removal element of the Project will return the canal to near operating design levels. Sediment deposits have raised the bottom of the canal by as much as four feet. The result is an inability to operate the canal to meet the needs of the agriculture and domestic water users. A significant problem which will be alleviated by the sediment removal is seepage resulting in water loss and high groundwater. The higher elevations of the water surface of the canal appear to contribute to the seepage by pressure in areas which are seeping.

(2) Canal Efficiency Enhancement

The operational efficiency of the canal will be improved by the efficiency enhancement element of the Project. Water users do not currently have real-time data on canal operations. Real-time data is important to domestic users such as the City of Yuma and to managers of the various Irrigation Districts. Real-time data will provide water users with the ability to monitor canal operations. Monitoring canal operations will allow water users to more efficiently schedule and use water. Real-time data will also be of considerable importance in times of emergency. Improved efficiency of canal operations will lead to decreasing water losses by allowing District Managers and domestic users to put into the canal only the water needed.

(3) Water Measurement Improvement Structure

Water measurement is often considered the cornerstone of water conservation. The water measurement structure to be built as the water measurement improvement element of the Project will provide the best currently available means for measuring the water flowing through the canal.

(4) Remote Control of Canal Operations

The Project intends to further conserve water by installing a system for controlling operations remotely. This will allow hourly water ordering. Hourly water ordering would reduce or eliminate over ordering of water and would conserve

water by diverting only the water which would be used. The remote control system would allow control of all gates on the system. The remote control element of the Project would follow the SCADA element of the Project.

(5) Canal Sealing

The Gila Gravity Main Canal includes several areas not susceptible to concrete canal lining. These areas insusceptible to canal lining are areas identified in which substantial seepage occurs. In order to control the seepage and conserve water, the canal sealing element of the Project will place a Bentonite or similar sealing clay in the canal. The areas to be sealed have been initially identified and the sealing clay will be applied following the sediment removal element of the Project. Coordination between the canal sealing element and the sediment removal element of the Project will be necessary in order to avoid exacerbation of seepage by sediment removal.

The Project will be designed, constructed, and completed within 36 months of certification by BECC. Design of the various elements is underway with 60% complete plans. Final design and contract documents for each element will be completed prior to construction of each element.

The Project will be completed by January 2006, within 36 months of certification.
Sediment Removal will require approximately one year to complete (including purchase, installation and removal of equipment). The other elements of the Project will follow the initiation of Sediment Removal and will be constructed and installed both concurrently and successively. Completion of the remaining four elements of the Project, other than Sediment Removal, will take approximately one year.

The Sediment Removal element involves the acquisition of equipment for sediment removal and the operation of the equipment. The cost of Sediment Removal including other equipment, operators and other workers, support and maintenance, will be provided in-kind by the Wellton-Mohawk Irrigation and Drainage District (WMIDD.) The plan for Sediment Removal estimates that the sediment will be removed within one year.

Construction design of the water measurement device is complete. Construction will be by in-kind services with materials, equipment and personnel provided by the various District members of the Gila Gravity Main Administrative Board, principally WMIDD, Yuma Mesa Irrigation and Drainage District (YMIDD) and the Yuma Irrigation District (YID.) Typical construction of these water measurement structures is a matter of days due to the inability to "dry-up" the canal. The Board schedules "water outages" as needed. Historically, no water outage has been scheduled for more than one week. Construction of similar measurement structures in the Yuma Valley (Yuma County Water Users' Association) have been completed within a similar time frame.

The Canal Efficiency Enhancement and Remote Control of Canal Operations elements of the Project are expected to require no more than six months to purchase and install during and following Sediment Removal. In order to seal the canal in the areas where seepage occurs, it is anticipated that the sealing will take place during annual outages in the three years of the Project Schedule. The Canal Sealing element is expected to be the only element with partial and final work being completed during the annual water outage occurring late in year three of the Project.

Description of the Sponsor

The Gila Gravity Main Administrative Board is an unincorporated association formed in 1981 by contract with the United States Bureau of Reclamation. The Gila Gravity Main Canal was constructed as a Reclamation Project by the United States Government. Until 1981, the Bureau of Reclamation operated and maintained the canal. The Gila Gravity Administrative Board has, since 1981 operated and maintained the canal.

The member entities of the Gila Gravity Main Administrative Board are: North Gila Valley Irrigation and Drainage District (NGVIDD), Unit B Irrigation and Drainage District (Unit B), Wellton-Mohawk Irrigation and Drainage District (WMIDD), Yuma Irrigation District (YID), and Yuma Mesa Irrigation and Drainage District (YMIDD). Each of the member entities is an irrigation district organized under the laws of the State of Arizona as a municipal corporation.

The Wellton-Mohawk Irrigation and Drainage District is the Wellton-Mohawk Division of the Gila Arizona Project. WMIDD delivers water for irrigation of approximately 63,000 acres in an area lying east of Dome Valley in eastern Yuma County extending to the Mohawk Pass. WMIDD also delivers up to 10,000 acre feet of domestic water from municipal and industrial use.

Yuma Mesa Irrigation and Drainage District is one of three irrigation districts comprising the Yuma Mesa Division of the Gila Project. YMIDD delivers irrigation water to approximately 20,000 acres of agriculture on the Yuma Mesa south and east of Yuma, Arizona. YMIDD also delivers up to 10,000 acre feet of domestic water from municipal and industrial use.

Yuma Irrigation District is located in the South Gila Valley and is bordered on the north by the Gila River and the south by the Yuma Mesa. YID is one of the three districts in the Yuma Mesa Division, Gila, Arizona Project. YID delivers water to approximately 11,600 acres of agriculture. YID also delivers up to 5,000 acre feet of domestic water for municipal and industrial use.

North Gila Valley Irrigation and Drainage District is bordered on the south by the Gila River and on the north by the Colorado River and to the east by the Gila Gravity Main Canal. NGVIDD is one of three districts in the Yuma Mesa Division of the Gila Project, Arizona. NGVIDD delivers water for irrigation of approximately 6,587 acres in the North Gila Valley. NGVIDD also delivers up to 2,500 acre feet of domestic water for municipal and industrial use.

Unit B Irrigation and Drainage District is one of the oldest irrigation districts in Arizona. Unit B originally received Colorado River water through the Yuma County Water Users Association system. After the construction of the Gila Gravity Main Canal and YMIDD, it was more efficient and less costly to deliver the water thru the Gila Gravity Main Canal.

Others served by the Gila Gravity Main Canal include portions of the City of Yuma and the Marine Corps Air Station, Yuma.

1.4 Conformance with International Treaties and Agreements

A signed statement from the Gila Gravity Main Administrative Board will be submitted stating that the Project conforms to international treaties. The most pertinent treaty is 1944 Mexican Water Treaty and subsequent Minutes dealing with the Colorado River.

2. Human Health and Environment

2.1 Human Health and Environmental Need

The Project will have significant water savings. More detail and discussion of the water savings is included in the Sustainable Development Water Conservation section. Water conservation is estimated at approximately 45,000 acre feet or about 14 billion gallons of water. In general, water savings are achieved in two ways: (1) elimination of transmission losses (which will be achieved by reducing seepage) and, (2) providing water flows at the right quantity and at the right time.

2.2 Environmental Assessment.

An environmental review of the Project is being made by the Yuma Area Office of the United States Bureau of Reclamation. The Project will be implemented entirely within existing canal rights-of-way and will not include the acquisition of any new lands for rights-of-way. An environmental assessment (EA) was prepared for the project. The public comment period ended on February 2, 2004 and a Finding of No Significant Impact is expected from the U.S. BOR.

2.3 Compliance with Applicable Environmental and Cultural Resource Laws and Regulations

The Project has been presented to the Bureau of Reclamation. The USDA Natural Resources Conservation Service (NRCS) and private landowners will also be involved in the planning process. Formal presentations were made to local agencies, potentially including the NRCS, the USBR, and the City of Yuma during October 2003.

3. Technical Feasibility

3.1 Appropriate Technology

The Project consists of five elements consisting of canal sediment removal (dredging), canal efficiency enhancement, water measurement improvement structure, remote control of canal operations and canal sealing.

Sediment removal is a basic operation necessary to maintain and enhance efficiency and water conservation. No project is an alternative course of action. If there is no project, the canal will continue to experience decreased efficiency in operation, increasing costs of maintenance and increasing seepage. Alternatively, the canal banks could be raised. The cost of raising the canal banks would be not less than several million dollars. The cost of bank raising would be prohibitive.

Water measurement and remote control of canal operations. A plan has been instituted for greater efficiency in conservation thru accurate water measurement. Remote control of canal operations through sensors and SCADA would reduce or eliminate over-delivery of water.

3.2 Operation and Maintenance Plan

Operation and maintenance is an ongoing task performed by personnel from the member Districts. Operations are supervised by a watermaster and an assistant watermaster and manned by dispatchers and ditchriders. No increase in personnel is anticipated due to the improvements, and similarly, no decrease in personnel is expected, though individual workloads may decrease due to the operation of the canal lined versus unlined canals.

Maintenance of the system is presently supervised by the maintenance and construction superintendent of WMIDD. No increase or decreases are predicted in maintenance personnel. O&M will continue to be funded by member Districts.

3.3 Compliance with Applicable Design Regulations and Standards

The design for the improvements is underway by a registered professional engineer in the State of Arizona. The design for the project is consistent with the U.S. Bureau of Reclamation guidelines for water conservation.

4. Financial Feasibility and Project Management

4.1 Financial Feasibility

The Gila Administrative Board provided three Fiscal Years of the Report on Audit for the Gila Gravity Main Canal system and the Associated Drainage Works, beginning with the fiscal year that ended on December 31, 1999. Evaluation of the financial statements is summarized in the following sections – funds received and disbursed and fund balances. The project sponsor will submit a resolution authorizing their Board to provide funding for the project. The resolution is expected before certification of the project.

Fund Disbursed and Received

For the year ending December 31, 2002, the Gila Administrative Board had total funds received of about $137,929, from the sources shown in Table 2. Historical and projected revenue for Fiscal Years ending December 31, 1998 though 2010 are shown in Figure 1.

Table 2. FY 2002 Funds Received Sources

Revenue Source	Amount ($)	Percent of Total
District Assessments	80,018	58
Landowner Assessments	54,109	39
Interest Earned	-1,566	-1
US BOR	5,367	4
District Assessments	80,018	58

Note: Interest earned was negative due to devaluation of a State Fund.

For the year ending December 31, 2002, the Gila Administrative Board had total funds disbursed of about $15,532 from the items shown in Table 3. Historical and projected expenditures for Fiscal Years ending December 31, 1998 though 2010 are shown in Figure 2.

Table 3. FY 2002 Expenditures

Expenditure Item	Amount ($)	Percent of Total
Road Rehabilitation	0	0
Bridge Rehabilitation	0	0
Bank Stabilization	0	0
Other	15,532	100

Note: In other years prior to FY 2002 there are expenditures for road, bridge and bank rehabilitation

As noted in the description of the Project Sponsor, each of the Gila Administrative Board Member Districts perform operations and maintenance on the Gila Gravity Main. Those expenditures and the

reimbursement to each District for their contribution for the time period FY 1998 – FY 2002 is shown in Table 4.

Table 4. Gila Gravity Main Operation & Maintenance Expenditures by Gila Administrative Board Member Districts

Fiscal Year Ending December 31 >>	1998	1999	2000	2001	2002
OPERATION & MAINTENANCE OF GGMCS					
Operation	91,566	99,745	102,169	98,140	101,447
Storm Repair	1,571	0	32,224	29,683	20,812
Maintenance-Roads	25,299	41,323	19,569	45,694	19,199
Maintenance-Structures	16,956	15,427	78,757	42,137	106,438
Maintenance-Weed Control	37,413	60,753	1,431	5,948	0
Maintenance-Canals	1,656	2,802	7,497	9,025	11,002
Electrical Repair & Power	4,126	5,212	12,610	9,471	11,453
Insurance	12,483	12,610	2,481	2,624	5,431
Accounting	4,029	3,067	2,378	1,987	2,047
General Expense	4,278	4,721	0	0	0
Total	199,378	245,659	259,116	244,708	277,829
AMOUNTS PAID BY DISTRICTS					
Yuma Mesa Irrigation & Drainage District	49,715	65,096	126,171	59,957	75,286
North Gila Valley Irrigation District	18,133	17,854	10,595	18,789	19,966
Yuma Irrigation District	12,893	16,732	30,289	15,357	19,292
Wellton-Mohawk Irrigation & Drainage District	108,994	133,379	92,061	139,010	148,724
Unit B Irrigation & Drainage District	9,642	12,599	0	11,595	14,561
Total	199,378	245,659	259,116	244,708	277,829

Figure 1. Historical and Projected Revenue

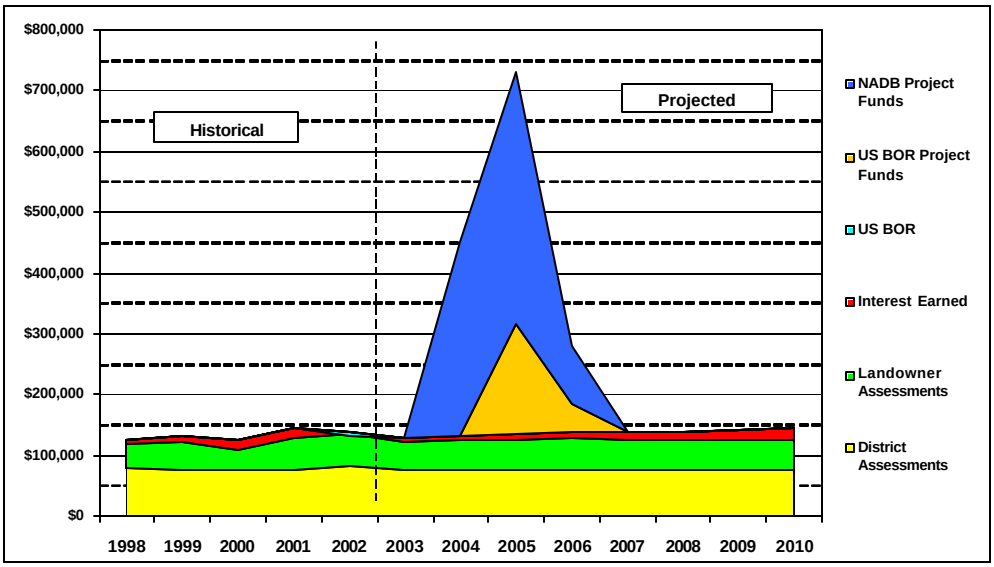
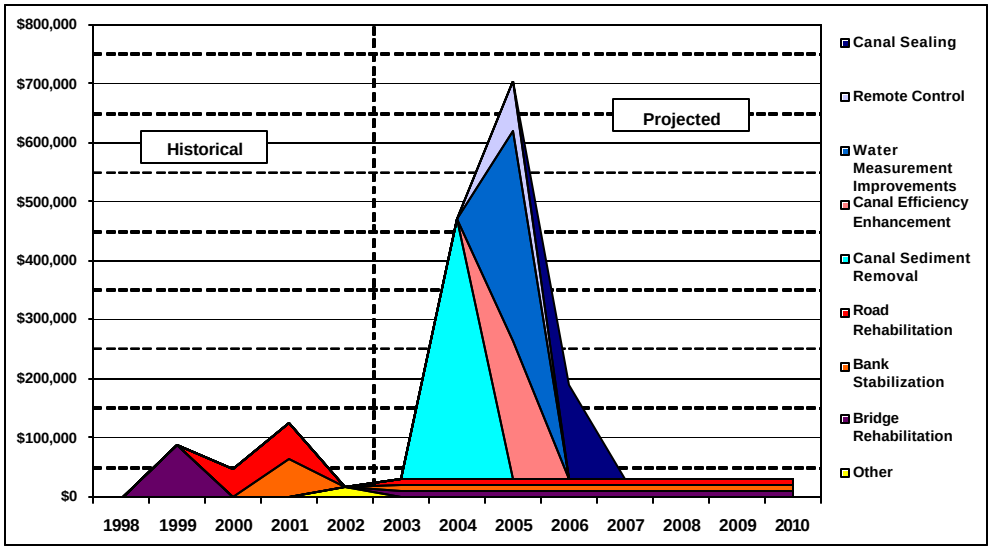


Figure 2. Historical and Projected Expenditures

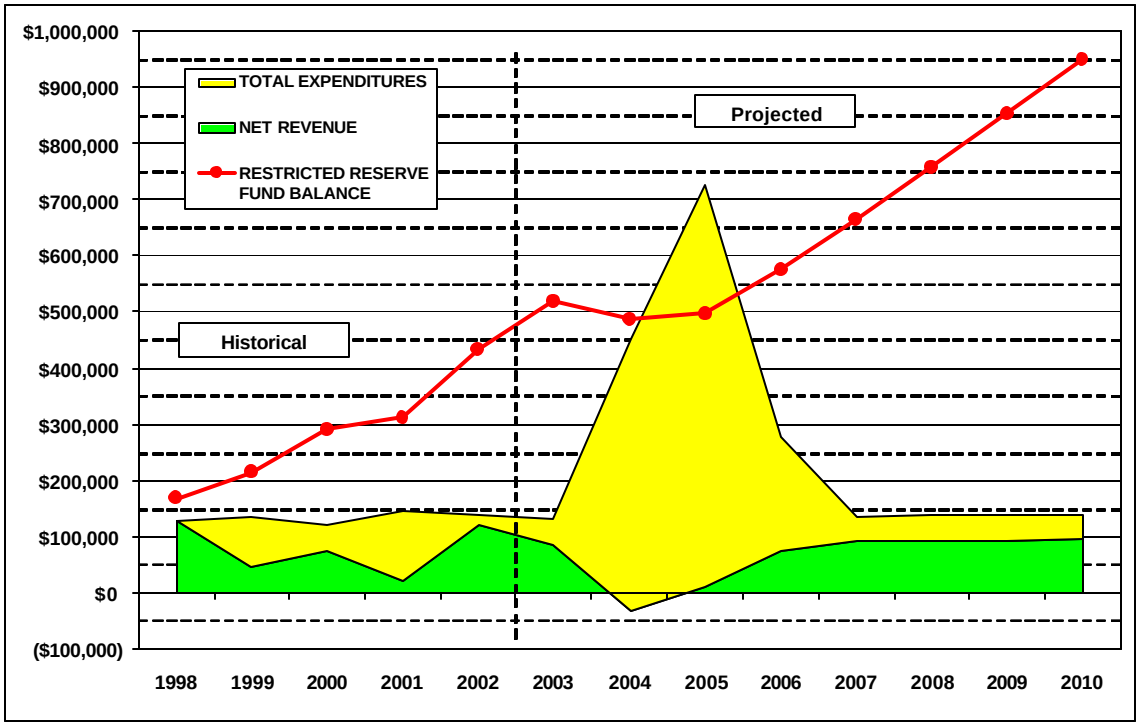


Fund Balances

During Fiscal Years ending December 31, 1998 though 2002, the ending balance for the Restricted Reserve Fund balance ranged from about $167,000 to $434,000.

The District intends to fund the proposed $1,756,255 of water conservation project improvements with funds from the NADB, U.S. Bureau of Reclamation, the Administrative Board's Reserve Fund and with in-kind contributions. The projected ending balances for the District's operations cash accounts should remain above $480,000 during construction of the project and the following four years. Historical and projected expenditures, net revenues and restricted reserve fund balances are shown in Figure 3.

Figure 3. Historical and Projected Expenditures, Net Revenues and Restricted Reserve Fund Balances



Project Costs

The following table presents the project costs for the Gila Gravity Main Canal improvements.

Concept	Cost (US dollars)
Sediment Removal	850,000
Canal Efficiency Enhancement	230,000
Water Measurement Structure	350,000
Remote Control of Canal Operations	75,000
Canal Sealing	150,000
Design Administration Costs	101,255
TOTAL	1,756,255

Project Funding

The project will be financed according to the funding sources identified in the following table.

Funding Source	Amount	Percentage
NADB - Water Conservation Investment Fund	827,500	47.1
Gila Gravity In-Kind Contribution	487,418	27.8
Gila Gravity Cash Contribution	214,087	12.2
U.S. Bureau of Reclamation	227,250	12.9
TOTAL	**$1,756,255**	**100**

4.2 Fee/Rate Model

The project will not modify the existing user fees charged by the different irrigation districts that the Gila Gravity Board represents. This is due to the fact that there is not a loan component as part of the project.

4.3 Project Management

The elements of the Project will be managed and supervised as follows:

(1) Sediment Removal : WMIDD will be responsible for the Sediment Removal element. WMIDD has the engineering, operating and labor personnel to design, implement, operate and maintain the sediment removal and sediment removal equipment.

(2) Canal Efficiency Enhancement : YMIDD will be responsible for the Canal Efficiency Enhancement element. YMIDD provides the watermaster and ditch riders for the canal. YMIDD logically has the most knowledge and experience for operating the canal and the greatest need for the information which will be provided by this element. YMIDD will rely on the technical assistance and advice of the Irrigation Training and Research Center at California Polytechnic State University, San Luis Obispo, California.

(3) Water Measurement Structure: WMIDD, with its engineering and construction divisions, will design and construct the Water Measurement Structure. Similar structures have been built in the area. WMIDD will be supported by the Irrigation Training and Research Center at California Polytechnic State University, San Luis Obispo, California in designing the water measurement structure as was Yuma County Water Users Association recently in installing a similar structure.

(4) Remote Control of Canal Operations: YMIDD will manage and supervise the remote control of canal operations element of the Project. This task is assigned to YMIDD due to YMIDD being assigned the operation of the GGMC. YMIDD will receive technical assistance from the Irrigation Training and Research Center at California Polytechnic State University, San Luis Obispo, California.

(5) Canal Sealing : NGVIDD will be responsible for the Canal Sealing Element of the Project because the areas to be sealed border NGVIDD and the adverse impacts of the seepage are mostly in NGVIDD. NGVIDD will employ James Davey and Associates, a local engineering firm with experience in the Yuma area irrigation and canal systems to manage and supervise this element.

5. Community Participation

5.1 Comprehensive Community Participation Plan

Initial contacts in July 2003 to inform the sponsors of the public participation requirements, led the Gila Gravity Administration Board to submit for approval the project's public participation plan in September 2003. It was approved that same month.

5.2 Local Steering Committee

The committee was formed with Roger Gingrich, City of Yuma; Edward Harrison, North Gila Valley Irrigation and Drainage District; John Klingenberg / Charles Slocum, Wellton-Mohawk Irrigation and Drainage District; Casey Prochaska, Yuma County Board of Supervisors; Ken Rosevear, Yuma County Chamber of Commerce; Don Pope, Yuma County Water Users' Association; Mark Smith, Yuma Irrigation District; Eldon Paulson, Yuma Mesa Irrigation District. Assisting the committee were Wade Noble, Noble Law Offices and Bill Plummer, consultant. Members of the committee were present at the public meetings and two organizational meetings.

5.3 Meetings with Local Organizations

Local agencies contacted included the City of Yuma, Yuma County Water Users Association, the US Bureau of Reclamation, Coachella Valley Water District, Colorado River Board of California, and the USIBWC. The North Gila Valley Irrigation District, Wellton Mohawk Irrigation District, Yuma Irrigation District, and the Yuma Mesa Irrigation and Drainage District and the Arizona Department of Water Resources provided letters of support for the project.

5.4 Public Access to Project Information

The Gila Main Canal project was known to each member district of the Gila Gravity Board since late 2002 and continued through the Step I Application and development of the Step II certification process. The Preliminary Engineering Report and the draft Project Certification Document were available at the North Gila Valley Irrigation and Drainage District office in Yuma thirty days prior to the first public meeting and available during normal and after business hours. One public meeting notice advertising both meetings was published on October 15, 2003 in the Yuma Sun newspaper, 30-days prior to the first public meeting.

Detailed discussions on the proposed project were held with approximately 20 individual growers and landowners receiving irrigation water from the Gila project. They received information from the fact sheet and the engineering and funding plan, and were unanimous in their support for the project.

5.5 Public Meetings

Public meetings were held on November 17 and 24, 2003. The people attending the meetings were district landowners and growers, as well as agency personnel who had ongoing information of the project since late 2002. They were well informed and supportive of it.

6. Sustainable Development

6.1 Definition and Principles

The project complies with BECC's definition of Sustainable Development: "Conservation oriented social and economic development that emphasizes the protection and sustainable use of resources, while addressing both current and future needs, and present and future impacts of human actions." The project will positively impact the area and sustainable life of the area's residents through the conservation of water which is becoming a scarce resource and critical for sustainability of life and economic growth.

Principle 1.

Food and fiber production are at the center of sustaining human beings. The Gila Project Arizona is a major contributor to sustaining human life by agricultural products. During winter months the Gila Project, along with the Yuma Project, provide nearly all of the lettuce for the United States. The Gila Project contributes much need water to vegetation and habitat. Without the Gila Project, and specifically the Gila Gravity Main Canal, habitat would, and thus species protection and enhancement would be substantially less.

Principle 2.

The Gila Project is an example of development that provides equitable support for the environment and development. The delivery of water for agricultural and domestic needs through the Gila Gravity Main Canal has allowed development of an area that otherwise would not have been developed. At the same time, the delivery and application of the water has maintained and enhanced the environment by extending the areas in which groundwater has developed habitat in an extremely arid land. The result benefits both the present users of the water and the environment and if maintained and enhanced by the Project, will provide benefits for future generations.

Principle 3.

The Project takes the environment into account. All appropriate and necessary measures will be taken to avoid damage to adjacent habitat. The Project will not extend beyond the rights of way for the GGMC. Keeping the Project within the rights-of-way means that no new lands will be subjected to development and that those lands initially contemplated for development as part of the Gila Project will not be subjected to a more intense use than initially contemplated. The Project will continue compatible with the environment, particularly sustaining habitat. It is conservation-oriented development, which emphasizes the protection and sustainable use of natural resources especially in the areas of water use reduction and efficiencies. The added efficiencies address both current and future water needs while fostering community development.

Principle 4.

The stakeholders have been identified and included in the planning process. Environmental, governmental, public and agency representatives are included in the Steering Committee. One of the special benefits of having the five irrigation district members of the GGAB is having 22 members of

the public elected to the boards of the irrigation districts representing the public in the Gila Project. The people impacted are those who are planning developing and implementing this Project.

6.2 Institutional and Human Capacity Building

The Irrigation Training and Research Center (ITRC) at California Polytechnic State University, San Luis Obispo, California; developed the "Proposed Modernization of the GGMC ". This study was funded by the USBOR. Also, the ITRC developed the "Modeling of the GGMC for Automation", with funding from USBOR.

The NADB Water Conservation Investment Fund (WCIF) will complement, with grant funds, the capital investments required by the GGAB for construction of the project. The use of WCIF grant funds allows the GGAB to fully finance and improve its infrastructure in order to reduce water conveyance losses. The GGAB intends to fund the proposed $1,756,255 of water conservation project improvements with funds from the NADB, U.S. Bureau of Reclamation, the Administrative Board's Reserve Fund and with in-kind contributions.

The projects will be managed by the GGAB and will be constructed and operated in conformance with Federal, State and NADB requirements. The elements of the Project will be managed and supervised as follows:

- WMIDD will be responsible for the Sediment Removal element. WMIDD has the engineering, operating and labor personnel to design, implement, operate and maintain the sediment removal.
- YMIDD will be responsible for the Canal Efficiency Enhancement element. YMIDD will rely on the technical assistance and advice of the ITRC.
- WMIDD, with its engineering and construction divisions, will design and construct the Water Measurement Structure. WMIDD will be supported by ITRC in designing the water measurement structure.
- YMIDD will manage and supervise the remote control of canal operations element of the Project. YMIDD will receive technical assistance from the ITRC.
- NGVIDD will be responsible for the Canal Sealing Element of the Project because the areas to be sealed border NGVIDD and the adverse impacts of the seepage are mostly in NGVIDD. NGVIDD will employ James Davey and Associates, a local engineering firm with experience in the Yuma area irrigation and canal systems to manage and supervise this element.

The process for the development of the projects has followed a planning and public participation process that developed alternatives and associated costs, solicited public input, established priorities based on input of the stakeholders and proceeded according to the priorities established in the planning process.

No increase in personnel is anticipated due to the implementation of the project, and similarly, no decrease in personnel is expected, though individual workloads may decrease due to the operation of the canal lined versus unlined canals. No increase or decreases are predicted in maintenance personnel. O & M will continue to be funded by member Districts.

6.3 Conformance with Applicable Local and Regional Conservation and Development Plans

A separate category of surface water in Arizona is the water supplied through the Colorado River. The federal government constructed a system of reservoirs on the River to harness its supplies for use in several states. Arizona, California, Nevada, New Mexico, Utah, Colorado, Wyoming and Mexico share the River's resources. Rights to use Colorado River water are quantified by a string of legal authorities known as the "Law of the River." Based on this body of law, Arizona has the right to use 2.8 million acre-feet annually of Colorado River water. Mohave, La Paz and Yuma county water users rely on Colorado River as their principal water supply.

Arizona implemented the Groundwater Management Code in 1980. The Groundwater Code promotes water conservation and long-range planning of water resources.

The Code has three primary goals:

1. Control severe overdraft occurring in many parts of the state
2. Provide a means to allocate the state's limited groundwater resources to most effectively meet the changing needs of the state; and
3. Augment Arizona's groundwater through water supply development.

The Code established three levels of water management to respond to different groundwater conditions:

- The lowest level of management includes general provisions that apply statewide.
- The next level of management applies to Irrigation Non-Expansion Areas (Douglas, Joseph City and Harquahala).
- The highest level of management, with the most extensive provisions, is applied to Active Management Areas (Phoenix, Pinal, Prescott, Tucson and Santa Cruz), where groundwater overdraft is most severe.

The boundaries of AMAs and INAs generally are defined by groundwater basins and sub-basins rather than by the political lines of cities, towns, or counties.

The Water Conservation Field Services Program (WCFSP), was implemented by the Bureau of Reclamation in 1996 to actively encourage water conservation, assist districts with their responsibility to develop conservation plans, and complement and support State and other conservation programs.

The Reclamation Reform Act of 1982 (RRA), Section 210 (P.L. 9777-293) states the following:

- Section 210 (a) of the RRA requires the Secretary of the Interior to encourage water users to adopt water conservation measures.
- Section 210 (b) of the RRA requires each district who has a water service contract with the Bureau of Reclamation, to develop and implement a water conservation plan containing: (1) definite goals; (2) appropriate water conservation measures; and (3) a time schedule for meeting the water conservation goals.
- Section 210 (c) of the RRA directs the Secretary of the Interior to coordinate with and involve others in water conservation efforts.

The proposed project is in conformance with the planning and conservation plans considered in the State and Federal regulations mentioned above.

6.4 Natural Resource Conservation

The Imperial Dam diverts Colorado River water at its east abutment through the desilting basin into the Gila Gravity Main Canal. The desilting basin, 1,165 feet long including transitions, is located between the Gila headworks of Imperial Dam and the Gila Gravity Main Canal diversion gates. Water is discharged from the desilting basin into the Gila Gravity Main Canal, which has a capacity of 2,200 cubic feet per second and extends from the desilting works 20.5 miles in a southerly direction to the Yuma Mesa Pumping Plant. The canal consists of two tunnels, one 1,740 feet long and the other 4,125 feet long; the 0.39-mile Gila River Siphon; and about 19 miles of open unlined canal.

The Project will result in substantial water savings. Each element will bring about water conservation. The GGAB estimated a total water conservation of 45,000 acre-feet per year.

The sediment removal element of the Project will return the canal to near operating design levels. Sediment deposits have raised the bottom of the canal by as much as four feet. The result is an inability to operate the canal to meet the needs of the agriculture and domestic water users. A significant problem, which will be alleviated by the sediment removal, is seepage resulting in water loss and high groundwater. The higher elevations of the water surface of the canal appear to contribute to the seepage by pressure in areas, which are seeping.

The operational efficiency of the canal will be improved by the efficiency enhancement element of the Project. Monitoring canal operations will allow water users to more efficiently schedule and use water. Real-time data will also be of considerable importance in times of emergency. Improved efficiency of canal operations will lead to decreasing water losses by allowing District Managers and domestic users to put into the canal only the water needed.

The water measurement structure to be built as the water measurement improvement element of the Project will provide the best currently available means for measuring the water flowing through the canal.

Hourly water ordering would reduce or eliminate over ordering of water and would conserve water by diverting only the water which would be used. The remote control system would allow control of all gates on the system

The Gila Gravity Main Canal includes several areas not susceptible to concrete canal lining. These areas insusceptible to canal lining are areas identified in which substantial seepage occurs. In order to control the seepage and conserve water, the canal sealing element of the Project will place a Bentonite or similar sealing clay in the canal. The areas to be sealed have been initially identified and the sealing clay will be applied following the sediment removal element of the Project.

6.5 Community Development

The implementation of the project will contribute to extend the availability of water required to fulfill the future municipal and agricultural needs, in a region where it is produced most of the lettuce consumed in the United States.

LIST OF AVAILABLE DOCUMENTS

1. Certification document
2. Financial Feasibility Study
3. Yuma Irrigation District Water Conservation Plan
4. Preliminary Engineering Report
5. Environmental Assessment