

# **PUEBLO IRRIGATION FACILITIES REHABILITATION**

## ***EXECUTIVE SUMMARY***

A serious need exists for rehabilitation and repair of Pueblo Indian irrigation infrastructure. Inspection of existing infrastructure shows that many key facilities such as diversion structures and main conveyance ditches are unsafe and barely, if at all, operable. Pueblo farm lands sometimes cannot be put into production because of inadequate irrigation and drainage facilities.

The benefits of rehabilitating and repairing Pueblo irrigation infrastructure include increased agricultural productivity, economic benefit, water conservation, safer facilities, and preservation of Pueblo Indian culture. By having the necessary irrigation infrastructure to put their farmlands into production, the Pueblos will be able to put their waters to beneficial use. This will provide the water, agricultural, and natural resources necessary for Pueblo reservations to continue as viable homelands into the future, as they have been historically. To neglect or postpone rehabilitation will result in further deterioration, increasing the cost of rehabilitation at a later date.

The Pueblos put a significant amount of time and energy into operating and maintaining their existing irrigation and drainage facilities. However, they do not have the financial and technical resources to undertake the major repairs needed. Other state and federal agencies, including the New Mexico Office of the State Engineer, the Army Corps of Engineers, the Natural Resources Conservation Service, and the Bureau of Indian Affairs do not have the programs, authorization, or funding necessary for a project of this magnitude. A Congressionally authorized and funded non-reimbursable Bureau of Reclamation project (Project) could be an option for rehabilitating Pueblo irrigation facilities.

Such a Project's scope of work would include the rehabilitation of irrigation and drainage facilities necessary for proper and efficient agricultural practice on Pueblo lands which have historically been irrigated. Excluded from a Project scope of work would be Middle Rio Grande Conservancy District facilities, construction of new storage dams and reservoirs, and on-farm improvements, unless such on-farm improvements (such as land leveling and installation of water measurement devices) result in significant water conservation.

The cost for a feasibility study for a Project is estimated to be \$3 million. Estimated time required for a feasibility study is 24 months. The feasibility study will provide a cost estimate for the construction portion of this Project.

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## 1.0 INTRODUCTION

In July 1998, at the Secretary of the Interior's national consultation with Indian tribes on Indian water rights and uses, the Secretary directed the Assistant Secretary - Indian Affairs to assess the status of the Indian water delivery systems on the Rio Grande in New Mexico. The Assistant Secretary engaged the Commissioner of the Bureau of Reclamation (Reclamation) to assist with a technical review and needs assessment of the water systems of the Pueblos on the Rio Grande. In 2004, this report is being requested by Commissioner John Keys for review.

## 2.0 NEED

**2.1 Current Condition.** The nineteen Indian Pueblos of New Mexico have historically been farming communities, relying on irrigation waters taken from the Rio Grande and its tributaries. Today, their agricultural way of life is suffering because of disrepair of irrigation facilities on ancestral Pueblo lands. A need exists for rehabilitation of Pueblo irrigation infrastructure. This need is documented in the photos which accompany this report.

The benefits of rehabilitation include preservation of Pueblo Indian culture, increased agricultural productivity, economic benefit, increased water conservation, and safer facilities. By having the necessary irrigation infrastructure to put their farmlands into production, the Pueblos will be able to put their waters to beneficial use. This will provide the water, agricultural, and natural resources necessary for Pueblo reservations to continue as viable homelands into the future, as they have been historically. To neglect or postpone rehabilitation will result in further deterioration, increasing the cost of rehabilitation at a later date. In the meantime, the Pueblos will continue to suffer both economically and culturally.

Most structures requiring rehabilitation can be grouped into four different categories: (1) non-engineered diversion structures; (2) engineered diversion structures; (3) conveyance facilities; and (4) drainage facilities.

Non-engineered diversion structures are either rock-and-brush structures or simple berms or ditches built across a river or creek as shown in Photos 1 through 12. These structures are inefficient and unreliable. A typical structure is constructed of tree branches and 6-inch to 18-inch size rocks placed across the full width of the creek bed, usually at an angle to the flow. Sandbags, plywood boards, or plastic sheets are used to plug gaps between larger rocks. These diversions are highly unstable and easily wash out after every spring runoff or thunderstorm event. Reconstruction is necessary after each washout. Frequent minor repairs are also necessary during low flow periods. Lower flows wash out the gravel, cobbles, and tree branches. These non-engineered structures do not have gates and there is no control of flow into the ditches. High flows cause excessive diversion into ditches, which overflow and flood farm

lands. During low flows, these inefficient rock-and-brush structures often do not divert any water at all into the irrigation system.

Engineered diversion structures are typically made of concrete, gabions, sheet piles, or some combination of these materials, as shown in Photos 13 through 25. Most Pueblo engineered diversion structures show considerable deterioration and many are structurally deficient. Some no longer divert water efficiently or dependably. Several structures are maintenance intensive and are frequently plugged by debris and sediment.

Conveyance facilities consist of a canal or ditch and its related structures which deliver water from the diversion structure to the irrigated land. Structures include earthen ditches, concrete lined ditches, or pipelines. Many are severely deteriorated, as shown in Photos 26 through 47.

Most drainage facilities are open earth ditches. Without adequate drainage, farm lands suffer from high water tables, decreased crop production, and increased soil salinity. Many Pueblo earth drains need to be cleaned and deepened in order to provide farm lands with adequate drainage. Subsurface drains may be a better option in some cases.

**2.2 Scope of Work.** The scope of work envisioned would involve the rehabilitation of irrigation and drainage facilities necessary for proper and efficient agricultural practice on Pueblo lands which have historically been irrigated.

The six Middle Rio Grande Pueblos are part of the Middle Rio Grande Conservancy District (MRGCD). Roughly half the irrigation facilities of these six Pueblos are MRGCD facilities, and half are Pueblo facilities. Pueblo facilities of the six Middle Rio Grande Pueblos would be included in the scope of work. MRGCD facilities would not be included in the scope of work.

Likewise excluded from the scope of work are construction of new storage dams, reservoirs, and on-farm improvements, unless such on-farm improvements (such as land leveling and installation of water measurement devices) result in significant water conservation.

Water conservation is an important issue for all Pueblos. Every year some Pueblo lands lie fallow because farmers are reluctant to invest money and labor in planting, only to lose their crops because irrigation water runs out in the summer and fall. While some of the water shortages are attributable to natural variations in weather and runoff patterns, much of it is attributable to inefficient diversions, conveyance systems, and farms. For example, most rock-and-brush diversion structures are only capable of diverting part of the available flow. Many unlined irrigation ditches traverse highly permeable soils, resulting in serious leakage. Farm fields which are not level require excessive amounts of water for irrigation because much of the water applied runs off. Low spots are often flooded in order that high spots can receive water. For these reasons, infrastructure rehabilitation necessary for water conservation is included in the Project scope of work.

Some water shortages experienced by the Pueblos can be attributed to inefficiencies in upstream non-Indian systems. Some ditches and diversions are shared by Indians and non-Indians, especially in northern New Mexico. This happens where there are private inholdings within reservation boundaries, and where there are private lands sandwiched between two different reservations. Rehabilitating selected non-Indian facilities which are upstream of Pueblos or which are shared with Pueblos can result in more water available for Pueblo irrigators. For this reason, the Bureau of Indian Affairs (BIA) supports inclusion of limited non-Indian facilities in this Project. At a minimum, this Project will not negatively impact non-Indian facilities.

The nineteen New Mexico Pueblos would be included in the Project. This includes eighteen Pueblos in the Rio Grande watershed, all of which are in the geographical area served by the Reclamation Albuquerque Area Office: Acoma, Cochiti, Isleta, Jemez, Laguna, Nambe, Picuris, Pojoaque, San Felipe, San Ildefonso, San Juan, Sandia, Santa Ana, Santa Clara, Santo Domingo, Taos, Tesuque, and Zia. The nineteenth Pueblo, Zuni, is also seeking inclusion in this project and its inclusion is supported by the All-Indian Pueblo Council. Zuni is in the Colorado River watershed of western New Mexico and is served by the Phoenix Area Office.

One other Pueblo is in the Rio Grande watershed and in the geographical area served by the Reclamation Albuquerque Area Office: Ysleta del Sur, south of El Paso in Texas. This Pueblo's entire reservation is only 69 acres. It does not have enough farmland to be considered for inclusion into this Project.

### **3.0 RECOMMENDED SOLUTION**

The need exists for Pueblo irrigation infrastructure rehabilitation. Different ways of accomplishing this rehabilitation include: (1) through Pueblo resources; (2) through other government agencies; and (3) through the Bureau of Reclamation.

**3.1 Pueblo Resources.** The Pueblos currently expend considerable time and energy on operation and maintenance (O&M) of their irrigation facilities. A Pueblo mayordomo generally operates the diversion structures. Maintenance performed by the Pueblos includes cleaning the acequias (irrigation ditches) in late winter, often a mandatory activity for adult males. The poor condition of Pueblo irrigation facilities is not the result of lack of care or interest on the part of the users. It results from a lack of funds to purchase materials and pay for engineering design, surveying, heavy equipment rentals, qualified operators, or skilled laborers to accomplish work which is beyond the capability of Pueblo laborers with hand tools.

**3.2 Other Government Agencies.** The only government agencies outside of Reclamation which might be considered to assist with Pueblo irrigation infrastructure rehabilitation include the BIA, the National Resources Conservation Service (NRCS), and the Corps of Engineers (COE).

Until the past few years, local BIA agencies were funded for O&M activities on the Pueblo irrigation ditches. The lack of adequate funding through the BIA for irrigation O&M is expected to continue into the future.

The NRCS current focus is to offer on-farm technical assistance and training to Pueblos and their farmers rather than to undertake a large-scale rehabilitation effort of the type required. Should rehabilitation of Pueblo irrigation infrastructure through Reclamation become a reality, the NRCS could form a conservation partnership with Reclamation to provide assistance for planning, design, on-farm improvements, and training.

The COE has an Acequia Program to help with rehabilitation of New Mexico acequia systems. The project was authorized in the Water Resources Development Act of 1986 by Section 1113 subject to the requirements of Section 903(a). The New Mexico Office of the State Engineer (OSE) administers the program. Indian acequia systems were ineligible for aid under this program until 1999. Typically there is \$1.2 to \$1.6 million available annually, with the total amount available limited to \$53.3 million, including both the federal and state cost share. Grants are awarded on a competitive basis and are open to all 900+ acequia groups in the State of New Mexico, in addition to Indian groups. The large number of groups competing for limited funding means that the needs of Pueblo irrigation systems cannot be adequately addressed through the COE Acequia Program.

**3.3 Bureau of Reclamation.** Reclamation has the expertise, ability, and experience to carry out a Project. Currently, Reclamation is not authorized to perform work on Pueblo Indian irrigation facilities. Reclamation would require both authorization and appropriations from Congress for a feasibility study and construction of a Project. It is not anticipated that Reclamation would provide funding for O&M.

## **4.0 FUNDING REQUIREMENTS**

The first step in Reclamation's involvement would be for Congress to authorize and fund a feasibility study. The estimated cost for a feasibility study is \$3 million. About 24 months would be required for completion of a feasibility study. Based on the feasibility study, Congress could authorize and fund construction. The feasibility study would provide a cost estimate for the construction portion of the Project. No funding would be sought for O&M. More details on feasibility and construction phases are given below.

**4.1 Feasibility Study.** A plan to carry out a feasibility study has been developed. This plan includes four elements: (1) design data collection, (2) conceptual design and construction cost estimate, (3) reports, reviews, and coordination, and (4) a contingency for unaccounted items. The end result of the feasibility study would be a plan for rehabilitation and betterment based on detailed field investigation, including soil assessments, engineering considerations, agricultural considerations, and Pueblo cultural and economic considerations. Designs will be carried through to the level of detail necessary to develop an adequate cost estimate of the items

of work. Previous studies were used as a guide to identify the requirements for feasibility design study. The estimated cost for the feasibility study is \$3 million.

**4.2 Construction.** A detailed construction cost estimate would be prepared for two categories of work: (1) repair, rehabilitation, and necessary improvement; and (2) water conservation measures.

Deteriorated facilities which have functional or operational deficiencies would be identified for repair and rehabilitation. These facilities are mostly diversion structures and primary conveyance structures. There is a water conservation benefit in repairing these structures.

There are some items where the chief benefit would be water conservation, such as concrete lining of ditches, placing ditches in pipes, installation of water measurement structures, and land leveling. These items would be identified separately in a cost estimate.

It would be cost prohibitive to construct every water conservation feature which could be identified. Some of the water conservation measures would be more critically needed than others. Pueblo input and soil testing during the feasibility study will help determine which water conservation features are critically needed and should serve as a priority for construction.

**4.3 Preliminary Construction Estimate.** A preliminary cost estimate for construction of a Pueblo irrigation rehabilitation project would be about \$75 to \$110 million for repair, rehabilitation, necessary improvement, and the most critically needed water conservation features. Other important water conservation measures could add an additional \$50 to \$100 million to the total. A more exact and detailed cost estimate would be generated during the feasibility study.

## **5.0 LEGAL AND INSTITUTIONAL ISSUES**

Some of the legal and institutional issues associated with this Project include trust responsibility, the Leavitt Act and repayment obligations, the Middle Rio Grande Conservancy District (MRGCD), water rights, environmental compliance, and prioritization of the work.

**5.1 Trust Responsibility.** The United States government has a trust responsibility to protect and maintain Indian trust assets. These trust assets include Pueblo irrigation and drainage facilities, agricultural lands, and ability to use the waters belonging to the Indian pueblos. A Project would enhance and protect Indian trust assets, allowing for their continued use and benefits to the Pueblos.

As increased population and Endangered Species Act requirements put more pressure on a limited water supply, the challenge of adequately carrying out the United States' trust responsibility with regards to Pueblo irrigation will become greater. Measures which increase

the efficiency of Pueblo irrigation will allow the Pueblos to continue their agricultural way of life while still allowing the United States to meet other obligations for water.

**5.2 The Leavitt Act and Repayment Obligations.** In general, Reclamation project beneficiaries are required to repay capital costs of a Reclamation project. No distinction is made between Indian and non-Indian beneficiaries, unless such distinctions are made part of the authorizing legislation.

A repayment study of the Project would show that the Pueblos and individual farmers are unable to repay capital costs. This would be based on the agricultural revenues generated by the Project.

In order for a Project to move forward, a provision will probably be required in the authorizing legislation for repayment of capital costs to be deferred or forgiven. This provision would take one of two forms: extending the Leavitt Act (Act of July 1, 1932, ch. 369, 47 Stat. 564) to such a Project, or declaring the Project to be non-reimbursable. With either provision, the Pueblos would still be responsible for operation and maintenance of the newly rehabilitated facilities.

**5.3 The Middle Rio Grande Conservancy District (MRGCD).** Roughly half of the irrigation facilities in the six Middle Rio Grande Pueblos of Cochiti, Santo Domingo, San Felipe, Santa Ana, Sandia, and Isleta are part of the MRGCD distribution and drainage infrastructure and half are Pueblo irrigation facilities. Pueblo irrigation facilities of the six Middle Rio Grande Pueblos would be eligible for inclusion in this Project, but MRGCD facilities would not be.

Reclamation took over ownership of MRGCD facilities as part of Reclamation's Middle Rio Grande Project in the 1950's. Reclamation rehabilitated these facilities and returned operation and maintenance duties back to MRGCD in 1975. A contract requiring MRGCD to reimburse Reclamation for rehabilitation costs was entered into at that time, with repayment of capital costs being deferred through Pueblo lands. The ownership of MRGCD is currently the subject of a lawsuit, with Reclamation and MRGCD both claiming title.

The facilities of MRGCD are not included in the Project scope of work, regardless of whether they are on Indian or non-Indian lands. However, MRGCD's repayment contract with Reclamation has been paid off. As a result of repayment, the six Middle Rio Grande Pueblos are investigating whether they must continue their present relationship with MRGCD. Any legal questions over the effect of repayment on this Project could be examined as part of a Project feasibility study.

Other plans and federal funding sources are currently being considered to improve MRGCD facilities and make the MRGCD system more water efficient. The need for better efficiency and water management is being driven by the potential for Endangered Species requirements in the Rio Grande adversely affecting the amount of water which MRGCD will receive in the future. The Department of the Interior should be aware of the need for inclusion of MRGCD facilities through Indian lands as part of any MRGCD-wide improvement plan.

**5.4 Water Rights.** As the Project is envisioned, it would not affect ongoing water rights litigation or negotiations in which some of the Pueblos are involved. The scope of work for this Project would not include increasing historically irrigated acreage or increasing diversions.

The Solicitor's Office in Albuquerque favors incorporation of language in any authorizing legislation which would affirm that a Project would not be intended to quantify unquantified Indian water rights.

**5.5 Environmental Compliance.** To carry out work on Pueblo irrigation facilities, environmental considerations would be addressed and incorporated into project planning. Compliance would be completed according to various laws and their implementing regulations such as the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Clean Water Act (CWA), and the National Historic Preservation Act (NHPA). Environmental compliance would include consideration of the array of biological resources (including endangered species), cultural resources (including traditional cultural properties and sacred sites), water quality issues, social and economic impacts, Indian trust assets, and environmental justice.

Complying with the various environmental laws would not prevent repair or rehabilitation of proposed irrigation facilities. Producing an Environmental Impact Statement for the Project would likely be less than 3% of the total Project cost. This does not include costs for mitigation or design features incorporated into the rehabilitated facilities to minimize impacts on the natural ecosystem and cultural resources. Increased costs for mitigation or design features would be estimated during a feasibility study.

**5.6 Prioritization of the Work.** If a Project is authorized and funded, it is anticipated that it could be done over a five to ten year period. Since not all of the work would be done at once, a method for prioritizing work would need to be devised. The role of the Pueblos, Reclamation, and BIA in the prioritization process, together with the federal agencies' trust responsibility, would be addressed. Consultation with the Pueblos would begin as early as possible on this and other issues.

**5.7 Indian Self-Determination and Education Assistance Act (P.L. 93-638 As Amended).** Under P.L. 93-638, both the feasibility study and construction portion of a Project are eligible for contracting under Title I (Indian Self-Determination), often referred to as "638 contracting," or compacting under Title IV (Self-Governance Act of 1944) with Indian tribes because it would be for the benefit of Indians because of their unique status as Indians.

## **6.0 CONCLUSION**

The repair and rehabilitation of Pueblo Indian irrigation and drainage facilities is needed. A Reclamation project would require Congress to authorize and fund a feasibility study estimated at \$3 million. The cost of construction would be estimated as part of the feasibility study.