

## **Navajo-Gallup Water Supply Project**

### **3.0 PROJECT HISTORY**

Regional water plans over the past 40 years have repeatedly identified the need for additional rural, municipal, and industrial water supplies for the eastern portion of the Navajo Nation and the City of Gallup. The history of the Project is presented in the following sections.

#### **1958 - Congressional hearings on the Navajo Indian Irrigation Project**

In 1958 the New Mexico State Engineer testified during Congressional hearings for the proposed Navajo Indian Irrigation Project that NIIP would be part of the regional water infrastructure intended to provide water from Navajo Reservoir to Navajo communities in northwest New Mexico and to the City of Gallup (Hearings before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, S.3648, July 9 and 10, 1958). This position was reaffirmed in House Report #685, July 10, 1961 which stated that NIIP is adapted to serve municipal and industrial water users as well as its primary purpose of irrigation.

#### **1960 - Preliminary Report on the Domestic Water Supplies for the Navajo Tribe**

In 1960 Banner and Associates prepared a report entitled *Preliminary Report n Domestic Water Supplies for the Navajo Tribe, Newcomb-Window Rock Area, Supplement to Proposed Water Supply to the Town of Gallup, New Mexico*. Banner and Associates proposed a 20-inch diameter pipeline to deliver five million gallons a day to the City of Gallup, and 1.5 million gallons a day to the BIA schools along the pipeline route and the Navajo population in the Window Rock area. The proposed configuration would convey water from the NIIP canals, to an 8,800 acre-foot storage reservoir located in Newcomb, and then follow Highway 666 to the City of Gallup with a spur to the Window Rock area.

#### **1962 - Authorization of the Navajo Indian Irrigation Project**

The Navajo Indian Irrigation Project was authorized by Public Law 87-483 (June 13, 1962), amended by Public Law 91-416 (September 23, 1970). These laws authorized the Secretary of the Interior to construct, operate, and maintain NIIP for the principal purpose of furnishing irrigation water to approximately 110,630 acres of land. In developing NIIP, the Secretary of the Interior is authorized to “provide capacity for municipal and industrial supplies or miscellaneous purposes over and above the diversion requirements for irrigation.” Public Law 87-483 also authorized the construction of the San Juan-Chama Diversion Project. The San Juan-Chama Project was completed during the 1960's and it is supplying water for municipal, recreation and irrigation uses for a population of 500,000 in the Rio Grande Corridor. Public Law 87-483 also stipulated that no long-term contracts for San Juan River water, other than the Navajo Indian Irrigation Project and the San Juan-Chama

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Project, will be granted until a Hydrologic Determination by the Secretary of the Interior shows that there is sufficient water to fulfill the contract.

### **1967 - Temporary water allocation from Navajo Reservoir**

In June 1967, the City of Gallup through Resolution 24-51 formally requested that the New Mexico Interstate Stream Commission (ISC) support the 15,000 acre-feet per year allocation of Upper Colorado River water for Gallup. Upon review, the ISC recommended temporarily reserving 7,500 acre-feet of water from Navajo Reservoir for the City of Gallup. Based on the 1967 Hydrologic Determination, the Secretary of the Interior approved a temporary allocation for the State of New Mexico for 100,000 acre-feet from Navajo Reservoir through the year 2005 (Assistant Secretary of the Interior, Report No. 1106, 90<sup>th</sup> Congress, 2d Session, February 27, 1968 - S.J. Res. 123). This reservation was made for planning purposes and was not a Secretarial contract for water delivery.

Because the 7,500 acre-feet temporary reservation for the City of Gallup is part of the 100,000 acre-foot allocation for New Mexico, any water use contract beyond the year 2005 must be supported by a hydrologic determination by the Secretary of the Interior and approved by Congress. However, in a letter dated December 13, 1973 from the State Engineer of New Mexico to Reclamation's Regional Director of the Southwest Region, he states that "It is New Mexico's position that under the correct interpretation of the compact's provisions, the full 100,000 acre-feet of consumptive use from Navajo Reservoir contracts would be available in perpetuity."

### **1971 - Congressional authorization for feasibility studies**

Congress specifically authorized Reclamation to complete feasibility studies for the "Gallup Project" (now called the Navajo-Gallup Water Supply Project) to transport San Juan River water to the City of Gallup (PL. 92-199, December 15, 1971). In 1972 the reconnaissance report concluded that: (1) water to meet the City's needs was available from Navajo Reservoir, (2) there was a potential to develop groundwater supplies within import distance of Gallup, and (3) feasibility investigations should be undertaken to develop plans for providing water to the City of Gallup and that those studies should consider providing water to Navajo communities along the supply routes.

### **1976 - The Turney Report assessing the Navajo Nation's water needs**

In 1975 the Navajo Tribal Utility Authority (NTUA) requested that the investigation be expanded to include municipal/domestic water supplies for various Navajo communities in the eastern part of the Navajo Reservation. A memorandum of understanding between the Bureau of Reclamation and NTUA to include Navajo Nation communities was executed August 12, 1975. As part of the agreement, NTUA retained the engineering firm of William F. Turney & Associates to prepare the report *U.S. Bureau of Reclamation - Navajo Tribal Utility Authority Water Study P.L. 92-1999*

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(Turney,1976). Turney and Associates assessed the Navajo Nation water needs that could be addressed by the Project. Turney and Associates projected the population and water demand through the year 2025 and evaluated 25 community water systems. Many of those systems had water quality and water supply problems. Turney and Associates identified the Dakota-Morrison-Cow Springs aquifer as having the best potential in the southwest portion of the study area. These formations, however would only be able to supply one third to one half of the water demand in the Tohatchi-Gallup Area by the year 2025. The Navajo Nation fully supported the findings of Turney's report and Reclamation adopted the findings as a basis for the 1984 project plan formulation.

### 1984 - Compliance with the National Environmental Protection Act

During the late 1970's and early 1980's investigations were conducted to develop and evaluate alternatives to meet the Project's purposes. To comply with the National Environmental Protection Act (NEPA) the fish, wildlife, and habitat resources of the Project area were assessed and the impacts of the alternatives were analyzed. Alternatives were evaluated which would divert 25,800 to 48,500 acre-feet of water per year. Meeting the Project's purposes through increased groundwater withdrawals, surface water from the Chaco Wash and the Rio Puerco, and weather modification were determined to be infeasible. These investigations culminated with the *Gallup-Navajo Indian Water Supply Project, New Mexico-Arizona-Utah, Part I, Planning Report, Part II, Draft Environmental Statement* (Reclamation, 1984). This report confirmed the City of Gallup and the Navajo Nation's need for a water supply, and it determined that the San Juan River was the only source of water capable of meeting the Project demand. The following alternatives were evaluated in that report:

- No-Action Plan - This plan was based on the premise that there would be no federal action taken to meet current and future water needs of the Project area. This plan did not satisfy the purpose and need of the Project.
- Non-structural Plan (Water Conservation) - It was determined that water conservation could not meet the needs of the Navajo communities. While conservation measures may help the City of Gallup meet short term needs, it was not a viable solution to meet long-term needs and did not address deteriorating water quality.
- Shiprock Diversion Plan - The features of this plan included a diversion structure on the San Juan River near Shiprock, pipelines, pumping plants, and related facilities necessary for water delivery, and specific environmental features pertinent to reaches of the river influenced by the plan. This plan was not viable due to the poorer quality of the San Juan River at this diversion point and the additional 350-foot lift. No cost estimates were prepared for this alternative.
- San Juan Alignment Plan - The features of this plan included a diversion structure on the San Juan River upstream from the Animas River in Farmington, 180.5 miles of pipeline, 14 pumping plants and related facilities. A treatment plant near the diversion would be

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constructed separately. The route of the pipeline was along Highway 666 from Shiprock to Gallup and to Window Rock. This configuration would serve Burnham, Coyote Canyon, Standing Rock, Crownpoint, St. Michaels, Fort Defiance, Sanostee, Two Grey Hills, Toadlena, Mexican Springs, and 23 other Navajo communities.

This plan was evaluated for demands from 25,200 to 45,600 acre-feet per year. The estimated capital cost, excluding water treatment, was between \$199 and \$263 million in 1980 dollars. Using Reclamation's steel price index, the cost in 2000 dollars would be between \$330 and \$437 million. The estimated annual operation and maintenance was between \$2.6 and \$3.7 million in 1980 dollars. Using Reclamation's composite index, the cost in 2000 dollars would be between \$4.1 and \$5.8 million. The unit cost of the water including repayment of the capital, and operation and maintenance cost was between \$1.87 and \$2.59 per thousand gallons in 1980 dollars. Using Reclamation's steel price index, the unit cost in 2000 dollars would be between \$3.06 and \$4.28 per thousand gallons.

- Cottonwood Alignment Plan - This plan proposed to use the existing NIIP facilities to divert water from Navajo Reservoir and deliver it to a reservoir constructed in Cottonwood Canyon. Other features included a treatment plant (constructed by others) located near the dam, 180.6 miles of pipeline, 13 pumping plants and related facilities. The route of the pipeline went through Burnham along Highway 5 and then south along Highway 666 to Gallup.

The plan was evaluated for demands from 25,200 to 45,600 acre-feet per year to serve 23 Navajo communities. The estimated capital cost, excluding water treatment, was between \$210 and \$266 million in 1980 dollars (or between \$348 and \$442 million in 2000 dollars). The estimated annual operation and maintenance cost was between \$2.2 and \$3.1 million in 1980 dollars (or between \$3.5 and \$4.9 million in 2000 dollars). The unit cost of the water including repayment of the capital, and operation and maintenance was between \$1.83 and \$2.68 per thousand gallons in 1980 dollars (or between \$3.06 and \$4.49 per thousand gallons in 2000 dollars).

- Four Corners Plan - This plan was considered the preferred alternative. It was essentially the same as the 1984 San Juan Alignment Plan except that it included construction of a water treatment plant for \$23 million (or \$37 million in 2000 dollars) and provided service to nine additional Navajo communities in Arizona and Utah. Features included 254.7 miles of pipeline and nine pumping plants.

The plan provided a total water supply of 42,270 acre-feet per year with 29,300 acre-feet of delivery in New Mexico, 6,990 acre-feet in Arizona and 1,180 acre-feet in Utah. The proposed configuration would serve Upper Fruitland, Nenahnezad, Shiprock, Sanostee, Tocito, Burnham, Newcomb, Two Grey Hills, Toadlena, Sheep Springs, Naschitte, Tohatchi, Mexican springs, Twin Lakes, Yah-ta-hey, Gamarco, Gallup, Rattlesnake, Beclabito, Teec Nos Pos, White Mesa, Navajo, St. Michaels, Fort Defiance, Sawmill, Crystal, Coyote Canyon, Standing Rock and Crownpoint.

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The estimated cost in 1981 was \$303 million (or \$605 in 2000 dollars). The estimated annual operation and maintenance cost was \$5.7 million in 1980 dollars (or \$8.9 million in 2000 dollars). The unit cost of the water including repayment of the capital, and operation and maintenance was \$3.24 per thousand gallons in 1980 dollars (or \$5.41 per thousand gallons in 2000 dollars).

This 1984 planning report recommended the Four Corners Plan as the best alternative to meet the area's needs. It was noted that some of the proposed service area overlapped with that of the Animas-La Plata Project. And, if the Animas-La Plata Project was funded for construction, those communities could be dropped from the Navajo-Gallup Project. The report concluded that the Secretary of the Interior should seek congressional authorization to construct, operate, and maintain the Four Corners Plan.

During April of 1984, public meetings on the draft environmental statement were held in Gallup, Crownpoint, Shiprock, Farmington, and Window Rock. The City of Gallup indicated continued support for the recommended plan. However, the Navajo Nation, under new administration, indicated that prior to any further commitment to the Four Corners Plan, other alternatives serving water short communities along New Mexico Highway 371 needed to be evaluated. Reclamation discontinued work on the Planning Report and Draft Environmental Statement and published a notice of withdrawal of the Draft Environmental Statement in the Federal Register.

### **1986 - Reclamation's Gallup-Navajo Technical Report**

Funding was written into the Energy and Water Development Appropriations Act for Fiscal Year 1986 to evaluate additional alternatives. Reclamation coordinated the definition of the Project's purpose with the Navajo Nation and the City of Gallup. The proposed concept would provide 7,500 acre-feet to the City of Gallup, 12,245 acre-feet to the Navajo Communities and 37,000 acre-feet for a proposed generating plant near Burnham, New Mexico. These alternatives were described by Reclamation in the *Gallup-Navajo Indian Water Supply Project, New Mexico-Arizona, Technical Report* (Reclamation, 1986). The following alternatives were evaluated in that report:

- Direct San Juan River Pipeline - Two plans were evaluated (Alternatives A and C) which would divert water directly from the San Juan River. These plans were essentially the same as the San Juan Alignment Plan proposed in the 1984 Draft Environmental Statement. The nominal capacity of the pipeline would have been 7,500 acre-feet for the City of Gallup and 5,280 acre-feet for Window Rock, Fort Defiance and St. Michaels. Alternative A would divert water from the Fruitland Canal. Alternative C would require a new diversion dam on the San Juan River upstream of the Animas River confluence. Using an 8-year construction period and a 50-year repayment obligation at 8.5 percent, the total 1986 estimated costs, including indirect costs, was approximately \$364 million for Alternative A and \$363 million for Alternative C. These costs would be \$512 and \$511 million in 2000 dollars.

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- A pipeline from the Navajo Indian Irrigation Project - Three alternatives were put forth in the 1986 document which include a feeder canal to divert water from the NIIP main canal to the proposed Gallegos Reservoir. Alternatives B and E would convey water from Gallegos Reservoir water through the Burnham Lateral and then south along Highway 371 to Thoreau and along Interstate 40 to Gallup. Alternative D was similar to Alternative B, but would not require the use of the Burnham Lateral canal. Alternative E included the staged development of the pumping plants required for irrigation. The nominal capacity for all three alternatives would have been 7,500 acre-feet for the City of Gallup and 5,280 acre-feet for the Navajo communities from White Horse to Crownpoint to Church Rock. Based on an 8-year construction period and a 50-year repayment obligation at 8.5 percent, the 1986 estimated costs, including indirect costs, of Alternatives B, D, and E were \$456 million, \$381 million, and \$369 million respectively. These costs would be \$642, \$537 and \$519 million in 2000 dollars.

In the late 1980's the Project stalled in part due to the Navajo Nation's concerns over the failure to complete the Navajo Indian Irrigation Project, and the inadequacy of the Project's proposed service area. It also stalled due in part to Reclamation's concern over the long-term availability of water, lack of quantified water rights for the Project, difficulty in complying with the Endangered Species Act, and difficulty in financing the Project. Reclamation funding was suspended at that time.

## **1991 - The City of Gallup's Forty Year Water Supply Master Plan**

In January of 1991 the City of Gallup prepared a forty-year water supply master plan (Shomaker 1991). The master plan projected that by the year 2030 the annual water demand in the Gallup area will be 7,632 acre-feet and that by the year 2010 the City will face peak water shortages of one million gallons per day. The City has already implemented periodic water rationing. As part of the master plan, the City evaluated additional water sources including "Alternative E" which is the alignment from NIIP to the City proposed in the 1986 Technical Report (Reclamation, 1986). The City also evaluated groundwater in the Bluewater area, the Ciniza Well Field, the Church Rock Mine area, the Yah-ta-hey Well Field, the Ramah Area Well Field, and the Danoff Well Field. The City also evaluated tertiary treatment and wastewater reuse, providing additional City storage and developing the surface water from the South Fork of the Rio Puerco. The City concluded that the Gallup-Navajo Project was the only project that offers a permanent supply and it should be pursued. This conclusion is supported by subsequent regional water plans prepared for the New Mexico Interstate Stream Commission. The short term alternatives identified by the Master Plan were to expand the Yah-ta-hey well field and to investigate groundwater in the Ciniza and Church Rock areas.

In December of 1991 the City investigated a stand alone water transmission line from NAPI to the City. The proposed project would convey 7,500 acre-feet of water. The proposed pipeline began at the southwest corner of NAPI, followed BIA Route 5 through Burnham, and south along Highway

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666. The estimated cost in 1991 for the stand-alone pipeline was \$61 million (or \$74 million in 2000 dollars). This cost estimate did not include many of the indirect costs that would be incurred.

### 1993 - Reclamation appraisal level evaluation and cost estimate

Funding was written into the Energy and Water Development Appropriations Act for Fiscal Year 1993 for the Reclamation to evaluate the Project and provide cost estimates. The study culminated in the *San Juan River Gallup/Navajo Water Supply Project Engineering and Cost Estimates Technical Appraisal Report*, (Reclamation, 1993), which evaluated the following three alternatives:

- Alternative “A” - This plan was for a pipeline capable of conveying 10,860 acre-feet per year. The pipeline alignment would begin at the proposed Gallegos Reservoir, proceed south along Highway 371, west along Navajo Route 9 and South to Yah-ta-hey along Highway 666. This pipeline would deliver water to the City of Gallup at Yah-ta-hey and to unidentified Navajo communities along the route. The estimated 1993 construction cost was \$67 million, the indirect cost was \$20 million, and the operation and maintenance cost was \$2.7 million (or \$84 million, \$24 million, and \$3.3 million in 2000 dollars, respectively).
- Alternative “B” - This plan utilized the same pipeline route as Alternative A. This plan included 1,085 acre-feet for NAPI, 7,960 acre-feet for the City of Gallup, 9,412 acre-feet for Window Rock and 7,783 acre-feet for thirteen Navajo chapters. The estimated 1993 construction cost was \$140 million, the indirect cost was \$40 million, and the operation and maintenance cost (excluding the laterals) was \$5.2 million (or \$175 million, \$50 million, and \$6.3 million in 2000 dollars, respectively).
- Alternative “C” - This plan was developed in an effort to find a more cost effective alternative. The pipeline alignment would begin at the proposed Gallegos Reservoir and convey water to a point near Twin Lakes, and south along Highway 666 to Yah-ta-hey. This plan included 7,820 acre-feet for NAPI, 5,940 acre-feet for the City of Gallup, 8,600 acre-feet for Window Rock and 8,655 acre-feet for thirteen Navajo chapters. With this plan the main line is shorter than the other two alternatives. It requires fewer pumping stations and it eliminates the need to lift the large quantities of water needed to serve Window Rock and Gallup up to the Crownpoint elevation via the Highway 371 alignment. The estimated 1993 construction cost was \$115 million, the indirect cost was \$34 million and the operation and maintenance cost (including the laterals) was \$4.7 million (or \$143 million, \$42 million, and \$5.7 million in 2000 dollars, respectively). This alternative serves the same water-short communities that were to have been served by Alternative E described in the 1986 report. This analysis did not include the full costs of the proposed Gallegos Reservoir, water treatment, an adequate peaking capacity, or pipe installation.

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### 1996 - Reclamation evaluates the water supply and storage options

In the 1996 report *Water Supply and Storage Options Gallup Navajo Pipeline Project*, the Reclamation's Farmington Construction Office reviewed three water supply and storage options. This Reclamation investigation did not evaluate the conveyance system that would bring the water south to the Navajo Nation communities and the City of Gallup. This investigation included:

- Direct diversions from Navajo Reservoir - This option would deliver water from Navajo Reservoir through a pipeline to the proposed Gallegos Reservoir at NIIP. The total estimated cost of the pipeline, pumping plants, Gallegos Dam, power lines, utilities and mitigation was \$107 million (or \$118 million in 2000 dollars). This option minimizes the use of NIIP facilities.
- Direct diversions from the San Juan River - This option would divert 42 cubic feet per second (approximately 30,400 acre-feet per year) from the San Juan River near Farmington to the proposed Gallegos Reservoir. This option would require the construction of a diversion structure within the designated critical habitat of endangered fish species. The estimated cost of the pipeline and pumping plant was \$34 million. The estimated cost of Gallegos Dam with 1,800 acre-feet of storage was \$18 million. The total estimated cost including power lines, utilities and mitigation was \$58 million (or \$64 million in 2000 dollars). Energy for pumping water from the San Juan River to Gallegos Reservoir would cost \$414,000 (or \$459,000 in 2000 dollars) per year. This option also minimizes the use of NIIP facilities.
- Diversions from the NIIP Canal System - This option included several scenarios for conveying water through the NIIP canals. Reclamation investigated three sites for a proposed water storage reservoir: (1) Lower Cottonwood, (2) Upper Cottonwood, and (3) Moncisco Wash. Reclamation assessed three reservoir capacities (1,850, 8,800, and 11,000 acre-feet) at each site. Based on this analysis, the Moncisco site became the preferred alternative for the dam. Moncisco Reservoir is a modification of the previously proposed Gallegos Reservoir. With 8,800 acre-feet of storage, stabilized channels, utilities and mitigation, the field cost was \$32.5 million (or \$36.1 in 2000 dollars). Energy for pumping water from the NIIP canal to the reservoir would cost \$160,000 (or \$176,000 in 2000 dollars) per year.

Although the Reclamation analysis did not explicitly include the full cost of using the NIIP facilities, Reclamation concluded that conveying water through the NIIP facilities was slightly more economical than the San Juan Diversion option and far more economical than the Navajo Reservoir Diversion option. Furthermore, the collaboration between NIIP and the Project may increase the overall benefits of the already constructed NIIP facilities.

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### **1998 - The Memorandum of Understanding between the City and the Navajo Nation**

In April 1998 George Galanis, the Mayor of the City of Gallup and Thomas Atcitty, President of the Navajo Nation signed an agreement to cooperate on the planning for the Navajo-Gallup Water Supply Project. That document commits the City and the Navajo Nation to:

- A cooperative effort to proceed with planning and development;
- A project that works conjunctively with the Navajo Indian Irrigation Project;
- A project that will result in a fair and equitable distribution of project water between the City of Gallup and the Navajo communities;
- Cooperatively investigate all viable alternative project configurations;
- Support the commitment of the Bureau of Indian Affairs to engage in consultation with the USFWS as quickly as possible; and
- Work together to resolve issues affecting the implementation of the Project.

The Memorandum of Understanding continues to serve as the basis for the collaborative efforts of the Navajo Nation and the City of Gallup to develop the Project (See Appendix B).

### **1999 - Resolutions of the Upper Colorado River Commission**

Recognizing the need to develop depletion schedules for long-range planing, the Upper Colorado River Commission periodically assesses the depletion projections for the Upper Colorado Basin states. Projections made in July 1994 had shown that New Mexico would exceed 669,000 acre-feet as soon as the year 2020. In December of 1999 the Upper Colorado River Commission passed a resolution not objecting to the use of the State's updated depletion schedules. According to the updated January 2000 depletion schedules, the State of New Mexico will not exceed 669,000 acre-feet of Upper Basin depletion until sometime between the years 2030 and 2040. Based on the January 2000 schedule, even though water allocated under the Upper Basin Compact to the State of New Mexico may not be available after the year 2040, it would be possible for the Project to develop a new water contract based on unused Upper Basin allocations at least through the year 2060.

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### 1990 to 1999 - Interdisciplinary technical reports

In a letter dated March 5, 1992 from Marshal Plummer, Vice President of the Navajo Nation to George Galanis, Mayor of the City of Gallup, Mr. Plummer indicated the Navajo Nation's support for a cooperative effort on this Project. As a result, a steering committee was created in June 1992 to oversee Project activities funded through annual congressional write-in funding and matching funds from the Project sponsors. The steering committee includes representatives from IHS, BIA, Reclamation, the City of Gallup, and the Navajo Nation. Additional technical investigations produced the following findings:

- Engineering - Reclamation provided additional review and constructability surveys of the Project's regulating storage facilities. Technical analysis also refined estimates of Project demands, diversions and depletions. Based on this information, in 1998 a draft Project description was developed with adequate detail for engaging the USFWS in consultation pursuant to Section 7 of the Endangered Species Act.
- Cultural Resources - Extensive cultural resource studies were conducted for the El Paso Natural Gas and Transwestern Pipeline corridors which overlap some of the proposed Navajo-Gallup alignments. These reports include Winter (1991a), Winter (1991b), Kearns (1990), ENSR 1990, and FERC (1991). In 1993 staff from Reclamation, the Navajo Nation Archaeology Department and the Navajo Nation Historic Preservation Department provided information on cultural resources within the potential impact area. Based on these studies sites that are potentially within the area of direct impact of the Navajo-Gallup Project were identified. The scope of work and budget for a Phase II cultural resource survey was prepared.
- Biological Resources - Extensive biological resource studies were conducted for the El Paso Natural Gas and Transwestern Pipeline corridors which overlap some of the proposed Navajo-Gallup alignments. These reports include Cedar (1990), Mariah (1991), Ecosphere (1990), and ENSR (1990), and FERC (1991). In 1993 Reclamation and the Navajo Department of Fish and Wildlife identified the terrestrial biological issues and concerns associated with construction of the Navajo-Gallup Project. A comprehensive bibliography of biological resource information for the Project area was completed, and the scope of work for further investigations was prepared. In 1998 a field trip was made to the proposed reservoir sites to assess the presence of Willow Flycatcher habitats. A biological assessment for the threatened and endangered aquatic species in the San Juan River is underway.
- Ability to Pay - In 1993 Reclamation estimated the annualized construction costs over a forty-year life cycle for Alternative C as described in the 1993 *San Juan River Gallup/Navajo Water Supply Project Engineering and Cost Estimates Technical Appraisal Report*. These costs were calculated for a range of interest rates from 3 to 9.5 percent and a range of an outside subsidy from 10 to 75 percent. Based on that analysis, the annualized construction

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cost ranged from \$1.6 million to \$15.8 million. For an interest rate of 6.5 percent and a 10 percent subsidy the annualized construction cost was \$10.1 million per year. The Reclamation analysis did not discount the interest rate due to inflation.

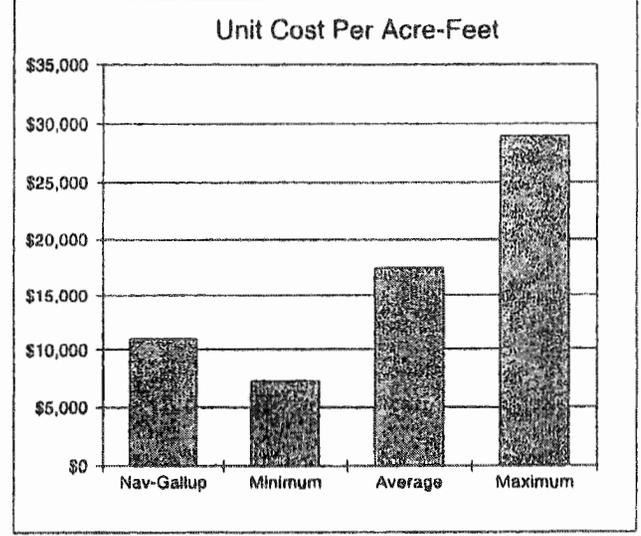
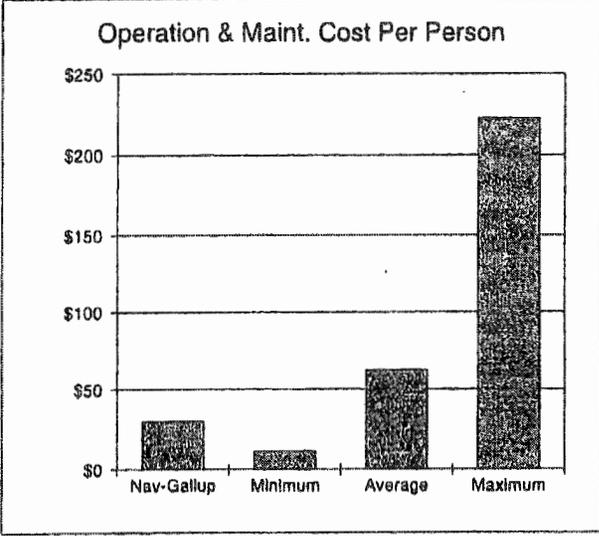
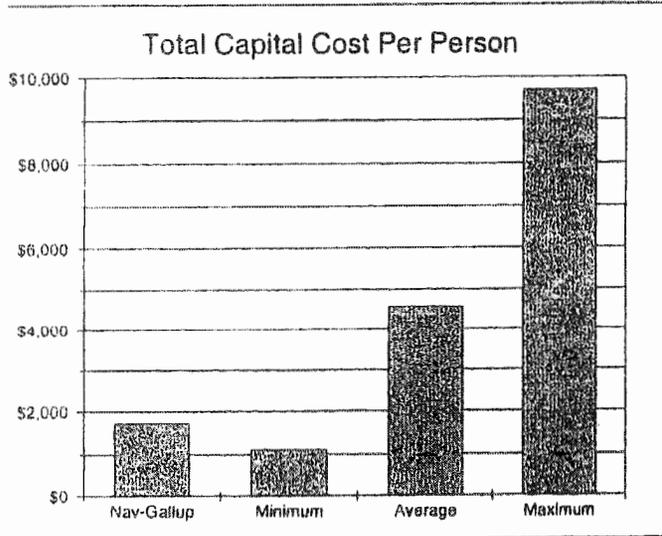
Based on average and maximum water bills, household incomes and tax burdens of 110 communities in New Mexico, Reclamation estimated the ability to pay for Gallup and the Reservation communities. The total annual ability to pay was estimated to be a little less than \$2.2 million for the City of Gallup and approximately \$1.0 million for the Reservation communities. This total amount was about one third of Reclamation's midrange estimate of the annualized construction cost. However, the Reclamation analysis did not fully take into account future population growth nor inflation.

To determine if the communities had the willingness to pay for the construction and operation of the proposed facilities, in 1995 willingness to pay surveys were conducted for the Navajo communities and the City of Gallup. The communities in the service area share a widespread appreciation of the value and scarcity of water in the region. The surveys indicated that the water users were willing and able to pay a portion of the operating cost for the Project. According to the survey, in 1994 approximately 44 percent of the Navajo homes in the service area were without direct access to a public water supply system.

- Comparative Analysis - In 1999 the NDWR compared the Navajo-Gallup Water Supply Project with comparable municipal pipeline projects in the Western United States. This selection was originally compiled by MSE-HKM & Associates. The results of this comparison are shown in Figure 3.1. This list includes projects funded by the Garrison Reformulation Act including projects at Fort Berthold, Standing Rock and Fort Toltten, and the Southwestern Pipeline. It also includes the WEB Rural Water Development Project, the Lewis and Clark Rural Water System, the Mid-Dakota Rural Water System, the Mni Wiconi Project and the north-central Montana Project. The unit cost of the Navajo-Gallup Water Supply Project is approximately \$11,000 per acre-foot of water (based on a Project cost of \$350 million). This unit cost is less than 65 percent of the overall average unit cost of all of the projects evaluated. The unit cost of the Navajo-Gallup Water Supply Project is only \$3,700 greater than the least expensive unit cost of the other nine projects reviewed. Additionally, the estimated operation and maintenance cost per acre-foot for the Navajo-Gallup Water Supply Project is only 78 percent of the overall average. These figures demonstrate that this Project compares very favorably with the other similar water supply projects.

Figure 3.1 : Comparisons of Municipal Water Projects

Projects	Total Capital Cost	Annual O&M	Annual Pumping Cost	G.P.D.	TOC/Person	O&M/Person	O&M/1000 Gal.	Pumping/1000 GAL	TOC/G.P.D.	Unit Cost/Acre-Foot
Port Berthold	\$95,746,810	\$2,197,296	\$409,965	299	\$9,705	\$223	\$2.04	\$0.38	\$789	\$28,970
Standing Rock-Phase I	\$11,069,217			391	\$4,290					\$8,386
Port Tolten-Phase I	\$6,226,625			141	\$1,159					\$7,334
Southwest Pipeline	\$200,220,240	\$1,752,700	\$1,489,300	302	\$3,626	\$32	\$0.29	\$0.24	\$173	\$10,712
VEB Rural Pipeline	\$176,416,000	\$938,000	\$227,000	309	\$7,787	\$41	\$0.37	\$0.09	\$149	\$22,499
Lewis & Clark	\$330,993,000	\$3,451,623	\$1,816,409	56	\$1,114	\$12	\$0.57	\$0.30	\$285	\$17,897
Mid-Dakota	\$157,787,010	\$1,803,176	\$359,781	84	\$3,094	\$35	\$0.55	\$0.11	\$215	\$15,652
Tri Wiconi	\$318,521,610	\$4,018,000	\$1,707,000	215	\$6,169	\$78	\$0.99	\$0.42	\$459	\$25,535
North Central Montana	\$207,883,520	\$1,428,565	\$349,047	230	\$6,944	\$48	\$0.57	\$0.14	\$230	\$26,945
Nav-Gallup	\$350,372,000	\$5,038,489	\$3,568,969	160	\$1,735	\$30	\$0.59	\$0.50	\$356	\$11,061
Minimum	\$6,226,625	\$938,000	\$227,000	56	\$1,114	\$12	\$0.29	\$0.09	\$149	\$7,334
Average	\$185,523,603	\$2,578,457	\$1,240,000	219	\$4,562	\$62	\$0.75	\$0.27	\$332	\$17,499
Maximum	\$350,372,000	\$5,038,489	\$3,568,969	391	\$9,705	\$223	\$2.04	\$0.50	\$789	\$28,970



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- Collection of NIIP Return Flows - An alternative water supply is to collect subsurface drainage water from NIIP irrigated lands. The potential advantage of sub-surface return flow is that it would be available all year reducing the need for Project storage at NIIP. Relief and interceptor drains would intercept groundwater helping to maintain the agricultural productivity at NIIP. Collector drains would collect the water from the relief and interceptor drains. Outlet drains would carry the collector drain water to a central location(s) for pumping into a forebay reservoir. A portion of the cost of the proposed collection systems may be incurred by NIIP to maintain commercial farming.

A study is being conducted on NIIP to predict the groundwater buildup under current and future irrigation practices. The groundwater model is being updated as additional input data is available and as assumptions are refined. Using return flows would not reduce the overall combined depletions associated with NIIP and the Project. However, it could reduce NIIP discharges into the San Juan River that may affect native species.

Recent studies of selenium levels in the San Juan River demonstrated that the environmental benefits of preventing these return flows from entering the San Juan River may be minimal. The relatively small volume of return flows, the high cost of the collection system, concerns regarding the expense of water treatment and the minimal environmental benefit have eliminated this option from further consideration as a water supply alternative.

- Groundwater Alternatives - In 1998 the NDWR prepared a summary of the current groundwater production for public water systems within the Navajo-Gallup Water Supply Project area. In some respects this report updates the 1976 report prepared by Turney & Associates. The NDWR identified and evaluated potential groundwater supply alternatives for each community within the Project area. The level of analysis is appropriate for planning purposes of the Navajo Chapters in the Project service area. For most of the communities evaluated, additional groundwater development is hindered by low yields, poor water quality, large depths to water and very low recharge rates. These conditions make the cost of drilling and pumping prohibitively expensive. Limited supplemental groundwater supplies were considered for several of the communities in the service area and they are included in the Project for development.

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### **1999 - San Juan River Recovery Implementation Program Flow Recommendations**

In 1991 the USFWS designated much of the San Juan River as critical habitat for the Colorado pikeminnow (formerly known as the Colorado squawfish) and razorback sucker. This designation dramatically impacted the ability of water users to deplete additional water from the San Juan River.

In the early 1990's the USFWS issued a biological opinion that concluded that an additional depletion of 57,100 acre-feet of water out of the San Juan River for the Animas-La Plata Project and 120,000 acre-feet for NIIP would jeopardize the continuing existence of the endangered Colorado pikeminnow and razorback sucker. The USFWS reasonable and prudent alternative for the Animas-La Plata Project included a recovery program that was initiated in 1992. The program included a research period of approximately seven years and a recovery period of an additional seven years. The goals of the recovery program are to:

- Conserve populations of Colorado pikeminnow and razorback sucker in the basin consistent with the recovery goals established under the Endangered Species Act.
- Proceed with water development in the basin in compliance with federal and state laws, interstate compacts, supreme court decrees, and federal trust responsibilities to the Tribes.

In 1992 the recovery program established the total San Juan River baseline depletions for New Mexico at approximately 440,000 acre-feet.

One component of the USFWS's 1992 reasonable and prudent alternative for NIIP included participation in the recovery program. This decision by the USFWS enabled NIIP to initiate construction of Blocks 7 and 8. Additional features of the alternative included incorporating "conservation acreage" into NIIP's crop rotation, allocating NIIP project-wide water shortages, and transferring 16,400 acre-feet of baseline depletions from other Navajo irrigation projects in the Shiprock area. With these constraints the overall Navajo depletions from the San Juan River, and in the environmental baseline, did not increase.

Due to the recovery program the San Juan River and the operation of Navajo Dam have been the subject of intensive research. Between 1992 and 2000, NIIP invested approximately \$14 million supporting the recovery effort. Based on that research, the flow requirements necessary to protect the endangered fish were assessed. The first phase of the flow recommendations were approved by the recovery program in May 1999 (Holden 1999). These recommendations have been provided to the USFWS for use in future Section 7 Consultations. The initial flow recommendations indicate that an additional 122,000 acre-foot annual withdrawal may be possible without jeopardizing the endangered fish. Through NIIP's 1999 consultation with the USFWS, this volume of depletion was added to the San Juan River environmental baseline. This additional depletion is barely sufficient to complete the construction of NIIP, and it does not enable NIIP to restore the 16,400 acre-foot baseline depletion to the Navajo irrigation projects in the Shiprock area. Additional features of the reasonable and prudent alternative include:

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- Re-operation of Navajo Dam to mimic a natural hydrograph and meet the flow recommendations for the San Juan River
- Construction of three rearing ponds to assist the augmentation program for razorback suckers and potentially Colorado pikeminnows
- Removal of the Cudei Diversion Dam to provide fish access to designated critical habitat
- Construction of fish passage at the Hogback Diversion Dam to provide fish access to designated critical habitat
- Improve irrigation efficiency to reduce irrigation return flows, improve water quality, and reduce impacts to river flows
- Continued funding of, and participation in, the San Juan River Recovery Implementation Program

Pending future research and recovery, the outcome of future Section 7 Consultations with the USFWS may enable additional depletions. Work is continuing to refine and optimize the required flow conditions for the fish while allowing water depletions for future development. Because the point of diversion for this Project has critical hydrologic implications, its location may be largely determined by the requirements of the endangered species in the San Juan River.

## **2000 - Investigation of the City of Gallup Transmission and Storage Facilities**

The *City of Gallup Transmission and Storage Facilities* (December 2000) by DePauli Engineering and Surveying Company presented a preliminary design and cost estimate for distributing the Project water from the Yah-ta-hey Junction through the City of Gallup to the NTUA systems in Churchrock on the east, Manuelito and Spencer Valley on the west, and Redrock on the south. DePauli also investigated the required peaking factor for the City of Gallup. The total estimated cost for construction, engineering and contingencies for this regional project is \$23.5 million (excluding costs associated with addressing NEPA, cultural resources and right-of-way).

## **2001 - A technical summary and plan of approach for the Project**

This document is the *Navajo-Gallup Water Supply Project Technical Memorandum*. It presents a summary and analysis of the Navajo-Gallup Water Supply Project with reconnaissance level cost estimates. It includes Project alternatives which can meet the Project's purpose and need. And, it forms the basis of understanding between the Navajo Nation and the City of Gallup for establishing a partnership to construct the water system.

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More than twenty-five years of studies have reached essentially the same conclusions. The range of alternatives is very limited because the San Juan River is the only viable, long-term, source of water. Configurations have been developed which, at an appraisal level, appear to meet the Project's purpose in an economic manner. Further refinements and analysis to the Project plan such as the selection of reservoir sites, pipeline alignments, and other project facilities will require the collection and analysis of on-the-ground design data and information which will be generated through the NEPA compliance activities that started in March 2000. The draft planning report which is being prepared by Reclamation will be completed by December 2001. The Final Planning Report and EIS will be completed by January 2003.