



Executive Summary

The Bureau of Reclamation (Reclamation) proposes to operate Navajo Dam and Reservoir to implement Endangered Species Act (ESA)-related flow recommendations on the San Juan River, or a reasonable alternative¹ to those recommendations, in a manner which allows for both current and certain future water depletions² to proceed.

This change in reservoir operation would assist in conserving endangered fish in the San Juan River downstream from Farmington, New Mexico, and in enabling water development to proceed in the San Juan River Basin (Basin) in compliance with applicable laws, compacts, court decrees, and American Indian (Indian) trust responsibilities. To accomplish this action, Reclamation would continue to operate Navajo Dam to meet the authorized project purposes while modifying reservoir release patterns to meet flow recommendations designed to maintain or improve habitat for the razorback sucker and Colorado pikeminnow (formerly Colorado squawfish).

This Navajo Reservoir Operations Draft Environmental Impact Statement (DEIS) describes and analyzes environmental effects resulting from the proposed operational changes to Navajo Dam and Reservoir. The DEIS has been prepared according to provisions of the National Environmental Policy Act of 1969 (NEPA) and other laws and mandates.

Purpose of and Need for the Proposed Action

The purpose of modifying the operations of Navajo Dam and Reservoir is to provide sufficient releases of water at times, quantities, and durations necessary to conserve the two endangered fish species and their designated critical habitat as recommended in the San Juan River Basin Recovery Implementation Program (SJRBRIP)³ *Flow Recommendations for the San Juan River* (Flow Recommendations)(Holden, 1999), and subject to concurrence by the Fish and Wildlife Service (Service) through formal ESA consultation. Reclamation

¹ A reasonable alternative may be determined through consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the ESA. All Federal agencies are required to consult with the Service for Federal actions that may affect threatened or endangered species or their designated critical habitat.

² Those which have obtained appropriate environmental compliance but are not yet implemented.

³ The SJRBRIP is a major cooperative effort among entities interested in the goals of endangered fish recovery and in proceeding with water development in the Basin. In addition to Reclamation, participants include the Service; Bureau of Indian Affairs; Bureau of Land Management; Southern Ute Indian and Ute Mountain Ute Tribes; Navajo and Jicarilla Apache Nations; water management interests; and the States of Colorado, Utah, and New Mexico. The SJRBRIP consists of three committees dealing with coordination, biology, and hydrology.

would maintain the authorized purposes of the Navajo Unit (Navajo Dam and Reservoir), which include enabling future water development to proceed in the Basin in compliance with applicable laws, compacts, decrees, and Indian trust responsibilities.

The need for a plan to modify operations has resulted from previous ESA consultations with the Service on other Basin projects that affect flows in the San Juan River. Reclamation is required to comply with the ESA for operation of the facilities of the Colorado River Storage Project (CRSP), which include Navajo Dam. The operation of Navajo Dam is a key element of the SJBRIP.

The Navajo Unit

After completion of the Navajo Unit in 1962, criteria governing releases of water from the dam focused primarily on meeting irrigation needs, providing flood control, maintaining stable river flows, and providing a recreation pool in Navajo Reservoir. However, native⁴ fish populations and their habitat have been adversely affected or modified in part by the construction and subsequent operation of Navajo Dam. Also, Lake Powell's inundation of approximately 30 miles of the lower San Juan River has had significant impact on native fish habitat, as well. Some of the other factors adversely affecting these native fish include the introduction of non-native⁵ fish, the past removal of native fish to create a more desirable recreation fishery, contribution of diversion structures, and instream channel modifications. Operating the dam under its historic operating criteria would continue the adverse flow effects. However, over the last decade, the criteria and associated pattern for releasing water from the dam were modified to accommodate endangered fish research and recovery efforts in the San Juan River due to ESA consultations.⁶

After requesting formal consultation under the ESA on the operation of Navajo Dam, Reclamation committed to operate the dam in concert with ongoing research to determine hydrologic conditions beneficial to endangered fish and to operate the dam in a manner most consistent with endangered fish recovery for the life of the dam.⁷ The Service concurred with Reclamation's request that the consultation process be initiated and the overall consultation period for the operation of the dam be extended while 7 years of planned research on the needs of the two listed endangered fishes in the San Juan River were conducted.⁸

⁴ Fish that are indigenous to the Colorado River Basin, of which the San Juan River Basin is a component.

⁵ Fish that evolved in basins outside of the Colorado River Basin but were purposely or accidentally introduced to this Basin.

⁶ Consultation under the ESA is required of Federal agencies for existing and new projects and programs to determine effects on endangered species.

⁷ Memorandum to the Service, July 30, 1991.

⁸ Memorandum to Reclamation, August 19, 1991.

San Juan River Basin Recovery Implementation Program

The SJRBRIP was initiated in 1992 with two goals:

- ❑ To conserve populations of Colorado pikeminnow and razorback sucker in the Basin, consistent with the recovery goals established under the ESA.
- ❑ To proceed with water development in the Basin in compliance with Federal and State laws, interstate compacts, court decrees, and Federal trust responsibilities to the Southern Ute Indian and Ute Mountain Ute Tribes and the Jicarilla Apache and Navajo Nations.

The SJRBRIP has identified factors limiting the recovery of endangered fish and is implementing actions to meet the ecological needs of the two endangered fish species. Ongoing and proposed activities recommended by the SJRBRIP include re-regulation of releases from Navajo Dam to better meet species needs, control of non-native fish, augmentation of endangered fish populations, and identification and removal of fish-passage barriers.

Under the direction of the SJRBRIP, Navajo Dam test releases were conducted and evaluated from 1992-1998. At the completion of the research period, the SJRBRIP completed the Flow Recommendations. The recommendations include suggested Navajo Dam operating rules for various hydrologic conditions and levels of water development in the Basin. Applying these rules would allow the Flow Recommendations to be met and water development to proceed consistent with the ESA and other applicable laws. Additional depletion in the Basin is to increase above the level set in the 1991 Animas-La Plata (ALP) Project biological opinion.

The suggested operating rules define conditions for mimicking a natural hydrograph in terms of magnitude, duration, and frequency of flows in the river downstream from Farmington. Such mimicry is designed to meet the river conditions required to develop and maintain habitat for the endangered fish and to provide the necessary hydrologic conditions for the various life stages of the endangered and other native fishes. For example, high spring flows create conditions for backwater formation while low flows help maintain backwaters which provide important nursery habitat. In addition, high flows clean cobble bars that are used for Colorado pikeminnow spawning (Holden, 1999). These are the recommendations that Reclamation is proposing to meet by modifying the operations of Navajo Dam. The Flow Recommendations are subject to periodic review and modification through the SJRBRIP based on new information obtained by the program.

The Flow Recommendations are based on knowledge available as of 1998. They include a recommendation for an adaptive management process based on new information as it becomes available. It is possible that the Flow Recommendations will be modified in the

future based on new information, and that these modifications may further affect operation of Navajo Dam. Any re-operation outside of the release range of the alternative selected as a result of the final EIS (FEIS) would be subject to further NEPA compliance, including public review and comment.

Public Involvement Activities

Reclamation used several methods to obtain public input in developing the DEIS, including scoping meetings and dissemination of public information through project newsletters, news releases, paid advertisements, and a project website (www.uc.usbr.gov), Environmental Programs, Navajo Dam and Reservoir).

Reclamation announced its intent to prepare a DEIS in a Notice of Intent (NOI) published in the *Federal Register* on October 1, 1999. A news release announcing the NOI was sent to approximately 300 parties, including Federal, Tribal, State, and local officials; agency representatives; conservation organizations; news media, and others.

The NOI also announced that a series of scoping meetings would be conducted in November 1999 to receive public input on issues to be addressed in the DEIS. The scoping meetings were held in November 1999 at Farmington and Albuquerque, New Mexico and Durango and Pagosa Springs, Colorado. In addition to the announcement contained in the *Federal Register*, each meeting was also advertised in local newspapers in advance of their scheduled dates.

In all, a total of approximately 100 people attended the Farmington, Durango, and Albuquerque meetings. No individuals (public or agency representatives) attended the Pagosa Springs meeting. Transcripts of the oral comments given at the meetings were made and are part of the public record for the Navajo Reservoir Operations EIS. Interested or affected individuals, organizations, and agencies were also encouraged to submit written comments to Reclamation to most effectively be considered. Reclamation received eight letters during the comment period. The principal issues and concerns that were identified during public and internal scoping centered on: fish and wildlife resources, hydrology and water rights, water quality impacts, cultural resources, Indian Trust Assets/Environmental Justice, social and economic resources, recreation resources, and others.

On June 12, 2000, Reclamation held a public meeting to discuss agency plans to conduct a 5-day Summer Low Flow Test of 250 cubic feet per second (cfs) in the San Juan River. The test, to have been conducted from Navajo Dam to the confluence of the Animas River, was to analyze potential low flow impacts to the river, recreation, and diversion structures. Approximately 80 people attended the meeting held in Farmington, New Mexico. Because

of drought conditions, the low flows would not have left enough water in the system to meet Flow Recommendations for the endangered fishes' critical habitat, and the test was postponed until 2001.

The Summer Low Flow Test was conducted from July 9 through July 15, 2001. Reclamation representatives attended meetings of various organizations and held two public meetings to discuss the Summer Low Flow Test. Approximately 65 people attended the public meetings held on April 4, 2001, in Farmington, New Mexico, and April 5, in Bluff, Utah. Thirty-five written comments were submitted to Reclamation.

Document Review

The DEIS is available to interested parties, including the agencies, organizations, and individuals in Reclamation's distribution list, and copies of the technical appendices referenced in the DEIS will be available from Reclamation upon request. The DEIS is also available at Reclamation offices and area public libraries.

The public comment period extends for 60 days following publication of the Notice of Availability in the *Federal Register*. Public hearings on the DEIS will be held to provide an opportunity for interested parties and agencies to present oral and written comments on this document and the proposed Navajo Reservoir operations. Comments should be received by Reclamation by November 4, 2002. Written responses to comments will be published in the Final Environmental Impact Statement (FEIS). Public hearings on this DEIS will be held from 6 to 9 p.m. at the following locations:

October 1, 2002	Farmington, New Mexico, Civic Center
October 2, 2002	Durango, Colorado, Doubletree Hotel
October 3, 2002	Bluff, Utah, Community Center

Consultation and Coordination

As the lead agency responsible for preparation of this DEIS and subsequent documents, Reclamation invited Federal agencies and local, State, and Tribal governments with appropriate expertise or jurisdiction in the project area to participate in the NEPA process as cooperating agencies. These agencies include:

Federal agencies

Bureau of Indian Affairs
Bureau of Land Management

Corps of Engineers
Environmental Protection Agency
Federal Energy Regulatory Commission
Fish and Wildlife Service
National Park Service, Glen Canyon National Recreation Area

Indian Tribes/Nations

Jicarilla Apache Nation
Southern Ute Indian Tribe
The Navajo Nation
Ute Mountain Ute Tribe

State of Colorado agencies

Colorado Water Conservation Board

State of New Mexico agencies

New Mexico Department of Game and Fish
New Mexico Interstate Stream Commission
New Mexico Department of Environment

Local agencies

City of Farmington, New Mexico
San Juan Water Commission
Southwestern Water Conservation District

Reclamation coordinated and consulted with these cooperating agencies concurrently with the development of alternatives and preparation of the DEIS. Activities with the cooperating agencies included regularly meeting with them; providing status reports concerning progress; convening project planning meetings; arranging conference calls; and facilitating regular interaction among the parties.

Reclamation and the Service have conferenced/consulted, both formally and informally, regarding potential impacts to protected species which may occur as a result of implementation of the Preferred Alternative. A list of the major actions and correspondence between the agencies, in accordance with the ESA, is included in the biological assessment included in Volume II of this DEIS. A Fish and Wildlife Coordination Act report will be prepared and included in Volume II.

Under the Native American Graves Protection and Repatriation Act (NAGPRA), Reclamation is consulting with interested and concerned Indian Tribes and Nations as part of normal Navajo Reservoir operations. Tribal representatives include elected officials, recognized traditional and religious leaders, Tribal representatives and historians, and cultural committees. In addition, as part of Reclamation's resource management planning, a draft NAGPRA Plan will be prepared concerning potential effects the operation of Navajo Dam and Reservoir would have on Native American human remains, associated grave goods and objects of cultural patrimony. A Draft Programmatic Agreement will also be prepared pursuant to the National Historic Preservation Act.

DEIS Evaluation Process

This DEIS evaluated seven alternatives. Most of the alternatives formulated for evaluation are described in terms of flow rates representing minimum and maximum limits in cubic feet per second in the range of release rates from Navajo Dam. The alternatives formulated are shown in table S-1.

Table S-1.—List of Navajo Reservoir operations
EIS alternatives

Title
No Action Alternative (Historical Operation)
250/5000 Alternative (Flow Recommendations)
500/5000 Alternative
250 Variable/5000 Alternative
250/6000 Alternative
500/6000 Alternative
Decommissioning/Breaching Navajo Dam Alternative

The range of alternatives developed for this DEIS was initially formulated and subsequently evaluated using hydrologic modeling and the following:

- Authorized purposes of the Navajo Unit
- Goals of the San Juan River Basin Recovery Implementation Program (SJRBRIP)
- The *Flow Recommendations for the San Juan River* (Flow Recommendations) (Holden, 1999)

- Public scoping meetings and informal public contacts
- Coordination with cooperating agencies and interagency consultations
- Flood control procedures for Navajo Dam established with the Corps of Engineers (Corps) to provide flood protection for areas along the San Juan River from the dam to Farmington, New Mexico
- Authorized and potential American Indian (Indian) and non-Indian water uses, including those pursuant to Indian water rights and Federal trust responsibilities to Tribes and Tribal nations, water contracts with the Secretary of the Interior for delivery of the Navajo Reservoir water supply, and compact apportionments
- Applicable water rights, laws, treaties, interstate compacts, court decrees, Indian trust responsibilities, and various rules, regulations, policies, and directives

Also taken into account in formulating the alternatives were such issues as water user concerns that high releases could wash out existing water diversion structures, while low releases might make it difficult to divert water. Other concerns centered on water quality, erosion, and minimizing adverse impacts of alternative dam operations on fish and wildlife, recreation, and hydropower generation benefits.

Alternatives Considered but Eliminated

During the alternatives formulation and evaluation process, some of the alternatives were found to have serious flaws either in meeting the project purpose and need or in technical/physical constraints. Accordingly, they were eliminated from further consideration and were not carried over for full evaluation.

250 Variable/5000 Alternative

The 250 Variable/5000 Alternative was developed with the intent to minimize potential impacts on downstream water users' ability to take their water right at their diversion structures. In addition, it would attempt to minimize impacts to downstream recreation users (trout fishing and rafting) by maintaining higher minimum releases during certain critical times of the year than does the 250/5000 Alternative. However, it would result in insufficient reservoir storage to provide releases to meet spring peak flow criteria.

Under the Proposed Federal Action section of the NOI, Reclamation stated the following:

Reclamation proposes to prepare a DEIS which will describe the effects of operating the Unit to implement the flow recommendations, or reasonable alternatives, as contained in the recommendation from the Program's Biological Committee resulting from consultation under the ESA.

To further this effort, Reclamation met with the Service on August 8, 2001, in Albuquerque, New Mexico. The meeting focused on discussing the possibility of implementing the 250 Variable/5000 Alternative as a reasonable alternative to operating Navajo Dam to more fully meet the Flow Recommendations. During the course of this discussion, it was determined that the Flow Recommendations contain flexibility, at least in the short term, that might allow for operations similar to those proposed in the 250 Variable/5000 Alternative. This alternative was eliminated because it did not meet the Flow Recommendations.

250/6000 Alternative

This alternative was considered because it was modeled and discussed in the Flow Recommendations. However, studies completed by the Corps and Reclamation during the summer of 1998 demonstrated that a maximum release of 6,000 cfs is not feasible without performing major structural modifications to the dam's outlet works and channel and diversion improvements from the dam to the Animas River confluence.

Subsequently, the Corps has determined that the current safe channel capacity for this reach is 5,000 cfs. Further, alternatives with the 6,000-cfs maximum release reduce the active storage of the reservoir to a point where, during extended droughts, releases to the Navajo Indian Irrigation Project (NIIP) could not be made.

500/6000 Alternative

This alternative was considered as a way to reduce potential impacts on downstream water users' ability to take water at their diversion structures by providing a higher minimum flow release of 500 cfs.

In addition, it attempts to minimize impacts to downstream recreation (trout fishery and rafting) by maintaining higher minimum releases during certain critical times of the year than does the 250/5000 Alternative. However, it has the same limitations as the 250/6000 Alternative and also does not fully meet the Flow Recommendations. The 6,000-cfs release also exceeds the channel capacity, as discussed under the 250/6000 Alternative.

Decommission and Breach Navajo Dam

This alternative largely meets the conditions of a natural hydrograph, and removal of the dam would provide the endangered fish with access to the portion of the San Juan River now inundated by Navajo Reservoir, as long as fish passage is provided throughout the river. Although large spring peaks would be provided most years, low flows during the irrigation season would still be impacted by downstream diversions that would result in low flows substantially below 500 cfs downstream of Farmington. Therefore, this alternative does not meet the Flow Recommendations.

This alternative is considered unreasonable and impractical because it does not meet all the elements of the purpose and need for the proposed action and would not support maintaining the authorized purposes of the Navajo Unit. It would result in loss of reservoir storage needed to allow contract water deliveries to the San Juan-Chama Project, the NIIP, and other contractors, and would make it extraordinarily difficult, if not impossible, for the States of New Mexico and Colorado to fully utilize their consumptive use apportionments under the Upper Colorado River Basin Compact. It also could precipitate expensive litigation of Indian versus non-Indian water rights in both States. In addition, this alternative would result in the loss of the following benefits provided by Navajo Dam and Reservoir: downstream flood control, reservoir and tailwater fisheries, reservoir and downstream recreation, and hydropower generation. The concept of decommissioning or removing the dam is beyond the scope of the proposed action.

Alternatives Retained for Further Consideration

The alternatives described below were retained for further analysis:

- No Action Alternative (Historical Operation)
- 250/5000 Alternative (Flow Recommendations)
- 500/5000 Alternative

No Action Alternative

Because it does not address the Flow Recommendations, it is likely that implementing the No Action Alternative would adversely affect downstream endangered fish habitat and existing and future water development. However, this alternative would help maintain or enhance the downstream trout fishery and river rafting by moderating flow fluctuations.

Selecting the No Action Alternative would require reconsultation with the Service under the ESA for the Animas-La Plata (ALP) Project, which could place the completion of the project at risk. Consequently, that portion of the Ute Mountain Ute and Southern Ute Indian Tribes' water right settlement provided under the ALP Project might not be met.

Selecting this alternative could put the completion of NIIP at risk and would leave the NIIP (Blocks 1-6) depletion limited to 133,000 acre-feet per year. The approximately 16,400 acre-feet per year that was transferred from Hogback and Fruitland to NIIP in the 1999 consultation would remain available for use on the NIIP. This could limit the development of NIIP to about 54,500 acres, or 56,130 acres short of the full project acreage.

The Jicarilla Apache Nation's third-party contract with Public Service of New Mexico (PNM) for the San Juan Power Plant Diversion of 16,200 acre-feet and other Navajo Reservoir Supply Contracts serviced by the Jicarilla Apache Nation (840 acre-feet) would also be jeopardized.

In addition, the current depletion allowance of 3,000 acre-feet for small unspecified water uses could no longer be valid and each minor use would need a separate ESA consultation. Future water delivery and associated renewal of existing water contracts from Lemon, Vallecito, and Jackson Gulch Reservoirs and the San Juan-Chama Project also could be at risk since there have been no ESA consultations on the operations of these projects.

250/5000 Alternative (Flow Recommendations)

Operations under this alternative would best meet the purpose of and need for the proposed action. It would allow water projects that have completed ESA consultations and NEPA compliance—including NIIP completion, the ALP Project, the Jicarilla Apache contract with PNM, and 3,000 acre-feet for minor unspecified depletions—to proceed, and would meet the Flow Recommendations. Since this alternative meets Flow Recommendations, it also removes the risk of impact to the other water uses listed under the No Action Alternative.

Reclamation would modify Navajo Dam operations to provide sufficient releases of water at times, quantities, and durations necessary to assist in conserving endangered fish and their designated critical habitat. Reclamation would maintain the authorized purposes of the Navajo Unit, enabling water development to occur in compliance with applicable laws, compacts, decrees, and Indian trust responsibilities.

Under this alternative, releases would range from 250 cfs to 5,000 cfs. The spring peak release would meet the Flow Recommendations criteria. The summer, fall, and winter releases as low as 250 cfs are intended to meet the Flow Recommendations downstream of

Farmington and to provide water storage in Navajo Reservoir. These releases would also help maintain a minimum 500 cfs flow downstream of Bluff, Utah, benefitting river rafting.⁹ All releases would be made within the operational limitations/constraints of Navajo Dam.

Some flexibility in reservoir releases already exists because water committed for present or future development is not currently used. This may be a significant amount of water in any given year and would be released downstream until used for development. The release of this water could be incorporated into operations to augment a 250 cfs minimum release while maintaining a target flow of at least 500 cfs downstream of Farmington¹⁰. It also could be released to extend the duration of the spring peak release. The regulation of this water would be determined through the Navajo Unit operation meetings and discussions with the Service. One likely scenario is to regulate this water to maintain higher late spring and summer releases to the river to provide recreation, hydropower, water quality, fish and wildlife, and other benefits. Unusually high inflows (other than those associated with spring runoff) resulting in very high reservoir elevations would be released as a spike flow if necessary to avoid an uncontrolled spill under this alternative.

500/5000 Alternative

During the public scoping process, many people and interests requested that minimum releases not be reduced below 500 cfs. This alternative was included to reduce potential impacts on downstream water users' ability to take water at their diversion structures and to downstream recreation users (trout fishery and rafting) by maintaining higher minimum releases than those under the 250/5000 Alternative.

Because Flow Recommendations are not fully met by this alternative, reconsultation under ESA on the ALP Project, NIIP completion, various water contracts, and 3,000 acre-feet of minor unspecified depletions would be required. In addition, Navajo Reservoir would infrequently (less than 1 percent of the time) be drawn down below the NIIP inlet works, thus interfering with irrigation deliveries to the NIIP. Further, maintaining the minimum release at 500 cfs limits the ability to develop water and results in spring peak releases of lesser duration and frequency. A minimum release of 500 cfs also limits the ability to meet Flow Recommendations below Farmington.

⁹ Flow Recommendations call for the average of two of four gages (Farmington, Shiprock, Four Corners, Bluff) to be 500 cfs; thus, flows are not always above 500 cfs at all locations.

¹⁰ The SJRBRIP Biology Committee acknowledged that some flexibility exists in meeting the upper limit of 1,000 cfs during the irrigation season. The Biology Committee indicated that during the irrigation season (March through October) "it may not be effective or necessary to lower releases below 500 cfs until water use in the basin increases to the point that the water is needed to meet runoff period recommendations. This flexibility is extended only to the irrigation season as defined. . .and only until water development reaches the level that additional water is needed for Spring releases." (February 21, 2002, memorandum from Biology Committee to Reclamation).

Even though this alternative would not fully meet the Flow Recommendations, the purpose and need outlined in this DEIS, or diversion demands from the Navajo Reservoir water supply, it was retained for analysis because of substantial public interest and concern.

Comparison of Alternative Impacts

Table S-2 summarizes the impacts associated with each alternative retained for detailed analysis.

Table S-2—Summary comparison of alternatives retained for further analysis

Resource	No Action Alternative	250/5000 (Flow Recommendations) Alternative	500/5000 Alternative
Navajo Reservoir operations and content	Reservoir operated for flood control and existing uses; average July content 1.52 million acre-feet.	Reservoir operated for flood control, endangered fish, full NIIP water supply; average July content 1.35 million acre-feet.	Reservoir operated for flood control and endangered fish, potential shortage to NIIP water supply; average July content 1.30 million acre-feet.
San Juan River monthly flows at Archuleta (near dam)	Minimum flow 500 cfs; Average annual flow of 1,015 cfs; average July flow 1,050 cfs; average January flow 880 cfs.	Minimum flow 250 cfs; Average annual flow of 775 cfs; average July flow 385 cfs; average January flow 300 cfs	Minimum flow 500 cfs; Average annual flow of 780 cfs; average July flow 540 cfs; average January flow 500 cfs.
San Juan River monthly flows at Bluff, Utah	Minimum flow 65 cfs; Average annual flow of 1,900 cfs; average June flow 4,250 cfs; average August flow 1,570 cfs.	Minimum flow 500 cfs; Average annual flow of 1,670 cfs; average June flow 4,680 cfs; average August flow 1,110 cfs.	Minimum flow <100 cfs when reservoir storage exhausted; average annual flow of 1,670 cfs; average June flow 4,110 cfs; average August flow 1,170 cfs.
Water uses and resources	Water supply adequate to meet existing uses; future water uses including NIIP completion and ALP Project assumed not to occur.	Water supply adequate to meet existing uses; completion of NIIP and ALP Project would occur. Best opportunity to accomplish future water development.	Water supply adequate to meet existing uses with possible additional shortages in dry years; completion of NIIP and ALP Project included with possible shortages.

Table S-2—Summary comparison of alternatives retained for further analysis

Resource	No Action Alternative	250/5000 (Flow Recommendations) Alternative	500/5000 Alternative
Indian Trust Assets/ Environmental Justice	Two types of ITA's potentially affected—water uses and cultural resources on trust lands. Least opportunity for development of water uses.	Two types of ITA's potentially affected – water uses and cultural resources on trust lands. Positive impacts to all Tribes by protecting water development that has ESA and NEPA compliance—allows best possibility for future water development.	Two types of ITA's potentially affected—water uses and cultural resources on trust lands. Shortages to water projects would occur and better chance for future water development than No Action.
Trout fishery	Maintains better downstream trout fishery than action alternatives	Habitat reduced average of 34 percent in special regulation waters when flows drop from 500 to 250 cfs. Physical habitat and water quality problems projected to be significant downstream from Citizens Ditch.	Maintenance of 500 cfs maintains existing trout fishery, although water shortage years may have adverse habitat impacts.
Trout fishery recreation	Provides more recreation opportunities than action alternatives.	Reduction in trout fishery results in lower quality and/or quantity of recreation associated with trout fishing.	Recreation maintained, very infrequent water-short years have adverse effects on quality and/or quantity.
Native fisheries (e.g., roundtail chub, flannelmouth and bluehead suckers, etc.)	Has greater adverse impact on native fishes than action alternatives.	Reduced habitat in the river reach between the Hammond Diversion and Farmington; habitat improvement downstream from Farmington due to more natural hydrograph.	Some habitat improvement downstream from Farmington due to more natural hydrograph.
Rafting recreation downstream from Farmington	Overall flow regime beneficial; however, periods of flow below 500 cfs adversely affect rafting.	Overall quality of flows for rafting declines; however, attempt to maintain 500 cfs minimum raftable flows.	Overall quality of flows for rafting declines; however, attempt to maintain 500 cfs minimum raftable flows.
Reservoir recreation	Less impact than action alternatives.	Generally recreation levels maintained; reservoir drawdown adversely affects quality of recreation in dry periods.	Generally recreation levels maintained; reservoir drawdown adversely affects quality of recreation in dry periods.

Table S-2—Summary comparison of alternatives retained for further analysis (continued)

Resource	No Action Alternative	250/5000 (Flow Recommendations) Alternative	500/5000 Alternative
Reservoir fishery	Less impact to reservoir fishery than action alternatives.	Minor adverse effects to reservoir fishery due to increased reservoir drawdowns.	Moderate adverse effects to reservoir fishery due to increased reservoir drawdowns.
Hydropower	Existing hydropower operations by City of Farmington at Navajo Dam would continue.	Reduced annual energy production. Annual hydropower replacement cost up to \$7 million.	Reduced annual energy production. Annual hydropower replacement cost up to \$3.2 million.
Diversion structures	Existing diversions protected by flood control operations and 500 cfs minimum releases from dam.	Some existing diversions need additional operation and maintenance to handle high spring releases and lower summer minimums.	Some existing diversions need additional operation and maintenance to handle high spring releases.
River water quality	Existing conditions continue or improve due to water treatment and erosion control advances.	Dilution of pollutants reduced when minimum releases occurring; additional dilution during high releases. Improved channel maintenance.	Similar to existing conditions although dry year shortages may lead to increased water quality issues. Improved channel maintenance.
Reservoir water quality	Existing conditions continue	Existing conditions continue	Existing conditions continue
Socioeconomics	Adverse impacts occur as water development, including completion of NIIP and ALP, is detrimentally affected. Recreation economy maintained.	Adverse impacts on trout fishery economy and hydropower; economic benefits associated with water development occur.	Economic benefits associated with water development occur, although reduced due to water shortages. Recreation economy maintained.
Special Status species	Flow recommendations to conserve endangered fish not met; no significant effect on other endangered species.	Flow recommendations to conserve endangered fish met; no significant effect on other endangered species.	Flow recommendations to conserve endangered fish partially met; no significant effect on other endangered species.

Table S-2—Summary comparison of alternatives retained for further analysis (continued)

Resource	No Action Alternative	250/5000 (Flow Recommendations) Alternative	500/5000 Alternative
River vegetation and wildlife downstream from dam	Minimal impacts to riparian vegetation recruitment due to reduced spring releases. Inconsequential effects on existing riparian vegetation and associated wildlife habitat.	Adverse impacts to vegetation and associated wildlife habitat along first 7 miles of river downstream from dam due to lower minimum flows; high spring releases may benefit cottonwood regeneration and reduce human encroachment into riparian areas.	Inconsequential effects on existing riparian vegetation and associated wildlife habitat. High spring releases may benefit cottonwood regeneration and reduce human encroachment into riparian areas.
Reservoir vegetation and wildlife	Less impact to existing wetland and riparian vegetation and associated wildlife habitat as compared to action alternatives.	Minimal additional impacts to wetland and riparian vegetation and associated wildlife habitat associated with greater reservoir fluctuations.	Moderate additional impacts to wetland and riparian vegetation and related wildlife habitat associated with greater reservoir fluctuations.
Land use	Current land uses not affected by reservoir operations. Possibly no future development of NIIP lands.	56,130 acres of additional irrigation land developed under NIIP.	Possible reduction of full NIIP development.
Cultural resources	Reservoir fluctuations continue to impact cultural resources in reservoir basin.	Reservoir fluctuations impact cultural resources; impact less than No Action but greater than 500/5000 Alternative.	Reservoir fluctuations impact cultural resources; impact between that of No Action and 250/5000 Alternatives.
Flood control and erosion	Flood control operations of Navajo Dam met; maximum releases limited to 5,000 cfs.	Flood control operations of Navajo Dam met; maximum releases limited to 5,000 cfs; increased frequency of releases of 5,000 cfs would cause bank erosion until river stabilized itself or banks stabilized.	Flood control operations of Navajo Dam met; maximum releases limited to 5,000 cfs; increased frequency of releases of 5,000 cfs would cause bank erosion until river stabilized itself or banks stabilized.

Table S-2—Summary comparison of alternatives retained for further analysis (continued)

Resource	No Action Alternative	250/5000 (Flow Recommendations) Alternative	500/5000 Alternative
Operation, maintenance and safety of dams	Operations would be within designed capability of Navajo Dam.	Operations would be within designed capability of Navajo Dam. Increased monitoring of gaging stations and more frequent release changes required.	Operations would be within designed capability of Navajo Dam. Increased monitoring of gaging stations and more frequent release changes required.
Hazardous materials	No impacts.	No impacts.	No Impacts.
Geology and soils	No impacts.	No impacts.	No impacts.
Air quality and noise	No impacts.	Increased dust due to lower reservoir levels exposing more land.	Increased dust due to lower reservoir levels exposing more land.

¹ The table presents long-term impacts. Until further water development occurs in the Basin, additional water would be available to reduce impacts to various resources including irrigation, trout fishery, and recreation; this interim water would diminish as development occurs.

DEIS Conclusions and Recommendations

After conclusion of a detailed analysis, Reclamation has selected the 250/5000 Alternative as the Preferred Alternative. This alternative best meets the purpose of and need for the Federal action. At the present time, mitigation measures are not included in the Preferred Alternative. Potential measures to mitigate adverse impacts to fish and wildlife and other resources with statutory requirements to consider mitigation are presented in the DEIS.