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Low-Flow Test, San Juan River, Final Environmental Assessment

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LOW-FLOW TEST

SAN JUAN RIVER

FINAL
ENVIRONMENTAL ASSESSMENT

United States Department of Interior
Bureau of Reclamation
Western Colorado Area Office
Grand Junction and Durango, Colorado

June 2001

INTRODUCTION

Purpose and Need

This final environmental assessment (EA) is prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190) to evaluate test flows from Navajo Dam into the San Juan River.

The underlying need for this proposed test is to evaluate the effect of low summer flows on various resources. The information obtained will be used in preparation of an environmental impact statement (EIS) on operating Navajo Reservoir to mimic a natural hydrograph in critical habitat of the San Juan River for the benefit of downstream endangered fish and to allow for future water development.

Background

In October 1999, Reclamation published a Notice of Intent in the Federal Register announcing it would prepare an EIS on the operation of Navajo Dam and Reservoir to implement flows recommended by the San Juan River Basin Recovery Implementation Program (SJRBRIP) to assist in the recovery of the endangered Colorado pikeminnow (*Ptychocheilus lucius*) and razorback sucker (*Xyrauchen texanus*).

Fully implementing the flow recommendations will result in Navajo Dam releases being periodically reduced to 250 cubic feet per second (cfs) in any season. In some years, during significant portions of the summer, releases would remain at 250 cfs. Reducing minimum releases from Navajo Dam from the present 500 cfs minimum to 250 cfs would result in saving water in Navajo Reservoir for large spring releases as described in the flow recommendations and for making water available for current and future water development. Another reason for the 250 cfs minimum release is to attempt to keep the flow within the designated endangered fish habitat downstream of Farmington between 500 and 1,000 cfs, in order to maximize nursery habitat for fish. Reclamation proposes to implement the flow recommendations, or a reasonable alternative to them, resulting from consultation under the Endangered Species Act.

Reclamation would implement the flow recommendations by modifying the operations decision criteria of Navajo Dam to provide sufficient releases of water at times, quantities and durations necessary to protect endangered fish and their designated critical habitat while maintaining the authorized purposes of the Navajo Unit, Colorado River Storage Project.

At the completion of a 7-year research study in 1998, the SJRBRIP Biology Committee completed a report that outlines and explains the flow recommendations believed to be necessary to recover the endangered fish in the San Juan River downstream from Farmington, New Mexico. The recommendations define the conditions for creating a more natural river flow in critical habitat of the San Juan River (natural hydrograph).¹ These recommendations have been accepted by the SJRBRIP Coordination Committee and have been provided to the U. S. Fish and Wildlife Service for their use. The Fish and Wildlife Service has used them, in compliance activities under the Endangered Species Act. It is believed by the SJRBRIP that these flow recommendations will protect and improve habitat needed to recover endangered fish populations in the San Juan River.

Presently, Reclamation's operations maintain a minimum release of 500 cfs from Navajo Dam. Low flow releases of 250 cfs could occur during any season under full implementation of the SJRBRIP flow recommendations. These reduced flows were first tested and monitored in the winter of 1996-1997. At that time, it wasn't apparent that low flows would also occur in other seasons, particularly the summer. Reclamation is therefore proposing a short-term, low-flow test in July 2001 to evaluate the impacts of flows below 500 cfs during the summer irrigation season. The duration of this test will range from 5 days to 10 days. At least a 5-day test is best to collect sufficient physical, chemical, hydrologic, and hydraulic engineering data to evaluate the 250 cfs low-flow. Additional time is also necessary to allow the river flow to adjust to the decrease in releases from the dam (500 cfs release to a 250 cfs release). Once sufficient information has been collected or if one of the conditions listed for canceling the test occurs, the test will be stopped. This test will allow a better understanding of potential impacts on summer water temperatures, irrigation, industrial, and domestic water supplies, fish habitat, and recreation. The summer test will allow a more accurate evaluation and comparison of alternatives in the EIS process.

Public meetings were held in 2000 in Farmington, New Mexico, and in Bluff, Utah to discuss a proposed 2000 low flow test. The test was subsequently canceled because hydrology conditions weren't appropriate. Many people in attendance at those meetings believed that it was necessary to conduct the test so that long-term impacts could be evaluated with more certainty in the EIS. Others in attendance expressed concern about the effect of the test flows (and the effect of long-term operations changes involving low flows) on irrigation and industrial diversions, water quality, recreation and related economies, and on fisheries. A draft EA on the test was released to the public in April, 2001 and additional public meetings were held in both Farmington and Bluff, Utah, to receive comments on the proposed 2001 low flow test. Similar concerns were expressed at these meetings. More information on comments received is found in the Consultation and Coordination section of this EA.

¹Holden, P.B. (Ed.). 1999. Flow recommendations for the San Juan River. San Juan River Basin Recovery Implementation Program, Fish and Wildlife Service, Albuquerque NM

DESCRIPTION OF THE PROPOSED TEST AND ALTERNATIVES

The proposed test would take place in early July 2001. The beginning date is July 9. At the start of the test, releases would be stepped down from 500 cfs to 250 cfs between 7 a.m. and 11 a.m. Once the test has been completed or called off, flows would be stepped up to 500 cfs in the same incremental change.

During the week prior to the test as part of the low flow test plan, Reclamation and New Mexico Department of Game and Fish will collect trout from the river downstream of Citizens Ditch and place these fish in the river upstream. Following the test, fish will be collected in the upstream area and restocked downstream from Citizens Ditch (the area downstream from Citizens Ditch is the most likely to have trout losses at low flows). Also Reclamation has committed to expend up to \$25,000 to purchase trout to replace losses in the river that may occur as a result of the test.

As part of the test, the following monitoring will occur:

- Aerial photos will be taken and evaluated from the dam to the confluence of the Animas River.
- Water temperatures before, during and after the test will be monitored at six locations from the dam to the Hammond Diversion. (A map showing the primary water divisions is located at the end of this EA.). Water quality data will be collected downstream from Navajo Dam (See Responses 60-65 in Consultation and Coordination section for further information).
- New Mexico Game and Fish Department will document fisherman use and catch rates in the trout fishery downstream from the reservoir.
- The river will be floated from the dam to at least the Hammond Diversion to observe and document changes in the river; including navigability, impacts to diversion structures, and recreation.
- The river will be accessed at several locations between the dam and Shiprock, NM to visually assess flow, habitat conditions, and impacts to the operation of water diversion structures, and recreation. Recreation impacts will be considered downstream to the Clay Hills takeout.
- Flow data will be compiled from existing gage stations along the river.
- Stage (river elevation) and wetted perimeter readings will be taken along the river.
- Resource specialists will document observations in memoranda.

The test is of a much shorter duration than would occur under the SJRBRIP flow recommendations, so Reclamation believes impacts will be of a short-term, reversible nature. However, Reclamation will maintain the option of ending the test early if significant problems occur with water diversions, fisheries, or other resources. The following events would be considered by Reclamation in any decision to terminate the test:

- Notification from the New Mexico State Engineer that 250 cfs releases were not sufficient to protect senior water rights downstream.
- Notification from the New Mexico State Office of the Fish and Wildlife Service that endangered species were being adversely affected to the degree that the test should be terminated.
- Notification from the New Mexico Department of Game and Fish that significant trout losses were occurring within the downstream trout fishery or determination that water quality criteria (oxygen, temperature, pH [see Comment No. 41]) were being exceeded.
- Notification from the New Mexico State Office of the Fish and Wildlife Service or the New Mexico Department of Game and Fish that native fishes between Navajo Dam and the confluence of the Animas River were being affected to the degree that the test should be terminated.
- Notification from responsible governmental agencies that public health or safety was being compromised by the test.
- U.S.G.S. gage data showing flows below 500 cfs downstream from Farmington.

Reclamation will notify the public when the written report summarizing the test is available. In particular, resource specialists observing the test will summarize their monitoring activities in conjunction with the impacts the low flows have on summer water temperature, water supplies (diversion structures), fish habitat, and recreation. News Releases will announce the test and Reclamation officials will be available to provide information to members of the media during and after the test.

The No Action alternative to the proposed test would be to maintain normal reservoir releases at 500 cfs during the proposed test period. Under this alternative, Reclamation would continue preparing the EIS on long-term operations and would rely on existing information and modeling to evaluate low summer releases.

EXISTING ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

For purposes of impact analysis, the area of concern includes Navajo Reservoir and the San Juan River and its flood plain downstream from the reservoir. Under some resource topics, for example, economics and social factors, the area of impact includes a larger geographic area.

The immediate project area includes Navajo Reservoir in New Mexico and Colorado and the San Juan River in Colorado (Four Corners Monument), New Mexico and Utah. The San Juan River Basin encompasses approximately 25,000 square miles and the river extends 350 miles from its

headwaters to Lake Powell. Navajo Dam was constructed between 1958 and 1963 and Navajo Reservoir extends into both Colorado and New Mexico. Navajo Reservoir has a capacity of 1.7 million acre-feet, a surface area of 15,610 acres, and 150 miles of shoreline. Approximately 225 miles of the San Juan River are between Navajo Dam and Lake Powell.

Historically, Navajo Reservoir was operated to provide water storage and control San Juan River flows. Since 1962, it has been operated in a manner that reduced peak spring flows and supplemented flows in other seasons. Flows were generally near or above 1,000 cfs during the early operation years. Since 1992, a minimum flow of 500 cfs has been maintained and high spring releases or peak flows (5,000 cfs) have been provided to support the SJRBRIP for endangered fish.

Resources and Impacts

The major tributary to the San Juan in the project area is the Animas River which joins the river at Farmington. The primary water source for both rivers are the San Juan and LaPlata Mountains in Colorado. South of the San Juan River, the region is characterized by desert topography; broad dry washes carry significant sediment loads during periodic thunderstorm events. The project area is semi-arid to arid; the major part of the basin is less than 6,000 feet in elevation and receives less than 8 inches of precipitation annually. Vegetation ranges from pinon-juniper areas around Navajo Reservoir to desert shrubs and grasses around the lower San Juan River. The San Juan River corridor supports riparian species such as cottonwood trees, willow, and non-native salt cedar and Russian olive.

Major towns and communities include Farmington at the confluence with the Animas; and Bloomfield, Blanco, and Archuleta upstream and Fruitland, Shiprock, Bluff, Utah, and Mexican Hat, Utah, downstream from Farmington. Energy development, agriculture, and tourism and recreation are important industries in the area. In particular, agriculture and recreation are closely related to Navajo Reservoir and its release patterns in the San Juan River.

Bluff and Mexican Hat are tourism and recreation dependent, mostly involving rafting and cultural visitation. These two activities, in many cases, occur as a result of each other. People visit the area to participate in one activity and end up enjoying the other.

There are diversion structures for irrigation, municipal, and industrial uses of water both upstream and downstream from Farmington and these diversions support a large segment of the local and regional economy. The water rights for these diversions total approximately 230 cfs, but these rights have not been administered closely in the past. A significant trout fishery exists for approximately 7 miles downstream from Navajo Dam with fishing extending downstream to at least the Hammond Diversion, 15 miles from the dam. A commercial-guide industry has developed around the fishery, with guided “walk and wade” trips and float-fishing trips. The city of Farmington owns and operates the Navajo Hydropower facility at Navajo Dam.

As indicated previously, the test flows will provide data to assist in preparing an EIS on the operation of Navajo Dam and Reservoir to implement flows recommended by the SJRBRIP. These changes are expected to have significant impacts on several resources; the test flow period will help determine this. Impacts of the test itself are not anticipated to be significant because of its short duration, because of guidelines to terminate the test if significant impacts are anticipated, and because the test does not represent any long-term decision. In addition, the test will not significantly impact San Juan River flows below the confluence of the Animas River. Data gained may also develop information that can reduce the impacts of long-term changes.

Public health and safety are not expected to be adversely affected; however, provisions are included to terminate the test early if such problems occur. Releases from the dam should be adequate to meet actual downstream senior water rights; however, the complex interaction of physical layout of diversion structures, level of river administration, return flows, water demand at the time, and other factors make it possible that shortages may occur.

Other important resources are associated with Navajo Reservoir and the San Juan River including wetlands and riparian habitat, wildlife, and Indian Trust Assets (ITAs). Within the San Juan River Basin, ITAs have been identified for four federally recognized tribes: the Navajo Nation, the Jicarilla Apache Nation, the Southern Ute Indian Tribe, and the Ute Mountain Ute Tribe. Water rights are one type of ITA that could be affected by Navajo Reservoir operations.

The immediate area of impact lies in the San Juan Basin, an area well known for its archaeology and contemporary/historical Native American culture. Nearby cultural/archaeological features include Mesa Verde National Park, Aztec Ruins National Monument, Salmon Ruins, and the Navajo and Ute Mountain Indian Reservations. Known cultural traditions include the Archaic (3,000 to 500 B.C.), the Anasazi (A.D. 1-1300), the Navajo/Ute Settlement Period (A.D. 1450-1870) and Euroamerican settlement (A.D. 1870- Present). A number of contemporary Native American tribes have ancestral and traditional ties to the San Juan Basin. The test is of a short-term duration and will occur exclusively within the channel of the San Juan River. The nature of the proposed undertaking is such that it has no potential to cause effects to historic properties.

Because of the short-term duration, the reduced flows are not expected to significantly impact wetlands and riparian areas associated with the river. Wetted perimeter and water table reductions would be very short-term.

The trout fishery will be stressed by the lower flows, reduced useable habitat, and by higher water temperatures in lower reaches of the fishery. In a short test, these factors are most likely to occur downstream from the Citizens Ditch, the first major diversion on the river. The short duration of the test should prevent significant impacts from occurring although the test will be cut short if significant long-term impacts begin to occur. This will be determined in consultation with the New Mexico Department of Game and Fish. A reduction in wetted perimeter will cause a temporary reduction in aquatic insect numbers although the extent of this loss is difficult to quantify. Warm water fisheries occur further downstream near Farmington and extremely low

flows may occur in this area because of water diversions. For the short duration, fish in many areas should find adequate habitat in pools and other more permanent habitat. Fish resorting to such pools may be more susceptible to predation, disease, and fishing harvest.

Endangered species, including river fish, are not expected to be affected; the test flow regime will be similar to flows recommended by the SJRBRIP for the fishes. Temporary lower flows are not expected to affect habitat of the southwestern willow flycatcher which is a potential nesting species along the San Juan. If adverse effects are determined to be occurring on endangered species by the New Mexico State Office of the Fish and Wildlife Service the test will be terminated. The Fish and Wildlife Service has written that adverse impacts are not anticipated on endangered species.

Water levels in Navajo Reservoir will not be noticeably affected during the test and associated recreation, fisheries, and cultural resources should not be affected. Water quality will decline between the dam and Farmington as the dilution effects of high quality dam releases are reduced.

Float fishing in the trout fishery will be affected in two manners: lower flows will reduce the depth and navigability of the river and potential clients of commercial guides may avoid the river during the test. Walk-wade fishing effects are difficult to project. On one hand, publicity on the test may deter some anglers from fishing that week. On the other hand, lower flows often attract anglers as wading is easier and there is a belief that the lower flows may concentrate fish. Less effect should occur to recreational floating downstream from Farmington as inflow from the Animas River and other tributaries should keep flows above 500 cfs.

Publicity on the test may have an adverse effect on commercial recreation services and operations downstream of Bluff, Utah. Potential impacts to these areas include raft trip cancellations and merchant income such as store, motel, and vehicle shuttle businesses (99% of shuttles are operated by Native Americans and in many cases this is their only income). Other affected interests include restaurants, souvenir and recreation equipment rentals and sales.

Hydropower revenues would be reduced during the test as less water would be available to the city of Farmington for power generation.

Low flows in the San Juan River will not affect operation of the Navajo Indian Irrigation Project since project water is delivered directly from Navajo Reservoir. The Navajo Nation's Fruitland, Hogback, and Cudei irrigation project diversions on the San Juan River are located downstream from the confluence of the Animas River. No impact is expected to these diversions since flows of at least 500 cfs will be maintained in this reach of the San Juan River during the test. Due to the short duration of the test, future development of Indian Trust Asset water rights associated with long-term changes in reservoir operations will not be affected. The test is not expected to affect any treaty-based fishing, hunting, gathering, and similar rights of access and resource use on traditional tribal lands. Low flows may affect the ability to divert water upstream from

Farmington. The 250 cfs releases are estimated to be sufficient to meet water rights, but diverting these rights may be more difficult.

CONSULTATION AND COORDINATION

The draft and final EA's have been developed in cooperation with Indian Tribes, federal, state and local governmental agencies, non-profit organizations, area businesses and water users. The draft EA was released for review on March 28, 2001. Following its release, Reclamation held two public meetings regarding the proposed low-flow (250 cubic feet per second) test release from Navajo Dam.

The first meeting was held on April 4 in Farmington, New Mexico, and approximately 50 people attended. The representation included water user organizations, water users, commercial fishing guides, recreationists, local businesses, and public agencies (e.g., City of Farmington, New Mexico Interstate Stream Commission, San Juan Water Commission, and New Mexico Department of Game and Fish). Major concerns and issues included water quality, loss of power generation, difficulty diverting water, lack of water for water right holders; harm to the trout fishery below the dam, and loss of revenue for area businesses. Overall, there is significant public opposition to any long-term operations that would reduce releases below 500 cfs. Opinions on the short-term tests were mixed; many people opposed to long-term low flow releases supported the test as a means of showing the adverse effects of long-term 250 cfs releases.

The second meeting was held on April 5 in Bluff, Utah, and 15 people representing the rafting and local business community attended. Their primary concerns included sedimentation problems in lower reaches of the San Juan River (San Juan arm of Lake Powell) and low water problems in the river during the rafting season. Ideally, they would like to see 1,000 cfs in the river at and below Bluff, UT.

Approximately 35 written comments were received on the draft EA. Most commentors have strong opposition to releases from Navajo Reservoir falling below 500 cfs. Opponents represent a broad spectrum of the area---recreationists, irrigators, business people, and the general public. Some of the opponents supported the test itself--because the test would more clearly show the impacts of releases lower than 500 cfs. The Fish and Wildlife Service commented that they do not anticipate any negative impacts to threatened or endangered species, provided that the duration of the test and the conditions outline in the EA for terminating the test are followed. New Mexico Game and Fish Department opposed the test because of concerns for the trout fishery.

This final EA has been provided to the individuals and groups listed at the end of this section. A news release has also been mailed indicating the availability of the final assessment.

Comments on the draft EA were categorized into general groups as presented below. Reclamation's responses to the comments are included. Where appropriate, changes have also been made in the final EA to respond to comments.

NEPA Compliance and Alternatives

- 1. Comment:** The purpose of the test needs to be clarified.
Response: *The purpose of the low flow test is to allow Reclamation, local and state agencies, and the general public a better understanding of the effect of lowering releases from Navajo Dam to 250 cfs during the summer months. Results from the test will allow Reclamation to more accurately present impacts of the low releases in the EIS to be prepared on the operation of Navajo Reservoir.*
- 2. Comment:** EA needs to clarify that water development as well as endangered fish are driving the low flows.
Response: *The final EA has been clarified on this point. Reclamation is preparing an EIS on Navajo Reservoir operations to help meet flow recommendations to protect endangered fish and their critical habitat. Meeting these flow recommendations will in turn provide Endangered Species Act compliance for new water development and protect existing water uses. Reducing flows to 250 cfs at certain times in the summer and winter would serve several purposes: helping to maintain flows downstream from Farmington between 500 and 1,000 cfs for fish habitat, saving water for the following years spring peak, saving water for development, and following recommendations in Biological Opinions for other projects.*
- 3. Comment:** Does the U.S. Fish and Wildlife Service support the test?
Response: *The Fish and Wildlife Service, in its letter to Reclamation dated March 30, 2001, stated that "Provided the duration of the test and the conditions outlined in the DEA for terminating the test are followed, the U.S. Fish and Wildlife Service does not anticipate any negative impacts to threatened or endangered species". The low flows being tested have been included by the Fish and Wildlife Service in San Juan River biological opinions.*
- 4. Comment:** If the EA is revised to accurately assess impacts, it is hard to believe that an EA is the appropriate NEPA document.
Response: *The purpose of the EA is to identify impacts of the low flow test and then to determine whether or not a Finding of No Significant Impact is*

appropriate. This determination is not made until the final EA is completed. Reclamation believes that long-term operation changes involving a 250 cfs release will have significant impacts; however, low releases for a short-term test are not predicted to be significant.

5. Comment: What is the No Action alternative-is it realistic?

Response: *The No Action alternative in this case is simply not to conduct the low flow test. If this alternative is selected, minimum releases will be 500 cfs rather than 250 cfs during this test period. The EIS on Navajo Reservoir operations would be completed without benefit of observing directly the impacts of 250 cfs summer releases in the field. It is a realistic alternative.*

6. Comment: Editorial comments were suggested to better reflect actual language from the endangered fish flow recommendation report.

Response: *An editorial comment suggested include replacing “implementing flow recommendations” with “operating Navajo Dam to meet flow recommendations”. The use of the word “implement” is consistent with the Proposed Federal Action for the Navajo Reservoir Operations Draft Environmental Impact Statement as stated in the Federal Register notice dated October 1, 1999. As such, Reclamation will continue to use the word implement as part of the Federal Action for this EA and for the Draft EIS.*

A related editorial comment suggested changing the following sentence (found at the end of the first paragraph on page 3 of the draft EA) from “It is the position of the SJBRIP that these flow recommendations are necessary to protect and improve habitat of endangered fish in the San Juan River” to “It is believed by the SJBRIP that the flow recommendations will protect and improve habitat needed to recover endangered fish populations in the San Juan River.” The final EA will reflect this change.

7. Comment: The City of Farmington opposes any operation which would result in releases below 500 cfs, but does not oppose a 5 - 10 day test which will demonstrate the many harmful effects of a 250 cfs release.

Response: *The City believes that the low flow release test of 250 cfs will demonstrate the many harmful effects of low flow releases. The City plans to actively participate in the test, with their engineer being the point of contact. The City also plans to do cross section elevations of the river, water quality testing, and take video footage. The City will also operate their power plant during the test, to better determine if the low releases will damage their power facilities.*

8. Comment: Disapprove the test because of damage to the ecosystem, the economy, the fishery, water users and hydropower.

Response: *Various individuals expressed disapproval of the test because of the damage a 250 cfs release may cause. Reclamation feels the test is of a much shorter duration than would occur under the SJRBRIP flow recommendations, so impacts will be of a short-term nature. Reclamation will maintain the option of ending the test early if significant problems are foreseen with water diversions, aquatic resources, or other resources.*

Monitoring Activities

9. Comment: What efforts are being undertaken to encourage a factual test—if normal water use patterns (diversions) are altered during the test, how can the test be factual?

Response: *Every effort will be made to encourage a factual test. Reclamation personnel, in conjunction with representatives from various agencies and in conjunction with monitoring existing river gages, will be observing, monitoring, and measuring the river, diversion structures and recreation use from the dam to Bluff, UT. Reclamation believes the test will actually show how existing water use patterns must change in order to accommodate 250 cfs low flow releases.*

10. Comment: At a minimum, you should have several study sites established at fixed locations where scientists are collecting data before/during/after the test—that is the only way that you will be able to collect quantitative information.

Response: *Reclamation believes sufficient physical data exists, most of which was collected during the 1996-97 winter low flow test, on the river from the dam to Archuleta; therefore, most of our effort will be focused on collecting much needed information downstream of this point. Reclamation is planning on locating several study sites downstream of Archuleta, N.M. These study sites will be selected once the test has commenced. At each site, several physical characteristics of the river will be quantitatively measured and/or qualitatively assessed. It is hoped that the sites located will extend to the confluence of the Animas River. Each location assessed will be uniquely located so that the same set of measurements can be collected after the test associated with a 500 cfs dam release.*

11. Comment: How will the information from the test be evaluated and documented? What level of peer review will occur? Is the SJRBRIP the review entity?

Response: *The resource specialists gathering the various test data will submit in writing their findings, analysis, and conclusions for review by peers within Reclamation. Documentation will occur in written format and through video footage and still pictures. The SJRBRIP is not a review entity.*

12. Comment: The draft EA offers no detail on how Reclamation will monitor the river during the test to ensure that significant impacts are detected in a timely fashion - and the low flow test terminated should those impacts begin to occur.

Response: *Please reference the Final EA. It provides a more detailed explanation of how the river will be monitored to ensure that significant impacts are detected in a timely fashion. Reclamation staff and New Mexico state personnel will be on the river daily during the test to monitor effects.*

13. Comment: Please provide an explanation justifying the proposed length of the low flow test and why it is being conducted in July.

Response: *5 - 10 days was selected as the proposed length of the test in order to allow as much flexibility in the monitoring process as possible. It also provides a couple of days for the river to acquire equilibrium after the releases are ramped down to 250 cfs. In addition, the resource specialists monitoring the river need time to travel its length from the dam to Bluff, UT, observing and documenting any impacts. July was chose in order to allow time for the river to stabilize after the spring peak; because Animas River flows should still be high, thus maintaining needed flows downstream from Farmington; and because July should also have high air temperatures, so that impacts on water temperature can better be determined.*

14. Comment: One of the factors to terminate the test is a flow less than 500 cfs at the Farmington, NM gauge. Historic flow data both at Farmington, NM and at Bluff, UT should be provided to determine the difference in flows between the two stations and within the Glen Canyon National Recreation Area. Further, it would seem appropriate that flow measurements should be made at Bluff, UT and compared to the flows at Farmington NM. A threshold value should also be established at Bluff to accommodate recreational use.

Response: *One of the categories of the flow recommendations is to meet a target base flow (mean weekly non-spring runoff flow) of 500 cfs from Farmington to Lake Powell. This will be determined by monitoring USGS real time streamflows at Shiprock, Four Corners and Bluff. The USGS maintains these stations, so Reclamation will not need to take measurements of streamflows in this area.*

The San Juan Basin Hydrology Model was used in the evaluation of flow recommendations for the 1929 to 1993 hydrologic period. Gains and losses between Farmington and Bluff were analyzed as part of the natural flow development and were therefore incorporated into the flow recommendation analysis.

Recreation flow thresholds are addressed in Comment No. 35.

15. Comment:

The draft EA states that the test will not significantly impact San Juan River flows below the confluence of the Animas River. With no supportive data this conclusion is impossible to make. In addition, the draft EA states that inflow from the Animas River should keep flows above 500 cfs below Farmington. To understand the potential effect of such flows, the historic flows at this location should be specified so a comparison can be made.

Response:

River flows downstream from the Animas will be reduced by approximately 250 cfs during the test.

Historic Animas River forecasted runoff was compared to historic San Juan River flows to estimate the July 2001 flows at Bluff, UT. This was accomplished in the following way: A comparison of the May 2001 forecasted April-July runoff for the Animas River at Durango was made to the 1971-1999 historic Durango forecasts. Years with forecasted runoff within +/- 15% of 2001 forecasts were selected as representative of this year. The historic daily flows for these ten years were used in the following equation to estimate possible flows in the San Juan River near Bluff during the proposed test period, July 9th-18th:

$Bluff_{July2001} = \text{Available water at Farmington} - \text{loss between Farmington and Bluff}$ or $Bluff_{July2001} = Animas@Farmington + San\ Juan\ above\ Animas - [San\ Juan@Farmington - San\ Juan\ near\ Bluff]$

Based on calculations made from streamflow measurements collected in August 2000, it was estimated that a 250 cfs Navajo Dam release will result in a 150 cfs flow in the San Juan River above the confluence with the Animas River.

Results of this analysis showed that only 1 in 10 years failed to meet the 500 cfs minimum flow requirement at Bluff and therefore there is about a 90% chance that sufficient flows over 500 cfs will be available to allow the test to go forward. The test will be ended if flows go below 500 cfs.

16. Comment: What type of pre, during, and post set of studies are planning to be conducted in order to evaluate the results of the test; who is providing the quality control and peer review of the individual study plans; and who will write up the results of the test and provide them to the public?

Response: *The final EA, including this Consultation and Coordination section, provide more explanation of what type of pre, during, and post studies will be conducted. Individual study plans have been reviewed within Reclamation and with Cooperating agencies. Reclamation will write the results of the test and make the results available to the public.*

17. Comment: Monitoring should include water quality, fish habitat, macro invertebrates, and water temperature.

Response: *The duration of the test will be short and the data that is to be collected has been prioritized. It is likely not all of the information that Reclamation would like to have can be realistically collected during the test. Nevertheless, Reclamation anticipates the information collected can be applied to better understand the potential effects of the long-term reduced summer flow below the dam. Water quality, water temperatures and physical data will be collected. Reductions in wetted area will be identified that will be used to infer impacts to macro invertebrate populations. Reclamation has information pertaining to reductions in useable trout habitat within the Quality Waters section associated with a 250 cfs release. (The Quality Waters section is identified by the New Mexico Game and Fish Department as the first 4 miles of the fishery downstream from the dam.) Downstream from this point, this information does not currently exist. During the proposed test, this portion of the river will be evaluated in terms of physical changes to include changes in wetted perimeter and depth. The information obtained will be used to infer impacts to fish habitat.*

18. Comment: What specific plans exist to determine the return flow or recharge of the stream from irrigation water and to determine the quality of the return flow.

Response: *For this short test duration, actual return flows will not be sampled, but the river itself will be sampled at Archuleta, Blanco, Bloomfield, and Farmington. Additional samples may be taken between Archuleta and Bloomfield depending on sampling times from the BIA contractor. The return flows may be sampled/studied in the future, but permission and access is needed from the individual irrigation companies before sampling could occur.*

Return flows resulting from ground water drain-out of irrigation will not be measured. The more significant canal operation wastes will be

measured, but since that water has not been applied to land, that quality will be similar to the river water. Analysis of data collected during the test includes estimates of return flows as a percentage of the diversion requirement. Mass balance equations will be used to demonstrate the reasonableness of estimated return flows.

Irrigation, Domestic and Municipal Water Users

- 19. Comment:** The low flow test may fail to provide an adequate water supply to the irrigation and domestic water user associations and businesses that divert water directly from the San Juan River, especially, where the river divides and channels around an island, such as with the Lee/Hammond Water Plant diversion and pumping station.
- Response:** *The purpose of this test is to provide documentation of the effects of 250 cfs release on existing structures and associated usage. Existing significant agricultural and municipal and industrial diversions will be monitored extensively during the test. The State of New Mexico will also monitor the situation to ascertain that the required water will be released from Navajo Dam to meet needed downstream water right priorities.*
- 20. Comment:** Any manipulation or channeling of the river to provide water to any diversion structure will require approval and permits from the U.S. Army Corps of Engineers.
- Response:** *Generally, this is correct. There are, however, some irrigation diversion activities that have an exemption for certain channel work and normal operation and maintenance associated with structures. In most cases, work at the diversion structure would not require a separate U.S. Army Corps of Engineers permit - this work would be allowed under the Irrigation Districts exemption.*
- 21. Comment:** Reclamation should make available portable pumps during the low flow release for industrial and domestic diversions should the flow in the river channel not be in contact with diversion headings.
- Response:** *The purpose of this test is to provide documentation of the effects of 250 cfs release on existing structures and facilities. This would include positive and/or negative affects to municipal and industrial diversions. Providing pumps for these diversions would negate the actual effects of this test. In some instances, municipal and industrial districts do not have senior water rights to allow the pumping to be considered as a viable alternative to diversion. The State of New Mexico will also monitor the situation to ascertain that the required water will be released from*

Navajo Dam to meet needed downstream water right priorities.

22. Comment: Will there be personnel located at each irrigation take-off to evaluate whether water withdrawals are being impacted and how will this information be documented? What specific plans exist to determine the return flow or recharge of the river from water applied to the land, the quality of that flow, etc.

Response: *Reclamation personnel will monitor the significant diversions on a regular basis, beginning when the flows are reduced to 250 cfs. This monitoring information will be documented by photograph and included in the low flow test report.*

Return flows resulting from ground water drain-out of irrigation will not be measured. The more significant canal operation wasteway will be measured.

Analysis of data collected during the test includes estimates of return flows as a percentage of the diversion requirement. Mass balance equations will be used to demonstrate the reasonableness of estimated return flows.

23. Comment: Individuals have indicated that they would alter their normal irrigation practice in anticipation of the test which could yield results not consistent with the norm. Can you adjust your findings to reflect this canting of the results?

Response: *Reclamation plans to measure actual flows within the river at selected locations and also flows at associated significant water diversion structures. The measured water usage amounts at the diversion structures can be compared against historical usage data for comparison. Data can also be compared against historical dam releases and USGS gaging data.*

24. Comment: There is concern about the availability of water at the city of Bloomfield's diversion point during the test—this is the sole source of water for the community.

Response: *This is a great example of the purpose of the test. City of Bloomfield diverts its supply from Citizen's Ditch. Citizen's Ditch needs to divert about 170 cfs to meet water rights on the ditch. Can that be accomplished at river flows of 250 cfs? Reclamation will be monitoring these types of situations and will be prepared to respond to severe problems.*

25. Comment: Is Reclamation required to release water for senior rights in Utah on the San Juan? Does Reclamation have a legal obligation to provide San Juan River water to Lake Powell? The Navajo Nation has a new water

diversion project below Mexican Hat, UT—does Reclamation have to ensure enough water for this project?

Response: *Basic water right law would indicate that junior water rights must honor senior water rights; however, between states some type of interstate compact would be needed to implement this. Reclamation does not have an obligation to provide Navajo Reservoir water to Lake Powell. Navajo Reservoir authorized purposes do not include providing water to Lake Powell. Overall basin water supply is controlled by the Colorado River Compact and the Upper Colorado River Compact, which restricts New Mexico, Colorado, and Utah depletions. Therefore, some water has to travel to Lake Powell—depending on annual hydrology.*

The “new” diversion project referred to is work being done by the Navajo Nation to combine two existing diversions into one new diversion. This is not a new water use and will result in no additional depletions.

26. Comment: What happens if the test is stopped—where does the Navajo EIS (on long-term operations) data come from?

Response: *If there is not a low flow test (No Action alternative in the EA), the Navajo operations EIS will still be completed, based on the best available existing data. Data would depend more on modeling than actual observations; however, a 250 cfs winter release test has previously been completed and that study will provide information. Effects on irrigation and municipal diversions will be based on modeling as will water quality determinations.*

Economics

27. Comment: July is the peak of the normal business season for entities benefitting from recreation on the San Juan River, so a great number of cancellations will probably occur. Is there a study planned to evaluate the impact economically?

Response: *Data will be gathered during and after the test to estimate impacts. Recreation related businesses and the Bureau of Land Management will be contacted before the test requesting that they monitor any changes in business activity or trip cancellations resulting from the low flow test. Estimates of recreation related revenue losses will be requested from those directly impacted (outfitters) as well as indirectly affected recreation support industries (lodging, restaurants, shuttle services, etc.). Transfers of trips to other sites and re-bookings to other times will not be considered as losses.*

28. Comment: Since there could be considerable economic impact to the area resulting from changes in angler use during the test, we request that Reclamation

include an analysis of the potential economic impacts that may result from conducting the test.

Response: *Estimates of impacts will be based on responses from guides, New Mexico Parks and Recreation, actual surveys taken by New Mexico Game and Fish and on-site monitoring during the low flow test. These impacts will be extrapolated to include indirect impacts on recreation support industries such as lodging, restaurants, retail tackle and equipment sales, etc.*

30. Comment: There are concerns with loss of hydropower production and revenues during the test and if long-term operations are changed.

Response: *The city of Farmington will monitor hydropower generation at their Navajo Dam power plant to determine reduction in hydropower production as well as damage that may occur to the turbines as a result of low flows. Farmington has estimated losses in generation and replacement costs for power due to low flow operations for the ten year period 2001-2010. Their estimated present value cost for replacement power for the 10 year period amounted to approximately \$36 million.*

Recreation

31. Comment: Because of the extreme low flows, float fishing will be totally affected in the tailwater area.

Response: *This will be monitored; it has been argued by some guides that 500 cfs is the minimum flow to conduct successful recreational Dory boat floats for fishing.*

32. Comment: The draft EA identified negative impacts to commercial recreational services and operations downstream of Bluff, UT. All of these negative impacts can also be expected for the cold water commercial services and should be included in the final EA.

Response: *You are correct and they will be included in the final EA.*

33. Comment: River monitoring should be expanded to include the river below Bluff, UT, and the EA should generally quantify the magnitude of impacts to this area of the river and specify why these impacts are not considered significant. In addition, it is essential to describe the historic flows at Bluff.

Response: *The river will be monitored below Bluff during the low flow test. The goal will be to keep flows above 500 cfs. Because of the anticipated and mandatory flows to the river in this area, significant impacts from a 250 cfs decrease in flow are not expected on rafting.*

Historic flows and impacts at Bluff will be described in the EIS.

34. Comment: The EA should acknowledge that the National Park Service likely has Federal Reserved Water rights (as yet unquantified) along the San Juan River with the Glen Canyon National Recreation Area and one of the purposes of the low flow test will be to determine if 250 cfs flows would violate those rights.

Response: *Reclamation is conferring with National Park Service water right experts to determine if there is a right and if long-term operations of Navajo Reservoir could be affected by the right. This issue will be addressed in the operations EIS.*

35. Comment: From a river rafting point of view around Bluff, even 500 cfs is too low; Bluff flows need to be around 1,000 cfs. A recreational threshold value for flows at Bluff should be established.

Response: *Designating a recreational threshold flow for recreation on a river is not a function of the Bureau of Reclamation. Minimum rafting flows vary with type of equipment, experience of the recreationist, type of trip and other factors. Minimum flow needs varying between 500 and 1,000 cfs have been mentioned at public meetings.*

36. Comment: It seems essential that the low flow test include an evaluation of the effects on recreational boating downstream from Bluff, especially at the Clay Hills Crossing take-out in the Glen Canyon National Recreation Area.

Response: *There is a siltation problem in the Clay Hills area. Clay Hills actually is within the high water area of Lake Powell. When the lake drops, silt deposits interfere with boating and this is a more difficult problem at low flows. An evaluation of this problem is beyond the scope of the EA; however if impacts occur at the site, they will be recorded in the low flow test report.*

Trout Fishery

37. Comment: Rapidly decreasing stream flows can lead to stranding of fish as declining water levels leave previously-occupied habitats without water. The draft EA does not address whether the proposed ramp-down of 250 cfs over four hours is adequate to allow fish to adjust to the changing stream channel. The EA also does not identify the rate of the ramp (increment per hour).

Response: *The ramp rate is 200 cfs per 2 hours. The proposed ramping rate identified in the draft EA was formulated with the New Mexico Department of Game and Fish's input. This is the same ramping rate used*

in 1996-97 when Reclamation conducted the Winter Low Flow Test when the effects of the same two flow (500 vs 250 cfs) releases were compared. There were no significant losses of fish associated with stranding associated with decreasing releases nor does Reclamation believe that will occur during the proposed test. Still, areas immediately downstream of the dam will be monitored as flows are reduced to identify areas where trout may be stranded. If they cannot be effectively relocated at a 250 cfs release and if the total numbers stranded are deemed a significant potential loss, this would be grounds to terminate the test.

38. Comment: Reduced flows may dry up portions of riffles that support substantial macro invertebrate production, reducing the food base for the trout fishery until the macro invertebrates are able to re-establish in those areas. Reclamation should try to quantify the loss.

Response: *Reclamation does not believe food supply (macro invertebrates) to be a significant limiting factor to the trout fishery. During the 1996-97 Winter Low Flow Test, trout health was assessed before, during and immediately after the 250 cfs test. There was no appreciable loss in the condition of the trout (length to weight ratio) during this period demonstrating that food supply was not affected to the point of becoming a limiting factor to trout. Loss of wetted area was calculated during the 4 month test and there was a corresponding loss to macro invertebrate habitat. That loss has been acknowledged but has been deemed insignificant in the winter low flow test in that there was no corresponding loss in trout production. Downstream from Citizen's Ditch the loss of wetted area and supported macro invertebrates would be expected to be greater. Macro invertebrate populations recover quickly once adequate flow has been restored. While the impact below Citizen's Ditch may be relatively extreme, it is anticipated benthic communities would recovery quickly. Under a worse case scenario, while aquatic insect populations recover, the trout within this section of the river may lose weight but would not perish. This would be a relatively short-term impact with all trout recovering fully within a relatively short time frame.*

39. Comment: The cold water trout fishery extends at least 15 miles downstream from Navajo Dam and not the 7 miles stated in the draft EA. The trout fishery is more than significant, as stated in the draft EA, it is considered to be one of the best Rainbow trout fisheries in the lower 48 states, possibly in the top 5 cold water resources.

Response: *Agreed, however, fishing decreases below the 7 mile mark.*

40. Comment: If young-of-the-year trout are occupying marginal habitats along the margins of the river, those habitats will be lost as the flows are reduced.

Are these impacts (i.e., stranded and habitat desiccation) going to be evaluated?

Response:

Although some natural reproduction takes place by rainbow trout, essentially the only trout species in the Quality Waters portion of the fishery, this section of the river is largely supported through the regular stocking of fingerling rainbow trout. (The Quality Waters section is identified by the New Mexico Game and Fish Department as the first 4 miles of the fishery downstream from the dam.) Also, the reduction in flow to 250 cfs, while reducing habitat for adult rainbow trout, actually increases available habitat for fingerling trout; therefore, impacts to young-of-the-year trout within this section of river would be negligible. There may be some effect to young-of-the-year habitat for brown trout, primarily downstream of Citizen's Ditch, however, entrainment of small fish in ditch diversions has much greater impact to small life stages than would habitat loss within the river.

41. Comment:

Reclamation needs to clearly define "significant trout losses" in the EA. In addition, Reclamation should develop specific parameters to protect against "significant trout losses" that if exceeded would require termination of the test.

Response:

Reclamation does not believe that "significant" trout losses will occur within the Quality Waters section (identified by the New Mexico Game and Fish Department as the first 4 miles downstream from the dam) of the trout fishery. Reclamation is concerned that trout downstream of major diversions may be lost to some degree. The significance of this potential loss is somewhat debatable. While there are "pockets" of trout (primarily brown trout) downstream of Citizen's Ditch, public access to anglers is extremely limited. Virtually all of the land on both sides of the river is private and permission to access the river for recreational fishing is required. Float fishing does occur and is permissible under New Mexico State law as long as the anglers do not leave their boat. Still, compared to fisherman use upstream of Citizen's Ditch, recreational fishing below this diversion is very low.

With only a few exceptions, losses to the trout population below Citizen's Ditch would not likely result in significant losses in angler days. The trout, in particular brown trout, are self sustaining due to successful natural reproduction and recruitment. They are; however, not a native species and were introduced for the recreational fisherman to use for their enjoyment.

From an ecological standpoint, losses to this population are not as significant as losses to native fish, although from a recreational fishing

standpoint, large losses of trout would likely result in reduced numbers of fish caught. Reclamation has committed to collecting numerous large trout from this portion of the river prior to the test and to return fish immediately after the test is finalized. This effort would be coordinated with the New Mexico Department of Game and Fish. Also, Reclamation would contribute monies not to exceed \$25,000 for the acquisition of fingerling trout (2-4 inches) to stock downstream of Citizen's Ditch. Also, Reclamation will work with water diversion companies to encourage them to minimize flow depletions to the San Juan River without jeopardizing their legal water rights. Last, several water quality parameters would be monitored during the test to anticipate and avoid (stopping the test) significant losses to the existing trout fishery.

42. Comment: Reclamation needs to consider mitigation for all fish losses below Navajo Dam to restore the trout population as soon as possible to minimize recreational and economic impacts.

Response: *See response to Comment No. 41 describing Reclamation's proposed fishery plan.*

43. Comment: It is unclear if this test is also to evaluate the potential impact to the blue ribbon trout fishery below Navajo Dam and irrigation users.

Response: *The test would indeed include monitoring the trout fishery downstream from Navajo Dam although there currently exists a lot of information pertaining to the Quality Waters section (identified by the New Mexico Game and Fish Department as the first 4 miles of the fishery downstream from the dam) collected in 1996-97 and through the winter of 2000-2001. Also, a trout health assessment will be conducted later this summer (August) to collect information pertaining to the relative health of the trout fishery during summer conditions. This assessment will be compared to similar assessments done at other times of the year.*

44. Comment: Where are the six locations for temperature modeling and are they habitat or spatially specific?

Response: *The six temperature recorders are located at the dam and at five other locations downstream to the Hammond Diversion, a river distance of about 15 miles. At this time, Reclamation will utilize the temperature data for impact assessment but will not develop a temperature model.*

45. Comment: Minimum flows in the trout section should be 500 cfs and we would prefer an average of 600-900 cfs.

Response: *It is recognized that a 500 cfs "minimum release" would provide better conditions for the trout fishery than 250 cfs. However, there is no established minimum set for the river and New Mexico does not have an*

instream flow water right law. Lowering releases to 250 cfs at different times of the year will allow both endangered fish recovery and water development to continue as well as protect existing water uses. Long-term operations will be evaluated in the upcoming Navajo operations EIS.

46. Comment: The New Mexico State Game Commission is opposed to the test because of impacts to the trout fishery. It recommends that the test be terminated if certain water quality parameters are reached—pH should stay between 6.6 and 8.8, dissolved oxygen above 6.0 mg/l, and temperature below 23 degrees Centigrade. It believes that if the test is conducted, Reclamation must be prepared to mitigate for all trout losses to minimize recreation and economic impacts.

Response: *See response to Comment # 41 describing Reclamation’s proposed fishery plan. Input from New Mexico Game and Fish Department will be used to help determine if test needs to be terminated. Reclamation and New Mexico Game and Fish Department will be monitoring the river daily in order to make these determinations.*

47. Comment: If monitoring indicates that suggested water quality thresholds are exceeded or if there are trout losses due to stranding or loss of habitat, New Mexico Game and Fish will recommend to Reclamation that the test be terminated.

Response: *Reclamation will fully consider a recommendation to stop the test from the New Mexico Department of Game and Fish based upon the supporting data and the degree of loss.*

48. Comment: New Mexico Game and Fish recommends that mitigation should be based on the number of dead trout observed, whether or not we know the loss to be “significant”. A mitigation plan was suggested consisting of stocking at various size fish and at various ratios, depending on the size of fish stocked.

Response: *See response to Comment # 41 describing Reclamation’s proposed fishery plan, which is part of the overall low flow test plan..*

49. Comment: On one hand the tests will reveal potential serious impacts from permanent reoperation to 250 cfs summer releases, thereby providing important information; on the other hand we are gravely concerned about the test’s adverse impacts to the river, particularly downstream from Citizen’s Ditch.

Response: *Reclamation understands the public’s concern regarding adverse impacts to the river, especially downstream from Citizen’s Ditch. Reclamation will conduct river, temperature, and water quality monitoring at certain locations along the river in order to identify adverse conditions before*

they occur. In addition, Reclamation will implement certain plans to lessen any impact to the trout fishery, especially below Citizen's Ditch. Please reference Response No. 41 for more specific information related to monitoring and fisheries.

- 50. Comment:** The low-flow test will not reveal the full extent of impacts of reoperation—chronic problems will not be apparent and the reduction in sediment transport will not be evaluated during the short test.
- Response:** *The primary reason the test will be of short duration is to avoid having a long-lasting impact to resources associated with river flow. During the test, physical changes to the river will be monitored and measured. In turn, this information will be used to more accurately predict the effects of a longer duration reduced summer flow and incorporated into the Navajo Operations EIS.*
- 51. Comment:** The self-sustaining brown trout population downstream from Citizen's Ditch will require many years to recover.
- Response:** *This population would be more difficult to recover than the upstream fishery which is supported by stocking, primarily with rainbow trout. See response to Comment # 41 describing Reclamation's proposed plan for fisheries.*
- 52. Comment:** Statements such as “the test may stress fish” or “float fishing may be affected” are inaccurate. Clarify that these resources will be affected.
- Response:** *The text within the EA has been changed to incorporate your comment.*
- 53. Comment:** The aquatic food base will be adversely affected during the test; will this be monitored –by monitoring changes in drift and emergence?
- Response:** *Reclamation does not plan to specifically study the effects to macro invertebrate populations during the proposed test. Reclamation does not believe that aquatic food base, principally macro invertebrates, is a limiting factor to the trout fishery. This is based on studies conducted in 1996-97 which showed no appreciable loss of the ratio of weight to length in trout (condition factor) during the 4 month winter low flow test. While a minimal loss to macro invertebrates will occur, it will recover soon after the test is over. If a longer summer low flow occurs in the future, pending the selection of a preferred alternative in the Final EIS, the corresponding effect to trout would be assessed.*
- 54. Comment:** Depending on the stratification in Navajo Reservoir at the time of the test, low dissolved oxygen conditions may exacerbate the stress that the trout experience.
- Response:** *Releases from Navajo Dam are well below any developing thermocline in*

Navajo Reservoir so water would not be released from the epilimnion where elevated water temperatures could further impact trout. Also, based on a full years cycle of limnological studies done on Navajo Reservoir in 2000, dissolved oxygen levels below the thermocline within the hypolimnion are never low enough to impact the downstream fishery.

Other Fish and Wildlife Resources and Endangered Species

55. Comment: Even though the low flow test is for a limited amount of time, if young-of-the-year native fish are in flow sensitive habitats the impact on the 2001-year class could be significant. This should be addressed in the EA.

Response: *There are very few backwater habitats between the dam and the confluence of the Animas River. Any young-of-the-year native fishes present the first part of July would more likely be in other low velocity habitats. It is much more likely that losses caused by the entrainment of young of year native fish in existing diversions has and will continue to be much more of a factor than flow depletions.*

56. Comment: Timing of the flow test may also be important in respect to the Southwest Willow Flycatcher if the young birds are fledging or if they are exposed to food reductions. In July the daytime thermal conditions are likely to be very warm in the lower San Juan river, which will mean that the aquatic insects in the exposed areas will be desiccated quickly, removing a portion of the aquatic insect food base from the adult willow flycatcher diet. Has an estimate been made on the amount of area that is likely to be desiccated along the riparian/river corridor during the low flow test?

Response: *The Fish and Wildlife Service has indicated that they do not believe that the low flow test will adversely affect any threatened or endangered species, including the southwestern willow flycatcher. The amount of river bottom exposed has been estimated for the river's first 7 miles downstream from Navajo Dam. The test will allow for a better determination of this factor in the downstream reaches to the city of Farmington. Downstream from Farmington and the Animas River confluence significant changes are not expected because the test is timed to coincide with high flows in the Animas River. A biological assessment and biological opinion will be prepared as part of the Navajo Reservoir Operations EIS and these documents will discuss the effects of long-term operation changes on the flycatcher and other endangered species. The low flow test will provide information for these documents.*

57. Comment: We are troubled by the fact that proposed target flows for lower reaches of

the San Juan (500 cfs) are not based on the biological needs of endangered fish-the biology committee report includes habitat curves indicating that backwater habitat is maximized not at 500 cfs, but at 900-1,000 cfs. Using the upper end of that spectrum would be more beneficial to endangered fish and better protect trout.

Response: *The flow recommendation report for the San Juan River prepared by the biology committee states “Target base flow (average weekly) following spring peak is 500 cfs at Farmington, Shiprock, Four Corners, and Bluff gages, measured as the average of any two of these gages. Minimum release is 250 cfs. The target flow should be maintained between 500 and 600 cfs, attempting to maintain target flows closer to 500 cfs.”*

58. Comment: Have you given some thought to the potential for the spreading of tamarisk seeds during this time period?

Response: *This has not been considered a significant issue for the low flow test itself. Exposed areas, particularly between Citizen’s Ditch and Farmington, may provide a seed bed for invasive species; however, when the short test is completed these areas will be rewatered, drowning out any germination.*

59. Comment: Provided the duration of the test and the conditions outlined in the EA for terminating the test are followed, the Fish and Wildlife Service does not anticipate any negative impacts to threatened or endangered species.

Response: *This comment is taken from a U.S. Fish and Wildlife Service letter to Reclamation dated March 30, 2001. The Service was writing in response to a request from Reclamation on potential concerns for threatened or endangered species during the proposed summer low flow test.*

Water Quality

60. Comment: Monitoring for key water quality parameters should take place at locations from Navajo Dam to Farmington. Where will this monitoring occur and what type of flow information will be collected (hourly, average, daily, etc.)? Also, water quality samples should be collected from the river above its confluence with the Animas River regardless of the flow at Shiprock, NM.

Response: *Water quality samples will be taken at Archuleta, Blanco, Bloomfield, and Farmington during the first week of the test. The parameters to be sampled include all those found in the New Mexico State Standards under the Irrigation, Livestock, Wildlife habitat, and Fishery standard sections. They include, but are not limited to physical parameters like pH, conductivity, temperature, turbidity, and discharge; trace element parameters, including most common metals (dissolved, totals, and*

selenium in total recoverable); major cations and anions; a few general radiometric and organic parameters. The samples will be taken according to USGS depth-integrated procedures. Flow discharge measurements will be taken just before or after the time of sampling for all samples. In addition, a fecal coliform sampling plan will be conducted which includes taking samples at Archuleta, Blanco, Bloomfield, Lee Acres, and Farmington.

61. Comment: The draft EA mentions sampling of water quality in Navajo Reservoir. What set of limnological conditions will be monitored and will Reclamation evaluate changes to the thermal stratification of the reservoir. It would also be helpful to explain how the water quality data for the reservoir will be used to assess impacts of alternative dam operations.

Response: *Navajo Reservoir will not be sampled during the test. Adequate information has already been collected. A full limnological suite of analyses was performed on Navajo Reservoir, which included nutrients (NO₃+NO₂-N, NH₃-N, TKN, orthophosphate, Total P), Hydrolab profiles (temperature, dissolved oxygen, pH, conductivity), Secchi depth, biological indicators (phytoplankton, zooplankton, chlorophyll a), major ions (Ca, Mg, Na, K, SO₄⁼, Cl⁻, HCO₃⁻), total organic carbon, and trace metals (23 metals). Samples were collected on a quarterly basis during the calendar year 2000, and thermal stratification was monitored using Hydrolab depth profiles. Nutrient, dissolved oxygen, and temperature data are currently being assessed to determine any potential water quality impacts downstream of Navajo Dam.*

62. Comment: We are concerned with the increased sediment in the river at the low flow level which will adversely affect the City of Bloomfield's reservoir and could affect the quality of drinking water.

Response: *During the low flow test, turbidity will be monitored along the river at the water quality sampling locations (Archuleta, Blanco, Bloomfield, and Farmington). It is anticipated that at lower test flows, turbidity will be lower due to the decrease in velocity and sediment dropping out of suspension. The city of Bloomfield reservoir should not be significantly impacted during the 5-10 day low flow test because of the length of canal water has to travel and the lower turbidity in the river.*

If a thunderstorm occurs over Gobernador Wash watershed, then sediment into the Citizen's Ditch diversion and the river will increase, but the difference between 500 cfs and 250 cfs in the river would probably not significantly alter the effects of the event. Events like this have occurred in the past and will continue to occur with or without the flow test.

Drinking water in the reservoir should not be significantly impacted due to lower turbidity and the quality of water from the river will be similar to historical values. Water quality sampling will be performed at Archuleta during the test. Parameters sampled for include pH, conductivity, temperature, major cations and anions, and trace metals.

63. Comment: Fecal coliform sampling should be done when Navajo Dam releases are at 500 cfs as well as 250 cfs to evaluate relative effects, if any, of release rates on fecal coliform concentrations.

Response: *Fecal coliform sampling is scheduled to be done during the low flow test at least once at Archuleta, Blanco, Bloomfield, Lee Acres, and Farmington. The river segment from Blanco to Farmington is out of compliance for fecal coliform and the State of New Mexico Environmental Department will begin extensive studies on fecal coliform next year in this segment. Since fecal coliform has a wide range of values and is more dependent on precipitation events, no other sampling is scheduled at this time.*

64. Comment: Will the return flow from septic and other sources be monitored?

Response: *Return flows from septic systems or waste treatment plants will not be monitored, however several places in the San Juan River will be monitored for fecal coliform (Archuleta, Blanco, Bloomfield, Lee Acres, and Farmington).*

65. Comment: Water quality measurements should be made at Bluff, UT, and water quality tests should occur before and after the test for comparison.

Response: *Water quality sampling is not scheduled at this time for Bluff, Utah. It is anticipated that inflows from the Animas River will be large enough to keep flows at the Bluff USGS gage within historical values. The historical water quality samples collected at this gage will be used as a reference for the low flow test and EIS.*

SUMMARY

The potential for significant impacts to a variety of resources from long-term low flows in the San Juan River is recognized. The short-term test is not expected to result in significant impacts; however, because there are provisions to terminate the test under certain conditions. The test is expected to provide valuable information to evaluate long-term impacts of changes in the operations of Navajo Dam.

Distribution List for Final Environmental Assessment (via E-mail or hard copy):

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R. L. Stockard, Bloomfield, NM
Leo Watchman, Jr., Navajo Dam, NM

Federal Agencies

Bureau of Indian Affairs, Albuquerque, Farmington, and Shiprock, NM; Towaoc, CO; and Window Rock and Chinle, AZ
Bureau of Land Management, Farmington, NM, Moab, Monticello, and Bluff, UT,
Environmental Protection Agency, Dallas, TX and Denver, CO
National Park Service, Glen Canyon National Recreation Area, Page, AZ
National Weather Service, Grand Junction, CO; and Salt Lake City, UT
U.S. Army Corps of Engineers, Albuquerque, NM and Sacramento, CA
U.S. Fish and Wildlife Service, Albuquerque, NM; Denver and Grand Junction CO; and Salt Lake City, UT
U.S. Geological Survey, Durango and Grand Junction, CO; and Albuquerque, NM

American Indian Tribal Governments

Jicarilla Apache Nation, Dulce, NM
Southern Ute Indian Tribe, Ignacio, CO
The Navajo Nation, Window Rock and Fort Defiance, AZ
Ute Mountain Ute Tribe, Towaoc, CO

State Agencies

Colorado Division of Wildlife, Durango and Grand Junction, CO
Colorado Division of Water Resources, Durango, CO
Colorado Water Conservation Board, Denver CO
Colorado State Parks, Arboles, CO
Colorado Water Quality Control Commission, Durango CO
New Mexico Department of Game and Fish, La Plata, Navajo Dam, and Santa Fe, NM
New Mexico State Parks, Navajo Dam, NM
New Mexico Interstate Stream Engineer, Santa Fe, NM

New Mexico Department of the Environment, Santa Fe, NM
University of New Mexico, Albuquerque, NM
Utah Department of Natural Resources, Salt Lake City, UT
Utah Division of Wildlife, Salt Lake City, UT

Cities and Counties:

Archuleta County Board of Commissioners, Pagosa Springs, CO
City of Aztec, Aztec, NM
City of Bloomfield, Bloomfield, NM
City of Farmington, Farmington, NM
La Plata County Commissioners, Durango, CO
La Plata County Sheriff, Durango, CO
Rio Arriba County Commissioners, Espanola, NM
San Juan County Commissioners, Aztec, NM
San Juan County Emergency Coordinator, Aztec, NM

Water Districts & Companies

Blanco Water Users Association, Blanco, NM
Bloomfield Irrigation Ditch Company, Blanco, NM
Hammond Conservancy District, Bloomfield, NM
Jaquez Ditch, Blanco, NM
Lee Acres Water Users Association, Farmington, NM
Lower Valley Water Users, Kirtland, NM
Manzanaris Turley Ditch, Blanco, NM
Navajo Dam Water Users Association, Navajo Dam, NM
Navajo Nation Irrigation Committee, Waterflow, NM
San Juan County Rural Domestic Water Users Association, Flora Vista, NM
San Juan Soil & Water Conservation District, Farmington, NM
San Juan Water Commission, Farmington, NM
Shiprock Irrigation, Shiprock, NM
Southwestern Water Conservation District, Durango CO
Turley Ditch Company, Blanco, NM
Upper La Plata Water Users Association, La Plata, NM
Velarde Community Ditch Project, Velarde, NM
West Hammond Water Users Association, Bloomfield, NM

Organizations

Arizona Public Service, Four Corners Powerplant, Fruitland, NM
BHP Minerals, Farmington, NM
Bio/West Inc., Logan, UT
Bloomfield Refining Company, Bloomfield, NM
Bloomfield Schools, Bloomfield, NM
Canyonlands Field Institute, Moab, UT
Canyon R E O, Flagstaff, AZ
Colorado River Alliance, Durango, CO
Conoco Inc., Bloomfield, NM
David Evans and Associates, Inc., Portland, OR
East Africa Studies Group, Durango, CO
Ecosystems Research Institute, Logan, UT
El Paso Field Services, Farmington, NM
Giant Industries, Inc., Bloomfield, NM
Glen Canyon Action Network, Moab, UT
Greene, Meyer & McElroy, Boulder, CO

Farmington Electric Utility System, Farmington, NM
Habitat Inc., Laramie, WY
Hall, Pints and Associates, Loveland, CO
Harris Water Engineering Inc., Durango, CO
Keller-Bliesner Engineering, Logan, UT
Maynes, Bradford, Shipps & Sheftel, Durango, CO
William Miller Engineers, Inc., Santa Fe, NM
Miller Ecological Consultants, Inc., Fort Collins, CO
Modrall, Sperling, Roehl, Harris & Sisk, Albuquerque, NM
Native American Pastorial Textile Project, Santa Fe, NM
Navajo Agricultural Products Industry, Farmington, NM
Nordhaus Law Firm, Santa Fe, NM
Piedra Metropolitan Improvement District, Arboles, CO
Ptmigan Resources and Energy, Inc., Aspen, CO
Public Service Company of New Mexico, Waterflow, NM
Rothstein, Donatelli, Hughes, Dahlstrom, Schoenburg, Albuquerque, NM
San Juan Audubon Society, Durango, CO
San Juan Fly Fishing Federation, Farmington, NM
San Juan Shrine Club, Farmington, NM
Trout Unlimited, Mesa, AZ; and Boulder, CO
Tully & Jolley, Farmington, NM
Williams Field Service, Bloomfield, NM

Media

Albuquerque Journal, Albuquerque, NM
Albuquerque Tribune, Albuquerque, NM
Associated Press, Albuquerque, NM
Cortez Journal, Cortez, CO
Daily Times, Farmington, NM
Denver Post, Denver, CO
Durango Herald, Durango, CO
Four Corners Flyer, Farmington, NM
Gallup Independent, Gallup, NM
Navajo Times, Window Rock, AZ
New Mexican, Santa Fe, NM
New Mexico Great Outdoors, Albuquerque, NM
Mancos Times Tribune, Mancos, CO
Pagosa Springs Sun, Pagosa Springs, CO
Pine River Times, Bayfield, Co
Southern Ute Drum, Ignacio, CO
Times Independent, Moab, UT
KDGO Radio, Durango, CO
KIQX/KRSJ/KIUP Radio, Durango, CO
KKFG Radio, Farmington, NM
KSUT Radio, Ignacio, CO
KPRN Radio, Grand Junction, CO
KENN/KRWN Radio, Farmington, NM
KISZ Radio, Durango, CO
KLLV Radio, Hesperus, CO
KRTZ/KVFC Radio, Cortez, CO
KSJE Radio Farmington, NM
KTRA Radio, Farmington, NM

KTNN Radio, Window Rock, AZ
KWUF Radio, Pagosa Springs, CO
KWYK-KNDR Radio, Farmington, NM
KOAT-TV, Albuquerque and Farmington, NM
KREZ-TV, Durango, CO

Individuals/Companies

Hugo Ableson, Fly Fishing School & Guide Service, Santa Fe, NM
Allen Adkins, Farmington, NM
Eric Anaya, New Mexico Fly Fishing, Navajo Dam, NM
Lloyd Ayliffe, Bloomfield NM
Curtis Bailey, Born-N-Raised on the San Juan River Inc., Navajo Dam, NM
Esmerlindo Barela, Farmington, NM
Ron & Marilyn Barrier, Alamosa, CO
Scott Beasley, Bloomfield, NM
Gene Benton, Navajo Dam Enterprises, Navajo Dam, NM
Bruce Berman, Sierra Vista, AZ
Michael Black, Durango, CO
Will Blanchard, Animas Valley Anglers, Durango, CO
Tommy Bolack, Farmington, NM
Clayton Bond, Kirtland, NM
John Bricker, Monte Vista, CO
Tom Burkiewicz, Colorado Outward Bound School, Jensen, UT
Kate Burnett, Los Alamos, NM
Aaron & Jill Carithers, Anasazi Angler, Inc., Durango, CO
Don Carlson, Farmington, NM
Lawrence Cata, San Juan Pueblo, NM
Steve Chavez, Blanco, NM
Tim Chavez, Born-N-Raised, Navajo Dam, NM
Ralph Clark, III, Gunnison, CO
Rob Cliffard, Fruitland, NM
Steve Cone, Farmington, NM
Cy Cooper, Farmington, NM
Jan Crawford, SW Fly Fishers, Santa Fe, NM
Mike Crowley, Navajo Dam, NM
James Custer, Wit's Inn Guest Ranch, Bayfield, CO
Dam Fly Girls, Navajo Dam, NM
Rob Degner, Mountain States Guide Service, Navajo Dam, NM
Mike Dehoff, Colorado Outward Bound School, Moab, UT
Joe Delling, Duranglers, Navajo Dam, NM
Charlie Delorme, Wild River Expeditions, Bluff, UT
Jeremy Dugger, Bloomfield, NM
William Dunn, Del Norte, CO
Jim Dyer, Hesperus, CO
Nancy Eaves, Sportsman Inn, Navajo Dam, NM
Richard Eckstein, Bloomfield, NM
Rob Elliott, Arizona Raft Adventures, Flagstaff, AZ
Terry Fitzgerald, Bayfield, CO
Chuck Freeland, Colorado Outward Bound School, Denver, CO
Dave Frick, Fort Collins, CO
H. Paul Friesema, Evanston, IL
Chris Garcia, Villa Nueva, NM

Les Goebel, Bloomfield, NM
Edmund Gomez, Alcalde, NM
Susan Goodan, Albuquerque, NM
Megan Graham, Durango, CO
Matt Gross, Moab, UT
Christopher Guikema, Resolution Guide Service, Durango, CO
David Gulliam, Back Country Outfitters, Pagosa Springs, CO
Janet Gzybowski, Soaring Eagle, Navajo Dam NM
Steve Hamilton, Geological Survey Board, Yankton, SD
Duke Hayduk, Bluff, UT
Mac Heard, New Mexico School of Diving, Farmington, NM
Dee Holladay, Holiday River Expeditions, Inc., Salt Lake City, UT
Jim Hook, Recapture Lodge, Bluff, UT
Ricky Hooley, Rocky Mountain Anglers, Navajo Dam, NM
Gary Horner, Farmington, NM
Dan Israel, Payson, AZ
Dave Jaquez, Cottonwood Anglers, Blanco, NM
Frank Jesmer, San Juan Marina, Arboles, CO
Chris Jimerson, Aztec, NM
Tim Jimerson, Navajo Dam, NM
Rick Johnson, Southwest Rivers, Flagstaff, AZ
Clay Johnston, Farmington, NM
Raymond Johnston, Float'n Fish, Navajo Dam, NM
Bob Jones, San Juan Expeditions, Moab, UT
Elizabeth Kaime, Farmington, NM
Andy Kim, Navajo Dam, NM
Susan Kimbler, Durango, CO
Brian Klien, Outwest Anglers, Navajo Dam, NM
Tom Knopick, Duranglers, Durango, CO
Justin Krauss, Native Guide, Evergreen, CO
Steve Krest, Marvel, CO
Fred Kullman, Santa Fe, NM
Gwen Lachelt, Durango, CO
Harry Lane, San Juan Troutfitters, Farmington, NM
Mike Latschar, Farmington, NM
Gary Ledbetter, Farmington, NM
Gretchen Lee, Enchanted Highway Lodge
J.O. Lewis, Alamosa, CO
Buddy Locke, Handy Bait Tackle Shop, Aztec, NM
James Maes, Abes Motel & Fly Shop, Inc., Navajo Dam, NM
Rebecca Martin, Ross River Ed Ventures, Monticello, UT
Art Martinez, Arcom Outfitting and Guide Service, Farmington, NM
Onesimo Martinez, Blanco, NM
Palemon Martinez, Valdez, NM
Keith McAuley, Durango, CO
Marsh McComb, Navajo Dam, NM
Mark Meloy, Bluff, UT
Joe Messina, Fort Collins, CO
Paul Meyer, Navajo Dam, NM
Robert Meyer, Navajo Dam, NM
Mark Miller, Let It Fly, Pagosa Springs, CO
Steve Miller, New Wave Rafting, Santa Fe, NM

Manuel Monasterio, Reel Life, Albuquerque, NM
Scott Moore, Durango, CO
Richard Neff, Valle's Trading Post & RV Park, Mexican Hat, UT
Pierce Nelson, Wild Adventures, Moab, UT
Edward Nemanic, High Desert Anglers, Dolores, CO
Mark Nesbit, Blue Sky Fly Fishing, Navajo Dam, NM
Ron Nott, Farmington, NM
Don Oliver, Durango, CO
Chuck Pearson, Farmington, NM
Brett Pejsa, Bloomfield, NM
Charles Phelan, Farmington, NM
Tim Reges, Waterflow, NM
David Rhine, Rhino's Reel Adventures, Peoria, AZ
Dave Rich, Durango, CO
Chuck Rizuto, Rizuto's Fly Shop & Guide Service, Navajo Dam, NM
Randy Roberts, East Creek Fly Fishers, Pagosa Springs, CO
Peter Robinson, Mancos, CO
Lloyd Rogers, Navajo Dam, NM
Spencer Schreiber, Navajo Dam, NM
Jonathan Schwarz, San Juan Anglers, Durango, CO
Jerry Scott, San Antonio, TX
James Selby, Farmington, NM
Mike Shepard, Durango, CO
Mark Sleight, High Desert Adventures, Inc., St. George, UT
Brian Spilman, SW Fly Fishing, Rio Rancho, NM
Travis Stills, Durango, CO
Lawrence Stock, Waterflow, NM
Michael Stowers, Durango, CO
Jerry Swingle, Durango, CO
Darrell Swinson, Darrell's Fly Fishing Service, Navajo Dam, NM
John Tavenner, Sandstone Anglers, Aztec, NM
Bill Utton, Aztec, NM
Orion Utton, Aztec, NM
Phillip Utton, Aztec, NM
Rich Valdez, Logan, UT
Louis Vaughn, Sportman Guide, Navajo Dam, NM
Ed & Dorothy Vezey, Pagosa Springs, CO
Jene Vredevoogd, Adventure/Discovery Tours, Cottonwood, AZ
Donna Wade, Bloomfield, NM
Craig Watters, Navajo Dam, NM
Greg Weaver, Fly Fishing Durango, Durango, CO
Dave Wegner, Durango, CO
John Weisheit, Moab, UT
George Wendt, O.A.R.S., Angels Camp, CA
Robin Williams, Colorado Trails Ranch, Durango, CO
Gary Willmart, Colorado Fishing Adventures, Navajo Dam, NM
Verna Willson, Farmington, NM
Don Wimsatt, Farmington, NM
Josh Winnicki, Wild Rivers, Bluff, UT