

RECLAMATION

Managing Water in the West

BR Updates

Glen Knowles
Bureau of Reclamation
Glen Canyon Dam
Adaptive Management Program
Technical Work Group Meeting
January 20, 2011



U.S. Department of the Interior
Bureau of Reclamation

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Managing Water in the West

Development and Implementation of a Protocol for High-Flow Experimental Releases from Glen Canyon Dam

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Public Involvement

- First presented to the public, agencies, and tribes beginning with an announcement from the Secretary of the Interior, Ken Salazar, on December 10, 2009.
- This announcement was followed by a Federal Register Notice on December 31, 2009 (74 FR 69361) to develop an experimental protocol under which future high flow experiments below Glen Canyon Dam would be conducted to improve sand conservation below Glen Canyon Dam. Hold a public meeting of the AMWG in Phoenix, Arizona, on February 3-4, 2010 in order to provide scoping information for the EA process.
- HFE Workshop was held in Salt Lake City on June 15-16, 2010. Used information from workshop, and communications with GCMRC and the researchers involved in the synthesis in this EA.
- Reclamation also had a meeting with the local businesses in Glen Canyon on August 20 and December 20, 2010, comments were received.
- Reclamation also used available information from a synthesis of information by the U.S. Geological Survey on the three HFEs in Grand Canyon.



Cooperating agencies

Federal:

National Park Service, Intermountain Region

Bureau of Indian Affairs

U.S. Fish and Wildlife Service

U.S. Geological Survey, Pacific Southwest Area

Western Area Power Administration

State:

Arizona Game and Fish Commission

Upper Colorado River Commission

American Indian Tribes:

Hualapai Tribe

Pueblo of Zuni

Hopi Tribe

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Purpose and Need

The Bureau of Reclamation is proposing a protocol for high-flow experimental releases (HFEs) from Glen Canyon Dam for a 10-year period, 2011–2020 as a multi-year, multi-experimental approach using short-duration, high-volume releases from Glen Canyon Dam during sediment -enriched conditions.

Purpose: 1) to develop and implement a protocol that determines when and under what conditions to conduct experimental high volume releases, and 2) to evaluate the parameters of high-flow releases in conserving sediment to benefit downstream resources in Glen, Marble, and Grand Canyons.

Need: to take advantage of future sediment-enriched conditions and improve understanding of HFEs and sediment conservation.



HFE Protocol

The proposed HFE Protocol contains three major components:

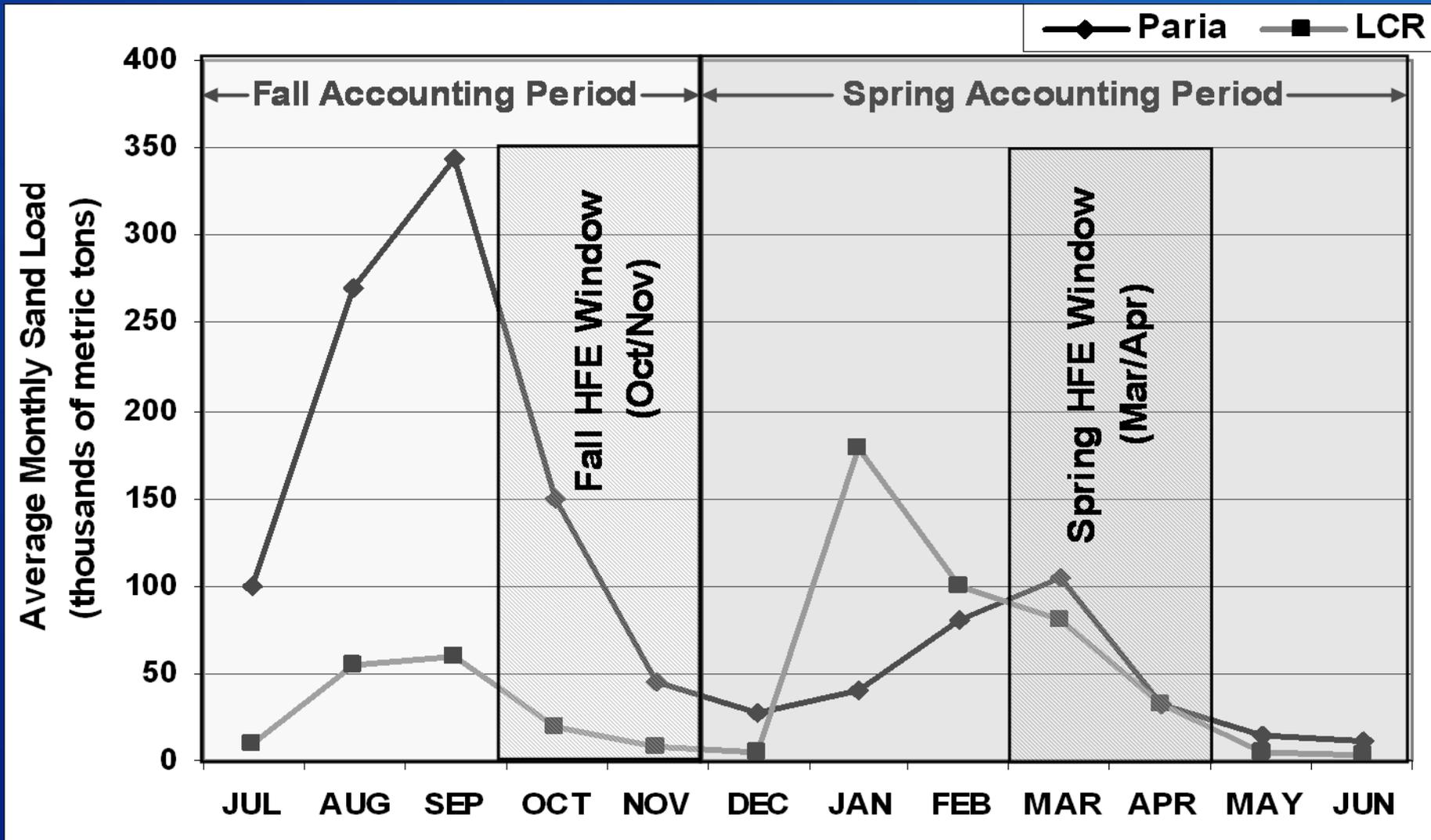
- (1) Planning and budgeting:** sets the stage for HFE consideration by evaluating the status of resources and assigning funding for conducting HFEs.
- (2) Modeling:** projects the sand mass balance during potential HFE release windows using known tributary sand inputs and forecasted hydrology, provides 1 of 13 HFE types.
- (3) Decision and implementation:** incorporates the results of the first two components in a process of technical deliberation balanced with policy considerations.

If the decision is made to conduct an HFE, GCMRC and cooperating scientists would conduct the scientific investigations following a previously agreed upon science plan.

HFE Protocol – Flow magnitude and duration for Model HFEs

| HFE No. | Flow Magnitude (cfs) | Duration (hours) | HFE No. | Flow Magnitude (cfs) | Duration (hours) |
|---------|----------------------|------------------|---------|----------------------|------------------|
| 1 | 45,000 | 96 | 8 | 45,000 | 1 |
| 2 | 45,000 | 72 | 9 | 41,500 | 1 |
| 3 | 45,000 | 60 | 10 | 39,000 | 1 |
| 4 | 45,000 | 48 | 11 | 36,500 | 1 |
| 5 | 45,000 | 36 | 12 | 34,000 | 1 |
| 6 | 45,000 | 24 | 13 | 31,500 | 1 |
| 7 | 45,000 | 12 | | | |

HFE Protocol – Store and Release





Next Steps

Reclamation released the draft EA to the public on January 18, 2011.

The EA is available on the Reclamation website at:

<http://www.usbr.gov/uc/envdocs/ea/gc/HFEPProtocol/index.html>

Comments are due by **February 14, 2011**:

Bureau of Reclamation,
Environmental Resources Division
125 South State Street, room 7218
Salt Lake City, Utah 84138

e-mail to: protocol@usbr.gov

For more info contact Dennis Kubly at (801) 524-3715

If a decision notice is completed by early March, could have HFE by late April....

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Nonnative Fish Control Environmental Assessment



Glen Knowles
Bureau of Reclamation
Glen Canyon Dam Adaptive Management Program
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History

- Tribes first expressed concern during the 2002-2006 removal experiment, resulting in a removal and mitigation program using fish emulsion as fertilizer in the Hualapai tribal gardens.
- Later, non-native fish control was added as an important conservation measure of several U.S. Fish and Wildlife biological opinions on operations of Glen Canyon Dam.
- As part of the Annual Work Plan of the Glen Canyon Dam Adaptive Management Program for Fiscal Year 2010-2011, up to two river trips to mechanically remove non-native fish were included and tentatively scheduled for May-June 2010 and 2011.
- The Pueblo of Zuni sent Reclamation a letter on June 30, 2009 in which Zuni Governor Norman Cooney expressed the Zuni Tribe's concerns with the massive "taking of life" associated with mechanical removal, and the failure of Reclamation and FWS to consult with the Zuni Tribe concerning this management action.
- In response DOI representatives attended a meeting with Zuni tribal leaders to hear their concerns on September 15, 2009. In response, reclamation cancelled the two planned removal trips in March 2010, reinitiated consultation with the U.S. Fish and Wildlife Service on cancelling removal.



Cooperating agencies

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National Park Service, Intermountain Region

Bureau of Indian Affairs

U.S. Fish and Wildlife Service

U.S. Geological Survey, Pacific Southwest Area

Western Area Power Administration

State:

Arizona Game and Fish Commission

American Indian Tribes:

Hualapai Tribe

Pueblo of Zuni

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Purpose and Need

Purpose of the action is to reduce the negative impacts of competition and predation by rainbow trout and brown trout on the endangered humpback chub (*Gila cypha*) and its critical habitat in Grand Canyon.

The need for this action is to fulfill the conservation measures and terms and conditions of several U.S. Fish and Wildlife Service (USFWS) biological opinions, to contribute to the recovery of humpback chub by helping to maintain high juvenile survival and recruitment rates resulting in an increasing adult population, and to address concerns expressed by American Indian tribal values over the killing of trout in the Grand Canyon, a location of cultural, religious, and historical importance to a number to tribes.



Structured Decision Making Project

- ❑ ASWS Anne Castle's requested Reclamation partner with USGS Patuxent Wildlife Research Center (Dr. Mike Runge) to conduct a Structured Decision Making (SDM) Project as part of the EA process as a structured approach to develop and provide substantive input from the cooperating agencies and tribes to Reclamation.
- ❑ At Saguaro Lake Ranch workshops, October 18-20 and November 8-10, 2010, a diverse set of objectives for the project were defined, a set of alternatives was developed, and participants assessed alternatives against the array of objectives. Multi-criteria decision analysis methods were then employed to examine trade-offs with the cooperating agencies and tribes and assess the performance of alternatives against the objectives.
- ❑ The SDM process analysis resulted in a ranking of alternatives. The proposed action was selected based on this ranking. In this way, the SDM Project was utilized as an integral part of this EA process in the identification and evaluation of various approaches to address the proposed action. Final report has been published as a USGS Open File Report.



Non-Native Fish Control below Glen Canyon Dam— Report from a Structured Decision-Making Project

Open-File Report 2011-1012

U.S. Department of the Interior
U.S. Geological Survey

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<http://pubs.usgs.gov/of/2011/1012/>



Proposed Action

- **Remove non-native fish, mostly trout, to reduce non-native fish abundance at the confluence of the Colorado and Little Colorado rivers, from river mile (RM) 56 to 66, area of greatest humpback chub abundance in the mainstem Colorado River and so predation losses are greatest. Target of 1,200 trout.**
- **In order to achieve this reduction, the proposed action, in coordination with related actions, includes reducing emigration of rainbow trout and brown trout from source populations in Glen and Grand canyons.**
- **Non-native fish, predominantly rainbow trout, will be removed from upper Marble Canyon with up to 10 boat-mounted electrofishing trips in the Paria River to Badger Creek reach (PBR reach, RM 1 to RM 8) and up to 6 removal trips in the LCR reach (RM 56 to 66). Fish that are removed will be frozen for later beneficial use. The proposed action will take place from 2011-2020.**
- **Adaptive Management component to vary effort based on new information, provide for flexibility in implementing control, and include the ability to develop and test flow options for control over the period of the proposed action, and incorporate FWS Recovery Plan goals when available.**



Next Steps

Public Draft of the EA to be released by January 28, 2011.

30-day public comment period.

Will include an email address and written address to send comments to.

For more info, Glen Knowles at (801) 524-3781.

If a decision notice is completed by early March, could have implementation this year. Important given timing of the HFE Protocol, and potential for increases in trout from a Spring HFE.

Basin Hydrology Update

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2011 Operations

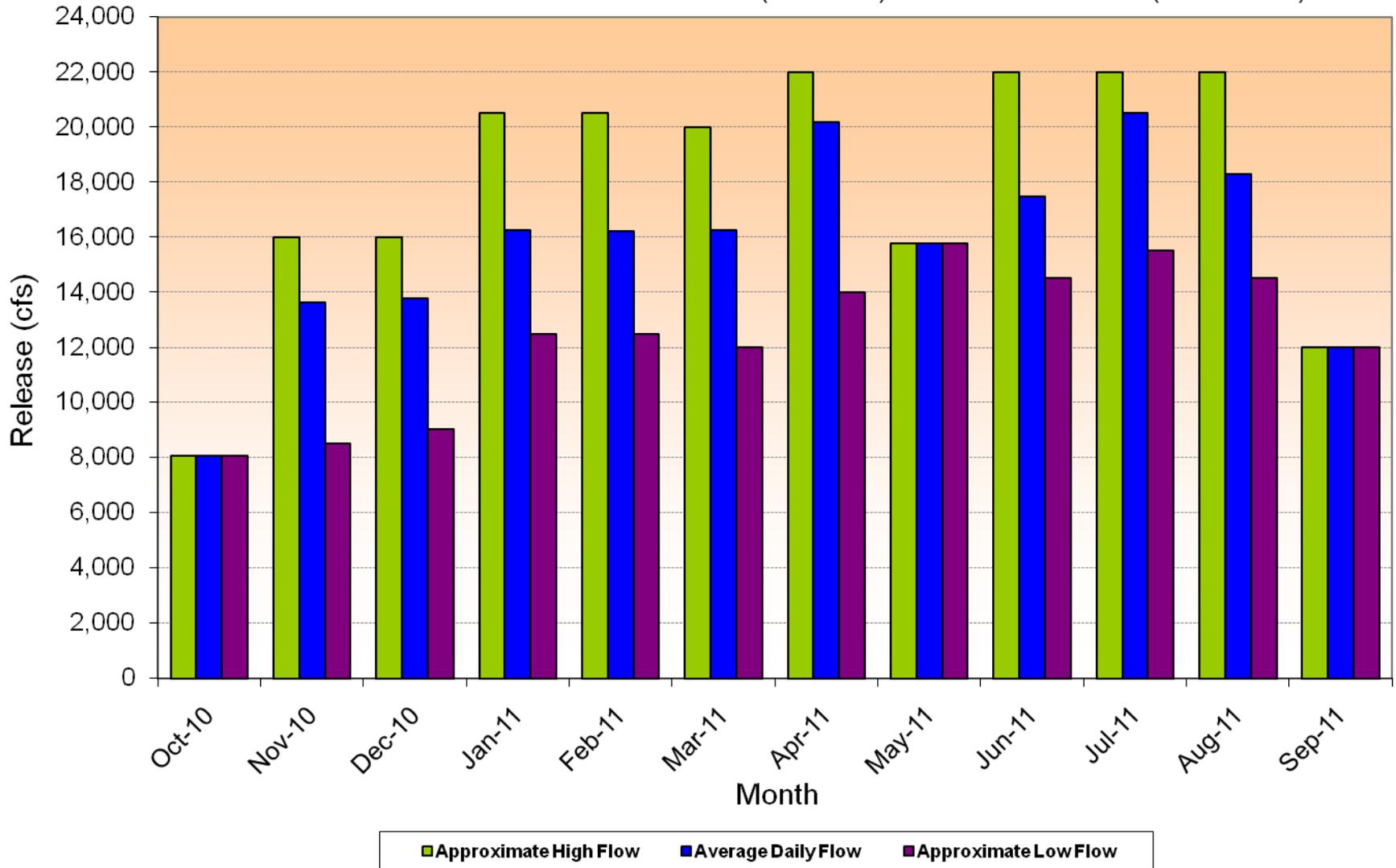
- ❑ As of January 13, 2011 the snowpack above Lake Powell was 134% of average.
- ❑ The Apr-Jul inflow forecast for Powell jumped from 6.6 maf to 9.5 maf in early January due to precipitation and snowpack levels that were near 150% of average. The mid-month Apr-Jul forecast was issued on January 13th and was decreased to 9.3 maf. This small reduction does not change the projected operation for WY2011.
- ❑ The **probability** of receiving sufficient inflow to trigger **Equalization** in water year 2011 increased from 48% in December to **76%** in January.
- ❑ This latest inflow projection increased the projected condition of Lake Powell for WY2011 well above the trigger elevation of 3643 for Equalization to be likely triggered in April. Under an Equalization Operation, the water year projected release volume jumped from 9.0 maf to **11.36 maf**.

2011 Forecast

- ❑ To accomplish this significantly higher water year release volume, releases from Glen Canyon Dam were increased on January 9, 2010 to where peaks each day will be approximately **20,500 cfs**. Peaks prior to this adjustment were 16,000 cfs. The release volume for January 2011 will be 1000 kaf rather than the 865 cfs scheduled earlier.
- ❑ Release volumes during February and March will be similar to January and fluctuations could be restricted due to maintenance outages occurring at Glen Canyon Dam.
- ❑ The determination of an Equalization release scenario will not be final until April and it is possible that the forecast could decrease between now and April enough to result in a release scenario that would not include Equalization releases. It is approximately a **1 in 4 probability** that this could happen and the annual release volume would likely be **9.0 maf** if this were to happen.

Proposed WY2011 Glen Canyon Dam Daily Release Regime

Estimated based on Most Probable (Median) Inflow Scenario (Jan 2011)



Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2011 (updated 1-14-2011)

| Unit Number | Oct 2010 | Nov 2010 | Dec 2010 | Jan 2011 | Feb 2011 | Mar 2011 | Apr 2011 | May 2011 | Jun 2011 | Jul 2011 | Aug 2011 | Sep 2011 |
|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
| 6 (3/4 Unit) | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
| Units Available | 4.75 | 5.75 | 6.75 | 6.75 | 4.75 | 4.75 | 6.75 | 4.75 | 6.75 | 6.75 | 6.75 | 4.75 |
| Capacity (kaf) | 933 | 1227 | 1449 | 1446 | 950 | 1130 | 1310 | 970 | 1180 | 1350 | 1350 | 1040 |
| Max (kaf) | 495 | 810 | 847 | 1000 | 900 | 1100 | 1310 | 970 | 1180 | 1350 | 1350 | 1040 |
| Most (kaf) | 495 | 810 | 847 | 1000 | 900 | 1000 | 1200 | 970 | 1040 | 1260 | 1125 | 714 |
| Min (kaf) | 495 | 810 | 847 | 1000 | 900 | 900 | 615 | 650 | 670 | 820 | 817 | 476 |

Programmatic Agreement

Glen Knowles
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History

- In 1994, the Bureau of Reclamation put in place, as part of the Glen Canyon Dam Operations EIS, a Programmatic Agreement (PA) to fulfill Section 106 of the National Historic Preservation Act requirements for Glen Canyon Dam operations.
- Signatories included: the Advisory Council on Historic Preservation, Arizona State Historic Preservation Office, Reclamation, National Park Service, Hopi Tribe, Hualapai Tribe, Kaibab Paiute Tribe, Paiute Tribe of Utah, Navajo Nation, and Zuni Pueblo.
- The PA has stipulations for identification of properties eligible to be added to the National Register of Historic Places, monitoring to determine effects to those properties, and development of a preservation plan.
- Under the PA, the NPS has monitored sites and objects that are eligible to be added to the National Register for their historic or archeological information values. Tribes have monitored sites or resources of tribal concern.

History

- Programmatic agreements are designed to satisfy an agency's Section 106 responsibilities remain in force until terminated; however, if agencies fail to carry out terms of a PA, the agency must complete standard Section 106 review for each individual undertaking that otherwise would be covered by the PA.
- Without terminating the PA, Reclamation and other consulting parties ceased working on the PA in 2008 and instead began to follow the standard Section 106 review process with the development of a memorandum of agreement for archeological data recovery.
- Work was conducted in 2008 and 2009 under separate MOAs. The data recovery was conducted under a treatment plan developed by Drs. Jonathan Damp and Joel Pederson at Utah State University. A synthesis report of this work is in preparation and will be available in Summer 2011. However, archeological data recovery that was proposed in 2010 could not be agreed upon by the consulting parties.



Next Steps

- **Agreements under Section 106, whether PAs or MOAs, require the consulting parties to agree on ways to accommodate historic preservation concerns as the undertaking proceeds.**
- **Because the parties could not agree on resolution of effect in 2010, Reclamation is currently completing Section 106 review for each individual undertaking that otherwise would be covered by an agreement document, in accordance with 36 CFR 800.4 through 800.6 and the Advisory Council's guidance.**
- **A meeting of the 1994 PA signatories is planned for January 31, 2011. Interested persons or members of the public may be involved in the discussions because Reclamation anticipates that the Long-Term Experimental and Management Plan EIS will become a new undertaking, necessitating Section 106 compliance.**
- **We have scheduled a PA Meeting for January 31, 2011, from 9:00 am to 3:00 pm at GCRMC Building 3.**