4332-90-P; 4312-CB

DEPARTMENT OF THE INTERIOR

Bureau of Reclamation

[RR02013000, XXXR5537F3, RX.19871110.1000000]

National Park Service

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Notice of Availability and Notice of Public Meetings for the Draft Environmental Impact Statement for the Long-Term Experimental and Management Plan for the Operation of Glen Canyon Dam, Page, Arizona

AGENCY: Bureau of Reclamation and National Park Service, Interior.

ACTION: Notice.

SUMMARY: The Department of the Interior, through the Bureau of Reclamation and National Park Service (NPS), has made available for public review and comment the Draft Environmental Impact Statement (DEIS) for the Long-Term Experimental and Management Plan for the Operation of Glen Canyon Dam (LTEMP). The LTEMP would determine specific options for dam operations (including hourly, daily, and monthly release patterns), non-flow actions, and appropriate experimental and management actions that will meet the requirements of the Grand Canyon Protection Act, maintain or improve hydropower production, and minimize impacts on resources, including those of importance to American Indian Tribes.

DATES: Written comments on the DEIS should be submitted by **April 7, 2016**.

Public meetings and webinars to provide information and receive written comments will be held on:

- Webinar – Tuesday, February 16, 2016, at 6:30 p.m. MST;
- Meeting – Monday, February 22, 2016, at 6:00 p.m. MST, Flagstaff, Arizona;
- Meeting – Thursday, February 25, 2016, at 6:00 p.m. MST, Phoenix, Arizona; and
- Webinar – Tuesday, March 1, 2016, at 1:00 p.m. MST.

Staff will be available to take comments and answer questions during this time.

ADDRESSES: You may submit written comments by the following methods:

- Website: *http://parkplanning.nps.gov/LTEMPEIS*.
- Mail: Glen Canyon Dam LTEMP Draft EIS, Argonne National Laboratory, 9700 South Cass Avenue – EVS/240, Argonne, Illinois 60439.

Comments will not be accepted by facsimile, e-mail, or in any other way than those specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted.

Public meetings will be held at the following locations:

- Flagstaff – USGS Grand Canyon Monitoring and Research Center, 2255 N. Gemini Road, Flagstaff, Arizona 86001.
- Phoenix – Embassy Suites Phoenix-Tempe, 4400 S. Rural Road, Tempe, Arizona 85282.

For specific information about the web-based meetings, please refer to the LTEMP EIS website at: *http://ltempeis.anl.gov/*.

The DEIS may be viewed at the LTEMP EIS website at: *http://ltempeis.anl.gov/*. Compact disc copies of the DEIS are available for public inspection at several libraries and government offices. To request a compact disc of the DEIS, please contact Argonne

at the address cited above or call 630-252-3169.

See the SUPPLEMENTARY INFORMATION section for specific locations where the DEIS is available for public inspection.

FOR FURTHER INFORMATION CONTACT: Ms. Beverley Heffernan, EIS Project Manager, Bureau of Reclamation, *bheffernan@usbr.gov*, 801-524-3712; or Mr. Rob Billerbeck, National Park Service, *Rob_P_Billerbeck@nps.gov*, 303-987-6789.

SUPPLEMENTARY INFORMATION: The purpose of the proposed action is to provide a comprehensive framework for adaptively managing Glen Canyon Dam over the next 20 years consistent with the Grand Canyon Protection Act and other provisions of applicable Federal law. The proposed action will help determine specific dam operations and actions that could be implemented to improve conditions and continue to meet the Grand Canyon Protection Act's requirements and to minimize – consistent with law – adverse impacts on the downstream natural, recreational, and cultural resources in Glen Canyon National Recreation Area and Grand Canyon National Park, including resources of importance to American Indian Tribes.

The need for the proposed action stems from the need to use scientific information developed since the 1996 Record of Decision (ROD) to better inform the public of Department of the Interior decisions on dam operations and other management and experimental actions so that the Secretary of the Interior may continue to meet statutory responsibilities for protecting downstream resources for future generations, conserving Endangered Species Act-listed species, avoiding or mitigating impacts on National Register of Historic Properties-eligible properties, and protecting the interests of American Indian Tribes, while meeting obligations for water delivery and the generation

of hydroelectric power.

The DEIS Analyzes Seven Alternatives.

The DEIS assesses the potential environmental effects of seven alternatives being considered: the No-Action Alternative (Alternative A) and six Action Alternatives (Alternatives B, C, D, E, F, and G), which are described below. There are a number of experimental and management actions that would be incorporated into all of the LTEMP Action Alternatives, except where noted:

- High-flow experimental releases for sediment conservation – Implementation of high-flow experiments (HFEs) under all alternatives are patterned after the current HFE protocol (adopted in 2012), but each alternative includes specific modifications related to the frequency of spring and fall HFEs, the triggers for HFEs, and the overall process for implementation of HFEs, including implementation considerations and conditions that would result in discontinuing specific experiments.
- Nonnative fish control actions – Implementation of control actions for nonnative brown and rainbow trout are patterned after those identified in the Nonnative Fish Control Environmental Assessment (EA) and Finding of No Significant Impact (adopted in 2012). Nonnative fish control actions are not included in Alternative F.
- Conservation measures identified in the 2011 biological opinion on operations of Glen Canyon Dam – Potential measures include the establishment of a humpback chub refuge, evaluation of the suitability of habitat in the lower Grand Canyon for the razorback sucker, and establishment of an augmentation program for the

razorback sucker, if appropriate. Other measures include humpback chub translocation, Bright Angel Creek brown trout control, Kanab ambersnail monitoring, determination of the feasibility of flow options to control trout including increasing daily down-ramp rates to strand or displace age-0 trout and high flow followed by low flow to strand or displace age-0 trout, assessments of the effects of actions on humpback chub populations, sediment research to determine effects of equalization flows, and Asian tapeworm monitoring. Most of these conservation measures are ongoing and are elements of existing management practices (e.g., brown trout control, humpback chub translocation, and sediment research to determine the effects of equalization flows), while others are being considered for further action under the LTEMP (e.g., trout management flows).

- Experimental and management actions at specific sites such as nonnative plant removal, revegetation with native species, and mitigation at specific and appropriate cultural sites – included are pilot experimental riparian vegetation restoration actions planned by the NPS. These actions would also have involvement from tribes to capture concerns regarding culturally significant native plants, and would provide an opportunity to integrate Traditional Ecological Knowledge in a more applied manner into the long-term adaptive management program (described in more detail below).
- Preservation of historic properties through a program of research, monitoring, and mitigation to address erosion and preservation of archeological and ethnographic sites and minimize loss of integrity at National Register historic properties.

- Continued adaptive management under the Glen Canyon Dam Adaptive Management Program, including a research and monitoring component.

Alternative A: The No-Action Alternative.

Alternative A represents continued operation of Glen Canyon Dam as guided by the 1996 ROD for operations of Glen Canyon Dam: modified low fluctuating flow, as modified by recent Department of the Interior decisions, including those specified in the 2007 ROD on Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead (Interim Guidelines) (until 2026), the HFE EA, and the Nonnative Fish Control EA (both expiring in 2020). As is the case for all alternatives, Alternative A also includes implementation of existing and planned NPS management activities, with durations as specified in NPS management documents.

Under Alternative A, daily flow fluctuations would continue to be determined according to monthly volume brackets as follows: 5,000 cubic feet per second (cfs) daily range for monthly volumes less than 600 thousand acre-feet (kaf); 6,000 cfs daily range for monthly volumes between 600 kaf and 800 kaf; and 8,000 cfs for monthly volumes greater than 800 kaf.

Under Alternative A, the current HFE protocol would be followed until it expired in 2020. Under this protocol, high-flow releases may be made in spring (March and April) or fall (October and November). HFE magnitude would range from 31,500 cfs to 45,000 cfs. The duration would range from less than 1 hour to 96 hours. Frequency of HFEs would be determined by tributary sediment inputs, resource conditions, and a decision process carried out by the Department of the Interior. The HFE protocol uses a "store and release" approach in which sediment inputs are tracked over two accounting

periods, one for each seasonal HFE: spring (December through June) and fall (July through November). Under the protocol, the maximum possible magnitude and duration of HFE that would achieve a positive sand mass balance in Marble Canyon, as determined by modeling, would be implemented.

Under Alternative A, the current nonnative fish control protocol would be followed until it expired in 2020. Mechanical removal would primarily consist of the use of boat-mounted electrofishing equipment to remove all nonnative fish captured. Captured nonnative fish would be removed alive and potentially stocked into areas that have an approved stocking plan, unless live removal fails, in which case fish would be euthanized and used for later beneficial use.

Alternative B.

The objective of Alternative B is to increase hydropower generation while limiting impacts on other resources and relying on flow and non-flow actions to the extent possible to mitigate impacts of higher fluctuations. Alternative B focuses on non-flow actions and experiments to address sediment resources, nonnative fish control, and on native and nonnative fish communities.

Under Alternative B, monthly volumes would be the same as under current operations, but daily flow fluctuations would be higher than under current operations in most months. Compared to current operations, the hourly up-ramp rate would remain unchanged at 4,000 cfs/hour, but the hourly down-ramp rate would be increased to 4,000 cfs/hour in November through March and 3,000 cfs/hour in other months.

Alternative B includes implementation of the nonnative fish control protocol and HFE protocol through the entire LTEMP period, but HFEs would be limited to a

maximum of one in spring or fall every other year. In addition to these experimental actions, Alternative B would test trout management flows and hydropower improvement flows. With trout management flows, high flows (e.g., 20,000 cfs) would be maintained for 2 or 3 days followed by a very sharp drop in flows to a minimum level (e.g., 5,000 cfs) for the purpose of reducing annual recruitment of trout. Hydropower improvement experiments would test maximum powerplant capacity flows up to four times during the LTEMP period, but only in years with annual volumes ≤8.23 million acre-feet (maf).

Alternative C.

The objective of Alternative C is to adaptively operate Glen Canyon Dam to achieve a balance of resource objectives with priorities placed on humpback chub, sediment, and minimizing impacts on hydropower. Alternative C features a number of condition-dependent flow and non-flow actions that would be triggered by resource conditions. The alternative uses decision trees to identify when experimental changes in base operations or other planned action is needed to protect resources. Operational changes or implementation of non-flow actions could be triggered by changes in sediment input, humpback chub numbers and population structure, trout numbers, and water temperature.

Monthly release volumes under Alternative C in August through November would be lower than those under most other alternatives to reduce sediment transport rates during the monsoon period. Release volumes in the high power demand months of December, January, and July would be increased to compensate for water not released in August through November, and volumes in February through June would be patterned to follow the monthly hydropower demand as defined by the contract rate of delivery.

Under Alternative C, the allowable within-day fluctuation range from Glen Canyon Dam would be proportional to monthly volume (7 × monthly volume in kaf). The down-ramp rate would be increased to 2,500 cfs/hour, but the up-ramp rate would remain unchanged at 4,000 cfs/hour.

Experimentation under Alternative C includes testing the effects of the following actions: (1) sediment-triggered spring and fall HFEs through the entire 20-year LTEMP period, (2) 24-hour proactive spring HFEs in high volume years ($\geq$10 maf release volume), (3) extension of the possible duration of fall HFEs while maintaining a maximum total volume of a 96-hour 45,000 cfs release, (4) reducing fluctuations before and after HFEs, (5) mechanical removal of trout near the Little Colorado River confluence, (6) trout management flows, and (7) low summer flows during the entire LTEMP period to allow greater warming.

Alternative D: The Preferred Alternative.

Alternative D is the preferred alternative for the LTEMP. The objective of Alternative D is to adaptively operate Glen Canyon Dam to best meet the resource goals of the LTEMP. Like Alternative C, Alternative D features a number of condition-dependent flow and non-flow actions that would be triggered by resource conditions.

Under Alternative D, the total monthly release volume of October, November, and December would be equal to that under Alternative A to avoid the possibility of the operational tier differing from that of Alternative A, as established in the Interim Guidelines. The August volume was set to a moderate volume level (800 kaf in an 8.23 maf release year) to balance sediment conservation prior to a potential HFE and to address power production and capacity concerns. January through July monthly volumes

were set at levels that roughly track Western Area Power Administration's contract rate of delivery. This produced a redistribution of monthly release volumes under Alternative D that would result in the most even distribution of flows of any alternative except for Alternative G. The allowable within-day fluctuation range from Glen Canyon Dam would be proportional to the volume of water scheduled to be released during the month (10 × monthly volume in kaf in the high-demand months of June, July, and August and 9 × monthly volume in kaf in other months). Up- and down-ramp rates would be the same as Alternative C.

Experimentation under Alternative D includes testing the effects of the following actions: (1) sediment-triggered spring and fall HFEs through the entire 20-year LTEMP period, (2) 24-hour proactive spring HFEs in high volume years ($\geq$10 maf release volume), (3) extension of the duration of up to 45,000 cfs fall HFEs for as many as 250 hours depending on sediment availability, (4) reducing fluctuations after fall HFEs, (5) mechanical removal of trout near the Little Colorado River confluence, (6) trout management flows, (7) low summer flows in the second 10 years of the LTEMP period to allow greater warming, and (8) sustained low flows to improve the aquatic food base.

Alternative E.

The objective of Alternative E is to provide for recovery of the humpback chub while protecting other important resources including sediment, the rainbow trout fishery at Lees Ferry, aquatic food base, and hydropower resources. Alternative E features a number of condition-dependent flow and non-flow actions that would be triggered by resource conditions.

Under Alternative E, monthly volumes would closely follow the monthly

hydropower demand as defined by the contract rate of delivery. The total monthly release volume of October, November, and December, however, would be equal to that under Alternative A to minimize the possibility of the operational tier differing from that of Alternative A as established in the Interim Guidelines. In addition, lower monthly volumes (relative to Alternative A) would be targeted in August and September to reduce sediment transport during the monsoon period, when most sediment is delivered by the Paria River. The allowable within-day fluctuation range from Glen Canyon Dam would be proportional to the volume of water scheduled to be released during the month (12 × monthly volume in kaf in high power demand months of June, July, and August, and 10 × monthly volume in kaf in other months).

Experimentation under Alternative E includes testing the effects of the following actions: (1) sediment-triggered fall HFEs through the entire 20-year LTEMP period, (2) sediment-triggered spring HFEs only in the second 10 years of the LTEMP period, (3) 24-hour proactive spring HFEs in high volume years ($\geq$10 maf release volume), (4) reducing fluctuations before fall HFEs, (5) mechanical removal of trout near the Little Colorado River confluence, (6) trout management flows, and (7) low summer flows in the second 10 years of the LTEMP period to allow greater warming.

Alternative F.

The objective of Alternative F is to a provide flows that follow a more natural pattern of high spring, and low summer, fall, and winter flows while limiting sediment transport and providing for warming in summer months. In keeping with this objective, Alternative F does not feature some of the flow and non-flow actions of the other alternatives.

Under Alternative F, peak flows would be lower than pre-dam magnitudes to reduce sediment transport and erosion given the reduced sand supply downstream of the dam. Peak flows would be provided in May and June, which corresponds well with the timing of the pre-dam peak. The overall peak flow in an 8.23 maf year would be 20,000 cfs (scaled proportionately in drier and wetter years), and would include a 24 hour 45,000 cfs flow at the beginning of the spring peak period (e.g., on May 1) if there was no triggered spring HFE in same year, and a 168 hour (7 day) 25,000 cfs flow at the end of June. Following this peak, there would be a rapid drop to the summer base flow. The initial annual 45,000 cfs flow would serve to store sediment above the flows of the remainder of the peak, thus limiting sand transport further downstream and helping to conserve sandbars. The variability in flows within the peak would also serve to water higher elevation vegetation. There would be no within-day fluctuations in flow under Alternative F.

Low base flows would be provided from July through January. These low flows would provide for warmer water temperatures, especially in years when releases are warm, and would also serve to reduce overall sand transport during the remainder of the year.

Other than testing the effectiveness of sediment-triggered HFEs, which would continue through the entire LTEMP period, there would be no explicit experimental or condition-dependent triggered actions under Alternative F.

Alternative G.

The objective of Alternative G is to maximize the conservation of sediment, in order to maintain and increase sandbar size. Under Alternative G, flows would be

delivered in a steady pattern throughout the year with no monthly differences in flow other than those needed to adjust operations in response to changes in forecast and other operating requirements such as equalization. In an 8.23 maf year, steady flow would be approximately 11,400 cfs.

Experimentation under Alternative G includes testing the effects of the following actions: (1) sediment-triggered spring and fall HFEs through the entire 20-year LTEMP period, (2) 24-hour proactive spring HFEs in high volume years (≥10 maf release volume), (3) extension of the duration of up to 45,000 cfs fall HFEs for as many as 250 hours depending on sediment availability, (4) mechanical removal of trout near the Little Colorado River confluence, and (5) trout management flows.

Public Review and Where to Find Copies of the DEIS.

The DEIS is available for reviewing on the internet at: *http://ltempeis.anl.gov/.* Compact disc copies of the DEIS are available for public review at the following locations:

- J. Willard Marriott Library, University of Utah, 295 South 1500 East, Salt Lake City, Utah 84112.
- Cline Library, Northern Arizona University, 1001 S. Knoles Drive, Flagstaff, Arizona 86011-6022.
- Burton Barr Central Library, 1221 North Central Avenue, Phoenix, Arizona 85004.
- Page Public Library, 479 South Lake Powell Boulevard, Page, Arizona 86040.
- Grand County Library, Moab Branch, 257 East Center Street, Moab, Utah 84532.
- Sunrise Library, 5400 East Harris Avenue, Las Vegas, Nevada 89110.

- Denver Public Library, 10 West 14th Avenue Parkway, Denver, Colorado 80204.
- Natural Resources Library, U.S. Department of the Interior, 1849 C Street NW, Main Interior Building, Washington, DC 20240-0001.

Special Assistance for Public Meetings.

If special assistance is required to participate in the public meeting, please contact Ms. Jayne Kelleher at 801-524-3680 or via email at *jkelleher@usbr.gov*. Please contact Ms. Kelleher at least 10 working days prior to the meeting. A telephone device for the hearing impaired (TTY) is available at 1-800-877-8339.

Public Disclosure.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Dated: December 21, 2015

Jennifer Gimbel, Principal Deputy Assistant Secretary –
Water and Science

Michael Bean, Principal Deputy Assistant Secretary –
Fish and Wildlife and Parks

[FR Doc. 2015-33274 Filed: 1/7/2016 8:45 am; Publication Date: 1/8/2016]