

DEPARTMENT OF THE INTERIOR AND DEPARTMENT OF ENERGY  
OPERATING HYDROGRAPH RECOMMENDATIONS  
FOR GLEN CANYON DAM (2012 WATER YEAR)  
JUNE 6, 2011

**Introduction:** The Federal agencies involved in the Glen Canyon Dam Adaptive Management Program (AMP) have jointly drafted this recommendation for the projected operation of Glen Canyon Dam in Water Year 2012. This recommendation is consistent with the Law of the River and the Grand Canyon Protection Act, which states that the Secretary of the Interior will operate Glen Canyon Dam “in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use.” This recommendation is designed to enhance protection of downstream resources. It can be implemented consistent with existing environmental and operational limitations applicable to Glen Canyon Dam, the annual release requirements of the 2007 Interim Guidelines, applicable operating limitations for Glen Canyon Dam, and the 1996 Glen Canyon Dam Record of Decision (ROD). This approach to operations does not modify the Interim Guidelines, operating criteria or ROD and is an adaptive management-based experimental approach to 2012 operation that falls within the parameters of the Modified Low Fluctuating Flow alternative adopted in the ROD.

Following up on work begun in 2010 (for the 2011 Glen Canyon Dam Hydrograph),<sup>1</sup> and applying information gained during the 2011 Water Year, the National Park Service, the U.S. Fish and Wildlife Service, the Bureau of Reclamation and the Western Area Power Administration, worked together over a number of months to develop and refine the concepts and approach for proposed 2012 Water Year operations as outlined in this paper. The Bureau of Indian Affairs has had the opportunity to participate in the development of this recommendation and has reviewed the drafts. The USGS Grand Canyon Monitoring and Research Center has reviewed this recommendation and provided input. In addition, the information in this paper was shared and discussed with the AMP Technical Work Group and the concepts herein were discussed in general terms at the May 18, 2011 meeting of the Glen Canyon Dam Adaptive Management Work Group in Phoenix, Arizona.

**Purpose:** To develop recommendations for the operational hydrograph for the 2012 Water Year based on anticipated possible annual release volumes for Water Year 2012 from Glen Canyon Dam that are consistent with Section 1802 of the Grand Canyon Protection Act. The operational hydrograph is within and consistent with the framework of the 1996 Record of Decision and the Modified Low Fluctuating Flow (MLFF) operation, consistent with balancing other resources, including power production, and recognizes the variability of possible annual release volumes from Glen Canyon Dam under the 2007 Interim Guidelines.

The concept is to apply sound science principles within the framework of adaptive management to adjust the timing of water deliveries to protect and restore flow-dependent resource conditions. The fundamental principle is conservation of the sand resource in order to minimize sand export

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<sup>1</sup> See Aug. 23, 2011 memo re: 2011 Hydrograph available at [http://www.usbr.gov/uc/rm/amp/amwg/mtgs/10aug24/Attach\\_07b.pdf](http://www.usbr.gov/uc/rm/amp/amwg/mtgs/10aug24/Attach_07b.pdf)

to Lake Mead and degradation of sandbar resources within the Colorado River Ecosystem (CRE).

**Objective:** To implement reasonable measures to minimize export of tributary sand inputs delivered to the main channel so as to benefit the lower elevation ecosystem of Grand Canyon National Park, including the ecological processes and functions that affect native flora and fauna, archeological and cultural resources, recreation uses, and other values for which Grand Canyon National Park was established.

**Science Principles:** For any given annual volume of water released from the dam, sand export is known to be minimized by reducing daily/monthly/seasonal variations in dam releases. (Rubin and others, 2002; Wright and others, 2005; Wright and others, 2008; ASCE, 1975; USDOl, 1995; Topping and others, 2006)

**Proposed Operating Parameters:**

- Monthly Release Volumes will be adjusted each month based on the most current forecast of the annual release required by the 2007 Interim Guidelines.
- Monthly Release Volumes are anticipated to vary within the targets identified for each month as set forth below. This monthly operational flexibility will be used for existing power production operations under the Modified Low Fluctuating Flow (MLFF) alternative selected by the 1996 ROD and contained in the 1995 FEIS. The targeted operation will also be adjusted as necessary to accommodate a targeted release volume for the month of August 2012 based on the schedule below:

January-	August 2012 Volume target set to greater of 800 kaf or 10% remaining annual release volume.
February-	August 2012 Volume target set to greater of 800 kaf or 10% remaining annual release volume.
March-	August 2012 Volume target set to greater of 800 kaf or 12% remaining annual release volume.
April-	August 2012 Volume target set to greater of 800 kaf or 15% remaining annual release volume.
May-	August 2012 Volume target set to greater of 800 kaf or 20% remaining annual release volume.
June-	August 2012 Volume target set to greater of 800 kaf or 25% remaining annual release volume.
July-	August 2012 Volume target set to greater of 800 kaf or 40% remaining annual release volume.
August-	Release volume established as 100% of remaining annual release volume (release could be less than 800 kaf in some cases).

- In some Equalization release scenarios, the release volume required in August could be as high as the full capacity of the powerplant.

- Steady flows will occur in September 2012 (and October 2012) per the 2008 HFE Environmental Assessment (EA).
- Monthly release volumes will be modified each month in consultation with Western Area Power Administration.
- The remaining annual release volume will be computed as the projected WY2012 annual release volume pursuant to the Interim Guidelines less volume already released in WY2012 less the September 2012 projected Steady Flow Experiment release volume.
- Additionally, the Bureau of Reclamation will continue to apply best professional judgment in conducting actual operations and in response to changing conditions throughout the water year. Such efforts will continue to be undertaken in coordination with the DOI/DOE agencies to consider changing conditions and adjust projected operations in a manner consistent with the objectives of these parameters as stated above and pursuant to the Law of the River.

**Expected Resource Results:** Tributary sand inputs to the Grand Canyon typically occur during the months of August and September each year. These operational measures are intended to conserve new tributary sand inputs will minimizing impacts to other resources throughout the operational year.