Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
August 24-25, 2010

Agenda Item

Low Summer Steady Flows of 2000 Report Update

Action Requested

✓ This is an information item.

Presenter

This item will be presented as an informational write-up only with no presentation. However, time will be set aside for questions with regard to this item as well as other informational write-ups.

Previous Action Taken

✓ By AMWG: GMCRC was provided funding in the FY 08 Annual Work Plan to synthesize the results of the 2000 LSSF experiment.

Relevant Science

✓ The following describes the relevant research or monitoring on this subject:
In FY2008, GCMRC was requested to summarize the relevant science results associated with the six-month-long experimental hydrograph that was implemented from April through September 2000. The experimental hydrograph was conducted in response to the Reasonable and Prudent Alternative included in the Fish and Wildlife Service's 1995 Biological Opinion for Glen Canyon Dam Operations. The hydrograph included three consecutive months of low steady releases (8 kcfs) from June through August and was called the Low Steady Summer Flow Experiment (LSSF). Two short-duration habitat maintenance or power plant capacity flows were conducted as part of the experiment. GCMRC held two workshops in fall 2008 to help identify resource responses to the LSSF experiment, and to garner input from resource managers about what they needed in a summary document. A summary report of responses of key resources based on workshop input as well as published and grey literature is under external peer-review. *The report is on schedule to be submitted for publishing as a USGS Open-File Report in October 2010.*

A few key general conclusions, subject to review and revision following peer review, are as follows:

- Short duration discharges up to power plant capacity in the absence of sediment inputs result in sediment export.
- The availability of low velocity aquatic habitats (<0.2m/s) increased along some shorelines at lower discharges, but local geomorphology plays a role in extent and the presence of low velocity environments among the sites studied. Further, it is unknown how small fish utilize these areas. (This is an objective of the current Near Shore Ecology project.)
- Mainstem warming downstream to the LCR is affected by initial release temperatures from the dam, whereas mainstem warming in Western Grand Canyon is affected by flow volume

(residence time), ambient air temperature, and initial release temperatures. The amount of warming in the mainstem at the LCR was similar to other MLFF operations.

- The target resource, native fish, did not respond in a strongly positive or negative manner to the LSSF hydrograph compared with other resources. The mean length of YOY native fish was similar to the mean YOY length from previous years, but the abundance of YOY native fish was greater.
- Planning for effective high magnitude discharges for ecological experiments is a challenge in a regulated system. The presence of a dam and a reservoir system that is designed for water storage restricts discharge magnitude and volume. Experiments that emphasize lower volume discharges may be more attainable and allow testing hypotheses about limiting factors in endangered fish species survivorship.
- High spring discharges in April and May, the associated vegetated scour, and the subsequent reduced discharge that began in June benefited tamarisk seedling establishment. Tamarisk seedling establishment may have been reduced if shoreline vegetation had not been scoured before the low steady releases in June.

Background Information

In accepting the charge from the AMWG to prepare a synthesis of the 2000 LSSF, GCMRC had assumed that researchers who had participated in the original experiment would also be available to participate in writing the synthesis report. While this was true in some cases, for the majority of researchers, their existing commitments, including participating in and reporting on the 2008 experimental high flow, did not allow them to participate in writing the LSSF synthesis. Therefore, nearly all of the report preparation has been conducted by GCMRC. The limited involvement of cooperators has caused the document preparation to take longer than originally anticipated.

The 2000 Low Summer Steady Flow experiment consisted of steady flows from April through September 2000 that varied in duration and magnitude. April and May were high steady releases that averaged 19,000 cfs. The spring steady flows were interrupted by a four-day 31,000 cfs habitat maintenance flow at the beginning of May. The months of June through September were steady releases of 8,000 cfs interrupted by a four-day habitat maintenance flow of 31,000 cfs at the beginning of September. The purpose of the experiment was to provide high steady spring and late summer releases and low steady summer releases to benefit humpback chub recruitment. The experimental hydrograph was implemented in 2000 because analysis of basin hydrology in January 2000 suggested a high probability that the first 8.23 maf year might occur. Implementing an experimental hydrograph under the first available 8.23 maf year was part of a reasonable and prudent alternative from the 1995 FWS biological opinion on Glen Canyon Dam operations. A decision to implement the hydrograph was made in March 2000 and data collection for some studies began in April. The compressed planning and implementation timeline compromised some data collection efforts for some resources, and precluded addressing some questions about resource response to the implemented hydrograph.

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