

**Glen Canyon Dam Adaptive Management Program
Technical Work Group - Experimental Flow Ad Hoc Group
Agenda - December 11, 2000**

Draft Meeting Minutes

Attendees

Norm Henderson, Tim Randle, Barry Gold, Rick Johnson, Barbara Ralston, Ted Melis, Bill Jackson, Don Metz, Cliff Barrett, Bill Davis, Bob Winfree, Gary Burton, Clayton Palmer, Kirk LaGory, Randall Peterson

Agenda

See Attachment 1

Schedule and charge

The ad hoc group produced recommendations for Biological Opinion flows, BHBFs, and Habitat Maintenance Flows (HMFs) for FY 2001. These recommendations will be mailed to the TWG on December 28, 2000, along with the ad hoc group meeting minutes. The remainder of the TWG charge to the experimental flow ad hoc group will be accomplished after January 2001. The goal of the experimental flow ad hoc group is to recommend a program of experimental flows for the Biological Opinion, BHBF, and HMF issues, as well as determination criteria for 8.23 MAF release years, by April 2001 for presentation to the TWG and AMWG.

Current conditions

Hydrology: November has been a very dry month across the basin, with precipitation averaging about 70 percent of normal. Basinwide snowpack is now about 85 percent of normal, compared to 130 percent of normal a month ago. Expected runoff conditions next year are near normal, which would produce an annual water year release of 9.5 MAF. Under minimum probable inflow, an 8.23 MAF release year is expected. Under a maximum probable inflow a release of about 12 MAF would occur, which might not result in the triggering of a BHBF (see Attachment 2 for a plot of these three hydrologic scenarios). Under the most probable release, Lake Powell would rise to about 15 feet from full; therefore, if there is additional inflow greater than the most probable, half would be stored in Lake Powell and half would be released to Lake Mead.

Sediment: Sediment inputs occurred in the Grand Canyon in June through August 2000 from ungauged tributaries in Marble Canyon. When the September 2000 4-day spike release occurred as part of the LSSF test, area and volume increases were observed in bars above the 20,000 cfs level, generally up to or exceeding the volume and area measured in 1991 (see Attachment 3). While the main channel may have already coarsened and winnowed since September, these bars seem to have retained a portion of the tributary inputs, thus accomplishing to some extent the goal of retaining sediment rather than transporting sediment in the main channel out of the canyon.

Ted Melis is considering targeting April - May as the time for annual sand bar monitoring, to give a more realistic picture of how much and in what location sediment is being stored in the system. This data could provide important information regarding the conducting of spring BHBFs or fall Habitat Maintenance Flows (HMFs).

Biological resources: Barb Ralston reported that the Kanab amber snail population seemed not to have changed much from previous years, with little effect from the 30,000 cfs spike flows in FY 2000. Humpback chub and trout populations also seem consistent with previous estimates, and the foodbase showed little effect from FY 2000 flows. The species composition of the cladophera in the Lees Ferry reach is changing, and large increases in the number of snails were also noticed. Large numbers of tamarisk seedlings were established after the spring spike flow this year, and while the fall 30,000 cfs fall spike did little to remove them, succeeding high fluctuating flows seemed to have reduced many of the seedlings. The reports from last year's monitoring and research will be available in the next few months.

FY 2001 monitoring and research activities (the ability to measure experimental flows or management actions)

Barry explained that the FY 2001 program has little flexibility to perform additional monitoring and research on management actions or experiments as a result of the cap placed on power revenues and the lack of lead time to seek additional appropriations. As a result of a very heavy existing workload on the GCMRC staff, if either experiments or management actions are performed, the ad hoc group will need to offer significant help on framing research questions and hypotheses on which to base RFPs. Funding will have to come from agency contributions, outside sources, or as a last resort, redirected from other GCMRC research program areas. The current monitoring effort is not sufficient to thoroughly understand the results of additional proposed actions, given the number and timing of FY 2001 science trips. Barry stated that in order to obtain the baseline and long-term data that has been lacking from the science program, monitoring activities cannot be redirected from year to year. A suggestion was made to take the issue to the TWG for ideas on alternative funding approaches.

Biological Opinion flows

The test conducted in FY 2000 was described as a "test of concept" in implementing RPA item 1(a) of the 1995 Biological Opinion, since it contained only a portion of the hydrograph proposed by SWCA. However, the FY 2001 test was very valuable in revealing what important variables needed to be measured and in evaluating different sampling techniques.

As a result of current reservoir conditions of Lakes Powell and Mead, the likelihood of FY 2000 being an 8.23 MAF release year is about 15 to 20 percent. Our current release regime through January is not substantially different from a typical 8.23 MAF release pattern. The group discussed the pros and cons of either (1) testing one year of ROD operations during an 8.23 MAF release year, followed by steady flows (high in spring and low the rest of the year) during subsequent 8.23 MAF release years, or (2) testing steady flows in order to approximate back to back steady flow years in an effort to increase the strength of the signal in recruitment. Barry

proposed that whatever flows the groups recommended, they should seek to produce the greatest amount of learning with respect to the needs of the endangered fish, and suggested conducting fluctuating releases with the same monthly volumes as in the FY 2000 test. Wayne Cook and Rick Johnson asked about the value of repeating the low steady summer flows of FY 2000. Clayton Palmer suggested the importance of establishing the baseline called for in the SWCA report. Following these discussions, the group began to converge on the idea of establishing the SWCA baseline using ROD operations should an 8.23 MAF release year occur.

Rich Valdez joined the meeting following these discussions to explain the logic behind portions of the proposed SWCA hydrograph. Following discussion, he was asked for his recommendation. He recommended that (1) the program of releases should be conducted as explained in the SWCA report, starting with the first year being ROD operations during an 8.23 MAF release year, (2) that a HMF not be conducted as part of the first year of ROD flows, and (3) that there was no compelling reason for summer steady flows to be less than 8,000 cfs during the second and third years of the test flows. Following further discussion, the group decided to recommend implementation of the baseline as recommended in the SWCA report.

During the January 9 - 10, 2001 TWG meeting, the ad hoc group will present (1) its recommendation that in FY 2001, if the annual release volume is 8.23 MAF then ROD fluctuating flows should govern releases according to the SWCA proposal, as well as (2) the pros and cons of alternative release patterns in FY 2001. If the Biological Opinion test flows are implemented in FY 2001, it will be important to commit that the full year of the hydrograph be released and monitored, March 2001 to March 2002.

If FY 2001 turns out to be an 8.23 MAF release year, the science plan prepared for the FY 2000 test should be evaluated as to its applicability to ROD flows. Some group members believed that many parts of the science plan wouldn't apply due to the hypothesized lack of stable habitats during ROD operations, while others believed that direct comparisons would be essential to determining the cause and effect value of implementing the flows outlined in the Biological Opinion. Group members were tasked to review the FY 2000 LSSF science plan and offer comments to GCMRC by January 9, 2001, on suggested changes for implementation in FY 2001 under ROD operations.

Beach Habitat Building Flows

Ted Melis felt that as a result of the tributary inputs and subsequent HMF in FY 2000, that if a BHBF were triggered in FY 2001, Reclamation should release a BHBF. He believed there is sufficient sand in storage to positively affect sandbar building. There are still concerns about the rate of downstream sediment transport under any action, and the group discussed the alternative release regime (flows > 25,000 cfs) if a BHBF was triggered but not released. As in the Biological Opinion discussion, specific questions / hypotheses should frame the monitoring and research activities associated with this flow. Funding of these activities is also a concern. The magnitude of the BHBF would be limited to 45,000 cfs, but the duration potentially would be shorter than during the 1996 test. An analysis from Ted Melis would guide a recommendation on the BHBF duration. Testing of BHBFs greater than 45,000 cfs will be addressed by the ad hoc

group in the next few months.

Habitat Maintenance Flows

The fall FY 2000 HMF seemed to show good promise in retaining sediment in the canyon through suspension and deposition of recent tributary inputs into eddy and channel margin areas between the 20,000 and 30,000 cfs levels. The success of this type of action depends greatly on (1) the status of eddy deposits (is there storage space available in the eddies?), (2) the availability of fine grained sands (has there been a recent tributary input?), and (3) the magnitude of antecedent dam releases (have releases been so high as to transport tributary inputs out of the canyon?). The group agreed with the concept that if the sediment supply conditions were appropriate, then we should conduct a fall HMF, unless the Biological Opinion test flows were released under ROD constraints. In this last case, the specific parts of the SWCA steady flow hydrograph were excluded from the 8.23 MAF release ROD operations test hydrograph in order to make a strict comparison. If the HMF were to occur, it should be released prior to the beginning of the non-motorized season, but only after fall tributary events.

Future Development of Programs of Experimental Flows

Several key questions still remain about the impacts of these types of releases. These questions are proposed to be addressed during the next few months by the ad hoc group in response to our TWG charge, and include (1) a program of experimental flows to address the issues raised in the Biological Opinion, starting with the SWCA proposed flows, (2) developing "determination" or "triggering" criteria for implementing experimental flows in 8.23 MAF release years, and (3) a program of experimental flows which address unanswered questions about BHBFs. We expect these ad hoc group efforts to be concluded this spring in order that applicable compliance activities can be undertaken on the experimental flows program as a whole, with the intent being implementation beginning in FY 2002.

Action Items

- 1 - prepare ad hoc group recommendation for mailing to the TWG on December 28, 2000, including pros and cons referenced above
- 2 - review and offer suggested revisions to GCMRC's monitoring and research plans for Biological Opinion flows, BHBFs, and HMFs for potential implementation in FY 2001, due by January 9, 2001 at the TWG meeting
- 3 - presentations at both the TWG and AMWG meetings regarding these FY 2001 flows

Attachment 1

Glen Canyon Dam Adaptive Management Program Technical Work Group - Experimental Flow Ad Hoc Group Agenda - December 11, 2000

1 - Schedule and charge

- December 28, 2000 mailing to TWG for January 10, 2001 meeting (FY 2001 flows)
- Target final report to TWG at February or April meeting

2 - Current conditions

- Hydrology and power generation
- Sediment (main channel, eddies, beaches)
- Biological resources (food base, terrestrial, HBC, KAS, trout)

3 - General objectives of experimental flow programs

4 - 2001 AMP monitoring/research program - the ability to measure impacts of experiments

- timing of monitoring/research trips vs. experimental flows
- funding
- use of the conceptual model

5 - Biological Opinion flows

- Results of FY 2000 LSSF test
- Discussion of SWCA report
- Key hypotheses / questions
- Success / failure of FY 2000 monitoring
- Potential FY 2001 release regimes / triggering / timing
- Contribution of FY 2001 release to program of experimental flows
- Required adjustments to FY 2001 AMP monitoring and research program

6 - Beach Habitat Building Flows

- Results of FY 1996 test
- Key hypotheses / questions
- Potential FY 2001 release regimes / triggering / timing
- Contribution of FY 2001 release to program of experimental flows
- Required adjustments to FY 2001 AMP monitoring and research program

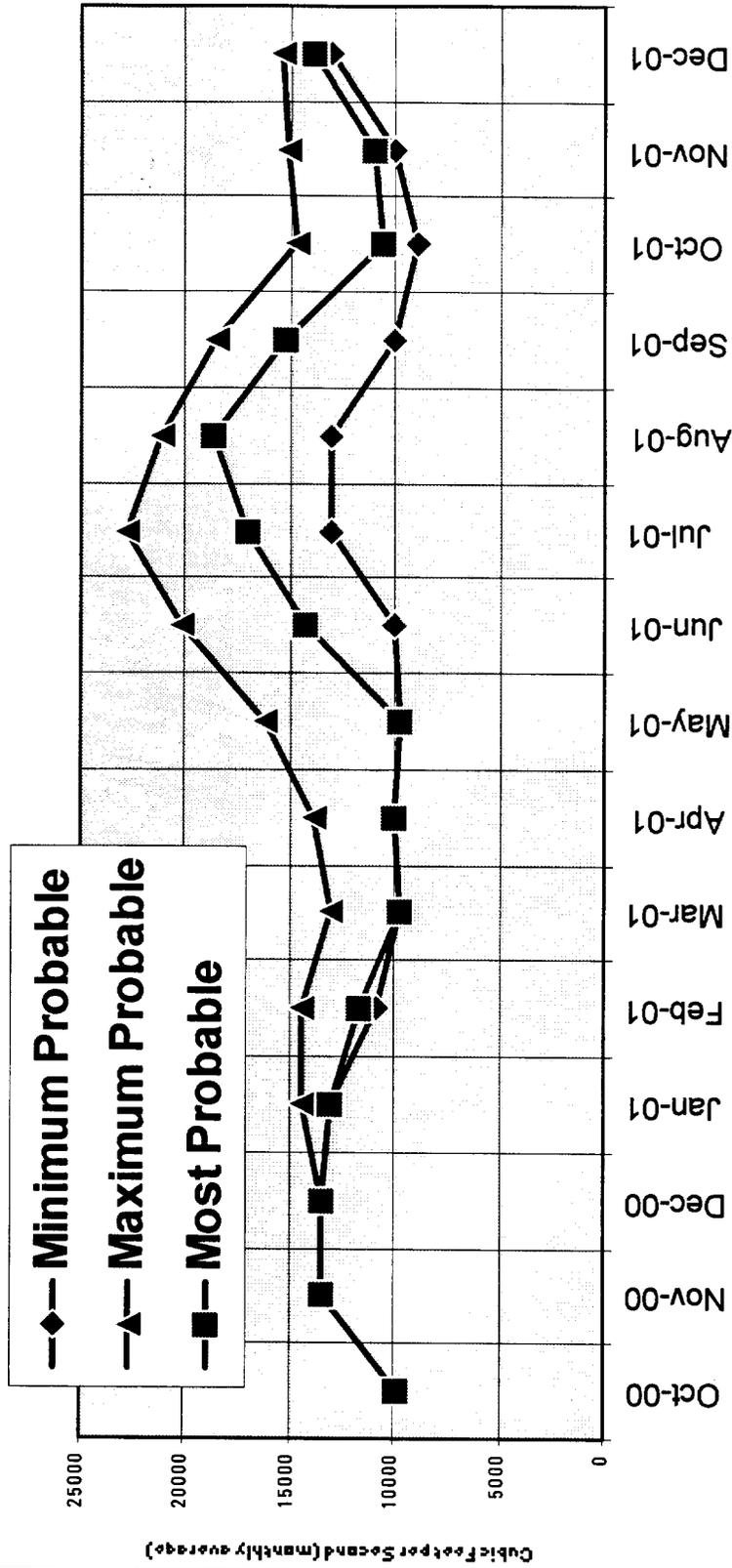
7 - Fall Habitat Maintenance Flows

- Results of FY 2000 release vs. 1997 test
- Timing of tributary inputs
- Key hypotheses / questions
- Potential FY 2001 release regimes / timing
- Contribution of FY 2001 release to program of experimental flows
- Required adjustments to FY 2001 AMP monitoring and research program

Attachment 2

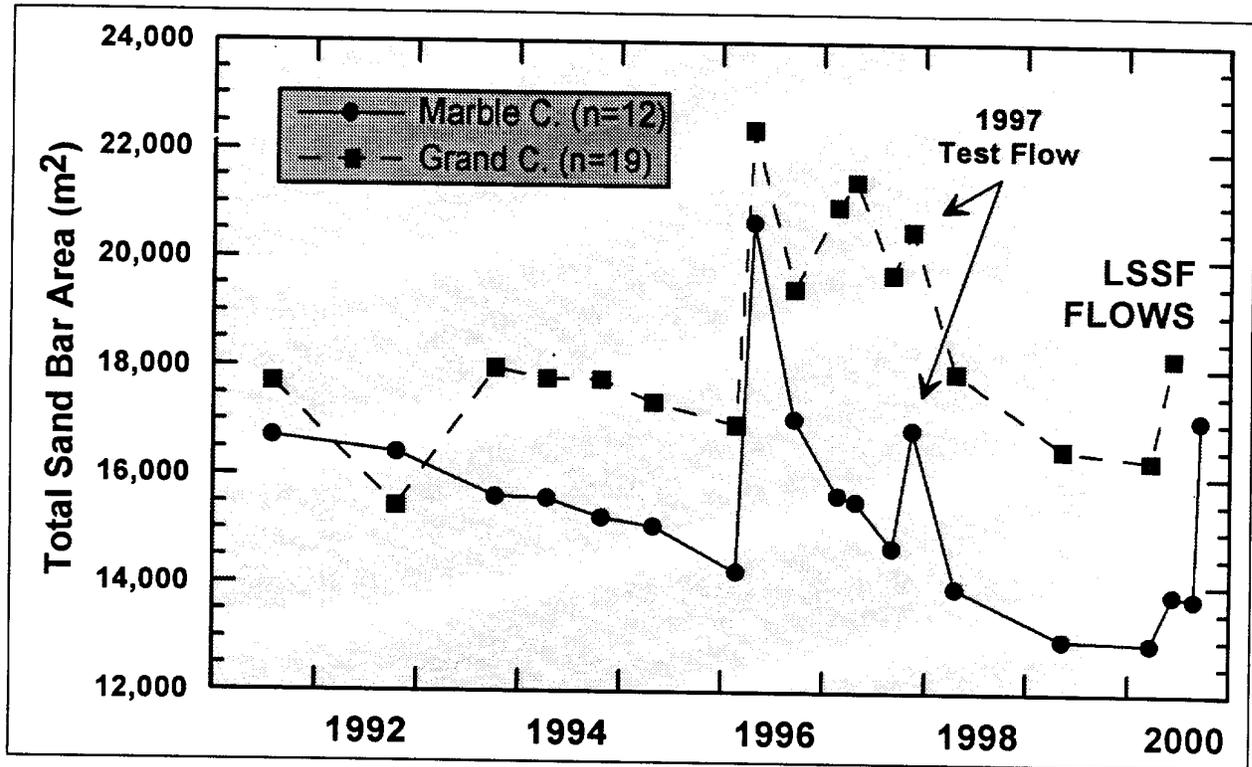
Glen Canyon Releases - Oct 2000 - Dec 2001

Based on December 2000 Final Forecast



Attachment 3

Bar area above 20,000 cfs level



Attachment 3 (continued)
Bar volume above 20,000 cfs level

