Managing Water in the West

Fall 2016 HFE Planning

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TWG presentation
October 18, 2016

U.S. Department of the Interior
Bureau of Reclamation
HFE Decision Making Process

1. Planning and Budgeting Component
   - Annual resource status assessment
   - Annual Agency Reporting
   - GCDAMP Budget and Work Plan Process

2. Modeling Component

3. Decision and Implementation Component
   - Review Modeling Component
   - Review Status of Resources
   - Consultation with agencies and tribes, AMWG input
   - Staff Recommendation/DOI GCD Leadership Team Recommendation
HFE Protocol Parameters

Possible Timing
- March-April and October-November through 2020
- Spring HFEs were considered starting in 2015

Duration range
- 1 hr – 96 hrs (at full magnitude)
- 1 ½ days – 6 ½ days (including ramping)

Magnitude range
- 31,500 cfs – 45,000 cfs (depends on maintenance)

Ramping rates
- Ramping rates are defined by 1996 ROD and 1997 Glen Canyon Dam Operating Criteria (62 FR 9447, 4,000 cfs up and 1,500 cfs down)
Current conditions from the GCMRC web page as of Oct 16, 2016

http://cida.usgs.gov/gcmrc/discharge_qw_sediment/stations/GCDAMP

~962,000 Metric Tons

Preliminary Data – Do not cite or distribute
As of 10/18/2016, there is sufficient sediment to support a 36000 cfs HFE. This data is preliminary.
Glen Canyon Dam Possible HFE Release Pattern

Provisional HFE Pattern

At full capacity
Nov 7, 1pm - Nov 11, 1pm

max release = ~ 36,000 cfs

Open bypass tubes
Nov 7, 10am

Begin ramp up
Nov 7, 7am

Complete HFE
Nov 12, 5am

powerplant capacity = ~ 21,000 cfs

November Volume
~745 kaf total release
(~60 kaf to be reallocated from later months)
(~125 kaf bypass)
96-hr HFE / 36,000 cfs max release
4,000 cfs up-ramp, then 1 bypass tube
1,500 cfs down-ramp
6,500 cfs / 9,000 cfs pre & post-HFE

Date-Hour

- - Powerplant capacity  96 hr
Resource Status Assessment

**Sediment Resources**
- In-channel sediment storage
- Sandbar campable area
- High-elevation sand deposits

**Cultural Resources**
- Archaeological site condition and stability
- Access to archaeological sites by tribes

**Hydropower and water delivery**
- Water quality
- Water delivery
- Dam maintenance
- Hydropower production and marketable capacity

**Biological Resources**
- Aquatic food base
- Lees Ferry trout population
- Lees Ferry fishery recreation experience quality
- Endangered humpback chub and other fish abundance
- Riparian vegetation
Hydropower/Socioeconomic Impacts

- HFEs impact hydropower production:
  - Water released during an HFE counts against the annual release and is not available to be programmed in peaking releases during high demand months (HFE windows of Mar/Apr and Oct/Nov are low-demand shoulder months).
  - 30-40% of HFE releases bypass the power plant.
  - Lake Powell is lowered, reducing hydrologic head.
  - 2014 HFE cost: $2.1 M

Western Area Power Administration estimates the annual hydropower impacts of approximately $1.4 M
Cultural Resources

- HFE-caused erosion and deposit is a consideration, some sites already mitigated.
- GCMRC monitoring shows that recent HFEs have eroded terraces that contain archaeological sites in Glen Canyon NRA and can resupply aeolian dunefields which contain archaeological sites (though it may not outpace erosion of the dunefields) No impacts to sites were identified from the 2012 HFE, no reports of issues with access to sites

- The MOA for the HFE Protocol requires notification to all the consulting parties at least 30 days in advance of a HFE and will consult with tribes to resolve any issues
- A 30-day notification letter notifying MOA signatories of a possible HFE in November will be sent soon
- The HFE MOA requires reporting and consultation after HFEs
Sandbars and Campsites: 2012-2015

- HFEs in 2012, 2013, and 2014 built sandbars
  - Bars eroded between HFEs
  - Greater erosion in years of higher release volumes
  - Bars larger now than at start of HFE protocol and periods with no HFEs, but no evidence for “progressive” increases in sandbar size
- High-elevation Campsite area (above 25,000 cfs stage)
  - No net change in non-critical reaches
  - Increase from 2012 to 2014 in critical reaches
- First three years of HFE protocol were a period of low annual release volumes and good tributary sand supply
  - Bar deposition without depleting sand from storage
  - Sand accumulated in Marble Canyon, replenishing sand evacuated during 2011 equalization

preliminary data, do not cite
Sandbars: 2008-present

- 50 individual sandbars with data 2008-present
  - 25 in Marble Canyon
  - 7 in Grand Canyon (RM 60-87)
  - 18 in Grand Canyon (below RM 87)
- With October 2008 as reference (8-month post-HFE)
  - Increase in Marble Canyon and Grand Canyon (below RM 87)
  - No change in Grand Canyon (RM60-87)

Marble Canyon: slightly larger than Oct. 2008
Grand Canyon (below RM 87): large relative to Oct. 2008
Grand Canyon (RM 60-87): same relative to Oct. 2008

preliminary data, do not cite
2011 USFWS Biological Opinion
Non-native Fish Control Trigger

- Adult humpback chub <7000 fish?  No

- OR

- ALL THREE?  No
  - 3 of 5 years 150-199 mm humpback chub in the LCR drops below 910?  No*
  - Temperature <12°C for 2 consecutive years at LCR?  No
  - Annual survival of 40-99 mm humpback chub in JCM drops 25% from preceding year?  No

*Fell below threshold in 2016
2011 USFWS Biological Opinion
Non-native Fish Control Trigger

- AND

- Rainbow trout abundance over 760? No

- AND

- Brown trout abundance over 50? Unknown

2016 catches remain low; 3 caught in Jan, 0 in April and July – catches too low to generate abundance estimate (Yard and Korman, preliminary data)
Aquatic Insect Drift: Long Term Trends

Controlled flood
Aquatic Insect Drift: Long Term Trends

Recent floods have NOT elicited the kind of response observed in 2008.

Mudsnails still dominating.
Rainbow Trout in Glen Canyon

Growth (g/30 days)

Condition Factor

Preliminary data, do not cite.

Sampling Interval

HFE
Rainbow Trout in Glen Canyon

Spring/Summer growth lower after 2012 & 2013 HFEs, but higher after 2014 HFE. Also lower in 2016 (no 2015 HFE). Indicates factors other than HFEs driving spring/summer trout growth.

Preliminary data, do not cite.
Rainbow Trout in Glen Canyon

Fall growth in HFE intervals slightly negative in 2012 and 2014 and slightly positive in 2013. Growth positive in fall interval with no HFE in 2015. Suggests temporary weak negative effect on trout growth during HFE intervals.

Preliminary data, do not cite.
Rainbow Trout in Glen Canyon

Any HFE effect is temporary, growth increases starting December or January. Late winter/spring growth increase was at similar levels in 2015 (post 2014 HFE) and 2016 (no 2015 HFE).

Preliminary data, do not cite.
2016 Green Sunfish Rapid Response

- Two detection trips in July 2016 = no GSF
- August 2016 – GSF detected
- 10 removal trips from August – October captured and removed over 4600 GSF
  - Trips conducted by GCMRC, AGFD, and NPS

Preliminary results provided by Charles Yackulic (GCMRC)
2016 Green Sunfish Rapid Response

- GSF numbers reduced by mechanical removal but cannot be eliminated
  - GSF removed by mechanical means will be provided to the Tribes for beneficial use
- NPS applied for a permit from ADEQ to apply ammonia as an experimental piscicide
Current Status

- Application for proposed ammonia treatment submitted to ADEQ on October 3
  - Approval received October 13
  - Treatment date is October 20
- All other permitting and compliance complete as of October 17
- HFE proposed for November 7
  - Decision will be made by October 20 by HFE leadership team after review of all resource conditions including status of GSF.
Treatment Plan

- GCMRC and NPS staff will conduct the ammonia treatment on October 20th.
- Water quality sampling will occur before and after treatment.
- 15 to 20 gallons of ammonia will be dispersed into upper slough.
- Electrofishing surveys Friday Oct. 21st and the following week to confirm treatment success.
- The slough area will be administratively closed from treatment to proposed HFE date.
HFE Protocol Reporting

1. GCDAMP Annual Reporting meeting every January.
2. Updates at TWG and AMWG GCDAMP meetings
3. Meet with the HFE MOA consulting parties and consult with tribes as needed.
4. The HFE Technical Team report to the Secretary’s Glen Canyon Leadership Team for their consideration in HFE decisions.
5. US Fish and Wildlife Service report each January on the effects of prior HFEs and conservation measures of the 2011 FWS biological opinion.
2016 HFE Summary and Next Steps

1. Sediment conditions support a 96-hr 2016 Fall HFE
   • 36,000 cfs for 96-hrs, possible start Nov 7
2. 30-day HFE MOA letter has gone out
3. Other resource considerations: green sunfish;
   • planned treatment Oct 20th.
4. TWG presentation: Oct 18th
5. The HFE Technical Team recommendation to the Secretary’s Glen Canyon Leadership Team: Oct 19th
6. Leadership Team decision on whether to proceed with fall HFE: Oct 20th
7. BO report- by December
8. Follow up at future AMP meetings