Glen Canyon Dam Technical Work Group
June 26, 2013

Water Year 2014 Hydrograph TWG Motion
As Adopted by TWG on June xx, 2013

Motion: TWG recommends the AMWG recommend to the Secretary of the Interior her approval of the DOI-DOE Proposed Hydrograph for Water Year 2014 as follows:

- Annual Release Volumes will be determined by the 2007 Interim Guidelines and shall be reviewed and adopted through the normal annual operating plan process.

- Monthly release Volumes are anticipated to shift depending upon the Annual Release Volume and the magnitude of a potential High Flow Experiment.

- Release objective for June of 600 kaf to 650 kaf is intended to provide warmer river temperatures at the mouth of the Lower Colorado River early in the season for endangered fish.

- Release objective for August of 800 kaf is intended to reduce the erosion of August sediment inputs in anticipation of a potential HFE.

- Release objective for September and October of 600 kaf (or less) is intended to reduce sediment transport in anticipation of a potential HFE and maintain warmer river temperatures for endangered fish.

- Monthly Release Volumes will generally strive to maintain 600 kaf levels in the shoulder months (spring and fall) and 800 kaf in December/January and July/August timeframes to meet Western's minimum power needs.

- 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.

RECLAMATION

Managing Water in the West

2014 Hydrograph

Dave Trueman
Division Manager
Bureau of Reclamation

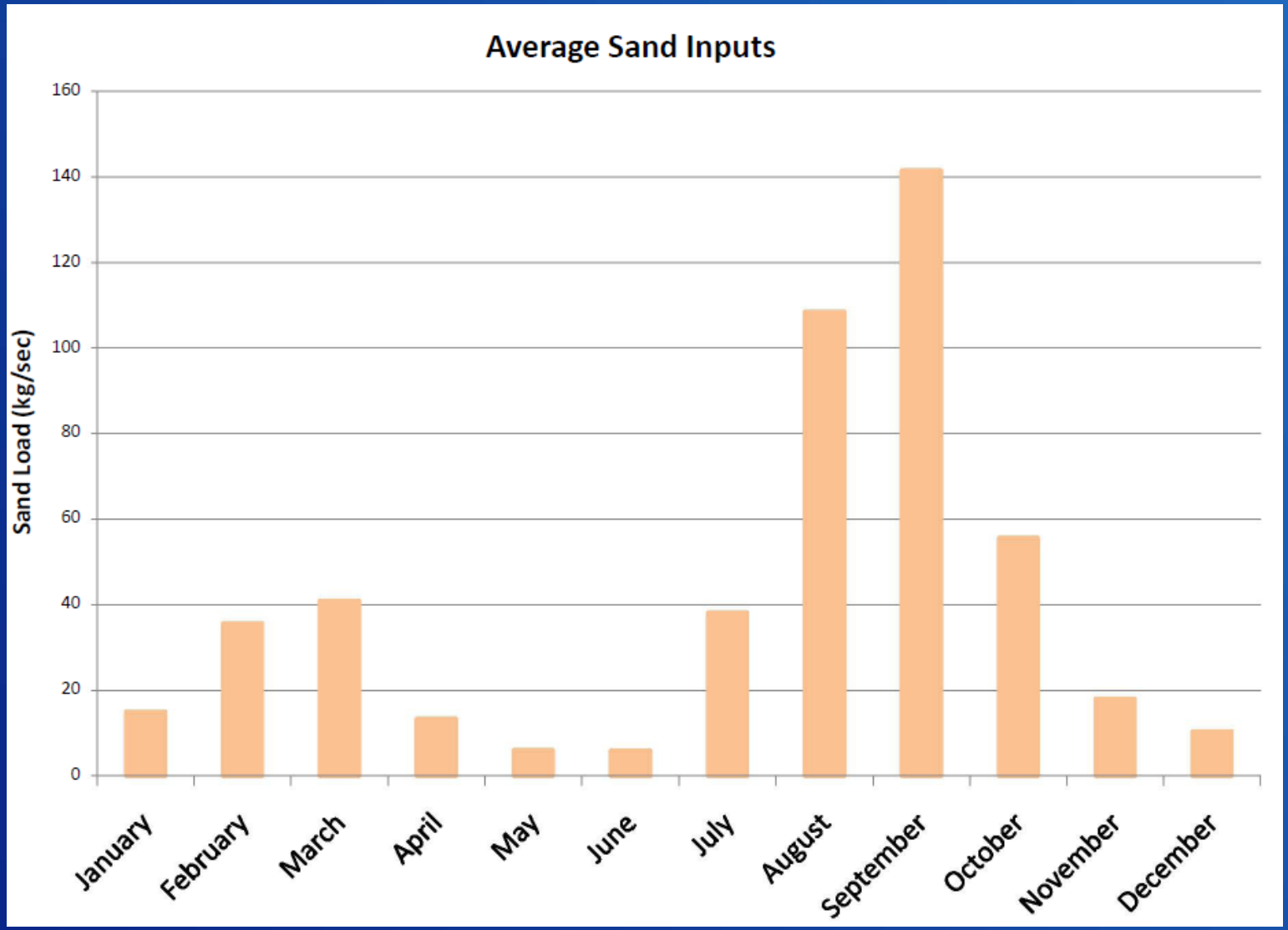
Glen Canyon Dam Adaptive Management Program
Adaptive Management Work Group Meeting
August 2013

U.S. Department of the Interior
Bureau of Reclamation

2014 Hydrograph Development

- Start with 2012/13 Hydrograph
- Consider operating experiences
- Take advantage of current conditions
- Not intended to be precedent setting
- Continue to work within existing environmental compliance

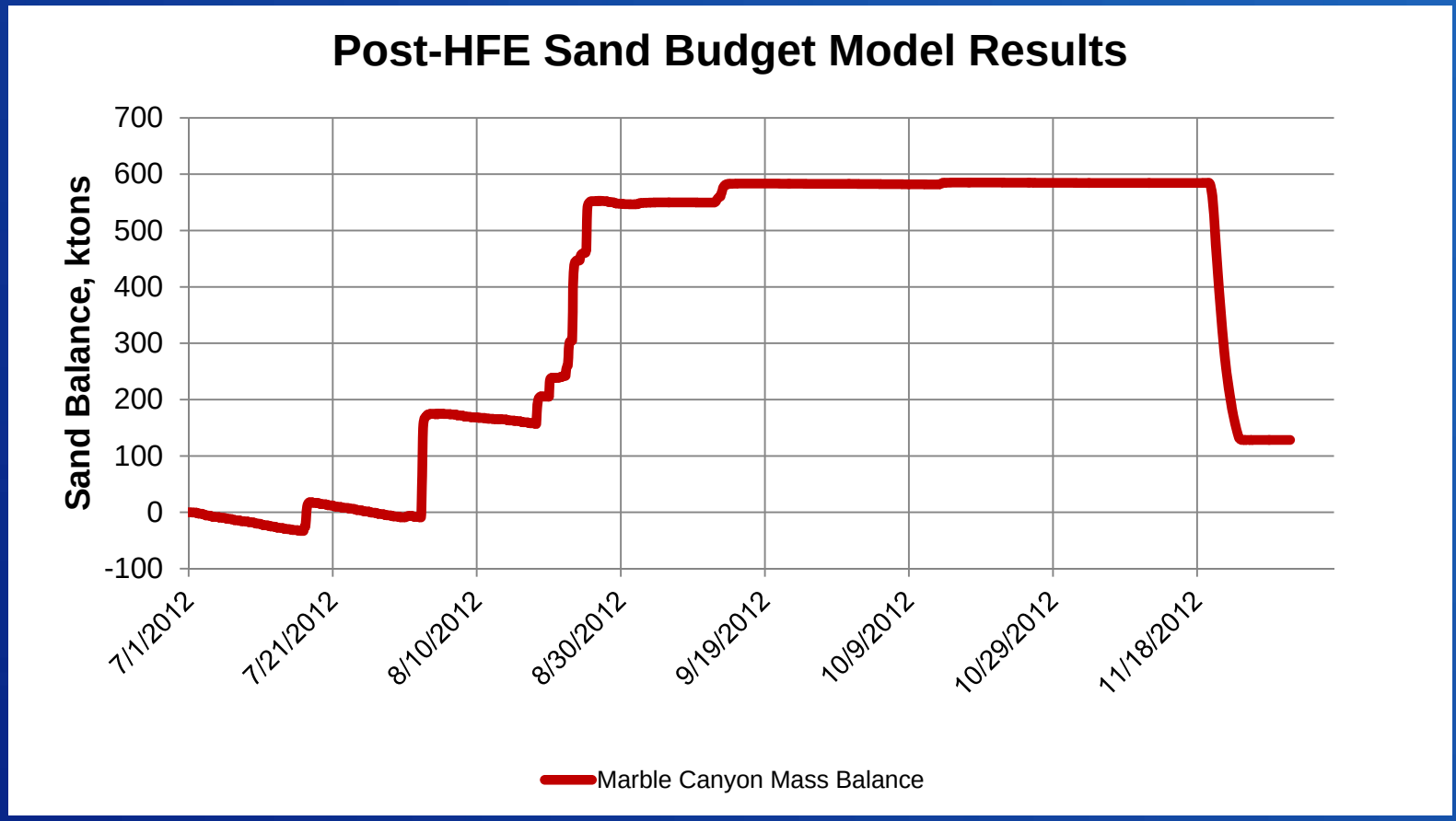
RECLAMATION



RECLAMATION

Lessons Learned

The 2012 HG worked very well at retaining sediment inputs high in the system in anticipation of an HFE



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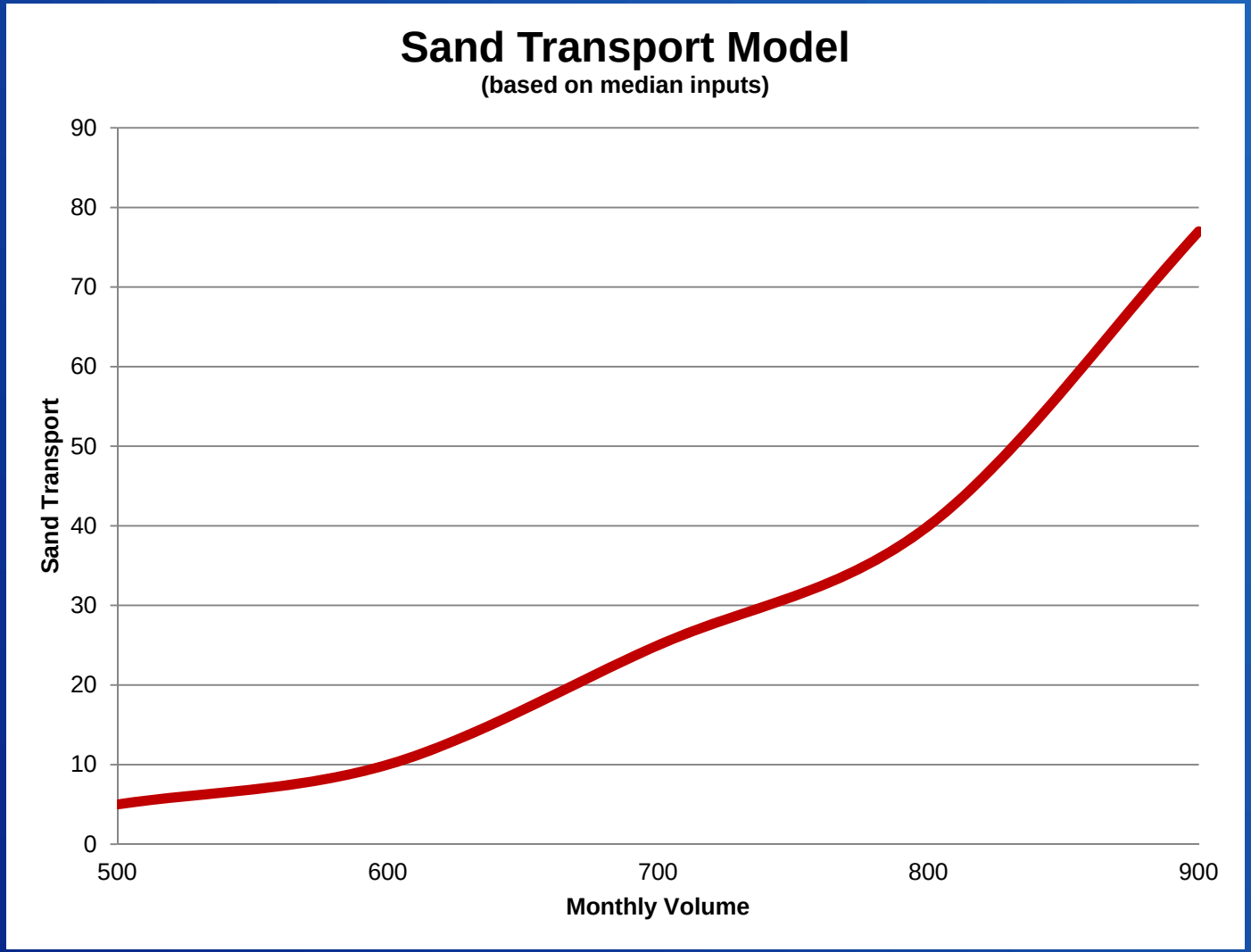

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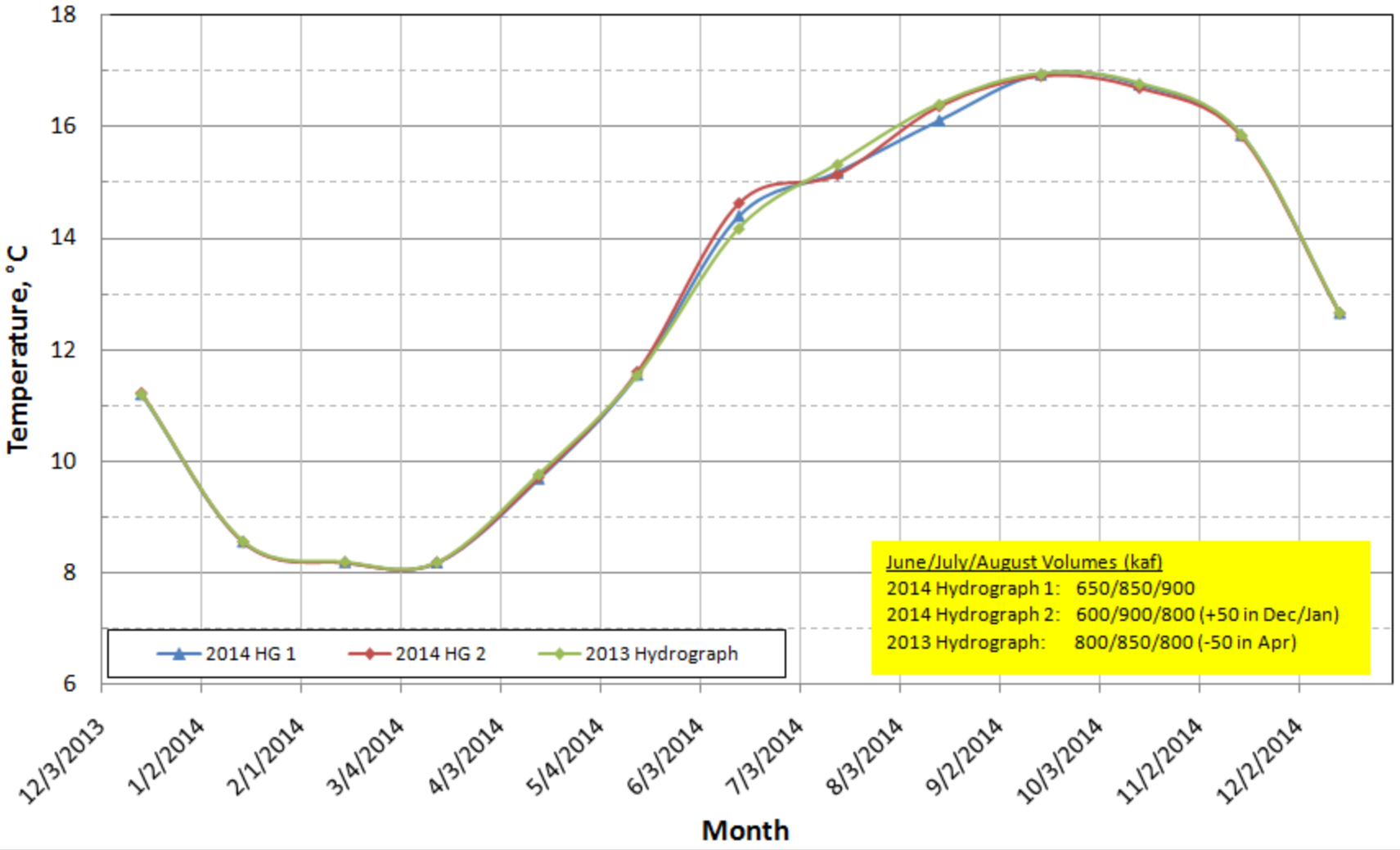
Additional Objective Identified

- FWS suggested we look at ways to improve temperatures at the mouth of the LCR early in the season (June)
- Looked at attempting to entrain warmer reservoir water into releases with high flows (no change found this year)
- LCR temperatures were found to drop by about 0.5 deg C as releases are increased from 600 to 800 kaf

Colorado River-LCR Confluence 2014 Water Temperatures

Operations: 2014 Hydrograph 1, 2014 Hydrograph 2, & 2013 Hydrograph



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Hydrograph Concepts

- Continue to target lower August – October releases to retain late summer/fall sediment inputs
- Avoid shifting “extra” water to June (which cools temperatures at the mouth of the LCR)
- Move water from Aug to other equal value months for power (December/January)

WY14 Hydrologic Conditions

- GCD annual release will be determined in August
- About equal probability GCD annual release will be set at either 7.48 maf or 8.23 maf
- Very minor chance of balancing (higher than 8.23)
- Unlike the higher tier operations, monthly volumes will be far less volatile and established early in the year

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Example of 7.48 maf release

	No HFE	96 hr HFE	72 hr HFE	60 hr HFE	48 hr HFE	36 hr HFE
Oct	480	480	480	480	480	480
Nov	500	630	577	551	524	497
Dec	600	600	600	600	600	600
Jan	800	800	800	800	800	800
Feb	600	600	600	600	600	600
Mar	600	470	523	549	576	603
Apr	500	500	500	500	500	500
May	600	600	600	600	600	600
Jun	600	600	600	600	600	600
Jul	800	800	800	800	800	800
Aug	800	800	800	800	800	800
Sep	600	600	600	600	600	600
	7480	7480	7480	7480	7480	7480

* assumes MLFF ramp rates and minimums on shoulders

  4,000 cfs/hr upramp and 1,500 cfs/hr downramp

  5,000 cfs nightime and 8,000 cfs daytime

* assumes max release = 33,400cfs (current estimate w/ 6 units)

RECLAMATION

Example of 8.23 maf release

	No HFE	96 hr HFE	72 hr HFE	60 hr HFE	48 hr HFE	36 hr HFE
Oct	600	600	600	600	600	600
Nov	600	630	600	600	600	600
Dec	800+50	800+20	800+50	800+50	800+50	800+50
Jan	800+50	800+50	800+50	800+50	800+50	800+50
Feb	600	600	600	600	600	600
Mar	600	570+30	600	600	600	600
Apr	600	600	600	600	600	600
May	600	600	600	600	600	600
Jun	650	650	650	650	650	650
Jul	850	850	850	850	850	850
Aug	900-100	900-100	900-100	900-100	900-100	900-100
Sep	630	630	630	630	630	630
	8230	8230	8230	8230	8230	8230

* assumes MLFF ramp rates and minimums on shoulders

  4,000 cfs/hr upramp and 1,500 cfs/hr downramp

  5,000 cfs nightime and 8,000 cfs daytime

* assumes max release = 33,400cfs (current estimate w/ 6 units)

RECLAMATION

DOI/DOE Proposed 2014 Hydrograph

- Annual Release Volumes will be determined in compliance with the 2007 Interim Guidelines (in consultation with the Basin States as appropriate).
- Monthly release Volumes are anticipated to shift depending upon: (1) the Annual Release Volume, and (2) the magnitude of a potential High Flow Experiment.
- Monthly Release Volumes may vary within the targets identified below. Any remaining 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 and in compliance with all applicable NEPA compliance documents (HFE EA, NNFC EA, 2007 IG).
- Release objective for June is 600 kaf to 650 kaf .
- Release objective for August is 800 kaf.
- Release objective for September and October is 600 kaf to 630 kaf (or less).
- Monthly Release Volumes will generally strive to maintain 600 kaf levels in the spring/fall timeframe and 800 kaf in December/January and July/August timeframe.
- 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, and after consultation with the Basin States as appropriate, 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.

RECLAMATION