

Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
August 8th and 9th, 2013

Agenda Item

Science Updates: Overflights, Riparian Vegetation, and Sediment

Action Requested

none

Presenters

Jack Schmidt and staff
USGS Grand Canyon Monitoring and Research Center

Previous Action Taken

Relevant Science

Background Information

During the Memorial Day weekend 2013, an over-flight mission was conducted under contract to USGS/GCMRC. During this mission, releases from Glen Canyon Dam were approximately 8,000 ft³/s. Data were collected during a 6-day period without delays, except that some flight lines were repeated due to wind gusts, which persisted each day. Wind gusts produce image smearing, because the Inertial Measurement Unit on the airplane cannot compensate for extreme movements. If there had not been high winds, the mission could have easily finished in 5 days. In the future, a second aircraft should be employed and arrive to fly on day 2 to reduce the collection period by one day. All data were acquired within the established high-sun, cloud-shadow-free specifications. Thus, these data are better than in 2009 when there were cloud shadows and some low-sun angle topographic shadows, due to weather prevailing weather conditions at that time. The total cost of the overflight program, not including the time of regular GCMRC, staff was approximately \$526,000.

Past over-flight missions conducted in 2002, 2005, and 2009 have yielded spatially extensive, comprehensive data concerning river resources. These data combined with other spatially extensive data collected in 1965, 1972, 1984, and 1992 demonstrate that the area of riparian vegetation is greater today than at any time since completion of Glen Canyon Dam. The area of riparian vegetation was extensive in the early 1980s, and the floods of 1983-1986 significantly scored vegetation. After 1986, however, riparian vegetation resumed expansion of its range. Controlled floods in 1996, 2004, and 2008 do not appear to have slowed the rate of riparian vegetation expansion. Additionally, despite these controlled floods, riparian vegetation has become established in some areas inundated by flows as small as 25,000 ft³/s. Riparian vegetation is especially dense in the elevation zone between 25,000 and 45,000 ft³/s.

Between December 1, 2012, and July 1, 2013, the sand mass balance of upper Marble Canyon was reduced by approximately 67,000 metric tons (mt) (-95,000 to -39,000 mt), and the sand mass balance of lower Marble Canyon was increased by approximately 44,000 mt (34,000 to 53,000 mt). The sand mass balance of eastern Grand Canyon did not change during this period (-5,600 mt, range of estimate -46,000 to 35,000 mt), but there were multi-month periods when the sand mass balance was negative (December 1 to February 1) and when the budget was indeterminate (February 1 to July 1). These data are available for inspection at http://www.gcmrc.gov/discharge_qw_sediment/reaches/GCDAMP/. Photographs taken by remote cameras of sandbars whose changes are monitored show that most of the monitoring sites were smaller in May 2013 than they were immediately following the November 2012 HFE. Significant amounts of HFE-deposited sand remain at some sites.