How's it look? The effect of the November 2004 high experimental flow on Colorado River sand bars

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Widespread monsoon precipitation in the fall of 2004 and the subsequent input of sediment from the tributary side canyons triggered the first high experimental flow since 1996. The flow was initiated on November 20 and consisted of a maximum release of 41,000 cfs for a period of 60 hours. The main purpose of the flood was to entrain the recently input sediment and redistribute it to the banks to hopefully rebuild eroded sand bars. The experimental aspect of the flow is to determine if this can be done.

We have conducted three trips to date, with another scheduled for May 2005, to determine the effects of the high flow. River trips immediately before and after the high flow collected multibeam bathymetry and backscatter, underwater microscope, ground topographic points in six 1-3 mile reaches between Lees Ferry and the Little Colorado River. In addition, Lidar topographic data was collected within the reaches by aerial overflights. An additional trip was launched in January to specifically survey the topography at long-term monitoring sites outside of the reaches.

Results from the reach-based approach are still being analyzed, but preliminary results are available for the long-term monitoring sites in Marble Canyon. The results show that There was a 27% increase in total bar area above 8,000cfs in upper Marble Canyon, whereas the increase in lower Marble Canyon was 2%. In contrast, area changes resulting from the 1996 controlled flood in upper and lower Marble Canyon were 7% and 9%, respectively. Sand bar volumes in upper Marble Canyon increased by 55%, while bar volumes in lower Marble Canyon increased by 15%. In 1996, sand bar volumes increased by 42% in upper Marble Canyon and 23% in lower Marble Canyon. In summary, preliminary results show that there was much more bar building in upper Marble Canyon in 2004 than in 1996, and less bar building in lower Marble Canyon this time than in 1996. The different patterns of deposition observed in 1996 and 2004 could possibly be due to differences in sediment supply. The recently input sediment supply in 2004 was mostly redistributed in upper Marble Canyon. In 1996, sediment supply increased in a downstream direction because there were no recent sediment inputs to entrain.

Surveys planned for May will sample the topography of all long-term sites, as well as campsite area. These surveys will document the effects of high fluctuating flows (5,000 cfs to 20,000 cfs), another experiment directed at reducing the rainbow trout population, on the newly deposited sediment.