



## United States Department of the Interior

### U.S. GEOLOGICAL SURVEY

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### **Memorandum for the Record**

To: Glen Canyon Dam Adaptive Management Program, Technical Work Group

From: Michael Moran, Deputy Chief, USGS Grand Canyon Monitoring and Research Center

Date: June 13, 2018

The US Geological Survey's Grand Canyon Monitoring and Research Center (GCMRC) held a review of its water-quality program on October 24-26, 2017. The GCMRC periodically convenes independent review panels to assess the quality, comprehensiveness, and the need for its various research and monitoring programs. The purpose of this review was to examine the science work conducted under GCMRC's water-quality program.

A panel of five recognized experts in water-quality, limnology, and aquatic ecology served as the review team. The panel was provided with a prospectus that outlined GCMRC's ongoing water quality monitoring program, stated the purpose of the review, identified key questions to be addressed, and provided a list of recommended papers and reports for the panel to read ahead of the review (see attached prospectus). Scientists from the GCMRC who conduct water-quality monitoring and research attended the review to provide descriptions of their research and methods, demonstrate field sampling protocols, and respond to questions from the review team. Other attendees included stakeholders from the Glen Canyon Dam Adaptive Management Program, scientific colleagues, water-resource managers, and interested members of the public.

The review consisted of presentations, field trips, discussion sessions, and a final panel review (see attached agenda). Presentations on past and ongoing water-quality monitoring work on Lake Powell as well as an overview of some of the results of that work were given. In addition, there were discussions of water-quality monitoring in Lake Powell as it relates to current research on nutrients in the aquatic ecosystem downstream of Glen Canyon Dam. The review group also heard from speakers on topics such as dam operations, water-quality modeling, and aquatic ecology.

Several field trips were conducted to observe field water-quality methods and procedures and representative sampling sites. The field trips included: 1) a trip to Lake Powell to examine water-quality sampling techniques at the Wahweap station, 2) a tour of Glen Canyon Dam to observe water-quality monitoring within the dam, and 3) a trip on the Colorado River downstream from the Glen Canyon Dam to observe other water-quality and aquatic ecosystem sampling sites.

A final report summarizing the conclusions and recommendations of the expert panel was received by the GCMRC on June 4, 2018 (see attached report). The report identifies areas where the panel believes the water-quality program can be improved and provides in-depth answers to the questions posed by GCMRC in the review prospectus. The recommendations of the panel will significantly improve the scientific quality, relevance, and direction of GCMRC's water-quality program.