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Lake Powell Water Quality Program

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TWG Webinar
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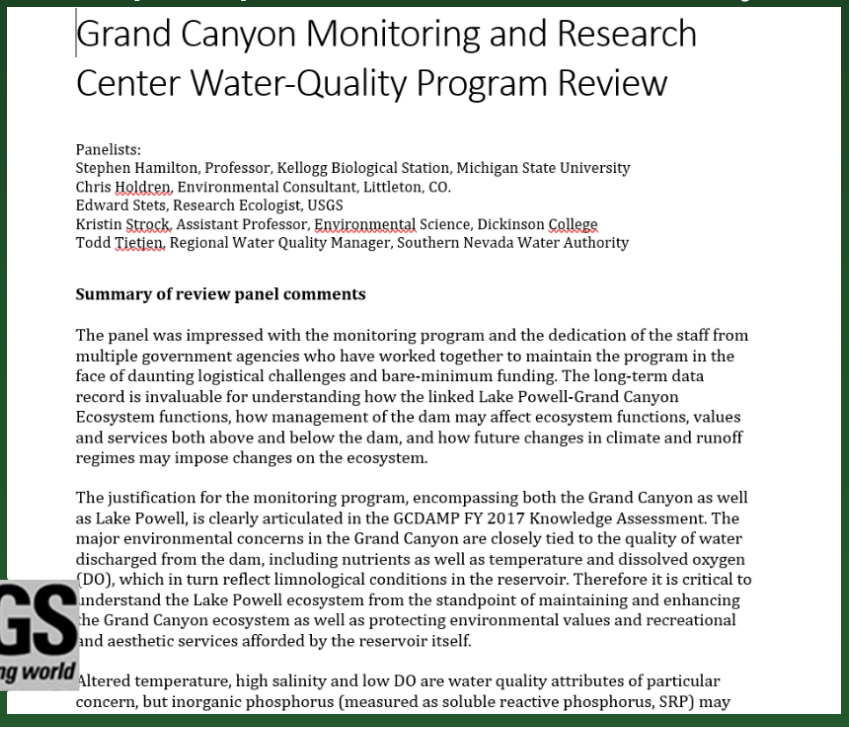
U.S. Department of the Interior
U.S. Geological Survey

Water Quality Review

- Grand Canyon Monitoring & Research Center held a review of its water-quality program on October 24-26, 2017 in Page, AZ
- The review included presentations, discussions, and field trips
- A report summarizing the conclusions and recommendations of the expert panel was received by the GCMRC on June 4, 2018



Grand Canyon Monitoring and Research Center Water-Quality Program Review

Panelists:
Stephen Hamilton, Professor, Kellogg Biological Station, Michigan State University
Chris Holdren, Environmental Consultant, Littleton, CO.
Edward Stets, Research Ecologist, USGS
Kristin Strock, Assistant Professor, Environmental Science, Dickinson College
Todd Tietjen, Regional Water Quality Manager, Southern Nevada Water Authority

Summary of review panel comments

The panel was impressed with the monitoring program and the dedication of the staff from multiple government agencies who have worked together to maintain the program in the face of daunting logistical challenges and bare-minimum funding. The long-term data record is invaluable for understanding how the linked Lake Powell-Grand Canyon Ecosystem functions, how management of the dam may affect ecosystem functions, values and services both above and below the dam, and how future changes in climate and runoff regimes may impose changes on the ecosystem.

The justification for the monitoring program, encompassing both the Grand Canyon as well as Lake Powell, is clearly articulated in the GCDAMP FY 2017 Knowledge Assessment. The major environmental concerns in the Grand Canyon are closely tied to the quality of water discharged from the dam, including nutrients as well as temperature and dissolved oxygen (DO), which in turn reflect limnological conditions in the reservoir. Therefore it is critical to understand the Lake Powell ecosystem from the standpoint of maintaining and enhancing the Grand Canyon ecosystem as well as protecting environmental values and recreational and aesthetic services afforded by the reservoir itself.

Altered temperature, high salinity and low DO are water quality attributes of particular concern, but inorganic phosphorus (measured as soluble reactive phosphorus, SRP) may

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- Recommendations were made to 4 questions posed to the panel
- The panel also made recommendations regarding data management

Major Recommendations

- Improved data management is a high priority and will facilitate using historical data
- Quality Assurance/Quality Control, especially of the SeaBird data, needs to be improved
- Data from an additional meteorological station, thermistor string, or other automated sampling would be helpful

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Major Recommendations

- The number of stations sampled during quarterly trips should be streamlined
- Continue to evaluate the role phosphorus plays in the ecology of Lake Powell and downstream
- CE-QUAL W2 model seems to be adequate but could be improved with better meterological and temperature data

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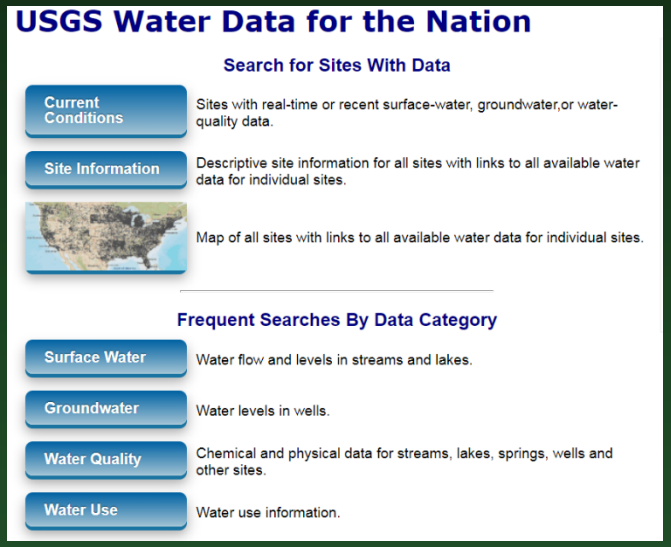
Major Recommendations

- Recommend using an existing, national data repository for storing water quality data such as:
  - NWIS (USGS database)
  - WQX (EPA database)
  - BioData (for plankton and other biological data)
- Developing metadata
- Identifying all data sources
  - Screen data for inclusion
- Document QA/QC procedures



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Implementation of Recommendations

Some things GCMRC and BOR are starting to consider:

- Cross-check dissolved oxygen and temperature measurements made with Seabird
- pH calibration of Seabird prior to each sampling event to check for drift
- Increased vertical resolution of sampling at Wahweap
- Deployed new thermistor string
- Laboratory analyses now include Total Dissolved Phosphorus
- Freezing chlorophyll samples
- Improved data management and serving
- Purchasing benchtop pH meter for field pH measurements
- Adding phosphorus to sampling gages in tributaries

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Questions?
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