PROPOSAL EVALUATION FORM

Note: This review arrived Thursday June 24 1998 and the P.I.s were unable to address these comments. The review is provided as information. Addressing issues raised in this review will be done following the June 25th mailing.

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Grand Canyon Monitoring and Research Center Integrated Water Quality Monitoring Plan

Integrated Water Quality Monitoring Program

A. Utility or Relevance of the Monitoring/Research Proposal:

The focus of the proposed monitoring program is on the effects of dam operations on downstream resources. Although the program design may provide adequate information on this topic, it is unlikely that the program will provide sufficient knowledge and information that will serve as the basis for improved understanding and management of the entire Colorado River ecosystem. In particular, the monitoring program will not meet the informational needs of Glen Canyon National Recreation Area and other agencies engaged in monitoring reservoir water quality in Lake Powell (the so-called "Black" category). This is not to say that the monitoring program is flawed, but it is not designed to answer many of the complex resource questions upstream of Glen Canyon Dam. Therefore, the monitoring program should not claim that spin-off information from monitoring in Lake Powell will automatically benefit upstream users. To date, much information collected by the GCMRC has benefited upstream users because of the lack of agency coordination on monitoring and research in Lake Powell. However, the solution in Lake Powell is to target reservoir studies to upstream information needs, and to recognize that both upstream and downstream components are part of the same ecosystem.

Response: The portion of the monitoring program related to Lake Powell is designed to focus primarily on those aspects of water quality effected by dam operations that influence resources downstream of Glen Canyon Dam. Addressing information needs in the "Black" category has been determined to lie outside the current scope of the Adaptive Management Program and would require direction and additional funding by agencies in need of this information. It is hoped that the information collected by the IWQP and the methodologies employed would be of benefit to investigators outside the geographical scope of the AMP.

If upstream information needs were the primary factor in designing the proposed monitoring and research program, the reservoir components of this program would most likely be more costly and of greater detail. With proper coordination and identification of funding sources outside of the AMP a more comprehensive program could be developed to meet a broader range of information needs.

B. Intrinsic Merit of the Monitoring/Research Proposal:

Recent improvements in the GCMRC monitoring program is one example that the program proposal exhibits merit with regard to scientific advances in the field of monitoring and adjusting programmatic goals to provide answers to new questions and linkages between resources. However, when the program proposal discusses potential collaborations and partnerships, the focus is solely between GCMRC and the Bureau of Reclamation. In addition, all talk of integration and standardization in Appendix B is between GCMRC and BOR. It would be welcome to see a stated objective in the proposal to collaborate with other agencies with interests in the Colorado River ecosystem. Doesn't the Adaptive Management Program wish to involve and engage agencies such as the U.S. Geological Survey, State of Arizona, State of Utah, and the National Park Service in coordination of water quality monitoring? In addition, shouldn't the Lake Powell Interagency Group be consulted in decisions regarding monitoring in Lake Powell?

Response: Greater collaboration with other agencies is certainly appropriate. In fact, a certain degree of collaboration already exists. Sample collection is occasionally performed for other agencies such as the State of Utah Department of Environmental Quality. The USGS conducts water quality sampling and measurements at downstream gages. GCMRC worked closely and shared information with Arizona Game and Fish investigators in past years. The National Park Service has been involved with GCMRC activities for the past several years providing logistical and fields assistance. All of the above agencies participate in the Lake Powell Interagency Group and are kept informed of current activities and encouraged to comment and participate. Additional efforts at collaboration with these and other agencies will be made in the future pending approval by the AMWG.

C. Technical Soundness of the Proposed Approach:

The technical soundness of the proposal is intact for the most part. The methodologies and instrumentation employed are of high quality and appropriate scale. Quarterly sampling in Lake Powell represents a minimum frequency of monitoring; however, it is recognized that the GCMRC crew and financial resources are spread very thin. It would be informative to know more about the status of monitoring in the Colorado River and its tributaries.

Response: With improvements in data management techniques, it is expected that information from recent monitoring efforts can be more easily evaluated to achieve refinements in sampling frequency and location. This will be a focus of research activities during FY 2001. Detailed monitoring of inflows to Lake Powell has not been conducted because it has not been a primary objective of the program and resources have not been available to conduct this level of monitoring.

Since it appears that GCMRC does not perform extensive monitoring in the river below the tailwater (except water temperature), how does the GCMRC intend to incorporate data collected by others to assess downstream effects?

Response: There is currently a large amount of water quality data collected by other entities that is already incorporated into the existing GCMRC data management program. This information is readily linked to data sets containing stream gaging information and dam releases. Currently

this data is stored locally at GCMRC. In the future, the formation of dynamic links with other databases in anticipated. Future contracts for monitoring and research will stipulation data management and metadata requirements that must be met for acceptance of deliverables.

With respect to data management, what justification exists for GCMRC to develop a comprehensive data management system? Would it be feasible for GCMRC to simply acquire a free copy of the new EPA STORET database software and adapt it for their use?
The new STORET program uses Oracle, like the database program proposed by GCMRC, and is not a main-frame archival system. Also, the new structure of STORET is not tied to individual parameter code IDs. In the proposal, GCMRC proposes to develop a Oracle data base, transfer these data into a MS Access database, and eventually transfer these data to the Web and STORET. This seems like a cumbersome process.

Response: GCMRC already has in place a workable and very useful data structure. This forms the basis for storage and retrieval of data for analysis and reporting. All existing data transfer protocols and analytical applications have been customized with this data structure. With further refinements in the existing data management system, such as centralization of files and the formation of relational linkages, all existing data can be viewed on a common platform. This is deemed to be the best way to perform error checking and necessary QA/QC validations. After this occurs these data will be uploaded onto the new STORET system. GCMRC has a copy of EPA's latest version of STORET. This system will be evaluated and the above approach reconsidered before full implementation.

Lastly, how will the hydrodynamic model for Lake Powell reduce monitoring in Lake Powell and measure effects of dam operation on downstream resources? Maybe the scope of the AMP should be expanded to encompass this and other topics of interest to other agencies.

Response: The development and calibration of a hydrodynamic model may reduce some aspects of monitoring in Lake Powell by simulating actual conditions, patterns, and trends in water quality. Sampling for easily predicted parameters could then be reduced to a level that verifies the predicted values. It is not expected to completely replace monitoring efforts. In some cases, the model effort may point to patterns that are poorly understood which may require additional monitoring efforts. It is anticipated that the model would guide further refinement of a long-term monitoring program as well as guide focussed research to answer specific needs.

D. Overall Recommendation:

The GCMRC monitoring proposal is well put together and develops rationale arguments for conducting the planned activities. However, one wonders why the agencies engaged in monitoring and research in the Colorado River ecosystem don't play a more active role in conducting similar monitoring activities. Part of the confusion lies in the roles of AMP, GCMRC, and other involved work groups and advisory boards. If the alternative to the proposal by GCMRC is that no long-term monitoring program will be continued, then the proposal not only should be recommended, but it should be supported at the highest level. Another alternative may be to combine the information and expertise of the ongoing monitoring program with other appropriate entities, information, and expertise to form a true collaborative approach to studying the Colorado River ecosystem.

Response: One of the purposes for which the Lake Powell interagency group was established was to communicate what monitoring and research activities were being conducted by various agencies for the purpose of coordination and reduction of redundancy. This group has supported the previous monitoring effort by GCES and GCMRC because of long-term consistency and experience. Another factor has been that the agencies involved have not had the authority or resources necessary to accomplish this work. There is a good deal of collaboration and integration that already exists with the Lake Powell group. Individual agencies conduct studies dealing with native and recreational fisheries, heavy metals contamination, bacteriology, and other resource areas. Efforts are ongoing to facilitate this collaboration by enhancing communication, information exchange, and integration.

In reading the document, Chapter 1 contained some confusing IN references, and the section on chemical analyses and QA/QC in Chapter 2 did not reference the appropriate information in Appendix D. Also, it may be useful to incorporate more material from the Appendices into the main proposal to make the proposal more complete and more easily understood.

Response: Corrections have been made in the final draft.