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**GRAND CANYON MONITORING AND RESEARCH CENTER
(GCMRC)**

PEER REVIEW GUIDELINES AND PROTOCOLS

October 26, 2001

INTRODUCTION AND RATIONALE

The Grand Canyon Monitoring and Research Center (GCMRC) is committed to ensuring the high quality of the scientific information it produces. Independent scientific peer review at all levels of GCMRC scientific activities -- proposals, ongoing programs, publications, and other products -- provides a mechanism for ensuring the quality, credibility, and objectivity of GCMRC's scientific activities. Issuance of these Peer Review Guidelines and Protocols is intended to affirm GCMRC's commitment to the use of scientific peer review; clarify the level of review received by all GCMRC proposals, programs, publications, and other products; and clearly convey the unambiguous standard of scientific objectivity and credibility followed by GCMRC.

Within GCMRC, all proposals for scientific activities (e.g., research, monitoring programs, inventories, and technique development) are evaluated for technical merit, feasibility, and relevance. Long-term monitoring and research activities are evaluated for the use of appropriate scientific methodologies and progress toward specified goals. Scientific reports, including manuals, standard operating procedures, and other results are subjected to peer review before general implementation.

Guidelines for scientific peer review within GCMRC stress matching the level of peer review to the nature of the proposal, program, publication or other product being reviewed, selection of qualified scientific peers, independence of the review process, and the inclusion of external (i.e. outside GCMRC) reviewers. GCMRC employs a variety of techniques for conducting the peer review process. These include: peer review panels for scientific study proposals, peer reviews of manuscripts, the protocol evaluation program (PEP), the science advisors (SA) and the National Resource Council (NRC).

DEFINITIONS

For the purposes of this document, the term “peer review” refers to scientific peer review, defined here as the review of scientific proposals, ongoing projects, programs, publications, and other products by qualified scientific and/or technical experts in relevant discipline(s).

SUBJECTS OF PEER REVIEW

Different situations call for different approaches to peer review. Selection of the proper approach is dependent on the type of proposal, program, publication, or other product being reviewed. These include:

Scientific study proposals

All proposals for scientific activities (e.g. research, monitoring programs, inventories, and technique development) are evaluated for technical merit, feasibility, and relevance. Primary objectives are to identify proposals most worthy of support, work in cooperation, as appropriate, to improve proposals, and create an atmosphere where scientists are rewarded for developing ideas fully and presenting them clearly.

For practical purposes, peer review for proposals will be managed to assure that the process is independent. In most cases, the use of reviewers outside GCMRC will permit an independent, locally managed peer review. Reviews will be used to assess the adequacy of the approach, methods, and the ability of the principal investigator(s) (PI) to carry out the work. Reviews are conducted and scientific merit is affirmed before the scientific activity begins. For proposals going to outside funding agencies that have their own peer review process, peer review is primarily the responsibility of the funding agency. GCMRC’s policy on peer review does not preclude GCMRC peer review of such proposals prior to their submission.

Funded Projects and GCMRC Programs

Long-term monitoring and research activities are evaluated for the appropriateness of the scientific methodologies being used and progress toward specific goals. Reviewers suggest comments and proposed modifications. The primary purpose is to assure scientific quality and relevance to information needs and contractual commitments. Reviews serve to identify problems and facilitate mid-course corrections, if necessary.

Review of funded projects should be conducted during their development and at least every five years to determine whether the scientific activity is on track scientifically and on schedule. Long-term projects will require re-approval at least once every five years.

Review of proposed and ongoing programs should be carried out at regular intervals to determine whether the program is being managed to meet the strategic goals of GCMRC as

well as stakeholder objectives and information needs. Program reviews should involve scientists from inside and outside GCMRC, resource managers and science administrators.

“Unpublished” reports

Scientific reports including manuals, standard operating procedures, and other results are subjected to peer review before general release. Primary objectives are to assure scientific quality before general release, prevent release of inadequate submissions, target presentation to intended and likely audiences, and expedite the transfer of results to clients.

Peer review of informal, “open-file”, and other unpublished reports and articles is the responsibility of individual GCMRC program managers.

Articles, books, and other publications

Scientific activities result in the publication of several types of products, such as articles in peer reviewed journals, book chapters, books conference proceedings, and monographs. Whether submitted to journals published by the U.S. Department of the Interior (DOI) or by outside organizations, scientists selected from inside and outside the survey typically review manuscripts. Primary objectives are to improve the quality of the work and screen out inadequate submissions.

RESPONSIBILITY FOR PEER REVIEW

Most peer review within the GCMRC involves scientific proposals, review of ongoing programs, publications and other products. Research activities vary according to their scope and focus. The appropriate level for conducting the review and the points in proposals, project, or program development at which this should occur vary according to the size and intent of the scientific activity

Certain products do not require scientific peer review, however, they may require technical or policy review. Examples include reports internal to the GCMRC, data transfer, pre-proposals, administrative reports, and World Wide Web sites. Again, the need for peer review should always be decided by a supervisor or other official at least one level above the investigator or author, subject to the specific policies of each reviewing unit in conformance with the principles articulated below.

TRACKING PEER REVIEW APPROVALS

To ensure compliance with these peer review guidelines, GCMRC is responsible for developing a mechanism for tracking the peer review of each proposal, program, publication, or other product covered by these guidelines. The tracking mechanism should document to entire review and demonstrate appropriate sign-offs for peer review were received. All proposals, programs, publications, or other products are to be covered by this tracking mechanism.

PEER REVIEW PRINCIPLES

Peer review of scientific proposals and products occurs along a continuum, from colleagues recommended by the scientists to independent peer review managed by third parties, such as journal editors or funding officials. This requires a set of peer review principles that provide flexibility while retaining the independence and rigor of the scientific peer review process. These following GCMRC principles will promote consistency and periodic reviews will be used to ensure that their implementation is adequate. Since the scientific peer review process is aimed at ensuring scientific rigor and quality of products, in situations where the need for review is unclear, or the guidance in this document does not apply, it is the responsibility of the investigator or author to obtain specific guidance from her/his supervisor to ensure that both the letter and the spirit of the GCMRC peer review principles are met. Reviews by outside peers should be a routine part of the peer review process, especially in the case of large funding decisions and when major publications are involved. Every set of peer review policies must adhere to the following principles:

- Objectivity and independence of reviews. All scientific proposals will be peer reviewed before implementation. Products (e.g. reports, articles and data for publication) will be peer reviewed prior to general release. The appropriate use of reviewers outside GCMRC will ensure the independence of a locally managed peer review.
- Scientific peer reviews will be coordinated by a GCMRC employee at least one level removed from that at which the proposal or product was produced. Peer review will be managed at or above the level at which funding decisions for projects and approval for product release are made, and in all circumstances at least one level above which proposals or products were developed.
- Reviews conducted by true scientific peers, as judged by demonstrable scientific achievements. Within the scope of specific proposals and products, GCMRC will involve as peer reviewers appropriate scientific experts based on national and international standards and criteria, such as a publication record in the relevant, peer-reviewed literature.
- Independence of peer reviewers. Each proposal or product must be reviewed by at least three peer reviewers. In the case of large funding decisions and major publications, no more than two of the peer reviewers may be employees of GCMRC. In no instance may all peer reviewers be affiliated with a single lab, office, or work group. Peer reviewers cannot be employees or supervisors of proposed project personnel or product authors, or have any personal financial or professional interests in the outcome of the review. Peer reviewers are required to sign a conflict of interest statement to verify their independence (See Attached).
- Provision of constructive feedback to the investigator or author. The comments and statements obtained in a review will be made available to the investigator or author, and responses by the investigator or author about how each comment was

addressed are to be maintained in project and manuscript files for at least three years after completion of a project or release of products, or such other period of time as judged to be reasonable. These files will be confidential.

- Informal advice will not substitute for formal independent scientific peer review. Scientists developing proposals or products are encouraged to seek informal advice from peers at various stages, however, informal commentary, even by qualified colleagues, does not meet the standard of independent scientific peer review under the GMCRC Peer Review Guidelines and Protocols.
- Selection of peer reviewers is the responsibility of the individual managing the peer review. Scientists may nominate potential peer reviewers for specific proposals or products, but selection of reviewers is the responsibility of the person managing the peer review process, in consultation with the individual responsible for final approval, and such nominations are not to be the sole or primary basis for the selection of peer reviewers.
- Anonymity for reviewers. Adequate safeguards must be in place to ensure that the identities of reviewers remain secure. Unless otherwise requested by the peer reviewers, the anonymity of peer reviewers will be protected.
- Evaluation of the effectiveness of GMCRC peer review Guidelines. Periodically, the integrity and effectiveness of GMCRC peer review will be evaluated at all levels by review teams, which will report findings and recommendations to the GMCRC Chief.

PEER REVIEW PROCESS FOR PROPOSAL SELECTION

The GMCRC seeks to maintain a pool of at least 500 potential peer reviewers. Potential reviewers will be contacted on an annual basis to determine their interest in taking part in the peer review process, either by participating in a panel or serving as a mail reviewer for proposals or manuscripts. With his/her response, each individual will be asked to submit his/her curriculum vitae as well as names of professionals who might be qualified peer reviewers. Continuously adding new names to the pool will ensure that reviewers remain objective and new perspectives are included in the process. Peer reviewers new to GMCRC's process should comprise at least 30% of each panel or manuscript review and after participating for two consecutive years, a reviewer will be excluded for one year before s/he can contribute again.

Annual Schedule for Contracting Cycle

A mailing to determine interest and availability will be sent out in January of each year and will include specific dates for a review panel. In February, the program managers will review the responses to evaluate potential reviewers and to maintain a database of 500 potential reviewers.

If proposals are released publicly March 1st, the application, peer review, and award processes will be completed by mid-September. This will ensure that the funds are allocated during the same fiscal year as they are awarded and allow time for the contractors to work with the logistics coordinator to obtain permits for the following field season, a process that can take up to 4 ½ months.

RFPs will close around May 1, 60 days after they are publicly released. Once the public release period is closed and the number of proposals known, the appropriate number of peer reviewers can be determined. Within the next week, the potential reviewers will be contacted to verify their availability for the peer review panel. Upon confirmation of participation, panelists will be notified of what will be expected of them during this process. These expectations include:

- Participating in person at the peer review panel meeting;
- Completing and submitting a written review of the proposals prior to the panel convening;
- Presenting and leading the review discussion for a set number of proposals;
- Agreeing to and signing confidentiality and conflict of interest statements; and
- Producing a consensus report upon completion of the panel.

This mailing will include a copy of the RFP, the proposals and supporting documents about the goals and objectives of the Glen Canyon Dam Adaptive Management Program (AMP) and the GCMRC. Panelist will be notified with the mailing of proposals to be reviewed or very shortly thereafter, which proposals they will be lead reviewer for. Mail reviewers will be held to the same deadlines as panelists for their individual review so their individual comments can be considered in the group report. The review coordinator will maintain communication with the panelists in order to facilitate travel arrangements, provide information about the AMP and GCMRC, and ensure that reviews are received according to schedule.

The panelists will meet for two days to discuss the proposals, share their comments, and generate a final consensus report. The Chief and program manager will make the final decision regarding awards, based upon the comments of the peer reviewers. After the Chief and program manager have met to discuss the reviewers comments, the individual comments as well as the group report will be sent to applicants protecting the anonymity of the reviewers.

Along with these comments, the applicants will receive one of three responses; they have been awarded funding, they have not been awarded funding, or they will be awarded funding pending a satisfactory response to the concerns raised by the reviewers. If they are to receive funding, they should receive their award letter in approximately four weeks after the panel meets. Modified proposals would be due six weeks later. This response may be reviewed by GCMRC or peer reviewed by the original panel or a new selection of reviewers. The modified proposal will be accepted or rejected within two weeks. If an award is to be made, the contracting officer will complete the awards process before the end of the fiscal year

(September 30th) and the contractor can immediately begin working on the permitting process with the logistics coordinator. A table summarizing this process for an idealized year is presented below:

First Week in January	Letter sent to potential reviewers polling interest and availability; response and CV requested within 30 days
First week in February	Responses received from reviewers, program managers review CVs, database updated
First week in March	RFPs released publicly, open for 60 days
First week in May	RFPs closed, number of reviewers needed for each proposal determined, reviewers contacted by e-mail to reconfirm availability and set expectations for participation
Second week in May	RFPs, proposals, and supporting documents sent to reviewers
First week in June	Individual comments due from reviewers
Second weekend in June	Peer Review Panel held and group evaluations completed
Third week in June	GCMRC decides funding, letters and anonymous comments go out to applicants
Third week in July	Successful applicants receive award documents from contracting officer
First week in August	Modified proposals due from applicants, if requested
Third week in August	Final decision made regarding modified proposals
Third week in September	If modified proposals are accepted, applicants receive final award documents from contracting officer

PEER REVIEW PROCESS FOR PROJECT EVALUATION

After research has been completed and a report produced, this report is subject to peer review before it is publicly released and the contractor receives final payment. The report will be reviewed by at least three scientific experts based upon standards such as their publication in relevant, peer-reviewed literature. Peer reviewers will have four weeks to complete their reviews. The reviewers' comments will be presented anonymously to the PI, who will have four weeks to modify the report. The program manager for that discipline will perform that final review of the document after changes have been made. S/he will recommend final payment for the contract. The review coordinator will track these deadlines.

PROTOCOL EVALUATION PANEL

A Protocol Evaluation Program (PEP) is utilized to ensure that the long-term monitoring program implemented for each of the resource areas is scientifically sound. Evaluations of current and alternative monitoring protocols are conducted by program area under the direction of the program managers. Monitoring methods are reviewed by external peer

review panels, GCMRC staff and cooperating scientists and evaluated for their effectiveness. Alternative protocols will be field tested for use in the Colorado River ecosystem prior to implementation. Results of the PEP will be used to help design or revise the GCMRC's long-term monitoring plan. All PEP workshops and evaluations are conducted in cooperation with external experts identified through a nationwide scoping and competitive selection process, as well as GCMRC science cooperators, contractors, and Technical Work Group members.

The main goal of the PEP is to identify an optimal design for an efficient and effective long-term monitoring program for the Colorado River Ecosystem (CRE). A highly effective long-term monitoring program is required to provide the Glen Canyon Dam Adaptive Management Work Group (and Technical Work Group) members with information needed to make recommendations to the Secretary of the Interior on the effects of Glen Canyon Dam operations under the existing Record of Decision (ROD) dam operations, initiated in December 1996. Although the PEP strategy will be generally followed regardless of individual protocol differences, the process will likely be tailored to meet program objectives of each resource area.

Individual resource-area PEP objectives will be accomplished through a multi-step process over two to three years in which systematic articulation, scoping, review and testing/evaluation efforts will identify the most effective and feasible methods of measuring Colorado River ecosystem resource attributes and their long-term responses to Glen Canyon Dam operations under the ROD. Following these steps, the most effective monitoring approaches will be identified and PEP results will be reported to the stakeholders. After final consultation with the Science Advisors (SA) and the Technical Workgroup, GCMRC program managers and the Chief will implement changes to the long-term monitoring program as indicated by need, and allowed by cost and other considerations.

As of October 2001, the first cycle of PEP panels has been completed. Additional evaluations may need to occur as new information needs arise, new knowledge is gained and as new techniques/technologies become available for monitoring. The PEP planning team also believes that a periodic review of the overall GCMRC monitoring program should be conducted at about five-year intervals to identify areas where improvements or small changes in focus are needed. Finally, the need for consistency in monitoring data sets, for purposes of comparability, is recognized as an important consideration as decisions to alter protocols are made by the GCMRC. The systematic nature of the PEP process will guarantee that paired tests leading up to changes in long-term monitoring are conducted in such a way as to ensure that data from past studies are comparable to future efforts.

Key Components of the PEP

A) Articulate Management Objectives/Information Needs, and Current Protocols – Just as it is critical to identify details of new and existing monitoring protocols, it is also crucial for PEP participants (external and internal) to have a clear and detailed understanding of present stakeholder-derived management objectives and information needs that guide long-term monitoring.

In addition to describing information needs and objectives, past and presently used monitoring protocols need to be clearly articulated on the basis of existing literature and discussions with present/former project chiefs and PIs who have conducted monitoring and research in the past. Information on existing protocols, including methods sections of reports and articles that describe various uses in the Colorado River ecosystem or other rivers, must be reviewed and made available to external review panels and participants in advance of all PEP workshops/meetings. This information will be collected, compiled and distributed by program managers during the scoping phase of the PEP as the lead of each of the individual protocol evaluations.

Outside experts, identified through GCMRC scoping activities, will also be invited to participate in review-oriented workshops. The GCMRC will solicit participation from experts qualified to provide external critical review of the PEP process, as well as those who may offer information and demonstrations on new technologies and methods from both the private and public sectors.

B). Define the Range of Optional Alternatives Under Existing Technologies – Alternatives to existing protocols will be identified by in-depth GCMRC scoping of monitoring techniques that are presently used in other long-term programs for riverine ecosystems. Methodologies will also be considered that are presently used in monitoring of other ecosystems (i.e. near coastal marine settings, forests, etc) where the protocols might be adapted to a large river, or technologies/methods that are still in developmental stages, but intended for large rivers.

The PEP scoping process is intended to be wide-ranging, and will glean information from multiple sources such as, reports, journal articles, professional presentations, displays at professional meetings. Attending national meetings frequented by ecosystem-monitoring experts, and conferences that attract technological innovators by GCMRC staff is encouraged as a means of conducting pre-workshop scoping activities. To increase the effectiveness of the PEP, the limitations and capabilities of new technologies of interest must be screened against information needs by the GCMRC/PEP planning team in advance of the first workshop. New technologies that hold great promise, but are mismatched with stakeholder/GCMRC information needs should be easily identified. In cases where innovation has led to new approaches unrecognized by stakeholders, the PEP could act to update managers on areas where new information could be easily obtained. This should eliminate consideration of inappropriate new protocols early in the process. Agencies and private sector firms identified through the scoping process will be invited to the workshop(s) for demonstration and discussions of new methods and technologies. Regardless of the diversity of monitoring approaches considered, other topics such as replication, sampling interval and spatial distribution for a long-term monitoring program also need to be evaluated by Colorado River ecosystem-resource category.

The PEP process also recognizes that new information gained from experiments, such as controlled high releases from GCD, as well as evolving information needs, will likely drive additional new needs from monitoring methods of the Colorado River ecosystem through

time. Therefore, although the PEP may have formal start and end dates, the GCMRC mission will require program managers, stakeholders and the SA to revisit the long-term monitoring strategy (including individual protocols) on a periodic basis; presently, five years.

C) Evaluation/Selection of Protocols to be Implemented – The PEP aims to identify which of the past, currently used or new, but untested protocols best meet the objectives of what a long-term monitoring program should accomplish for a given set of Colorado River ecosystem-resource objectives. Second, the program aims to design a river-monitoring program with protocols capable of assessing long-term trends, as well as be able to document the impacts of discreet events, such as high-flows from Glen Canyon Dam. Protocols must also be able to provide information to stakeholders in a timely manner useful for supporting the adaptive management process (recommendations to the Secretary of the Interior). The selected protocols also must work within the unique settings of the Colorado River ecosystem, be minimally intrusive to the environment, demonstrate cost effectiveness, stand as scientifically defensible, provide suitable accuracy/precision (depending on level of information need), and be highly repeatable and reproducible regardless of changes in contractors over time. Most importantly, the selected approaches must directly address the management objectives and derived stakeholder information needs.

Following the articulation/scoping steps (phase I), committed PEP review panel members (3-5 persons per phase/program area) will be paid a stipend and travel for attending workshop(s), and will be required to provide individual and group reports on protocols evaluated, presentations/reports on assessments of existing data, results of field testing (phase II), and critical review of trial implementations (phase III). A key component of each report will consist of recommendations to the GCMRC Chief and the SA on what changes in monitoring protocols are warranted. The SA will review the results of each PEP evaluation and comments will be forwarded to the GCMRC Chief for consideration before program managers through a competitive RFP-driven process implement new or modified monitoring procedures.

SCIENCE ADVISORS

To ensure that the long-term monitoring and research activities initiated by GCMRC are unbiased and objective, scientifically sound, and focused on the most important issues, an independent group of Science Advisors (SA) has been established to advise GCMRC on the coordination and planning of its monitoring and research programs. The SA will also review the results of GCMRC's monitoring and research programs. The SA is synonymous with one of the Independent Review Panels (IRPs) specified in the Glen Canyon Dam Environmental Impact Statement. The SA is an advisory, not a decision-making body, but both the GCMRC and the Adaptive Management Work Group (AMWG) should be prepared to explain why it has accepted or rejected advice provided by the SA. The SA will not review, interpret, or otherwise evaluate public policy decisions or assess legal compliance associated with the Adaptive Management Program (AMP) and activities of the AMWG, the Technical Work Group (TWG), or individual member agencies and organizations.

The SA is an interdisciplinary board, composed of scientists who are qualified, based on their record of scientific achievement, in a range of disciplines related to the work of GCMRC. Scientists are selected for their expertise and not as representatives of a particular agency, organization, or other stakeholder group. SA members will be prohibited from competing for GCMRC long-term monitoring and research awards while they serve on the SA and for two years following completion of their term of service.

NATIONAL RESEARCH COUNCIL REVIEWS

The National Research Council (NRC) has a history of evaluating science in the Colorado River ecosystem since 1985. The NRC has published three reports on this area including: River and dam management: a review of the Bureau of Reclamation's Glen Canyon Environmental Studies (1987), River resource management in the Grand Canyon (1996), and Downstream: Adaptive Management of Glen Canyon Dam and the Colorado River Ecosystem (1999). The purpose of external review by the National Research Council is to determine whether GCMRC will effectively fulfill its mandate based upon the strategic plan and to identify weaknesses in planning or methods and offer improvements. The NRC may conduct additional reviews of the work of GCMRC's adaptive management program in the future.

PEER REVIEW AND MANAGEMENT DECISIONS

When properly implemented, peer review provides a fair and rigorous assessment of scientific merit, but determining how the results of peer review will be used in decision-making is a separate topic that must be addressed in the context of program management and administration. Often, the results of peer review will be considered along with reviews of project relevance and information needs. Determining how these different types of review and evaluation will be used to set priorities for GCMRC research needs, and how they influence funding decisions are important topics for GCMRC program managers, but these go beyond the scope of this document. As rigorous peer review policies are implemented, it is important to remember that peer review is an aid in decision-making; it is not the decision process.

APPENDIX I

FORMS USED AS PART OF THE REVIEW PROCESS

GRAND CANYON MONITORING AND RESEARCH CENTER CONFLICT OF INTEREST/CONFIDENTIALITY STATEMENT

Reviewers who are principal investigators, consultants or otherwise identified as a participant in a proposal cannot serve as a reviewer of that proposal.

Reviewers must be excused from participation in the review of any application when there is any potential for a conflict of interest. A conflict of interest exists when the reviewer has any financial or personal interest in an application being considered for review. Situations that may constitute a conflict of interest are provided for your information.

Reviewers must also observe strict confidentiality for all review materials, discussion notes and results.

CERTIFICATION

I certify that I have read the above statement and that I am not aware of any conflict of interest with regard to my review and discussion of GCMRC proposals. In the event that a conflict of interest situation should arise, I will notify the GCMRC Review Coordinator or the Program Manager of the review session accordingly.

I certify that review information will be kept confidential. I also certify:

_____ As a mail reviewer, I will destroy/delete all information after the deadline for my submission of the review to GCMRC.

-or-

_____ As a panelist, I will surrender reviewed materials along with typewritten responses/critiques to the GCMRC Review Coordinator or Program Manager.

Conflict of Interest Statement for GCMRC Peer Reviewers

As a peer reviewer, please review these examples of possible conflicts during your tenure.

You may have a conflict by your affiliation with an applicant institution if you have/hold:

- ✓ Current employment at the institution as professor, adjunct professor, visiting professor, or similar position.
- ✓ Other current employment with the institution (e.g., consulting, advisory agreement).
- ✓ Being considered for employment at the institution.
- ✓ Formal or information re-employment arrangement with the institution.

Your relationship with an investigator, project director, or other person who has a personal interest in the proposal or other proposal.

- ✓ Known family or marriage relationship. (Only if the relationship is with a PI or PD).
- ✓ Business or professional partnership.
- ✓ Employment at the same institution within the last 12 months.
- ✓ Past or present association as thesis/dissertation advisor or thesis/dissertation student (this is a lifetime conflict of interest).
- ✓ Your collaboration on a project or on a book, article, report or paper within the last 48 months.

Other:

- ✓ Your personal knowledge of the PI, that you believe, makes it impossible for you to provide an objective review of the proposal.

GRAND CANYON MONITORING AND RESEARCH CENTER
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PROPOSAL EVALUATION FORM

PRINCIPAL INVESTIGATOR(S) (Name & Address: last name first; show first name and/or initials as shown in manuscript)

INSTITUTION

PROPOSAL TITLE

PROGRAM:

A. UTILITY OR RELEVANCE OF THE MONITORING/RESEARCH PROPOSAL - LIKELIHOOD THAT RESEARCH WILL CONTRIBUTE TO PROGRAMMATIC GOAL OR PROVIDE KNOWLEDGE THAT WILL SERVE AS THE BASIS FOR IMPROVED UNDERSTANDING AND MANAGEMENT OF COLORADO RIVER ECOSYSTEM.

B. INTRINSIC MERIT OF THE MONITORING/RESEARCH PROPOSAL - LIKELIHOOD THAT RESEARCH WILL:

- LEAD TO NEW DISCOVERIES OR FUNDAMENTAL ADVANCES WITH REGARD TO PROGRAMMATIC GOALS; PROMOTE TECHNICAL ADVANCES IN THE SUBJECT AREA;
- PROVIDE RESOURCE MANAGEMENT ALTERNATIVES NOT PRESENTLY AVAILABLE; IMPROVE UNDERSTANDING OF THE LINKAGES BETWEEN RESOURCES; ANTICIPATED PARTNERSHIPS/LINKAGES WITH OTHER FACILITIES.

C. TECHNICAL SOUNDNESS OF THE PROPOSED APPROACH. APPROPRIATENESS OF HYPOTHESES TO BE TESTED; METHODS ARE APPROPRIATE AND SCIENTIFICALLY VALID; PROPOSED SCHEDULE IS REALISTIC.

D. MONITORING AND RESEARCH PERFORMANCE COMPETENCE: CAPABILITY OF THE INVESTIGATOR(S) TO ACCOMPLISH PROJECT; ADEQUACY OF THE INSTITUTIONAL RESOURCES AVAILABLE; PROPOSER(S) RECENT PERFORMANCE AND ABILITY TO MEET PROJECT OBJECTIVES AND SCHEDULE.

E. ADEQUACY OF PROPOSED BUDGET: SUFFICIENT INFORMATION TO EVALUATE IF THE BUDGET IS REASONABLE AND REALISTIC FOR TASKS IDENTIFIED.

Recommendation: Fund

Do not fund

REVIEWER (Name, address, phone) (CONFIDENTIAL - TO BE BLANKED ON ANY COPY PROVIDED TO AUTHORS)

Use additional sheets as necessary

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EXTERNAL MANUSCRIPT REVIEW SHEET	
AUTHOR(S) (Name & Address: last name first; show first name and/or initials as shown in manuscript & Institution Address)	REVIEWER (Name, address, phone) <u>(TO BE BLANKED ON ANY COPY PROVIDED TO AUTHORS)</u>
REVIEWER'S SIGNATURE: _____ DATES _____	
TITLE: _____	
PROJECT NO.: _____	PROGRAM: _____
FORM OF PUBLICATION <input type="checkbox"/> AGENCY UNPUBLISHED REPORT <input type="checkbox"/> NON-REFEREED JOURNAL <input type="checkbox"/> AGENCY PUBLICATION <input type="checkbox"/> PROCEEDINGS (PUBLISHED) <input type="checkbox"/> REFEREED JOURNAL <input type="checkbox"/> NOT SPECIFIED FOR PUBLICATION OR OUTLET	_____ TOTAL PAGES (Include title page and all page-size figures and tables)
NUMBER OF ILLUSTRATIONS _____ COLOR _____ OVERSIZE PLATES _____ B&W _____ NUMBER OF TABLES	
REVIEW COMMENTS A. TREATMENT OF EXISTING KNOWLEDGE TO SUPPORT HYPOTHESIS, SELECTED RESEARCH PROCEDURES, CONCLUSIONS DRAWN	
B. COMPATIBILITY OF RESEARCH GOAL/OBJECTIVE/HYPOTHESIS TO SELECTED RESEARCH PROCEDURES	
C. OVERALL APPROPRIATENESS OF CONCLUSIONS, INCLUDING CREDIBILITY OF STATISTICAL ANALYSES	

D. APPROPRIATENESS OF PROPOSED APPLICATION OF RESEARCH CONCLUSIONS

E. LEVEL OF CONTRIBUTION TO SCIENTIFIC LITERATURE

REVIEWER'S RECOMMENDATIONS: PUBLISH: WITH MINOR REVISIONS WITH MAJOR REVISIONS

DO NOT PUBLISH

SPECIFY GENERAL RECOMMENDATIONS
FOR REVISIONS:

RECOMMENDATIONS IN TEXT

RECOMMENDATIONS NOT IN TEXT

OTHER SUGGESTED REVIEWERS (OPTIONAL):

PLEASE RETURN BY: