PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM
Scope of Work
Wet Meadows Hydrologic Monitoring Approach Peer Review

1) Document Introduction and Background

The Executive Director's Office (EDO) of the Platte River Recovery Implementation Program (Program) prepared this series of four documents (hereafter referred to as "chapters") describing the Program's approach to monitoring the hydrologic processes at four Program wet meadow sites. The Program began a hydrologic monitoring effort in 2013 focusing on the dominant hydrologic processes occurring at wet meadow sites. The objective of the monitoring effort is to inform the use of Program land, water, and fiscal resources to create, maintain, and/or enhance wet meadows environments along the Associated Habitat Reach (AHR) of the Central Platte River (the Associated Habitat Reach consists of a 90-mile reach of the Platte River in central Nebraska from Lexington to Chapman). The monitoring effort will continue through the end of the Program's first increment in 2019. Data collected as part of the effort will be analyzed to better quantify the relationship between the dominant hydrologic processes. A suite of groundwater models will aid in this analysis. The findings from the monitoring effort will be compiled and undergo peer review toward the end of the Program's first increment.

To ensure the monitoring approach is adequate to achieve the monitoring effort's objectives, four chapters are compiled outlining the Program's monitoring approach and the groundwater model developed to assist in hydrologic analysis. The first chapter provides an overview of wet meadow hydrology, the monitoring project, and the monitoring approach for groundwater, surface water, precipitation, evapotranspiration, and soil moisture. Chapter 2 reviews methods for determining evapotranspiration and evaluates them in light of their applicability to wet meadow sites. Chapter 3 describes the soil moisture monitoring plan in greater detail and provides additional background information. Chapter 4 presents the details of the groundwater model and describes the model's calibration, sensitivity testing, and overall performance.

After completion of the peer review, the hydrologic monitoring approach will guide the Program as it conducts the monitoring effort. The monitoring approach is being peer reviewed at this point in the project's timeline so that the monitoring methods can be adjusted before the end of the six-year monitoring period. A thorough review of the monitoring approach is needed to ensure the data collected as part of the monitoring effort is sufficiently comprehensive and will address the questions posed in the project's objectives with the best available science.

2) Description of Peer Review

The purpose of this review is to provide a formal, independent, external scientific peer review of the information presented in the four (4) monitoring approach documents. **Peer reviewers will review the described monitoring approach and assess its sufficiency in addressing the monitoring project's objectives.**

NOTE: In all cases (including this scope of work), peer-reviewed and other documents cited in the chapters have been compiled into a zip file that will be made available to all peer reviewers for reference if necessary.

3) Methods and Scientific Standards

Factors to be addressed include the scientific merit of the monitoring approach and providing suggestions for its improvement. The peer reviewers must ensure any scientific uncertainties are clearly identified

and characterized, and the potential implications of the uncertainties for the technical conclusions drawn are clear. Peer reviewers are advised they are not to provide advice on policy. Rather, they should focus their review on identifying and characterizing scientific and technical uncertainties.

4) Charge to the Panel

Each Peer Review Panel member will be tasked with reviewing all 4 wet meadow hydrologic monitoring approach chapters from their particular area of expertise following the PRRIP Peer Review Guidelines for Reports & Studies (attached) and the specific directions contained in this Scope of Work. Peer reviewers will be asked to submit all comments, questions, and other communication in writing to ensure an appropriate record is built, and generally all communication with peer reviewers will be conducted via e-mail during the course of the review.

Peer reviewers must consider and respond to the questions listed below, at a minimum, in their reviews:

General Questions

1. Are the objectives of the monitoring effort clear and obtainable?

2. Will the monitoring approach provide sound and comprehensive data to achieve the Monitoring Plan's objectives?

3. Please identify any additional monitoring equipment or procedures that would allow this study to better achieve its objectives.

4. Are potential biases, errors, or uncertainties appropriately considered within these chapters?

Chapter-Specific Questions

CHAPTER 1

5. Does the conceptual model presented capture all the relevant hydrologic processes? Does it ignore any critical processes?

6. The monitoring approach assumes the understanding of wet meadow hydrologic processes gained through the higher level of monitoring at the Fox and Binfield site can be applied to the Johns and Morse site which receive less extensive monitoring. Is this a reasonable assumption?

7. Given the information currently available, is the well placement and density appropriate to capture site-wide groundwater behavior at each of the four sites?

8. Is the assumption of minimal off-site runoff reasonable?

9. Is the assumption that near surface groundwater behavior is not driven by the behavior of the deeper alluvial aquifer on a daily time scale reasonable?

10. Is the assumption that percolation into the underlying aquifer has a negligible impact on near surface groundwater behavior reasonable?

11. Are single river stage gages used in conjunction with surface water models sufficient to capture surface water behavior at a wet meadow site?

12. Is the approach to relating river stage and discharge reasonable?

13. Is the assumption that precipitation falls fairly uniformly across a wet meadow site reasonable?

CHAPTER 2

14. Does the review of methods of determining ET omit any commonly used method?

15. Are the conclusions drawn from the comparison of methods reasonable and scientifically sound?

16. Is the use of the crop coefficients developed by the USGS for riparian grassland reasonable? Are there other crop coefficients that would provide better results?

CHAPTER 3

17. Does the conceptual soil moisture water balance accurately approximate expected soil moisture behavior at wet meadow sites?

18. Does the soil moisture monitoring approach provide and appropriate level of detail in light of the project's objectives?

CHAPTER 4

19. Is the model domain appropriate to capture groundwater behavior at the wet meadow sites?

20. Is the assumption of a homogeneous aquifer clearly supported and appropriate?

21. Are the model boundary conditions appropriate?

22. Is the use of the MODFLOW evapotranspiration (EVT) package appropriate? Would combining the precipitation and evapotranspiration values into the recharge (RCH) package better represent the physical system?

23. Is the assumption that standing surface water storage is negligible and no surface storage term in the groundwater models reasonable?

24. Overall, do the models capture the groundwater behavior at the two sites to address the monitoring effort's objectives?

Reviewers must protect information and ensure that services consist of unbiased assessments. Until it is made public, no information from the wet meadow hydrologic monitoring approach chapters may be released without express written permission from the EDO. Additionally, all peer review-related inquiries from outside sources must be forwarded to the Louis Berger project manager; reviewers should not communicate with those inquiring about the review.

5) Peer Review Rating & Recommendation

In addition to providing written comments on the chapters, each reviewer will provide a comprehensive rating and recommendation for the combined chapters utilizing the following format:

RATING

Please score each aspect of this set of chapters using the following rating system:
1 = Excellent; 2 = Very Good; 3 = Good; 4 = Fair; 5 = Poor

Category	**Rating**
Scientific soundness	_____
Degree to which the monitoring approach addresses the project's objectives	_____
Organization and clarity	_____
Conciseness	_____
Important to objectives of the Program	_____

RECOMMENDATION	**(Check One)**
Accept	_____
Accept with revisions	_____
Unacceptable	_____

PLEASE NOTE: *If a peer reviewer checks "Accept with revisions" or "Unacceptable", the peer reviewer* ***must explicitly state*** *what changes would be required to change the recommendation to "Accept". This is a critical step in ensuring the Program understands potential fatal flaws or major areas of revision that must be addressed before finalizing these chapters and moving them on to the Governance Committee for approval.*

6) Available Documentation

Peer reviewers will be provided with the following information:

- This Scope of Work for the peer review, including PRRIP Peer Review Guidelines for Reports
- All four wet meadow hydrologic monitoring approach chapters
- Access to all references cited in the synthesis chapters
- Adaptive Management Plan
- Additional information as requested by Peer Review Panel members – if a document is requested by one member, it will be transmitted to all members simultaneously

References

Platt, J. R. 1964. Strong inference. *Science, 146*(3642), 347-353.

ATTACHMENT A

PRRIP Peer Review Guidelines for Reports

Appendix A – Peer Review Guidelines

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

SCIENTIFIC PEER-REVIEW GUIDELINES

These guidelines have been developed to provide a general process for peer-review of scientific documents during the Platte River Recovery Implementation Program (Program). Peer-reviews conducted during the Program will be conducted in accordance with "INSTRUCTIONS TO PEER-REVIEWERS" (Attachment A).

WHAT IS PEER-REVIEW? Scientific peer-review is a process by which technical experts provide unbiased comments, suggestions, and evaluation of the science and technology of proposals, study plans, reports of data analyses, and other documents. Peer-review provides evaluation of the technical quality and relevancy of a document in meeting objectives or in addressing hypotheses. Peer-review usually involves obtaining comments from appropriate technical experts ("peers") who have no financial, supervisory, or familial relationship to the authors of the work. Peer-review is not an administrative review, nor does peer-review address political or other non-scientific features of a project or document.

Peer-review typically involves review by several technical experts in the appropriate subject area. By obtaining multiple, independent technical opinions, the peer-review process provides a means of evaluating the scientific soundness of a product, further minimizing introduction of bias or conflict of interest. The process of peer-review ultimately cannot insure that a document or product is without fault.

Peer-review should be an efficient process so that monitoring, research, publications, and other work can proceed in a timely manner. This process should be streamlined and not create a bottleneck of bureaucracy, delaying appropriate publications, fieldwork, data analyses, or modeling.

WHY IS PEER-REVIEW NECESSARY? Peer-review serves to strengthen a document, whether it is a study plan, proposal, or report, in several ways. A review can provide suggestions for improvements of the work. Experts typically suggest better approaches, more efficient methods, innovative approaches to analysis, and supporting data or literature. A document or plan that has been viewed as being sound, through peer-review, achieves improved credibility in the eyes of the scientific community. Peer-review enhances the reliability of a document, having been examined by peer-scientists. Where proposals or study plans are developed to address specific needs, peer-review can insure that the project serves the specific objectives of the program.

WHEN WILL PEER-REVIEW BE USED? The process described in this document may be used for products (proposals, plans, models, data, reports, protocols, etc.) funded by the Program or for other products essential to meeting Program milestones, but lacking adequate review. All

products relied upon by the Program that influence management decision may be subjected to the following peer review process at the discretion of the Governance Committee with advice from the Technical Advisory Committee or other advisory committees. For some products, however, a high level of scientific quality may be maintained by existing quality control and administrative review procedures, and peer review will be unnecessary.

WHAT ARE THE PRIORITIES FOR PEER REVIEW? The first priority for peer review are items identified for peer review in the 1997 Cooperative Agreement Milestones, which include all water depletion/accretion impact analyses, and all habitat and species monitoring and research activities. Proposals and protocols for new research and monitoring activities necessary for meeting Program milestones will receive the second priority for peer review. Third priority will be given to recent reports of completed studies considered essential to meeting Program milestones. Already peer-reviewed products will receive the lowest priority for peer review. Priorities may change depending on issues.

PEER-REVIEW PROTOCOL

1. The Executive Director will administer the peer-review process for the Governance Committee. The duties of the Executive Director are as follows:

    a) Assemble Master List of potential reviewers with assistance from the standing advisory committees (Technical, Land, Water).
    b) Select reviewers for each work product to be reviewed, and obtain approval of selected reviewers by the Governance Committee.
    c) Handle all correspondence with reviewers.
    d) Compile and transmit all relevant materials from reviews to Panel members for decision-making.
    e) Coordinate revision of work product if needed.
    f) Prepare, obtain approval from the Governance Committee, and administer budget for reviews.
    g) Ensure the review process works in a timely and efficient manner.

2. The Governance Committee and its recognized advisory committees (Technical, Land, Water) identify the need for peer-review as requirements for proposals, studies, or reports arise. The requesting committee identifies each need for peer-review to the Executive Director (see figure below).

3. The Executive Director will determine priorities for peer review in keeping with the guidelines noted above, and develop budgets for peer review for approval by the Governance Committee. A Peer Review Working Group consisting of one member of the Governance Committee and one member from each of the Governance Committee's standing advisory committees (Technical, Land, Water) or other group as identified will assist the Executive Director in this effort. Budgets and priorities will be subject to the approval by the Governance Committee and may change as the Program evolves.

4. Reviewers meeting the standards outlined in these guidelines will conduct the peer-review.

5. When peer review is appropriate the Executive Director, in consultation with the Peer Review Working Group, will select three peer-reviewers from scientific areas appropriate to the subject or discipline of each request. The reviewers will conduct independent peer-reviews and send reviews to the Executive Director. According to the specific needs of each peer-review task, the reviewers could complete review of a single or group of related proposals, plans, or reports. A statistician will participate as a fourth reviewer when the subject or discipline includes experimental design and/or statistical analyses.

6. A list of qualified and willing experts will be assembled in a number of technical topic areas; reviewers will be carefully selected from this list to ensure reviewers are the most appropriate based on the subject matter being reviewed. The Executive Director will maintain a file with the resume and credentials of each peer-reviewer.

7. Criteria for peer-reviewers include:

   a) No conflict of interest for or against the project document or its authors based on financial interest in the product or author(s), familial relationship with the author(s), personal bias for or against the institution or author(s), professional connection to the institution or author(s), organizational affiliation, or potential to be influenced by lobbying or other political pressure to produce a certain result or more work in the area of this product.

   b) Expertise appropriate for the theme of the project or document(s).

   c) The ability to complete a technical review in a reasonable time, as determined by the requesting committee.

   d) Individuals will be selected from a diversity of institutions, including state, federal, local government, and non-governmental organizations for each project, while avoiding members from the same institution or agency as the author(s).

8. The committee requesting review, in conjunction with the Peer Review Working Group, will approve the Peer-review Panel. Objections regarding individuals must relate to the criteria outlined in number 7. The Governance Committee will resolve all conflicts.

9. An attempt will be made to obtain voluntary participation on Peer-review Panels without cost to the Governance Committee. A stipend or honorarium will be offered for review when necessary. The Governance Committee will approve an annual budget for peer-reviews.

10. The requesting advisory committee will prepare specific guidance for each review task. Suggested guidance includes an outline of the specific need for peer-review, the milestones or objectives to be addressed by the work, and other specific criteria for the document.

11. Reviewers shall provide written comment on the document(s) under review. Reviews will be conducted similar to the system and methods used by the National Science Foundation and major scientific journals and in accordance with the Proposal, Protocol and Study Plan Review Guidelines and Report Review Guidelines (see Attachment A).

12. Upon completion of the reviews, the Executive Director will:
    a) Prepare a package of material including all reviews and any relevant material,
    b) Distribute all material to requesting committee for a determination of action,
    c) If appropriate work with the requesting committee and author to make any needed revisions,
    d) Maintain a file of peer-reviews for each document, and
    e) Provide a summary of items a-c to the Governance Committee for approval.

13. The peer-review process does not determine the approval or disapproval of the activity associated with the request (funding a study, use of data or analytical results, publication of a report, etc.). Peer reviews may not be definitive (i.e., there may be disagreement among reviewers). The Committee seeking the review may or may not have the authority to approve the review; however, at a minimum, it is responsible for transferring the review summary and document(s) to the Governance Committee, who will have final authority to approve the review.

DOCUMENTATION OF PEER-REVIEW CONDUCTED OUTSIDE THE PROGRAM

There will likely be cases where the Program will benefit from models, data, analyses, or conclusions drawn by projects developed in the past or ongoing, but supported by institutions outside the oversight of the Program. The committee requiring the information will determine the need for peer-review of these products.

There is no intent to duplicate the peer-review conducted by others. Scientific journals typically conduct their own peer-review. Most major journals have high-quality peer-review that is universally accepted. Scientists are encouraged to publish their findings in the peer-reviewed scientific literature whenever possible and appropriate. In most instances this level of peer review is considered adequate for the purposes of the Program.

Institutions and agencies may administer their own peer-review process for study plans and reports. In using the models, data, or conclusions (reports) from studies not funded by the Program, the appropriate advisory committee is responsible for determining if additional peer-review is necessary. In making the decision regarding the need for peer-review it may be helpful to document an institution's peer-review process for the project or report. With the assistance of the appropriate advisory committee, it may be useful to consider the following information on alternative peer-review processes when available:

I. Title of Study / Project / Report:
II. Type of Work: __report __study plan/proposal __model __ other (specify)
III. Principal Investigators: name, address, phone number, and e-mail
IV. Source of financial support for project / report:

V. Peer-Review Documentation

A. Names / Institutions of peer-reviewers (may have been anonymous)

B. Brief Description of the peer-review process:

C. Were revisions made to the project/report in response to reviewers' comments?

ATTACHMENT A

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

INSTRUCTIONS TO PEER-REVIEWERS

Thank you for agreeing to review this product. The following is a summary of expectations for peer-review and the topics that we wish each peer-reviewer to address.

A. INDEPENDENCE OF A PEER-REVIEW

Peer-review must provide an unbiased opinion of the scientific quality of a product (proposal, report, data, map, etc.) by individuals who are independent from the authors and external to them and their institution. A review must be independent of various types of conflicts of interest with the author(s) and with the product under review. The Platte River Recovery Implementation Program (Program) places considerable reliance on the objectivity, integrity, and professionalism of each peer-reviewer to provide technical opinion of each product without bias or conflict of interest.

Please review each question about your bias or independence. Your peer-review will be anonymous to the author unless you choose to share it. Your review will be held in the file for the Program as documentation of the peer-review process for this product.

YOUR CONSIDERATIONS SHOULD INCLUDE THE FOLLOWING FACTORS THAT COULD LEAD TO BIAS OR CONFLICT OF INTEREST:

- financial interest in the product or the author(s);
- familial relationship with the author(s);
- bias, for personal reasons, for or against the author(s) or institutions of this product;
- professional connection (current or former: student or advisor, supervisor or supervised, employer, etc.) to the author(s) or the institution of this product;
- organizational affiliation (same agency, department, organization, business, etc.);
- impacts of lobbying or political pressure exerted by persons looking for a particular result or more work in the area of this product;

IF YOU FEEL THAT YOU CANNOT PROVIDE AN UNBIASED REVIEW, PLEASE DO NOT REVIEW THIS PRODUCT AND IMMEDIATELY RETURN THE DOCUMENT TO THE PROGRAM'S EXECUTIVE DIRECTOR.

C. REPORT REVIEW GUIDELINES

CONFIDENTIALITY - The enclosed manuscript is a privileged communication. Please do not show it to anyone or discuss it, except to solicit assistance with a technical point. Your review and your recommendation should also be considered confidential.

TIMELINESS - In fairness to the author(s) and to the needs of the Program, please return your review within __ days. If it seems likely that you will be unable to meet this deadline, please return the manuscript immediately or contact the Executive Director.

CONFLICTS OF INTEREST - Please review the "Independence of a Peer-Review" above. If you feel you might have any difficulty writing an objective review, please return the manuscript immediately, un-reviewed. If your previous or present connection with the author(s) or an author's institution might be construed as creating a conflict of interest, but no actual conflict exists, please discuss this issue in the cover letter that accompanies your review.

YOUR REVIEW SHOULD ADDRESS THE FOLLOWING:
What is the major contribution of this document? What are its major strengths and weaknesses, and its suitability for publication and/or use by the Program? Are conclusions based on sound scientific methods and reasoning? Please include both general and specific comments bearing on these questions and emphasize your most significant points.

General Comments:
1. Scientific soundness
2. Organization and clarity
3. Conciseness
4. Degree to which conclusions are supported by the data
5. Cohesiveness of conclusions

Specific Comments:
Please support your general comments with specific evidence and literature. You may write directly on the manuscript, but please summarize your handwritten remarks separately. Comment on any of the following matters that significantly affected your opinion of the manuscript:

1. Presentation: Is a tightly reasoned argument evident throughout? Does the manuscript wander from the central purpose?

2. Methods: Are they appropriate? Current? Described clearly and with sufficient detail so that someone else could repeat the work?

3. Data presentation: When results are stated in the text of the manuscript, can you easily verify them by examining tables and figures? Are any of the results counterintuitive? Are all tables and figures clearly labeled? Well planned? Too complex? Necessary?

4. Statistical design and analyses: Are they appropriate and correct? Can the reader readily discern which measurements or observations are independent of which other measurements or observations? Are replicates correctly identified? Are significance statements justified?

5. Conclusions: Has the author(s) drawn conclusions from insufficient evidence? Are the interpretations of the data logical, reasonable, and based on the application of relevant and generally accepted scientific principles? Has the author(s) overlooked alternative hypotheses?

6. Errors: Point out any errors in technique, fact, calculation, interpretation, or style.

7. Citations: Are all (and only) pertinent references cited? Are they provided for all assertions of fact not supported by the data in the manuscript?

D. FAIRNESS AND OBJECTIVITY

If the research reported in this paper is flawed, criticize the science, not the scientist. Harsh words in a review will cause the reader to doubt your objectivity; as a result, your criticisms will be rejected, even if they are correct!

Comments should show that:
1. You have read the entire manuscript carefully,
2. Your criticisms are objective and correct, and are not merely differences of opinion, and are intended to assist the author in improving the manuscript, and
3. You are qualified to provide an expert opinion about the research reported in this manuscript.

E. ANONYMITY

You may sign your review if you wish. If you choose to remain anonymous, avoid comments to the authors that may serve as clues to your identity, and do not use paper that bears the watermark of your institution.

RATING:
Please score each aspect of this manuscript using the following rating system: 1=excellent, 2=very good, 3=good, 4=fair, 5=poor.

	Rating
Scientific soundness	___
Degree to which conclusions are supported by the data	___
Organization and clarity	___
Cohesiveness of conclusions	___
Conciseness	___
Importance to objectives of the Program (For use by internal review panel only)	___

RECOMMENDATION	(check one)
Accept	___
Accept after revision	___
Unacceptable	___

Peer-Review Sequence Platte River Cooperative Agreement (CA) and Proposed Platte River Recovery Implementation Program (PPRRIP)