Independent External Peer Review

Lower Snake River Programmatic Sedimentation Management Plan and Draft Environmental Impact Statement

Contract No. W912HQ-11-D-0002, Order No. 0008

24 May 2013
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<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BiOp</td>
<td>biological opinion</td>
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<tr>
<td>COI</td>
<td>conflict of interest</td>
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<tr>
<td>DEIS</td>
<td>Draft Environmental Impact Statement</td>
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<tr>
<td>DMMP</td>
<td>Dredged Material Management Plan</td>
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<tr>
<td>EC</td>
<td>Engineer Circular</td>
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<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
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<tr>
<td>ESA</td>
<td>Endangered Species Act</td>
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<tr>
<td>FWSL</td>
<td>freshwater screening level</td>
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<tr>
<td>GDP</td>
<td>gross domestic product</td>
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<tr>
<td>H&amp;H</td>
<td>Hydrology and Hydraulics</td>
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<tr>
<td>HTRW</td>
<td>hazardous, toxic, and radioactive waste</td>
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<td>IEPR</td>
<td>Independent External Peer Review</td>
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<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<tr>
<td>LSR</td>
<td>Lower Snake River</td>
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<tr>
<td>MOP</td>
<td>minimum operating pool</td>
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<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
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<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
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<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
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<td>OMB</td>
<td>Office of Management and Budget</td>
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<tr>
<td>PDF</td>
<td>Portable Document Format</td>
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<tr>
<td>PDT</td>
<td>Project Delivery Team</td>
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<tr>
<td>PSMP</td>
<td>Programmatic Sedimentation Management Plan</td>
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<tr>
<td>SEF</td>
<td>Sediment Evaluation Framework</td>
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<td>SME</td>
<td>subject matter expert</td>
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<td>SOW</td>
<td>Scope of Work</td>
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<td>USACE</td>
<td>U.S. Army Corps of Engineers</td>
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Executive Summary

Noblis has performed an Independent External Peer Review (IEPR) for the Lower Snake River Programmatic Sedimentation Management Plan (PSMP) and Draft Environmental Impact Statement (DEIS) for the U.S. Army Corps of Engineers (USACE). The purpose of the IEPR is to analyze the adequacy and acceptability of methods, modeling, data, and analyses to develop documents for the PSMP/DEIS.

Noblis performed this IEPR in accordance with the procedures described in the Department of the Army, USACE Engineer Circular (EC) No. 1165-2-214, Water Resources Policies and Authorities, dated 15 December 2012, and the Office of Management and Budget (OMB) Final Information Quality Bulletin for Peer Review, dated 16 December 2004. The review was conducted by a panel of subject matter experts (SMEs) with relevant expertise and experience in sedimentation, risk and reliability, fisheries biology, and environmental compliance requirements. The panel was “charged” with providing a broad technical evaluation of the overall project. Consistent with the requirements of the Water Resources Development Act of 2007, the IEPR report was developed and issued within 60 days of USACE receipt of public comments on the Draft PSMP/EIS.

Noblis provides impartial, conflict of interest (COI)-free, independent assistance to organizations throughout the federal government and has extensive experience with conducting independent peer reviews, including IEPRs. Noblis and the IEPR panel for this effort have not been involved in any capacity with the Lower Snake River project. In addition, Noblis has not performed or advocated for or against any federal water resources projects and has no real or perceived COI for conducting IEPRs. For these reasons, Noblis was suitable for upholding the principles of independence in all aspects of managing the IEPR.

The IEPR Panel (the panel) reviewed the Lower Snake River PSMP/DEIS along with its associated appendices. The panel recognizes the significant amount of work that went into the development of the documents and applauds the USACE for looking at sediment management both now and into the future. It is clear from the information presented that sediment management of the system will continue to be an important operational consideration. The panel was not able to assess the total failure risk of the Lewiston-Clarkson levee system since the Geotechnical Appendix in the original document package was not included in the DEIS and within the scope of this review. From the documents that the panel did review, the panel also identified a number of key concerns that require resolution in order to improve the DEIS. The concerns, discussed in more detail below, include:

- The screening of sediment management measures;
- The evaluation of system operational changes;
- Mitigation of environmental impacts;
- Cumulative environmental effects; and,
- Sediment deposition and location within the Lower Granite Dam reservoir.

The following paragraphs provide a summary of the panel’s recommendations in environmental and technical areas. Since the panel did not include an economist SME, the panel did not assess the economics aspects of this project.
With respect to environmental aspects, the Lower Snake River DEIS included appropriate methods for analyzing project impacts. However, certain key project impacts and aspects of the mitigation critical to the justification and implementation of the project were not included or adequately discussed. Particularly, the panel raised issues associated with sediment reduction measures and analysis of cumulative effects associated with implementation of the preferred alternative. The documentation did not fully identify project impacts in terms of quantifiable habitat functions and values, and subsequent mitigation requirements. In addition, specific issues with regard to impact to benthic organisms and salmonids that would be potentially impacted by the proposed alternatives were not adequately described in the materials provided for review. The panel recognizes that more detailed information to support the assessment of environmental impacts and mitigation approaches, particularly more detailed analysis of mitigation and monitoring, will be added to the Lower Snake River DEIS as well as addressed in other stages of project implementation.

Technical evaluations of alternatives should be improved to better support the PSMP and DEIS conclusions. A level of consistency should be maintained throughout the analysis of all alternatives with respect to their potential impacts. Specifically, all possibilities should be considered and rationale provided for dismissal, as appropriate (e.g., external policies or issues). This approach would be especially helpful when looking at watershed-based and upstream sediment controls, with or without cooperation with other land management agencies, and how significant they are to the success of each alternative. The hydrologic and sediment modeling analyses are very detailed and thorough, and provide an in-depth understanding of the various issues involved. The benefits to be derived from adopting each alternative, as shown by these studies, should be itemized for improved presentation of results. It may be useful to include some additional information from the appendices into the main report to improve clarity. Of particular importance is the impact of changing reservoir operating rules, and the potential benefit of changing the rules as sediment accumulates in the reservoir. Sediment dispersal in the reservoir should also be more clearly defined and if it is dismissed from consideration, the rationale should be included in the documents. Reservoir hydraulics should be addressed in more detail, especially with regard to sediment movement and potential encroachment into the navigation channel. Long-term potential for movement of the upstream delta face, as well as the disposal areas, should be discussed in more detail so that the selection of Alternative 7, and rejection of other alternatives, is more fully justified.
1 Introduction

1.1 Introduction and Report Overview

This Independent External Peer Review (IEPR) Report provides a description of the IEPR conducted for the Lower Snake River Programmatic Sedimentation Management Plan (PSMP) and Draft Environmental Impact Statement (DEIS) prepared by the U.S. Army Corps of Engineers (USACE). This report includes a description of the IEPR objectives and process, overview of the Lower Snake River project, summary of the IEPR panel members’ expertise, and discussion of observations and comments by the IEPR panel.

Section 1 of the IEPR Report provides a description of the objectives of this effort and general background information on the IEPR, as well as a brief introduction to Noblis, the contractor managing this effort. Section 2 provides an overview of the Lower Snake River project. Section 3 presents the overall process followed in performing the IEPR. Section 4 describes the panel composition and the panel members’ expertise. Section 5 discusses the conclusions and observations of the IEPR, including a description of the IEPR comments. References are listed in Section 6. Appendix A of this IEPR Report lists the final IEPR comments, as well as editorial comments identified by the IEPR panel. Appendix B provides a description of the IEPR panel and the panel members’ résumés. Appendix C includes the “charge” and list of documents provided to the panel for the IEPR of the Lower Snake River project. Appendix D provides Noblis’ completed USACE Conflicts of Interest (COI) Questionnaire for the Lower Snake River project.

1.2 IEPR Overview

The USACE lifecycle review strategy for Civil Works products provides for a review of all Civil Works projects from initial planning through design, construction, and Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R). It provides procedures for ensuring the quality and credibility of USACE decision, implementation, and operations and maintenance (O&M) documents and work products. Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, the validity of the research design, the quality of data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product.

1.3 IEPR Objective

The objective of the work was to perform an IEPR on the Lower Snake River PSMP and DEIS, in accordance with the procedures described in the Department of the Army, USACE Engineer Circular (EC) No. 1165-2-214, Water Resources Policies and Authorities, dated 15 December 2012, and the Office of Management and Budget (OMB) Final Information Quality Bulletin for Peer Review, dated 16 December 2004. The purpose of the IEPR is to analyze the adequacy and acceptability of methods, modeling, data, and analyses to develop documents for the Draft PSMP/EIS. The review was limited to a technical review and did not involve policy review (e.g., USACE internal processes). The IEPR was conducted by a panel of subject matter experts (SMEs) with relevant experience and expertise in sedimentation, flood risk management,
fisheries biology, and environmental compliance requirements. The panel was “charged” with providing a broad technical evaluation of the overall project.

The independent expert reviewers identified, recommended, and commented upon assumptions underlying the analyses as well as evaluated the soundness of models and planning methods. They evaluated data, the use of models, analyses, assumptions, and other scientific and engineering methodologies. The reviewers offered opinions as to whether there are sufficient technical analyses upon which to base the ability to implement the project.

1.4 Noblis is Conflict-of-Interest Free (COI) in Water Resources Projects

Noblis, the contractor leading this effort, is a nationally recognized leader in systems analysis and analytical support to the federal government. As a nonprofit science, technology, and strategy organization, Noblis solves complex systems, process, and infrastructure problems in ways that truly benefit the public. Noblis staff includes accomplished engineers, scientists, analysts, researchers, technical specialists, and management experts with extensive multi-disciplinary and multi-sector experience. Since Noblis has no commercial interests to advance, no vendor alliances to protect, and no sponsors or shareholders to represent, it is fully independent. Noblis provides impartial, COI-free, independent assistance to organizations throughout the federal government. Noblis has documented experience with peer review oversight. Noblis and the selected IEPR panel have not been involved in any capacity with the Lower Snake River project. (See Appendix D for Noblis’ completed COI Questionnaire.) In addition, Noblis has not performed or advocated for or against any federal water resources projects.

Noblis has been recognized, for the fifth time, as one of the World’s Most Ethical Companies by the Ethisphere Institute. This award honors companies that demonstrate “real and sustained ethical leadership in their industries.” Noblis was one of three companies worldwide to be listed in the Professional, Scientific and Technical Services category. The Ethisphere Institute is a think-tank dedicated to the creation, advancement, and sharing of best practices in business ethics, corporate social responsibility, anti-corruption, and sustainability.

Noblis clients and the public deserve nothing less than work that meets the highest standards of excellence, conducted in an environment where objectivity and integrity are the hallmarks. Noblis achieves this through the development, implementation, maintenance, and continual improvement of its International Organization for Standardization (ISO) 9001:2008 Compliant Quality Management System.

2 Lower Snake River Project Description

As authorized by Congress, the USACE maintains and operates the navigational system on the Columbia and Snake Rivers waterway. Between 1961 and 1975, USACE constructed four dams on the Snake River in Washington. This area is collectively referred to as the Lower Snake River. The four dams and locks on the Lower Snake River are Ice Harbor, Lower Monumental, Little Goose, and Lower Granite. Construction of these dams has created a series of reservoirs on the Snake River, adding an additional 140 miles to the Columbia and Snake Rivers shallow draft inland navigation system. This navigation system depends on the availability of a 14-foot deep and 250-foot wide navigation channel for barge tows.
The Snake River reservoirs generally act as sediment traps due to the river’s slow velocity through this reach. The Lower Granite Reservoir, which is the upriver reservoir in the Lower Snake River system, traps approximately 85% of the sediment entering the system. The remaining sediment stays suspended in the water and gradually settles out as the water passes through the other reservoirs. The accumulation of sediments in the Lower Snake River affects the authorized purposes of the USACE projects.

Historically, USACE has used dredging as the primary means of managing sediment deposited in areas that interfere with the authorized uses of the lower Snake River. Most of these maintenance dredging actions have been conducted on a case-by-case basis without a long-term focus. Since the late 1990s, USACE has been working on the development of a programmatic plan to clarify and adopt processes and procedures for managing sediment on a long-term basis. The first effort to accomplish this involved the development of the 2002 Dredged Material Management Plan/Environmental Impact Statement (DMMP/EIS). The recommended plan of the DMMP/EIS was maintenance dredging in navigation channel, beneficial use of the dredged material, and up to a three-foot levee raise on the Lewiston Levee system for standard project flood conveyance.

The DMMP effort resulted in a legal challenge that halted implementation of the recommended plan. The focus of the lawsuit was on an inadequate range of alternatives and on detrimental direct and indirect impacts to Endangered Species Act (ESA) listed salmon. A Settlement Agreement was reached in September 2005 whereby USACE agreed to prepare a separate PSMP/EIS by December 2009. The schedule has been delayed due to funding limitations.

At the present, the draft PSMP/EIS was released for public comments on 21 December 2012, and the extended public comments due date is 26 March 2013. Consistent with the requirements of the Water Resources Development Act of 2007 (WARDA), the IEPR report and panel comments should be issued no later than 25 May 2013, which is within 60 days after receipt of public comments.

3 IEPR Process

3.1 Planning and Schedule

Noblis developed a schedule that would meet USACE’s goal of completing the IEPR as efficiently as possible in accordance with the Performance Work Statement (PWS). The schedule of activities was agreed upon by Noblis and USACE. Table 1 shows the major milestones and deliverables for the IEPR.

<table>
<thead>
<tr>
<th>TASK</th>
<th>MILESTONES</th>
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<tbody>
<tr>
<td>1. Prepare Work Plan to Conduct IEPR</td>
<td>Draft Work Plan submitted</td>
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<tr>
<td></td>
<td>USACE provides comments on Draft Work Plan</td>
</tr>
<tr>
<td></td>
<td>Teleconference to discuss comments on Draft Work Plan</td>
</tr>
<tr>
<td></td>
<td>Final Work Plan with Charge submitted</td>
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### TASK

<table>
<thead>
<tr>
<th>TASK</th>
<th>MILESTONES</th>
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</table>
| 2. Recruit and Select IEPR Panel Members | Noblis requests input from USACE on COI Questionnaire  
USACE provides comments on COI  
List of selected Panelists submitted  
USACE provides comments on selected Panelists  
Noblis completes subcontracts for Panelists  
Review documents sent to Panelists |
| 3. Meetings | IEPR Kickoff meeting with USACE and Noblis  
IEPR Kickoff meeting with USACE, Noblis, and IEPR Panel  
IEPR midpoint teleconference |
| 4. Conduct IEPR | IEPR Panel provide response to Charge  
Noblis/Panel consensus meeting |
| 5. IEPR Report | Final IEPR Report submitted |
| 6. Responses to IEPR Final Panel Comments | USACE PDT provides draft evaluator responses (for information only) and clarifying questions to Noblis  
Teleconference between USACE and Noblis to discuss comment/response process and teleconference  
USACE submits final evaluator responses via email  
IEPR Panel completes backcheck comments  
PDF of comment/response dialog submitted |

NOTE: This report includes the results from execution of Tasks 1 through 5. Task 6 activities will be completed subsequent to the completion of this report.

As required by the Water Resources Development Act of 2007, the IEPR report had to be developed and issued within 60 days of USACE receipt of public comments on the Draft PSMP/EIS. To manage this effort and meet the project schedule, Noblis prepared a draft and final Work Plan to define and manage the process for conducting the IEPR, including the screening and selection of peer reviewers, communication and meetings with the USACE project team, project schedule and quality control, and compilation and dissemination of peer reviewers’ comments. The final Work Plan included the charge to the panel.

Noblis also provided USACE with Project Status Reports on a biweekly basis to communicate the current status of the project. The Project Status Reports included details of each task and noted any schedule changes. Noblis performed the requirements of this contract in accordance with its Quality Management System, which is compliant with ISO 9000.

### 3.2 Selection of Panel

Reaching out to its various pools of experts, Noblis identified experts who met and exceeded the technical expertise and requirements of this IEPR. Noblis provided potential candidates with a copy of the SOW, including the required expertise and project schedule, and conducted informal and formal discussions to identify any technical competency concerns or potential COI issues.
Consistent with the guidelines of the OMB, the following were considered in the screening of the candidates:

- **Expertise:** Ensuring the selected reviewer has the knowledge, experience, and skills necessary to perform the review.
- **Independence:** The reviewer was not involved in producing the documents to be reviewed.
- **COI:** Identification of any financial or other interest that conflicts with the service of an individual on the review panel because it could impair the individual’s objectivity or could create an unfair competitive advantage for a person or organization.
- **Availability:** Candidates’ availability to meet the project schedule.

After screening candidates to exclude those with inadequate expertise or potential COI issues in accordance with the requirements and guidelines of the National Academy of Sciences and OMB, several candidates were selected for further screening and evaluation to ensure they met or exceeded the requirements of this task. The list was then narrowed down to identify the most qualified candidates that would be available to serve on the Lower Snake River IEPR panel. Noblis provided the list of selected panelists along with their detailed résumés to USACE to identify any outliers who may have a potential COI based on USACE knowledge of the individual’s past involvement with the Lower Snake River project. USACE acknowledged the proposed panel members’ experience relative to the requirements of the IEPR and that there are no perceived COI issues. A description of the panel is provided in Section 4.

### 3.3 Preparation and Charge for Peer Review Panel

USACE made available necessary project documents (listed in Appendix C) to Noblis, which were provided to the IEPR panel members. Noblis communicated to the panel via email and held a kickoff meeting outlining the steps of the IEPR process, identifying the overall schedule and deadlines, and instructing the IEPR panel members how to access the documentation and undertake the review. Noblis requested panel members to review the documents for which USACE had requested comments, and noted additional supporting documents as background material for their reference.

Subsequent to a cursory review of the documents by the panel but prior to the actual detailed IEPR, a meeting was held with USACE via teleconference to familiarize the IEPR panel members with the technical aspects of the project and the specific objectives of the review. As part of this meeting, USACE provided a detailed project briefing, reviewed project features and requirements, and provided the opportunity for the exchange of technical information between the panel and USACE technical staff. Noblis met with the panel members following the meeting with USACE to refine roles and responsibilities of the IEPR panel members, including providing them with general instructions and guidance for preparing their comments to ensure proper coverage of all important issues and consistency in the development of the IEPR comments. Noblis remained as the conduit for information exchange between the panel and USACE throughout the project in order to ensure a truly independent IEPR.

The final charge developed and approved by USACE established the general boundaries for the IEPR. The charge questions are detailed in Appendix C.
3.4 Performing the IEPR

After the panel was oriented with the general scope and background information of the project, the panel initiated a detailed review of the requested documents and supporting documentation. The Lower Snake River IEPR involved conducting an independent technical peer review to analyze the adequacy and acceptability of environmental and engineering methods, models, data, and analyses presented in the documents. The review was limited to a technical review and was not involved with policy issues. The IEPR panel identified, recommended, and commented on the information presented in the documents relative to the charge.

Noblis coordinated a teleconference with all panel members and the USACE at the approximate midpoint of the review process, in order to allow panel members to ask clarifying questions of the PDT to assist in the development of comments. Many of the panel questions and concerns were addressed. As a result of these discussions, USACE provided additional information (i.e., the Geotechnical Appendix that was not included in the DEIS) regarding the failure risk of the Lewiston-Clarkson levee system. However, considering the project schedule, the panel did not perform an assessment of this document.

Noblis communicated to the panel all relevant project information, instructions and required actions, and deadlines. Any identified information or documents that the panel required to support its review were noted. Noblis used internal tools to track comments, issues, and information requests by the panel members during the evaluation process. Noblis facilitated information exchange and discussions between the panel and USACE in order to meet the needs of the panel and project objectives.

3.5 Panel Consensus Discussion and Finalization of IEPR Comments

After the IEPR review period ended and comments were submitted by the panel members, Noblis collated the panel comments and ensured they were complete and responsive to the charge. Noblis ensured the panel focused on performing a technical review of the documents and avoided commenting on policy-related issues. Noblis convened a group consensus meeting via teleconference and WebEx with the panel members to discuss the panel’s comments. This meeting provided a forum for reviewers to reach consensus on the comments, identify any overlapping comments, and resolve any contradictions. Further refinement and consolidation of the comments occurred via email exchange following the meeting. The panel discussion resulted in the final IEPR comments that were submitted to USACE in a Microsoft Word file (“Comment Tracking Form”). The final IEPR comments are presented in Appendix A.

Each comment was formatted into four parts: (1) a clear statement of the concern (“Comment”), (2) the basis for the concern (“Basis for Comment”), (3) the significance of the concern (the importance of the concern with regard to project implementability) (“Significance”), and (4) the recommended actions necessary to resolve the concern to include a description of any additional research that would appreciably influence the conclusions (“Recommendation[s] for Resolution”). Comments were rated as “high,” “medium,” or “low” to indicate the general significance the comment has to project implementability. Noblis identified overall themes that were presented by multiple peer reviewers or repeated by one reviewer, comments that indicated conflicting peer review opinions, and other noteworthy comments.
Minor editorial changes were not included in the final set of comments unless they affected the understanding of the technical content. Noblis provided these minor editorial comments to USACE under a separate cover letter.

3.6 Responses to IEPR Comments
This report summarizes the results of implementation of activities under Task 1–5 of this effort. Following the submittal of this IEPR report, Noblis will hold a teleconference with USACE to discuss the process for clarifying the final IEPR comments, delivering the final evaluator responses, and providing the concluding backcheck comments. As determined from this discussion, Noblis may conduct another meeting with USACE and the IEPR panel to seek any needed clarification on the IEPR comments as well as discuss the USACE draft evaluator responses.

Following the teleconference, USACE will submit the final evaluator responses to the IEPR comments. All evaluator responses provided by USACE will be labeled as “concur” or “not concur” to indicate agreement or non-agreement, respectively, on whether the concerns identified by the panel are valid. In addition, in response to the IEPR panel recommendation for resolution, USACE will include a statement to “adopt,” “not adopt,” “adopt in part,” or “adopt in future” for each recommendation, along with a response describing where documentation will/will not be expanded, revised, or changed. After the submittal of the final evaluator responses, Noblis will meet with the panel to discuss the responses and the approach for preparing the concluding backcheck comments, which are to provide concurrence or non-concurrence with the USACE responses on whether the responses adequately address the identified concerns.

After the panel inputs the panel backcheck comments to each USACE evaluator response, Noblis will provide USACE with a Portable Document Format (PDF) of the final IEPR comments, the final USACE evaluator responses to those comments, and the panel’s concluding backcheck comments.

4 Panel Organization
Noblis assembled a panel of experts to conduct the IEPR, responsible for reviewing and providing comments on Lower Snake River draft documents. Noblis guided communications between the panel and USACE to complete the IEPR project.

4.1 Panel Description
Noblis selected four panel members providing expertise in the required areas of sedimentation, risk and reliability, fisheries biology, and environmental compliance requirements. All panel members met and exceeded the minimum requirements for each of the specified areas of expertise. The panel represented a well-balanced mix of individuals from academia, large companies, and individual consultants.

Figure 1 outlines the members of the IEPR Team. Table 2 presents the list of IEPR panel members and associated qualifications to participate in this IEPR. Panel member résumés are included in Appendix B.
4.2 IEPR Panel Members

*Christopher Brown*

**Role:** Engineer – Navigation and Flood Risk Management  
**Affiliation:** University of North Florida, Jacksonville

Prof. Brown has 22 years of water resources, groundwater, and environmental engineering experience with public sector, private sector, and in academia, and has worked on a number of large water resources, flood control, hydrology, and water supply studies. These studies included seepage, groundwater hydrology, dam design, sedimentation, erosion, and many other areas, and both small and large scale water resources projects that have included adaptive management strategies with an environmental focus. Prof. Brown worked for Golder Associates, Inc., where he developed floodplain models using HEC-HMS and HEC-RAS for Winn Dixie Inc. and private developers in Georgia. He also worked for the Jacksonville District of USACE, and while there and at Golder, worked on water supply studies including reservoir optimization modeling using linear programming and “evolutionary solvers” as well as consumptive use permitting for new groundwater projects. Prof. Brown worked on the Everglades Restoration Project and completed engineering work on new reservoir planning, dam rehabilitation including flow/stage forecasting, large artificial recharge basins, wetland flow-ways, pump stations, and ASR wells. He has also worked on Adaptive Management and its pre-cursors since 1999 when he began working on the Everglades Restoration, having helped develop some of the original adaptive management strategies for the ASR component ($2 billion component) of the Restoration. The adaptive management strategy included installation of instrumentation, monitoring of threshold values, and numerical modeling. The plan envisioned that once the system was in place and monitoring was underway, operational changes would be made based upon system response as measured by instrumentation. He is a member of Society of American Military Engineers – Faculty Advisor to student chapter, the American Society of Civil Engineers, the International Association of Environmental Hydrologists, and the American Water Resources Association. Prof. Brown has a Ph.D. in civil engineering from the University of Florida.
Elvidio V. Diniz, PE, D.WRE
Role: Engineer - Sedimentation
Affiliation: Professional Engineer

Mr. Elvidio V. Diniz has 42 years’ professional experience in hydrology, civil engineering, and water resources for federal, state, local, industrial, and tribal clients, with 29 years on the Mid. Rio Grande region. Mr. Diniz has a thorough understanding of hydraulic, hydrographic, and hydrologic principles and practice, derived from many years of water resource analyses, modeling, and construction plan development. He has served as a Registered Professional Engineer in New Mexico and Texas for 32 years, and has completed course work for his PhD in civil/water resources engineering. Mr. Diniz served as Program Manager for the Southwest Valley (Mid. Rio Grande) flood Damage Reduction Study for USACE, and for the sediment control dams feasibility study on Rio Puerco and Rio Salado, plus Drainage Management Plans for eight more tributaries to the Mid. Rio Grande. Mr. Diniz is a Diplomate, American Academy of Water Resources Engineers, and has served as adjunct professor at the University of New Mexico, has lectured on water resource issues in flood hydrology and hydraulics short courses at the University of Texas at Austin, and has presented at numerous professional conferences. Mr. Diniz is an expert computer modeler, having authored various models for the USEPA and the U.S. Bureau of Reclamation, and serves as a beta tester for USACE Hydrologic Engineering Center Programs and for U.S. Office of Water Resources Technology Programs.

James Dobberstine
Role: Fishery Biologist
Affiliation: Lee College

Prof. Dobberstine is a long-time advocate of Galveston Bay and his 18-year professional career is increasingly focused on strengthening the connections between science, policy, and public awareness. He currently teaches environmental science and biology at Lee College, in Baytown, Texas. He has extensive experience as an environmental scientist and regulatory specialist, focusing on wetlands and other aquatic habitats. Prof. Dobberstine has enjoyed working on a number of successful projects linking science to policy. He has experience developing and evaluating USACE permits, and is experienced with the complex regulatory framework affecting projects that potentially impact coastal habitat. He has also worked in the area of habitat conservation, and has experience with conservation easements, fee-simple acquisitions, and development of habitat assessments, project cost models, and easement contracts. He has leadership experience on aquatic habitat restoration projects aiding in project development, permit acquisition, safety and toxicity issues, fundraising/grant development, and project implementation. He has also served on the IEPR of the Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of the Dam Safety Modification Study Report for Rough River Dam, Kentucky. Prof. Dobberstine has served on subcommittees of the Galveston Bay Council of the Galveston Bay Estuary Program, formerly as Vice-Chair of the Public Participation and Education Subcommittee, and currently as a member of the Monitoring and Research Subcommittee. He also serves on the Boards of Directors of the Texas Association of Environmental Professionals (as President 2010–2011), the South Central Regional Chapter of Society of Environmental Toxicology and Chemistry (SETAC), and the Galveston Bay Foundation. Prof. Brown has a Ph.D. in civil engineering from the University of Florida, and is a Certified Professional Engineer for the states of Florida and Pennsylvania.
**Jennifer Johnson**  
**Role:** Environmental Compliance  
**Affiliation:** Dudek

Dr. Johnson is a principal with over 12 years’ experience. She offers a unique blend of consulting experience and formal legal training, specializing in providing ecological, land use, permitting, and planning support to multidisciplinary development projects and commercial enterprises. She has developed numerous regulatory compliance documents to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Dr. Johnson understands the myriad regulatory requirements and processes required for large-scale projects with regulatory agencies such as the Bureau of Land Management (BLM), California Public Utilities Commission (CPUC), USACE, U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration/National Marine Fisheries Service (NOAA/NMFS), California Department of Fish and Wildlife (CDFW), Regional Water Quality Control Board (RWQCB), California Coastal Commission (CCC), California State Land Commission (CSLC), and the San Francisco Bay Conservation and Development Commission (BCDC). Dr. Johnson holds a JD in environmental law and a BS degree in environmental policy. She is a member of the State Bar of California.

### Table 2. Lower Snake River IEPR Panel

<table>
<thead>
<tr>
<th>Role</th>
<th>Dr. Jennifer Johnson</th>
<th>Prof. James Dobbershine</th>
<th>Dr. Elvidio Diniz</th>
<th>Prof. Christopher Brown</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Highest Degree</strong></td>
<td>JD</td>
<td>M.S.</td>
<td>PhD</td>
<td>PhD</td>
</tr>
<tr>
<td><strong>Years of Experience</strong></td>
<td>12</td>
<td>15</td>
<td>39</td>
<td>22</td>
</tr>
<tr>
<td><strong>Past Experience with USACE Projects</strong></td>
<td>● ● ● ●</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Environmental Compliance</strong></td>
<td></td>
<td>● ●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>≥ 10 years demonstrated experience in conducting NEPA coordination and analyses for public works projects or land use projects.</td>
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<tr>
<td>Experience determining the scope and appropriate methodologies for environmental impact analyses for projects and programs with high public and interagency interests and including programmatic planning projects.</td>
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</tr>
<tr>
<td><strong>Fishery Biologist</strong></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>≥ 10 years demonstrated experience in fisheries biology and sediment management techniques.</td>
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<tr>
<td>Experience determining the effects of proposed projects on salmonids, especially Endangered Species Act-listed species and their critical habitats, in the Pacific Northwest or similar riverine systems.</td>
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<td></td>
</tr>
<tr>
<td><strong>Engineer - Sedimentation</strong></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Registered professional engineer with ≥ 10 years experience in sedimentation in riverine systems.</td>
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<tr>
<td>Primary mission centers around design and construction of flood risk reduction levees and lock and dam along the inland waterways system.</td>
<td></td>
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<tr>
<td>≥ 10 experience in sediment numerical modeling with HEC-RAS.</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Engineer - Civil Works</strong></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Registered professional engineer with ≥ 10 years experience in civil works navigation projects.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary mission centers around design and construction of flood risk reduction levees and lock and dam along the inland waterways system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 10 experience in risk and reliability analysis for flood risk reduction levees and lock and dam systems.</td>
<td></td>
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</tr>
</tbody>
</table>
4.3 Noblis Team
The Noblis Project Management Team (as outlined in Figure 1) included the following members:

Mr. Ahmad Faramarzi, PE, PMP, Project Manager/Co-Task Leader, supervised project personnel and communicated policies, procedures, and goals to these employees, and maintained regular contact with the USACE. Mr. Faramarzi was responsible for the overall project plan, project performance, and contractual obligations on project tasks.

Ms. Christina Gannett, Co-Task Leader, developed the Work Plan and Report and provided technical leadership in managing the IEPR activities.

Ms. Tammy Ryan, Project Coordinator, supported the Project Manager on all IEPR tasks, including the identification and recruitment of candidates for the expert panel. Ms. Ryan also supported Ms. Gannett in coordinating IEPR activities.

Mr. Ryan MacPherson and Mr. Michael Barba, Research Assistants, supported the IEPR activities on an as-needed basis.

Ms. Carolina Funkhouser provided Administrative Support for the project.

5 Conclusions and Observations
The Lower Snake River IEPR resulted in several comments on the adequacy of the information presented in the draft documents, as well as the information that was not found and recommended to be included. In general, the comments identify shortcomings and offer suggestions that would improve the technical adequacy and overall quality of the Lower Snake River documents. The comments also include a number of issues that should be addressed so that the documents can be comprehensive in the assessment of all important considerations in the implementation of the project study.

The IEPR Panel (the panel) reviewed the Lower Snake River PSMP/DEIS along with its associated appendices. The panel recognizes the significant amount of work that went into the development of the documents and applauds the USACE for looking at sediment management both now and into the future. It is clear from the information presented that sediment management of the system will continue to be an important operational consideration. The panel was not able to assess the total failure risk of the Lewiston-Clarkson levee system since the Geotechnical Appendix in the original document package was not included in the DEIS and within the scope of this review. From the documents that the panel did review, the panel also identified a number of key concerns that require resolution in order to improve the DEIS. The concerns, discussed in more detail below, include:

- The screening of sediment management measures;
- The evaluation of system operational changes;
- Mitigation of environmental impacts;
- Cumulative environmental effects; and,
- Sediment deposition and location within the Lower Granite Dam reservoir.
The following paragraphs provide a summary of the panel’s recommendations in environmental and technical areas. Since the panel did not include an economist SME, the panel did not assess the economics aspects of this project.

With respect to environmental aspects, the Lower Snake River DEIS included appropriate methods for analyzing project impacts. However, certain key project impacts and aspects of the mitigation critical to the justification and implementation of the project were not included or adequately discussed. Particularly, the panel raised issues associated with sediment reduction measures and analysis of cumulative effects associated with implementation of the preferred alternative. The documentation did not fully identify project impacts in terms of quantifiable habitat functions and values, and subsequent mitigation requirements. In addition, specific issues with regard to impact to benthic organisms and salmonids that would be potentially impacted by the proposed alternatives were not adequately described in the materials provided for review. The panel recognizes that more detailed information to support the assessment of environmental impacts and mitigation approaches, particularly more detailed analysis of mitigation and monitoring, will be added to the Lower Snake River DEIS as well as addressed in other stages of project implementation.

Technical evaluations of alternatives should be improved to better support the PSMP and DEIS conclusions. A level of consistency should be maintained throughout the analysis of all alternatives with respect to their potential impacts. Specifically, all possibilities should be considered and rationale provided for dismissal, as appropriate (e.g., external policies or issues). This approach would be especially helpful when looking at watershed-based and upstream sediment controls, with or without cooperation with other land management agencies, and how significant they are to the success of each alternative. The hydrologic and sediment modeling analyses are very detailed and thorough, and provide an in-depth understanding of the various issues involved. The benefits to be derived from adopting each alternative, as shown by these studies, should be itemized for improved presentation of results. It may be useful to include some additional information from the appendices into the main report to improve clarity. Of particular importance is the impact of changing reservoir operating rules, and the potential benefit of changing the rules as sediment accumulates in the reservoir. Sediment dispersal in the reservoir should also be more clearly defined and if it is dismissed from consideration, the rationale should be included in the documents. Reservoir hydraulics should be addressed in more detail, especially with regard to sediment movement and potential encroachment into the navigation channel. Long-term potential for movement of the upstream delta face, as well as the disposal areas, should be discussed in more detail so that the selection of Alternative 7, and rejection of other alternatives, is more fully justified.

6 References


Appendix A – IEPR Comments

A.1 Final IEPR Comments
This Appendix provides the IEPR comments on the Lower Snake River IEPR project documents. The comments cover a range of issues that pertain to the technical aspects of the documents reviewed. Each comment is formatted into four parts that include the following: (1) a clear statement of the concern, (2) the basis for the concern, (3) the significance of the concern (the importance of the concern with regard to project implementability), and (4) the recommended actions necessary to resolve the concern to include a description of any additional research that would appreciably influence the conclusions. Comments are rated as “high,” “medium,” or “low” to indicate the general significance the comment has to the project implementability. The significance ratings are applied using the following criteria:

- High = Comment describes a problem fundamental to the overall goals and objectives of the project study that could affect the ability to implement aspects of the project that the documentation supports.
- Medium = Comment describes a problem that affects the completeness or overall understanding of the project study and its conclusions.
- Low = Comment relates to the technical quality and presentation of technical information in the documentation that could confuse the reader or be considered misleading, but there is limited effect on the overall project conclusions.

The comments are arranged in order of significance. Of the final 19 comments, 3 were identified as having high significance, 14 were identified as having medium significance, and 2 were identified as having a low level of significance.

A.2 Summary of Comments
Following is a listing of the final comments submitted in the Comment Tracking Form.

Table A-1. Overview of Final Comments Identified by IEPR Panel

<table>
<thead>
<tr>
<th>Significance – High</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Post-construction monitoring of the constructed habitat needs additional discussion and clarification.</td>
</tr>
<tr>
<td>2</td>
<td>Need to clarify the selected alternative – is it the toolbox or the Programmatic Sediment Management Plan (PSMP).</td>
</tr>
<tr>
<td>3</td>
<td>Sediment source reduction studies must be more fully discussed. Consideration of sediment reduction studies should be comparable to other measures considered as part of Alternative 7.</td>
</tr>
<tr>
<td>Significance – Medium</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>4 The EIS should discuss climate change in the context of a reasonable foreseeable future condition which could cause increased sedimentation in the basin. See Appendix D of the EIS, which states that climate change could alter sediment yields primarily through changes in temperature and hydrology that promote vegetation disturbances (e.g., wildfire, insect/pathogen outbreak, drought-related die off), which effectively reduce hillslope stability and alter the styles and rates of geomorphic processes that cause erosion.</td>
<td></td>
</tr>
<tr>
<td>5 The geotechnical appendix of the DEIS should be included in the final published document.</td>
<td></td>
</tr>
<tr>
<td>6 The alternative screening logic is flawed.</td>
<td></td>
</tr>
<tr>
<td>7 Further supporting discussion and evidence should be provided to support elimination of several measures considered for sediment management in the DEIS.</td>
<td></td>
</tr>
<tr>
<td>8 It is not clear why System Management – Modify Flows measure is not applicable to navigation.</td>
<td></td>
</tr>
<tr>
<td>9 The presentation regarding cumulative effects should be more robust in the DEIS.</td>
<td></td>
</tr>
<tr>
<td>10 Provide further discussion and consideration of system operational changes as a measure for sediment management.</td>
<td></td>
</tr>
<tr>
<td>11 In-reservoir dredge material disposal may not be a fully reliable solution. Need a more detailed discussion of sediment distribution in the reservoir, because typical underwater sand slopes, or angles of repose, are much lower than proposed. Also, additional proactive measures may benefit the management of suspended solids migration and turbidity associated with sediment removal and placement.</td>
<td></td>
</tr>
<tr>
<td>12 The 2009 Sediment Evaluation Framework (SEF) used as the primary reference in the LSR PSMP for determining sediment contaminant (HTRW) screening thresholds does not specify freshwater dry weight screening levels for contaminants.</td>
<td></td>
</tr>
<tr>
<td>13 Dredge material proposed for beneficial uses for salmonid habitat should have specific composition targets to ensure suitability for the proposed purpose.</td>
<td></td>
</tr>
<tr>
<td>14 The discussion regarding juvenile lamprey presence/absence within the project footprint should be more robust in the text.</td>
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<tr>
<td>15 The rationale for effects on benthos and subsequent recolonization need additional justification in the Lower Snake River PSMP.</td>
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<tr>
<td>16 Clarify if the not-yet-defined structural measures will result in permanent definable benefits or impacts.</td>
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<tr>
<td>17 It is not clear if there is an optimum approach to the viability of the Lewiston/Clarkston levees.</td>
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## Significance – Low

<p>| | |</p>
<table>
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<tr>
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<tbody>
<tr>
<td>18</td>
<td>A more detailed description of baseline and its place in the analysis would be useful to gear the public toward what to expect in the analysis (i.e., difference between baseline and effects of the project as implemented).</td>
</tr>
<tr>
<td>19</td>
<td>The Ice Harbor Navigation Lock sediment sample locations do not appear to include samples from the highest sediment accumulation areas likely to be dredged (Appendix I, Section 3.1.4, Fig 5).</td>
</tr>
</tbody>
</table>

The following pages outline the final IEPR comments in detail, including the four-part analysis. The comments are sorted based on their designated significance.
**Comment #1**

Post-construction monitoring of the constructed habitat needs additional discussion and clarification.

**Basis for Comment:**

Several sections of the PSMP note elements of post-construction monitoring that would be conducted “pending funding.” For example, Appendix J section 3.3 states, “The hydrographic surveys would be performed each year for at least 2-3 years to determine if the embankment has sloughed, settled, or moved, and to verify that the desired physical structure determining rearing habitat suitability have been achieved and maintained... Biological surveys would be performed twice over 10 years, if funding is available, to assess the use of the disposal area by target fish species and to document changes in several parameters such as use by juvenile salmonids, sediment grain size, food organisms, and water temperature.”

The funding structure for these monitoring elements is not clear in the DEIS, nor is it clear whether the habitat creation associated with the dredge material placement is considered mitigation for project impacts under the Clean Water Act (or whether mitigation is proposed at all). Appendix A section 1.5 notes that the Record of Decision (ROD) would include a summary with implementation, mitigation, and monitoring plans, but that is not yet complete. It also notes the importance of monitoring to the PSMP. The 404(b)(1) evaluation (Appendix L, section 4.7.1) notes the USACE expects that project impacts will be offset by habitat creation.

Approval of construction activities, specifically dredge material placement and habitat creation, should be contingent on providing for post-construction monitoring over a biologically relevant timeframe sufficient to ensure project success (minimally 5 years). From a technical point of view, it does not make sense to have the construction component developed without monitoring it to determine success. It appears from the DEIS that the beneficial uses (habitat creation) of dredge placement might be considered mitigation for impacts covered under the Clean Water Act. Monitoring associated with these activities is required under 40 CFR 230 and 33 CFR 332. Criteria for monitoring periods, ecologic performance standards, and management are specified therein.

**Significance: High**

This omission represents a fundamental problem with the project that could affect the recommendation or justification of the project alternatives.

**Recommendation for Resolution:**

Develop monitoring and performance criteria for inclusion in the DEIS consistent with the requirements of 40 CFR 230 and 33 CFR 332.
<table>
<thead>
<tr>
<th><strong>Comment #2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Need to clarify the selected alternative – is it the toolbox or the Programmatic Sediment Management Plan (PSMP).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Basis for Comment:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>It appears that no specific actions are proposed, except for the immediate action. Specific actions to be defined in the future will require new environmental impact analyses.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Significance: High</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important to specify that the selected alternative is a set of future options to be selected based on monitoring results, and not any action plan at this time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Recommendation for Resolution:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughout the documents as well as the Executive Summary, please state explicitly that no specific action items are proposed—except for the immediate dredging plan—and that any future plan of action will be based on results of on-going monitoring. And that any of the potential actions listed under Alternative 7 could be used to address the concern at that time.</td>
</tr>
</tbody>
</table>
Comment #3

Sediment source reduction studies must be more fully discussed. Consideration of sediment reduction studies should be comparable to other measures considered as part of Alternative 7.

**Basis for Comment:**

Differentiate between naturally occurring and human caused sediment production, and how ecosystem benefits would accrue in upstream watershed areas from reduced sediment production. Watershed based and upstream in-channel sediment controls, particularly in cooperation with other land management agencies, should be emphasized as part of the overall strategies in Alternative 7.

Alternative 7 (Full System and Sediment Management Measures), lists among the considered measures “Continued upland sediment reduction measures by the Corps, other land managers/owners (at current levels of implementation).” This management option would ostensibly benefit habitat throughout the LSR watershed, particularly for many of the fish species of concern (i.e., Chinook). Riparian re-vegetation efforts might also provide dual benefits for sediment reduction and increased habitat corridors for endangered/threatened species (i.e., Yellow-billed cuckoos p 3–31), and may address issues regarding tributary habitat effects noted in the NOAA/NMFS biological opinion (BiOp).

However, this management measure is really not further explored in the DEIS, and begs the question whether it is truly a relevant component of the alternatives analysis. Section 2 of the DEIS states, “Agencies responsible for land management in the basins that drain into the LSRP would continue to implement existing sediment reduction measures, consistent with their current authorizations and funding.” Many of the management methods (i.e., forest vegetation management p2–21) are clearly outside of the jurisdiction of the USACE, and it is not clear if there is significant USACE coordination or Memorandums of Understanding (MOUs) with the appropriate entities to make these options viable. The DEIS does mention coordination with land management agencies and consultation on research with other agencies/universities, but the discussion is non-specific. Since many of the efforts are ostensibly dependent on other federal programs (Forest Service and BLM, for example – see Appendix B 3.3), presumably these programs are operated independently of the USACE project, and could be altered or changed without regard to the USACE. Appendix E suggests that much of the sediment load is attributable to farming practices that still follow traditional methods, and notes that efforts to curb this are likely to be dependent on future incentive programs; it is unlikely that these efforts could be counted on to the degree necessary to include as part of an alternative considered for the proposed project. If MOUs are not currently in place or seriously considered for development should the preferred alternative be selected, it is unlikely that the USACE could consider this as a relevant component of the future action.

Upland sediment reduction measures merit substantive consideration and development within the relevant sections of the DEIS and appendices (i.e., Section 4 Environmental Effects of Alternatives). In the event that sediment reduction measures are not currently a viable management method, but could develop to be so at some point in the foreseeable future, this rationale should be discussed in greater depth. In the event that the data indicates that sediment reduction measures would not further the project goals, then that should be thoroughly discussed and the measure removed from the alternative. Its inclusion to the limited degree that it is currently developed within the DEIS suggests that it is an “add-on” to make Alternative 7 appear...
more comprehensive in scope than it would otherwise appear.

<table>
<thead>
<tr>
<th><strong>Significance: High</strong></th>
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<tbody>
<tr>
<td>Inclusion of this management measure to its current level of development represents a fundamental problem with the project that could affect the recommendation or justification of the project alternatives.</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Recommendation for Resolution:</strong></th>
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<tbody>
<tr>
<td>Revise or further develop this sediment management method to evaluate its importance relative to the other methods included under this alternative. Recommendations to conduct future detailed studies of upstream controls, especially on the Salmon River, should be strongly promoted.</td>
</tr>
<tr>
<td>Comment #4</td>
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<tr>
<td>------------</td>
</tr>
<tr>
<td>The EIS should discuss climate change in the context of a reasonable foreseeable future condition which could cause increased sedimentation in the basin. See Appendix D of the EIS, which states that climate change could alter sediment yields primarily through changes in temperature and hydrology that promote vegetation disturbances (e.g., wildfire, insect/pathogen outbreak, drought-related die off), which effectively reduce hillslope stability and alter the styles and rates of geomorphic processes that cause erosion.</td>
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</tbody>
</table>

**Basis for Comment:**
Given the significance of climate change, this should be considered in the EIS.

**Significance: Medium**
Not adequately considering the reasonable foreseeable future condition in regards to climate change weakens the analysis overall.

**Recommendation for Resolution:**
Update the analysis to include the USACE assumptions regarding the future condition.
**Comment #5**

The geotechnical appendix of the DEIS should be included in the final published document.

**Basis for Comment:**

The geotechnical report is a critical element necessary to assess USACE risk studies of the Lewiston-Clarkston levee system. The overall risk of levee failure is a combination of hydraulic, geotechnical, and operational conditions.

**Significance: Medium**

Affects the results and overall conclusions of the report.

**Recommendation for Resolution:**

Include the geotechnical appendix in the final published EIS.
**Comment #6**

The alternative screening logic is flawed.

**Basis for Comment:**

DEIS, Page 2-32, Section 2.2.6. The alternative screening logic links immediate and future project needs explicitly. This means that only alternatives that can “remedy sediment deposition that interferes with authorized purposes of the LSRP, for both future and immediate needs” are retained. It seems that considering them for future or immediate needs would be better and permit a larger array of alternatives to be carried forward.

**Significance: Medium**

The logic affects the recommendations and conclusions of the DEIS.

**Recommendation for Resolution:**

Alternative screening should be reconsidered so that alternatives that satisfy either immediate or future needs are retained.
### Comment #7

Further supporting discussion and evidence should be provided to support elimination of several measures considered for sediment management in the DEIS.

#### Basis for Comment:

DEIS, Page 2-8, Table 2-3. Three measures (bubble curtains, agitation, reduce navigation depth) that were eliminated from further consideration lack adequate technical, environmental, or economic justification supporting their deletion. The discussion regarding the elimination of bubble curtains and agitation to prevent settling contains very little supporting evidence to justify measure elimination. Also, although the measure of agitation to prevent settling is supposedly eliminated from consideration in sediment management alternatives, it actually does appear under the description of Alternatives 4, 6, and 7. The measure to maintain the navigation channel at less than 14 feet was dismissed from further consideration because it did not meet the project purpose and need since the channel depth of 14 feet is Congressionally authorized. While this is true, many USACE projects have modified, added, or deleted project features. Based upon the likely increasing sediment load in the future (Figure 1-7) with its associated sediment management cost, the economic justification of a 14-foot navigation channel may change. Besides the increasing sediment load, the actual tonnage shipped through the project has been decreasing over time (DEIS, Figure 3-2). It is clear that such a Post Authorization Change Report is a long process, so this measure should have to be grouped with those relevant to the future, but the USACE reasoning for outright dismissal of this measure is poorly supported. The constraint is mainly an institutional issue not an engineering or environmental issue.

#### Significance: Medium

This affects the overall DEIS recommendations and conclusions.

#### Recommendation for Resolution:

Provide additional supporting evidence and discussion regarding the elimination of these various measures. The justification should be based upon engineering, environmental, economic, or institutional considerations. For those measures eliminated, ensure that they do not appear as part of later alternatives.
<table>
<thead>
<tr>
<th>Comment #8</th>
</tr>
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<tbody>
<tr>
<td>It is not clear why System Management – Modify Flows measure is not applicable to navigation.</td>
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</table>

**Basis for Comment:**

DEIS, Page 2-9, Table 2-4 and Table 2-5. Modifying the operation of Lower Granite Dam to permit large-scale flushing events is feasible (H&H Appendix) and was tested with some success in 1992. The flushing activity removes sediments intruding into the navigation channel. Therefore, it is difficult to understand why this measure was rated as “no” for navigation in Table 2-4. Also, there are no ratings under recreation or fish/wildlife although presumably these might be improved also since “natural” sediment removal may be preferable to dredging. In addition, Table 2-5 shows a “no” in the second column in a similar fashion. Unfortunately, this prevented the alternative from being considered further.

**Significance: Medium**

This discrepancy affects the DEIS recommendations and conclusions.

**Recommendation for Resolution:**

Provide further explanation and justification for the rating of this measure on Table 2-4.
**Comment #9**

The presentation regarding cumulative effects should be more robust in the DEIS.

### Basis for Comment:

The EIS in Section 4.11 states “This section presents the Corps’ evaluation of the potential cumulative effects of its actions as part of programmatic alternatives for managing sediment in the LSRP reservoirs. The Corps’ cumulative effects analysis focuses on actions that are within the Corps’ authority to implement and are described as components of all three PSMP alternatives. Potential effects from other agencies’ actions are addressed in Alternative 3 only.”

The section further states “The Corps used public scoping input (see Section 2 and Appendix G), as well as technical analysis conducted for this EIS, to focus this analysis on cumulative effects that are “truly meaningful” in terms of local, regional, or national significance (CEQ 1997).”

While this is technically adequate, most EISs present more robust cumulative effects analyses for all resources that would be affected by the project, especially on projects that are subject to legal proceedings or intense public scrutiny.

For example, the cumulative effects discussions do not appear to fully consider economic growth over time and the effect on activity/use of the industrialized areas of the project footprint. Discussions regarding cumulative effects (specifically Appendix K, section 6.7) should present a more robust discussion of reasonably foreseeable increases in activity within the shipping/berthing areas of the reservoirs over time, specifically those at Port Clarkson and the confluence of the Snake and Clearwater rivers. Increases in site use at these facilities would create additional development pressure on adjacent land, potential for contaminant introductions, pressure to dredge these locations, navigation within the SR, etc.

As the proposed action serves to maintain (and arguably, improve) access to the facilities along the harbor compared to the no action alternative, and increases in materials transport and other commercial activity associated with long-term economic growth are likely, it seems plausible that activities at these sites would increase over time with the preferred action. Even given flat economic setting, the Idaho Economic Forecast published in April 2013 expects to see real gross domestic product (GDP) growth exceed 2.0% and approach 3.2% over the next 5 years. Real GDP growth for Washington and Oregon is expected to be similar. The 2008 NOAA BiOp notes that projects including dock and boat launch construction, maintenance dredging, and embankment repair could have short- and long-term adverse effects on Snake River fall Chinook and other salmonid populations.

Additionally, consideration of the full range of measures considered under Alternatives 5 and 7 do not appear to be well considered under cumulative effects. Many of the measures actionable under Alternative 7, including upland sediment reduction measures, dredging, dikes and weirs, and others listed in 2.2.5.7 of the DEIS would have a range of either beneficial or adverse effects. Even though this is proposed as a programmatic EIS (and thus has a broad consideration of future actions), the consideration of these reasonably foreseeable future actions are too broad and brief to be meaningful. While the DEIS states that the USACE anticipates cumulative effects analyses of actions proposed pursuant to this EIS will conduct cumulative effects analysis at a project-specific level of detail through a tiered NEPA process, the consideration of cumulative effects of proposed alternatives should be considered more fully in the DEIS.
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<th><strong>Significance: Medium</strong></th>
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<tr>
<td>This affects the overall recommendations and conclusions.</td>
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**Recommendation for Resolution:**

Further develop the discussion regarding cumulative effects to address the issues noted.
**Comment #10**

Provide further discussion and consideration of system operational changes as a measure for sediment management.

**Basis for Comment:**

DEIS, Page 2-17 and 3-7. There are a number of system operational changes that were mentioned by the USACE but not really considered in detail. These include raising the maximum operating pool within Lower Granite reservoir and/or operating the navigation system at temporally varying depths. The panel feels that these operational changes are worthy of additional discussion and consideration. It is understood that any operational changes would require an Environmental Assessment (EA), EIS, or Post Authorization Change Report; however, these options may actually represent the least cost sediment management option over the long-term. The overall feasibility of any of these measures should be discussed further by the USACE in the DEIS with the focus of the discussion on engineering, environmental, economic, and institutional considerations that would constrain any proposed operational changes. Some type of hybrid navigation depth schedule may provide many benefits with limited overall costs or impacts if such a measure is feasible. For example, juvenile salmon species in the river system are in Lower Granite reservoir from about April to September each year. During this time, fisheries managers desire to keep the operational pool within 1 foot of minimum operating pool (MOP) (H&H Appendix). At other times of the year, higher pool levels may be feasible. Therefore, “navigation windows” similar to how many tidally-influenced navigation systems operate in the United States may be useful.

**Significance: Medium**

This affects the overall DEIS recommendations and conclusions.

**Recommendation for Resolution:**

Provide further narrative discussion regarding operational changes as a sediment management measure. If such changes are not feasible, provide supporting evidence to that effect. If such changes are feasible, provide discussion of how such changes could be included in the future as part of long-term management measures or alternatives.
<table>
<thead>
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<th>Comment #11</th>
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<tr>
<td>In-reservoir dredge material disposal may not be a fully reliable solution. Need a more detailed discussion of sediment distribution in the reservoir, because typical underwater sand slopes, or angles of repose, are much lower than proposed. Also, additional proactive measures may benefit the management of suspended solids migration and turbidity associated with sediment removal and placement.</td>
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<th>Basis for Comment:</th>
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<tr>
<td>It is not clear what happens to the migration of the headwaters delta downstream from the ADH modeling. How stable will the sediment disposal areas be in response to flow circulation, wind induced and temperature gradients, and wind and shipping generated waves in the reservoir? The resulting sand slopes would be much flatter than a 1V:10H slope. Were silt curtains or similar technologies evaluated for sediment removal and placement activities; if so, why were they rejected? It would be good to cite examples of the most probable construction BMPs that would be required.</td>
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<tr>
<td>The DEIS does not provide a full understanding of the rationale behind the selected approach.</td>
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<th>Recommendation for Resolution:</th>
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<tr>
<td>Please clarify if reservoir currents would re-distribute the sediments throughout the reservoir, or how significant is this concern. Confirm that the final angle of repose will be as expected, and which BMPs and proactive sediment management may reduce turbidity and migration of sediments.</td>
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Comment # 12

The 2009 Sediment Evaluation Framework (SEF) used as the primary reference in the LSR PSMP for determining sediment contaminant (HTRW) screening thresholds does not specify freshwater dry weight screening levels for contaminants.

**Basis for Comment:**

The 2009 SEF does not have freshwater dry weight screening levels (SLs) for the contaminants listed in Appendix I, table B-2, B-3, B-6, or B-7 (p 24 of Appendix B, laboratory results); the levels referred to in the DEIS are specified for marine (salt water) sediments. This may be important, as some toxicants exhibit different bioavailability in saline v. freshwater conditions (metals screening levels are often magnitudes of order lower). It is good that the USACE is referencing the 2012 Washington SMS draft guidelines, but those guidelines refer to WAC 173-204-340 (Freshwater sediment quality standards), which state that “The department shall determine on a case-by-case basis the criteria, methods, and procedures necessary to meet the intent of this chapter.”

It might be valuable to also refer in the DEIS and/or appendices to the interim *Bulk Sediment Screening Levels for SEF Chemicals of Concern* values used by the USACE Portland District, which include the freshwater benthic toxicity screening levels from Table 7-1 of the 2006 Interim Final Northwest Regional Sediment Evaluation Framework: (http://www.nwp.usace.army.mil/Missions/Environment/DMM.aspx) or the February 2013 updated Seattle District *DMMP Chemicals of Concern* list: (http://www.nws.usace.army.mil/Missions/CivilWorks/Dredging/UsersManual.aspx).

Adopting these recommendations may not appear to change the outcomes of the plan alternatives (as many of the values would still fall below the freshwater screening levels [FWSL]), but it is important to note any uncertainty involved in FWSLs from a practical risk-determination sense and to fully understand the potential environmental effects of the plan alternatives in light of the best available information applicable to the onsite environmental conditions. Some of the analyzed values would approach the FWSLs more closely than the marine screening levels. In regard to the importance of using FWSLs, research show that chronic toxicity tests conducted with freshwater sediments demonstrate biologic responses in ranges below those where an empirical sediment quality guideline would predict toxicity using acute 10-day toxicity tests; these differences are 6-fold lower for the chronic responses in freshwater toxicity tests (SETAC Pellston Workshop 2002). Also, the scientific literature has suggested that water quality standards may frequently fail to reflect the importance of combined aqueous and dietary exposures to some contaminants (specifically metals), typically resulting in feeding inhibition through avoidance response (Wilding and Maltby, 2006).

**Significance: Medium**

The information provided in the DEIS could be misleading to the reviewer and does not provide a fully accurate basis for determining risk.

**Recommendation for Resolution:**

The panel recommends that the Lower Snake River PSMP be revised to fully reflect available guidance on freshwater screening levels for the Pacific Northwest.
<table>
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<th>Comment #13</th>
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<td>Dredge material proposed for beneficial uses for salmonid habitat should have specific composition targets to ensure suitability for the proposed purpose.</td>
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**Basis for Comment:**

| Appendix L, Section 2.6 notes that “... about 85 percent of the material is expected to be sands (grains greater than 0.0024 inch in diameter) and gravels and cobbles; while about 15 percent of the material is expected to be silts and finer-grained material” (p 15). There is some suggestion in the literature that silt concentrations exceeding 20% in Snake River Basin sediments result in substantially reduced survival to emergence for Chinook salmon. Other data suggest target values of as low as 11% fine sediments due to alteration of the habitat and direct effects on egg survival and developing embryos. However, the literature also notes that local criteria should not be generalized, and suggests that specific targets relevant to the created habitat be established as a benchmark (EPA 910-R-99-014, p 47). |

It is recommended that the proposed placement and habitat creation plan clearly specify targets for sediment composition in the text to ensure optimal habitat suitability and a benchmark for monitoring efforts required under 40 CFR 230 and 33 CFR 332. It is critical to have these targets in the DEIS, as this placement is part of an immediate action and would not require another EIS (under the tiered programmatic EIS). |

**Significance: Medium**

This is important to ensure project success and toward developing specific benchmarks related to monitoring and performance criteria. |

**Recommendation for Resolution:**

Specify sediment composition targets in the text as noted.
**Comment #14**

The discussion regarding juvenile lamprey presence/absence within the project footprint should be more robust in the text.

**Basis for Comment:**

Appendix J, section 3.1.2 (P 5): The failure of the electroshocking method to detect juvenile lamprey indicates that the method may not have been fully applicable or developed for the site circumstances as noted in the text: “It is plausible that juvenile lamprey were present but not observed with this electroshocking sled as it was recently developed for this specific objective and had a limited testing period prior to deployment.” The text then notes: “… while juvenile lamprey are often found in silt/sand substrate (Artzen et al 2012), it is unlikely that juveniles are present in moderate or high numbers in the proposed templates.” Why is this the case? While ostensibly due to sediment compositions within the project area, this conclusion needs clear reasoning to accompany this statement.

The text also states, “Juvenile lamprey typically have a patchy distribution related to other environmental variables such as water depth and velocity, light level, organic content, chlorophyll concentration, proximity to spawning area and riparian canopy (Moser et al. 2007).” This is good information, but again, the text does not clearly link its relevance to the site conditions or predictions regarding lamprey populations within the LSR.

Lamprey are an important component within the resident biologic community, and impacts to this species as a result of project activities could affect salmonid populations negatively. More detailed information regarding the rationale supporting this conclusion regarding lamprey populations with such limited onsite data should be readily evident in the text of the PSMP.

**Significance: Medium**

The omissions could affect the DEIS recommendation and conclusions.

**Recommendation for Resolution:**

Provide a more robust discussion on lamprey presence/absence and on site conditions supporting the USACE rationale.
**Comment #15**

The rationale for effects on benthos and subsequent recolonization need additional justification in the Lower Snake River PSMP.

**Basis for Comment:**

The discussion in section 3.1.2 of the DEIS (Affected Environment) regarding the effects on benthos needs to be more robust. Different sections of the PSMP state different expectations for recolonization; in section 3.1.4 the text states the USACE expects recolonization to occur within six months, whereas in 3.7 it states the recolonization is expected to take 6 months to 1 year. Are these estimates based on referenced studies? Why are they not consistent throughout the documents?

The 2011 Synthesis Report on Use of Shallow-Water Dredge Spoil on Aquatic Habitat Availability and Use by Salmonids and other Aquatic Organisms in Lower Granite Reservoir, WA. 1983-2010 (Contract No. W912EF-11-P-5008) states, “…some differences between reference and disposal stations are evident for both shallow (Figure 5) and mid-depth (Figure 6) disposal sites. Although BMI recolonization followed soon after, standing crop remained lower at disposal than at reference sites (4, 5, 29). Indeed, although Bennett et al. (4) documented recolonization four months after deposition of spoil, BMI densities were only one-third of what they had been prior to disposal. After initial disposal in 1988 and 1989, Bennett et al. (1993) documented a trend of increasing biomass at one disposal site; however, this trend was not significant statistically, and data from 1991 showed that all three disposal sites had significantly lower biomass of Oligochaetes and Dipteras than reference sites (7).” (P 27-30)

Delayed recolonization of benthic organisms could be important from a secondary and cumulative effects perspective as it applies to threatened and endangered species through community interactions (predator/prey relationships).

Additionally, section 3.1.2 Affected Environment states “Freshwater mussels (e.g., Mollusca: Unionoida) are vital components of intact salmonid ecosystems and are culturally important to Native Americans. Historically, at least seven mussel species occurred in Oregon and Washington (NWPCC 2004a). However, due to their sensitivity to ambient pollutants such as metals and pesticides, freshwater mussels are one of the most endangered faunal groups in North America (NWPCC 2004a). A recent study found that during the fall and spring, mollusks were the dominant macroinvertebrate community in the majority of sampled locations in the LSRP (Seybold and Bennett 2010).” The PSMP does not appear to specify what the bivalve composition of the affected biologic community might be, nor does it further address impacts to this community. The USFWS and others identify vulnerable species of freshwater mussels common to the Snake River, including the Western Ridged Mussel (*Gonidea angulata*), that have been found within the LSR (i.e., the Lower Granite Reservoir).

The PSMP should specify if the bivalves in these areas are primarily native or introduced, and bivalve species present should be better described in the DEIS. FWS lists a few that have distributions within the watershed and project river systems. Some of these mussels require fish for part of their lifecycle; any impacts to fish (i.e., no action) should include this potential impact to mussels if they are native species. This may need to be addressed in section 4.1 of the DEIS. Impacts to these species could also present community level effects on other organisms, including threatened and endangered species, through reduced ecologic niche fulfillment.
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<th>Significance: Medium</th>
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<td>This affects the overall understanding, recommendations, and conclusions of the DEIS.</td>
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<th>Recommendation for Resolution:</th>
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<tr>
<td>Revise the discussion regarding benthos to better describe and justify recolonization expectations, and provide additional information on the benthic biologic community, including bivalve community composition.</td>
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<td>Comment #16</td>
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<td>Clarify if the not-yet-defined structural measures will result in permanent definable benefits or impacts.</td>
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**Basis for Comment:**

Structural improvements may result in channelization and improved flow conveyance, including higher flow velocities and sediment transport. It is not clear if future Environmental Analyses will be conducted to evaluate these impacts.

**Significance: Medium**

This will clarify the circumstances under which structural measures are selected, and how the individual structure benefits/impacts are defined for the PSMP.

**Recommendation for Resolution:**

It appears that each structural measure will have to be evaluated for its own merits, if and when it is considered. And that evaluation may determine how useful that structure may be in terms of sediment transport and habitat creation. Based on the present information, it appears that both ports will require structural protections, which are not yet defined; unless continued dredging will be the long-term option.
<table>
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<th>Comment #17</th>
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<tr>
<td>It is not clear if there is an optimum approach to the viability of the Lewiston/Clarkston levees.</td>
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**Basis for Comment:**

It is important to indicate if the FEMA criteria are met under the various potential actions listed, even if SPF protection will not be available. For example, would increasing flow velocities along the Lewiston levee using structural features cause scour at the toe of the levee?

**Significance: Medium**

The flood risk must be assessed in relation to any of the options included under the selected alternative.

**Recommendation for Resolution:**

The actual flood control benefits to both communities will probably be defined when the specific actions are implemented. But a general discussion in the PSMP is warranted, to show that navigation and flood control benefits will be complementary with some of the toolbox options. Also, a general assessment of O&M requirements for each type of structure would be helpful in the decision to include these structures.
<table>
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<th><strong>Comment #18</strong></th>
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<tr>
<td>A more detailed description of baseline and its place in the analysis would be useful to gear the public toward what to expect in the analysis (i.e., difference between baseline and effects of the project as implemented).</td>
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<th><strong>Basis for Comment:</strong></th>
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<tr>
<td>This is an overarching comment to clarify public expectation/the limits of analysis.</td>
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<tr>
<td>The USACE does not have an explicit explanation of what baseline is and therefore when reading the effects analysis it is easy to stray away from what action the USACE is taking (i.e., developing and implementing an O&amp;M Program for which some activities have already been occurring) and to think of all the proposed activities as “new” activities. If baseline/existing environment/activities are defined more succinctly, it would make the limited scope of the analysis and alternatives more understandable to the reader.</td>
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<th><strong>Significance: Low</strong></th>
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<tr>
<td>This confuses the overall understanding of the document and its conclusions.</td>
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<tr>
<td>Provide an explanation of baseline and its use in the NEPA analysis.</td>
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**Comment #19**

The Ice Harbor Navigation Lock sediment sample locations do not appear to include samples from the highest sediment accumulation areas likely to be dredged (Appendix I, Section 3.1.4, Fig 5).

**Basis for Comment:**

The sediment sample locations at Ice Harbor Navigation Lock approach do not include any of the highest sediment accretion areas, which differentiates this site from the other sites targeted for dredging in the LSR PSMP. The other sites (i.e., Port of Lewiston, etc.) included representative samples from the high accretion areas most likely to be dredged. Sediment samples taken outside of the high accretion areas may not be representative of the sediment characteristics within the high accretion areas. Additional data or discussion (perhaps from prior dredging or sampling events) specifically addressing these high accretion areas would benefit the rationale and findings of the PSMP, and further demonstrate consistency with the 2009 SEF.

**Significance: Low**

The data provided does not allow for a full technical understanding of the report.

**Recommendation for Resolution:**

Provided additional data or a more robust discussion regarding the sample selection and discrepancy of sample locations at the Ice Harbor Navigation Lock relative to the other sites.
Appendix B – IEPR Panel Members

Noblis selected four panel members to conduct an IEPR for the Lower Snake River project and supporting models for the USACE. Consistent with the requirements of the USACE PWS, the panel members provided expertise in four required areas: sedimentation, risk and reliability, fisheries biology, and environmental compliance requirements. All panel members met and exceeded the minimum requirements for each specified areas of expertise. The panel represented a well-balanced mix of individuals from academia, large companies, and individual consultants.

B.1 Résumés of panel members

The résumés of the panel members follow.
Qualifications Summary

- Ph.D. in civil engineering focused on Hydrology and Groundwater Flow. M.A. in civil engineering focused on geo-environmental engineering.
- Dr. Brown has worked with Corps of Engineers numerical modeling codes including HEC-1, HEC-HMS, HEC-RAS for over 15 years. Dr. Brown has testified on hydrology and groundwater flow cases as well as been on other expert panels as hydrology expert. Dr. Brown worked on new reservoir projects as well as dam modification projects.
- Dr. Brown is familiar with the application of USACE risk and uncertainty evaluations in flood damage reduction studies. Dr. Brown started his career 20 years ago with the Phila District COE on Basin Planning studies and hydrologic models. Prior to leaving the COE in 2006, Dr. Brown was a member of the USACE National Levee Assessment Team. Dr. Brown has worked on the following flood control projects: Schuykill River, Molly Ann’s Brook, Little Mill Creek, N. Branch Newton Creek, Cedar River, Alafia River, and others.
- Dr. Brown is familiar with risk and uncertainty analyses and is familiar with standard USACE hydrologic models, hydraulic models, and most seepage models. Dr. Brown has developed models using HEC-HMS, HEC-RAS, MODFLOW, SEEP2D, SEEP/W, and others. Dr. Brown has programmed his own model codes using Visual Basic and Microsoft Solver to investigation design optimization studies. Teach courses in hydraulics/hydrology, fluid mechanics, and groundwater flow. Testified in the International Court of Arbitration on groundwater modeling and dewatering.
- Actively participate in AWRA, ASCE, and SAME. Helping organize the national 2012 AWRA conference in Jacksonville, Florida.
- Dr. Brown has worked on 5 previous multi-million dollar IEPR projects including one with a construction cost of over $1 billion.

Education

- Ph.D., Civil Engineering, University of Florida, 2005
- M.S., Civil Engineering, Villanova University, 1997
- B.S., Civil Engineering, Temple University, 1991

Certifications and Licenses

- Professional Engineer – State of Florida – Number 65308
- Professional Engineer – State of Pennsylvania – Number 049758-E

Summary of Professional Experience

University of North Florida, Jacksonville — Adjunct Faculty Member, Visiting Assistant Professor – Faculty Member, Tenure Track Assistant Professor – Faculty Member

- Teaching undergraduate level courses in civil engineering, fluid mechanics, hydraulics, foundation engineering, senior capstone, introduction to engineering, and engineering geology. Developed new curriculum sets in engineering geology and groundwater hydraulics.

Golder Associates Inc., Jacksonville, Florida — Senior Consultant

- Responsibilities include project management, business development, and engineering technical services. Technical areas of specialization and expertise include: water resources engineering,
ASR, geotechnical engineering, ports/waterways, dredging, levees/dams, hazardous wastes, computer modeling, water resources planning, and environmental impact statements. Major projects have included development of regional groundwater models in Florida and Georgia and levee/dam designs in south Florida.

**University of Florida, Gainesville, Florida — Graduate Student**
- From September 2001 to December 2005, in addition to his duties with the U.S. Army Corps of Engineers, Dr. Brown was a graduate researcher at the University of Florida, under the advisement of Kirk Hatfield, Ph.D., Professor of Civil Engineering. Dr. Brown’s research topics included ASR Planning and optimization, ASR water supply and reuse, ASR performance metrics, geotechnical constraints related to ASR, and ASR water law in Florida.

**U.S. Army Corps of Engineers, Jacksonville, Florida — Technical Expert**
- Responsibilities included serving as one of the District’s senior technical experts on groundwater hydrology, ASR wells, water resources planning, dredging, confined disposal areas, geotechnical engineering and subsurface structures such as coffer dams and hydraulic barrier walls.
- Completed projects involved water resources, levee/dam design, hazardous waste, geotechnical design, coastal engineering, port improvements, and environmental restoration.
- Provided recommendations where existing guidance is not adequate or literature is incomplete. Completed work has included the preparation of many technical reports relating to a variety of projects.
- Worked on numerous port development projects including Tampa Harbor deepening, Alafia River improvements for Cargill, Jax Port, and Cape Canaveral Trident submarine base. In support of the Everglades Restoration, he was responsible for a project budget in excess of $5,000,000 annually.
- Team leader for the Everglades Restoration ASR program covering five separate projects and numerous team members from many different technical disciplines.
- Additional adhoc responsibilities included serving on national technical committees, public speaking, and mentoring more junior employees. Mentoring subjects have included numerous projects and geo-environmental engineering issues involving geostatistics, soil remediation, groundwater contaminant transport, settlement, bearing capacity, slope stability, dewatering, shear strength, cyclic loading, soft soils, contaminated sediment dredging, geotextiles, embankment toe drains, embankment construction, compaction, groundwater modeling, injection wells, relief wells and seepage.

**U.S. Army Corps of Engineers, Philadelphia, Pennsylvania — Junior then Senior Geotechnical Engineer**
- Involved in various District water resources projects of a complex nature. Projects included the Bridgeport Rental & Oil Services (BROS) Superfund remediation project, Tranguich Superfund investigations, Lipari Landfill Superfund remediation, Fort Dix Groundwater Model Study, Delaware Main Channel Study, Dover AFB Pax Terminal, and the C&D Canal Deepening Study.
- For the C&D Canal Deepening Study, performed significant embankment dam inspections and designs for Prompton Dam, Beltzville Dam, and Jadwin Dam.
- Assisted other engineers in the scoping of subsurface investigations to explore abutment seepage at the F.E. Walter Dam.
- Responsible for dredgeability assessments, stability analysis, embankment design, and site explorations.
- Worked on port planning projects for the C&D Canal, Wilmington Harbor, and Packer Avenue Marine Terminal.
- One of the primary points of contact for technical services support to the EPA Regions II and III including work efforts in support of the Superfund program as well as the RCRA corrective action program. Responsibilities included document review, site explorations, groundwater modeling, contaminant fate and transport assessments, and limited engineering design.
- Section point of contact for two geotechnical engineering A/E design and exploration contracts.
Prepared scopes of work, schedules and pay estimates for this assignment. Approximately $2,400,000 worth of assignments was contracted for over a 3-year period.

- As a junior level engineer, was responsible for the development and oversight of multiple site exploration programs for civil works, military, and hazardous waste projects.

**Waste Management of North America, Bensalem, Pennsylvania — Engineering Intern**

- From 1989 to 1990, worked as an engineering intern for Waste Management of North America where he worked on numerous geotechnical and environmental engineering projects involving new and existing sanitary landfills.

**SELECTED PROJECT EXPERIENCE**

- **East Coast Floridan Aquifer System Modeling, Southeast Florida.** Project engineer responsible for model development, calibration, and verification of a regional density-dependent groundwater model of the entire southeastern Florida coast including all or parts of 8 counties. Model development effort utilizes the code SEAWAT from the United States Geological Survey to evaluate potential for salt-water intrusion or upconing from existing or proposed water supply projects.

- **Florida Power & Light Groundwater Modeling, Southeast Florida.** Project engineer responsible for model development, calibration, and verification of a sub-regional groundwater model of Glades County Florida for the purpose of evaluating water supply impacts from a proposed cooling water supply system. Model development effort utilized the code MODFLOW from the United States Geological Survey to evaluate potential for off-site impacts to nearby users.

- **Occidental Chemical Model Development, Belle, West Virginia.** Team member of a model development team charged with the development of a finite-element groundwater numerical model of the entire industrial site. The team developed the model for the US EPA Region III as a remedial measures assessment tool in order to ensure proposed measures were feasible.

- **Portugues Dam Groundwater Model, Ponce, Puerto Rico.** Dr. Brown worked with another hydrologic modeler to develop a MODFLOW model in support of the Portugues Dam project located in Ponce, Puerto Rico. The Portugues Dam is a thick arch RCC concrete dam located in the uplands of Puerto Rico. The dam foundation includes a complicated geologic regime including major near-vertical shear zones. The model development and calibration was difficult since the foundation was probably a combination of porous media and fracture flow systems. The numerical model was compared against older existing models and compared very favorably. The model was utilized to estimate uplift pressures, under seepage, through seepage, and to help with the design of drainage galleries and grout curtains.

- **L-31 North Seepage Management Pilot Project, Miami-Dade County, Florida.** Project geotechnical engineer responsible for the overall assessment and development of a permanent subsurface groundwater barrier system between Everglades National Park and Miami, Florida. The evaluations included feasibility-level design and analysis of over 50 separate barrier wall concepts including SB and SCB slurry walls; PVC sheetpile; steel sheetpile; jet grouting; canal lining; and many others. Dr. Brown developed the concept of a pilot project to test a combination of different seepage control technologies. The final design of the project is underway.

- **Beltzville Dam Periodic Inspection, Northeast Pennsylvania.** Project Engineer responsible for both annual and periodic inspections of the earth and rockfill embankment dam near Lehighton, Pennsylvania. Dr. Brown led a multi-disciplinary team of engineers from the USACE to inspect the dam and all associated infrastructure including reservoir control tower, main conduit, spillway, access roads, bridges, and control buildings. Dr. Brown followed USACE and FEMA protocols for these work efforts. After the inspections, Dr. Brown assisted the team with the development of technical reports sent to USACE headquarters.

- **General Edgar Jadwin Dam Annual Inspections, Northeast Pennsylvania.** Project Engineer responsible for several annual dam inspections of the USACE-owned earth and rockfill embankment dam near Scranton, Pennsylvania. Dr. Brown led a multi-disciplinary team of engineers from the USACE to inspect the dam and all appurtenant structures for safety and

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24 May 2013
• **Prompton Dam Modification Study, Northeast Pennsylvania.** Project geotechnical engineer responsible for the evaluation of new spillway options at the USACE-owned Prompton Dam in northeastern Pennsylvania. Prompton Dam spillway capacity was determined to be inadequate based upon new hydrologic studies in the study area. Dr. Brown developed a range of alternatives for safely passing the design flows through the spillway. Dr. Brown evaluated adding RCC to the embankment crest, new spillway through bedrock, and modifying the existing spillway via blasting and excavation to enlarge its capacity. Ultimately, the selected alternative was modification of the existing spillway.

• **Prompton Dam Relief Well Construction, Northeast Pennsylvania.** Assist senior project geotechnical engineer responsible for the evaluation, design, and construction of new relief wells at the Prompton Dam. Project included numerous new deep relief wells, header piping to connect outlets together, and a small weir to measure outflow from the relief wells.

• **Everglades Agricultural Reservoir, Palm Beach County, Florida.** Project Geotechnical Engineer for the Everglades Agricultural Area (EAA) Reservoir. Primary duties included the oversight of geotechnical subsurface investigations to characterize the site geology and hydrogeology, evaluation of potential rock quarry sources, and evaluation of embankment dam safety and stability. Multiple types of foundation improvement were considered for the project including jet grouting, slurry walls, and dental concrete. The overall feasibility study also evaluated various embankment types including homogeneous earth, zoned earth/rockfill, rockfill, and RCC. Key embankment dewatering and seepage evaluations were completed using the Groundwater Modeling System (GMS), MODFLOW, and SEEP/W.

• **Water Preserve Area Feasibility Study, Broward County, Florida.** Project geotechnical engineer responsible for feasibility-level evaluations of multiple new reservoirs located in southern Florida in support of the Everglades Restoration project. Dr. Brown was responsible for embankment design, erosion protection, surveillance, subsurface explorations, and report preparation. Dr. Brown oversaw a team of geotechnical engineers who prepared the full geotechnical appendix for the USACE and the District. The evaluations included calculations, design drawings, and a final geotechnical appendix for eight separate proposed reservoir impoundments. Many of the projects are now under construction as part of the “Acceler8” program including the Site 1 Impoundment, C-9 Reservoir, and C-11 Reservoir.

• **Levee Assessment Team, Louisville, Kentucky.** Dr. Brown was a key member of a Corps of Engineers National Levee Assessment team charged with the inventory and development of a national levee database. In addition, the technical team was responsible for the development of risk-based assessment methodologies to be used for levee assessment across the entire United States. The work included development of national levee inventories and field visits to various at-risk levee systems. One visit included a general overview of St. Louis District levee systems. Prior to joining Golder, Dr. Brown was working on the development of new criteria related to wave overwash of earthen levees.

• **C&D Canal Deepening Feasibility Study, Maryland and Delaware.** Project Engineer responsible for the development of a site selection methodology for the disposal of dredged material throughout the Maryland and Delaware study area. The site selection study utilized linear optimization techniques and various spatial map coverages to screen through over 350 different possible disposal area locations. The types of spatial map coverages included wetlands, parks, cultural resources, bird habitat, endangered species, and landuse. Linear optimization analysis was performed on combinations of disposal areas to arrive at the least cost disposal option considering pumping distances, access, and other required infrastructure. In addition to dredging-related projects, Dr. Brown also prepared an accident study for the lower reaches of the C&D Canal to determine if number of accidents was related to channel geometry. Lastly, Dr. Brown evaluated need for anchorages or ship passing zones in the Canal in-lieu of conventional channel deepening.

• **Delaware Main Channel Deepening Project, Pennsylvania and New Jersey.** Project Geotechnical Engineer responsible for exploration, evaluation and design for proposed channel and harbor deepening study. Technical work included evaluation of dredgability of sediments, beneficial reuse of dredged material, and design of new confined disposal areas in New Jersey.
Brown also oversaw explorations of site “17G” to determine the overall geological and geotechnical foundation properties. Also, Dr. Brown assisted the project engineer with evaluation of potential impacts to groundwater from confined disposal operations.

- **National Park CDF Groundwater Study, Red Bank, New Jersey.** Project Geotechnical Engineer responsible for data collection and analysis of National Park confined disposal area (CDF) groundwater study. The National Park site is located on the outcrop of the PRM Aquifer System in New Jersey which is regulated as a “sole-source aquifer” in New Jersey. Dr. Brown oversaw site explorations at National Park and developed a conceptual hydrogeologic model of groundwater movement from the site to nearby pumping wells. The conceptual model was transformed into a groundwater numerical model of the site for evaluations of possible contaminant movement towards area water supply wells.

- **Tampa Bay Harbor CDF 2D Dike Raising, Tampa, Florida.** Project Geotechnical Engineer responsible for developing an overall exploration plan and embankment raising design for CDF #2D in Tampa Harbor. Site 2D is an island CDF located within sensitive habitat areas and close to key navigation projects. It is utilized for both, maintenance dredged material disposal and new work efforts. Dr. Brown directed a comprehensive exploration effort of the huge island and then developed a conceptual design for various dike raising scenarios. One scenario considered placing “geotubes” instead of conventional earthfill. The design evaluations were completed by Dr. Brown and other COE engineers. The final evaluations also included development of recon-level cost estimates for each of the dike raising alternatives.

- **Tampa Bay Harbor Dredged Material Management Plan, Tampa, Florida.** Project Geotechnical Engineer responsible for overall development of a dredged material management plan for the Tampa Bay Harbor channel system including multiple Federal and State navigation projects. Plan involved evaluations of channel shoaling, sediment transport, and frequency of maintenance dredging. After collection of pertinent supply information, Dr. Brown worked with a team of scientists, engineers, and economists to determine the most efficient long-term disposal plan for the harbor including consideration for beneficial use of dredged material.

- **Foundation Design PAX Terminal, Dover AFB, Delaware.** Project geotechnical engineer responsible for foundation explorations and design of a new passenger air terminal building at Dover AFB in Delaware. Dr. Brown developed the exploration plan working with a field geologist and then prepared the geotechnical characterization report resulting from the explorations. Dr. Brown worked with a design team to evaluate different shallow and deep foundation options to safely support the structure.

- **C-111 Infiltration Basin Design, South Florida.** Project geotechnical engineer responsible for the layout, planning, and design for a large water resources project located in South Florida adjacent to Everglades National Park (ENP). The C-111 project is a series of infiltration basins and stormwater treatment flow-ways designed to treat excess stormwater from the L-31N/C-111 Canal system. The infiltration ponds create a hydraulic buffer between ENP and urban areas in Miami-Dade County. The S-332D component of the system is a vast 810-acre stormwater flow-way discharging directly into Taylor Slough portion of ENP. Both water levels and water quality (phosphorus and nitrate levels) of the discharge water are monitored using a variety of instrumentation types to ensure compliance with design intent and applicable regulations.

- **ASR Regional Study, South Florida.** Project Engineer responsible for huge multi-year regional ASR feasibility study of the entire south Florida region in support of the Everglades Restoration project. The ASR Regional Study is a multi-agency effort evaluating the efficacy of a proposed 333-well ASR system to be located throughout southern Florida. The scope of work included hundreds of technical tasks as well as a project budget exceeding 50 million dollars. Dr. Brown was the lead technical representative for the Corps of Engineers for the study and was responsible for oversight of technical products prepared by others as well as preparation of specific assigned technical reports. Dr. Brown prepared reports on ASR well site selection and optimization; aquifer pressure changes; water treatment options; and numerical modeling. Several of the technical reports were summarized and published in leading technical journals or presented at national conferences.

- **ASR Dissertation, University of Florida.** Dr. Brown published a full dissertation researching new, innovative methods of evaluating ASR projects and ASR project planning. This dissertation is
the first dissertation published in the United States dedicated to ASR as a unique water resources option. Preparation of the dissertation concluded with a document containing 415 pages and 22 pages of technical references.

- **ASR Pilot Project Design Report, Palm Beach County, Florida.** Responsible for the development innovative aquifer, storage and recovery (ASR) well pilot projects in south Florida. Working with partners from the SFWMD and in-house and out of house consultant design engineers, developed the original authorizing report for the project that was approved by the State of Florida and Corps of Engineers HQ. Plan includes installation and testing of multiple, large-capacity (5 MGD) ASR wells completed within the upper Florida Aquifer System. Other key tasks included numerical modeling, UIC permitting, FLDES permitting, and GIS-based site selection/optimization. Numerical modeling efforts included the development and calibration of a MODFLOW and MTDMS model of Palm Beach County, Florida.

- **Lipari Landfill Superfund Site, Pitman, New Jersey.** Project Geotechnical Engineer responsible for the development of a comprehensive hydrogeologic and groundwater quality investigation of offsite areas of the landfill site working with URS and Sevenson Environmental. A complete characterization of the hydrogeology was conducted which included the installation of borings, test pits and monitoring wells, aquifer testing of remedial system, soil classification, regular sampling and analysis of groundwater. Dr. Brown was primarily responsible for the development of the complex, multi-layer, hydrogeologic framework throughout the site as well as developing conceptual remedial designs that led to installation of a sheet pile toe drain remedial system. Dr. Brown also prepared multiple presentations for EPA Region II in support of litigation with various responsible parties at the site.

- **Fort Dix Regional Groundwater Study, Ocean County, New Jersey.** Project manager and geotechnical engineer in charge of development of a regional groundwater model of Fort Dix, McGuire AFB, and Lakehurst Naval Air Engineering Center. Dr. Brown prepared a full three-dimensional hydrogeologic conceptual model of the entire study area covering large portions of Burlington and Ocean Counties New Jersey. The numerical model simulated the entire Coastal Plain Aquifer System including the sole-source PRM Aquifer System. Contaminant transport simulations were completed to determine travel time of various plumes to regulated wellhead protection areas. This model was one of the first groundwater models developed in-house by the Corps of Engineers.

- **8.5 Square Mile Area SEIS, Homestead, Florida.** Geotechnical Engineer of Record for the preparation of a Supplemental Environmental Impact Statement for a proposed flood mitigation project located at the 8.5 Square Mile Area. The 8.5 Square Mile Area is a large mixed residential/commercial community in western Homestead, Florida adjacent to Everglades National Park. It is a component of the Modified Waters to Everglades National Park federal project currently under construction by the U.S. Army Corps of Engineers. Dr. Brown was responsible for overall report preparation for geotechnical and hydrologic appendices for the report. These efforts included pre and post-processing model output, developing flood mitigation scenarios, public meetings, site explorations, hydrogeologic evaluations, evaluation of blasting requirements using seismic refraction data, inter-agency coordination, and assistance to project ecologists in interpreting hydrologic model results. Due to the unique limestone foundation conditions and porous nature of the aquifer, all excavations were planned to be completed “in the wet” in order to avoid infeasible dewatering options. This project has been called one of the lynch pins of Everglades Restoration due to its strategic location in the ecosystem.

- **S-9 Pump Station Design, Broward County, Florida.** Geotechnical Engineer of Record for the planning, design, and construction of the S-9 pump station located in western Broward County, Florida. The structure was a large flood control pump station with a design capacity of 500 cfs. The overall geotechnical design included development and oversight of required site explorations including SPT, rock coring, and lab testing. Due to the unique geology and porous limestone aquifer, the design included provisions for the installation of a steel sheet pile coffer dam and an underwater tremie concrete slab. In addition, grouted rock anchors were specified to be installed through the tremie slab to provide resistance to significant uplift pressures. The overall anchor design was proof tested in the field with no anchor failures observed during construction.
- **Cape Canaveral South Jetty, Brevard County, Florida.** Geotechnical Engineer and project team member for the rehabilitation of the Cape Canaveral inlet south jetty. This large navigation jetty had been damaged due to several large hurricanes and winter storms that resulted in the displacement of existing armor stones. Dr. Brown developed the new design to “overbuild” the jetty section similar to project practice in Europe. The overbuilt section included the installation of new armor stones in excess of 13 tons. The median size of the new armor stones was determined by a full stochastic evaluation of the various design parameters. The stochastic analysis revealed that the previous design could be exceeded 20% of the time during large storms. In addition to the innovative analysis, Dr. Brown’s design saved approximately 1 million dollars originally budgeted for the project.

- **Tranguch Superfund Site, Hazleton, Pennsylvania.** For this project, Dr. Brown acted as the project engineer responsible for the development of a detailed hydrogeologic framework beneath the Tranguch Superfund site in northeastern Pennsylvania. Working with a team of scientists, determined the various contaminant transport pathways in the complicated urban environment. The project was unique due to the presence of an abandoned coal mine beneath the contaminated groundwater plume. This feature greatly complicated the remedial alternatives at the site. Dr. Brown developed preliminary design for horizontal well soil vapor extraction system that provided minimal disturbance of nearby residential properties. The field and design efforts were supplemented with the development of a complex finite-element groundwater model. Dr. Brown developed the overall model geometry and hydrogeology. The various studies were summarized in a publication in GSA proceedings: Brown, Christopher J. and Stevens, Glendon, 1999. “Mind over Mine” in Proceedings of Annual Meeting of the Northeast Section of the Geological Society of America (GSA). King of Prussia, PA.

## Related Publications


Independent External Peer Review Report – Lower Snake River


• Geibel N. & Brown, C.J., (2011). Hydraulic Fracturing of the Floridan Aquifer from Aquifer Storage and Recovery Operation, Engineering and Environmental Geoscience, xx(xx), ii-i9, Accepted for publication.


Independent PEER Review Projects


• Under contract to Battelle, Team member review of the Alton to Gale Levee Rehabilitation Project in St. Louis District 2010.

24 May 2013
Under contract to Battelle, Team member review of the Olmsted Lock and Dam Project in Louisville District 2010.

Under contract to Battelle, Team member review of the Melvin Price Lock and Dam, Wood River Levee Rehabilitation Project in St. Louis District 2011.

**Legal Deposition and Expert Opinion Assistance**

- US Army Corps of Engineers versus Weeks Marine, 1997 – Member of expert panel evaluating dredging “differing site conditions” claim in C&D Canal. Case settled and did not go to trial.
- US EPA versus Rohm & Haas Chemical, 1998 – Expert witness for the Federal Government in Superfund cost recovery action against the primary responsible party at the Lipari Landfill (Offsite) Superfund Site. Case was arbitrated and did not go to trial and Rohm and Haas settled.
- Caddell Construction versus US Army Corps of Engineers, Ongoing – Assist lead geotechnical expert in defining nature of excess bedrock “differing site conditions” at Fort Knox, Kentucky.
- Astaldi Construction versus City of Fort Lauderdale, Trial Finished – Expert witness for Astaldi assisting them with differing site condition claim involving dewatering of a sanitary sewer trunk line in Fort Lauderdale, FL. Assisted lead counsel with preparation of a technical affidavit for Astaldi on May 12, 2008. Testified at trial in 2009.
- Palmetto Health versus Bovis et al., Settled – Assist lead geotechnical expert in defining the nature of flood damage at the Palmetto Hospital complex in Columbia, SC. Project went to settlement in 2009.
- Siemens Communication Inc. versus MONI Holdings LLC – Provide modeling support and evaluation of groundwater conditions at former manufacturing plant in Lake Mary, FL. Testified at trial in October 2008.

**Professional Associations**

- Society of American Military Engineers – Faculty Advisor to student chapter
- American Society of Civil Engineers
- International Association of Environmental Hydrologists
- American Water Resources Association

**Awards**

- “Teacher of the Year” for the NE Florida Chapter of FES in 2011.
- 2011, recipient of the “Bliss Medal” for teaching and mentoring students. The Bliss Medal is a national award from the Society of American Military Engineers (SAME).
- Received performance awards every year with the COE.
- Received the COE Jacksonville District Engineer of the Year in 2002
- Geotechnical Branch Engineer of the Year in 2000
- COE Philadelphia District Engineer of the year in 1998
- Player of the Month in 1999
- Teamwork awards in 1996 and 2004
Elvídio V. Diniz, P.E., D. WRE

Qualifications Summary

- 39 years’ professional experience in hydrology, civil engineering, and water resources for federal, state, local, industrial, and tribal clients. Completed course work for PhD in Civil/Water Resources Engr. Project Manager of record for six large-scale FEMA FIRM mapping studies
- Registered Professional Engineer in New Mexico and Texas for 32 years
- Diplomate, American Academy of Water Resources Engineers, Certificate No. 367
- Extensive experience associated with the six-step planning process, which is governed by ER 1105-2-100. Served as Program Manager for Southwest Valley (Mid. Rio Grande) flood Damage Reduction Study for USACE. PM for Borderland and Highway Diversion Channels H&H Study in El Paso TX for USACE.
- Experience related to the identification and evaluation of structural flood risk management alternatives for projects located in the southwestern U.S. PM for flood plain mapping along Mid. Rio Grande for FEMA. PM for levee and bosque (riparian) improvements along Mid. Rio Grande for City of Albuquerque and Bernalillo, Sandoval and Valencia counties. PM for Southwest Valley (Mid. Rio Grande) flood Damage Reduction Study for USACE.
- Project Manager of record for six large-scale FEMA FIRM mapping studies.
- Instructor for HEC-1 and HEC-2 courses at University of Texas at Austin, and HEC-6 training at New Mexico DOT and U.S. International Boundary and Water Commission
- Instructor, HEC-RAS, HEC-6, HEC-1, HEC-2, USEPA SWMM software packages, Austin and El Paso, TX, and Albuquerque and Santa Fe, NM
- Expert witness in over 25 water-resources-related federal and state court cases.
- Preparation of large-scale regional land use and water planning studies (including water conservation plans).
- Design and construction supervision of stormwater management facilities.
- Thorough understanding of hydraulic, hydrographic and hydrologic principles and practice, derived from many years of water resource analyses, modeling, and construction plan development.
- Served for three years as Flood Plain Management Branch Chief at the Texas Water Development Board.
- Completed over 50 reports for USACE for planning feasibility and construction of water conservation, stream restoration, irrigation and flood control dams, and for safety evaluation of existing dams.
- Adjunct professor at University of New Mexico. Lectured on water resource issues in flood hydrology and hydraulics short courses, University of Texas at Austin; presented at numerous professional conferences.
- Adjunct Faculty, Civil Engineering Department, University of New Mexico, Hydrology and Hydraulics courses
- Instructor, Sediment Sampling Protocols, El Paso, TX
- Instructor, Porous Pavement Analysis and Design, Austin, TX, Southampton, UK, and Singapore
- Instructor, various short courses on Flood Plain Management, Association of State Flood Plain Managers, Albuquerque and Socorro, NM, Phoenix, AZ, and Madison, WI.
- Author of Version 3.0 of the U.S. EPA Storm Water Management Model and the U.S. Bureau of Reclamation's Program BURDAT; and Beta tester for USACE Hydrologic Engineering Center Programs HEC-1, HEC-2, HEC-RAS and HEC-RMA, AMAFCA'S AHYMO, and for U.S. Office of Water Resources Technology Programs SIMYLD-II, RESOP-1, SIM-IV, QUAL 2E, HYD-1, HYDTID and SEDMT.
- Author of Porous Pavement, Phase I, Design and Operational Criteria, EPA 600 2-80 135 for
Municipal Environmental Research Laboratory, USEPA

- Expert, capable and efficient computer modeler in all of the models listed above as well as FLO-2D, MODFLOW, BOSS-DAMBRK, FLDWAV, QUICK-2.0, UNET 2.1, FESWMS, TR-20, TR-55 ILLUDAS, and QUAL-ILLUDAS.


**Education**

- Ph.D., Civil Engineering (course work completed, dissertation pending)—University of Texas at Austin
- M.S., Civil Engineering, University of New Mexico, 1970
- B.S., Civil Engineering, Catholic University of America, 1968

**Certifications and Licenses**

- Professional Engineer, State of New Mexico (No. 7111, 2010)
- Professional Engineer, State of Texas (No. 35485, 2010)

**Summary of Professional Experience**

**Weston Solutions, Inc., Albuquerque, N.M. —Senior Client Service Manager (2009–Present)**


**Key Projects**

- **Southwest Valley Flood Damage Reduction Feasibility Study (FS) and Drainage Facility Design, Albuquerque, NM, Project Manager.** Project Manager for 181-square mile area Drainage Management Plan and drainage facilities design. Conducted hydrologic and hydraulic analysis of detention ponds, drainage channels, storm drains, and culverts. Designed erosion control structures at critical locations, and a new outfall channel to the Rio Grande, with flood control gates at the river levees.

- **Drainage Management Plans and Drainage Facility Design for Pueblo of Isleta, NM, Enterprise Area and Golf Course, Pueblo of Isleta, Project Manager.** Completed Drainage Management Plans for this 6.5-square mile area using AHYMO and HEC-RAS programs. Drainage facilities included three new detention ponds, rehabilitation of three existing detention ponds, diversion channels, storm drains, culverts, and erosion control structures. Resolved dam safety issues on all ponds and coordinated future land use development projects to be initiated after drainage improvements are constructed.

- **Boca Negra Arroyo Drainage Management Plan, Albuquerque, NM, Albuquerque Metropolitan Arroyo Flood Control Authority, Project Manager.** Conducted the Albuquerque Metropolitan Area Flood Control Authority funded hydrologic study of Boca Negra/Mariposa Arroyo drainage basin. Used results to conduct hydraulic analysis and floodplain mapping of existing arroyo, channel, and detention dam system downstream of Petroglyph National Monument resulting in a Drainage Management Plan. Designed naturalistic channels and detention dams to control flood and erosion damage to protect the monument. Coordinated project, including public meetings, with National Park Service (NPS), planning, and environmental groups, and all local government agencies.

- **North Albuquerque Acres/Sandia Heights Drainage Study, Albuquerque, NM, Project Manager.** Conducted extensive hydrologic (AHYMO) modeling, analysis, and evaluation of major arroyos; HEC-RAS-based hydraulic analysis; analyzed potential avulsion locations; calculated sediment transport capacity; designed channel linings, storm drain systems, and new...
crossing structures; and developed erosion control plan. Included street, drainage, and stormwater conveyance design, public meetings, and environmental documentation.

- **Various Conservancy District Projects, Sandoval, Bernalillo, Valencia, and Socorro Counties, NM, Middle Rio Grande Conservancy District, Project Manager.** Conducted several projects in the middle Rio Grande valley including water reclamation projects at San Felipe, Santa Ana, and Isleta Pueblos; design of high groundwater drainage improvements at Pena Blanca and Isleta Pueblo; and development of Bosque Management Plan for the entire valley. Design projects include diversion dams, erosion control, ditch lining, drain rehabilitation, irrigation works, and system operations and maintenance (O&M).


**Texas Department of Community Affairs, Austin, Tex. – Civil Engineer (1974–1975)**


**District of Columbia Department of Water Resources (1967–1969)**

**LITIGATION AND EXPERT WITNESS EXPERIENCE**

**Federal and State Courts**

**U.S. Court of Federal Claims**
- Isleta Pueblo Surface and Groundwater Drainage Mismanagement Claims – for Sonosky, Chambers, Sachse, Endreson, & Mielke, P.C.

**U.S. District Court for New Mexico**
- Isleta Dam Trespass Claim, Isleta Reservation, NM – for Sonosky, Chambers, Sachse, Endreson, & Mielke, P.C.
- Bank Erosion at Elephant Butte Reservoir, Sierra County, NM – for U.S. Attorney Office
- Church Drainage Ponds and Groundwater Problems, Sandoval County, NM – for Bennie Lovato et.al.
- Quemado Dam Spillway Slope Erosion, Catron County, NM – for U.S. Attorney Office
- La Puente Dam Failure and Acequia Erosion Damage, Rio Arriba County, NM – for U.S. Attorney Office
- Soda Dam Erosion/Sedimentation, Sandoval County, NM – for U.S. Attorney Office
- Ambrosio Chavez Ditch Operation, Lincoln County, NM – for U.S. Attorney Office

**U.S. District Court for Arizona**
- Hydraulic, Erosion, and Sediment Yield/Transport for Santa Cruz River, Maricopa and Pinal counties, AZ – for Jones, Skelton, & Hochuli, PLC

**U.S. District Court for the Central District of California**
- Hydrology and Hydraulics Modeling for Orcutt Creek and Wetlands Preservation, Santa Barbara County, CA – for Adam Brothers Farming, Inc. et al.

**U.S. District Court for Harris County, Texas**
- Brickhouse Gully Flooding, Harris County, TX – for WAUSAU Insurance Company
- Turkey Creek Flooding, Harris County, TX – for Dannenbaum Engineering Corporation

**New Mexico District Courts**
- Loma Larga Road Flooding, Corrales, NM – for Modrall Sperling Roehl Harris & Sisk, P.A.
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- Nogal Canyon Erosion, Sediment Transport, Levee Failure and Flooding, Socorro County, NM – for Riley & Shane, P.A.
- Brook Apartments Flooding, Albuquerque, NM – for Stacey A. Johnson, P.A.
- The Beach Water Park Flooding and Erosion Damage, Albuquerque, NM – for Robert Montgomery and Charles Aspinwall
- Melrose Bombing Range, Ground Water Quantity and Quality, Roosevelt County, NM – for Cannon Air Force Base
- Christine Street, House Flooding and Erosion Problem, Rio Rancho, NM – for James A. Chavez, P.C.
- Water Supply for Estancia Basin Subdivision, Torrance County, NM – for Messina, Madrid & Maynez, P.A.
- Four Hills Country Club Flooding, Albuquerque, NM – for Hatch Beitler Allen & Shepherd, P.A.

**Texas District Courts**
- Flooding Problems in Franklin Hills Subdivision, El Paso, TX – for Gordon Mott & Davis P.C.

**Federal Agencies**

**International Boundary and Water Commission**
- Water allocations between Texas and Mexico in Amistad and Falcon Reservoirs

**Rio Grande Compact Commission (Texas)**
- Water allocations between Texas and New Mexico in West Texas

**U.S. Environmental Protection Agency**
- National Urban Runoff Program (NURP) – for Municipal Environmental Research Laboratory

**Federal Emergency Management Agency**
- Flood Insurance Mapping Criteria – El Paso and Fort Bend Counties, Texas

**U.S. Bureau of Reclamation**
- U.S. Study Commission – Texas

**U.S. Natural Resources Conservation Service**
- Flood damage assessments at New Braunfels and Seguin, Texas – Award of Recognition from Governor of Texas

**New Mexico State Agencies**

**New Mexico State Engineer Office**
- Rio San Jose water rights adjudication – surface water/civil engineering expert
- Rio Jemez water rights adjudication – water resources expert
- Water rights permit applications, declarations and transfers – Los Lunas Schools, Philmont Scout Ranch, Belen Consolidated Schools, private interests

**New Mexico Environment Department**
- Total Maximum Daily Load (TMDL) Allocations for Jemez River Basin
- Wastewater discharge permits
- Ground water contamination hearings

**Middle Rio Grande Conservancy District**
- Irrigation system operations

**Albuquerque Metropolitan Arroyo Flood Control Authority**
- Floodplain, erosion and sediment control enforcement
- Drainage and erosion control criteria development

**Other State Agencies – Testimony on Local Issues**
- Texas Water Development Board
- Texas Water Commission
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- Arizona Department of Water Resources
- Illinois Environmental Protection Agency
- Illinois State Water Survey
- Washington Suburban Sanitary Commission
- District of Columbia Department of Water Resources
- Harris County Flood Control District, Texas
- Lower Colorado River Authority, Texas
- Brazos River Authority, Texas
- Trinity River Authority, Texas
- Nueces River Authority, Texas

Publications and Presentations.

- Diniz, E.V. 2011. “Green Infrastructure at the Site Scale.” National Green Infrastructure Conference, Shepherdstown, WV.
- Diniz, E.V. 1998. “FEMA Concerns in Flood Plain Mapping with Sedimentation in Flood Control Basins.” New Mexico Flood Plain Managers Association, Fall Workshop, Albuquerque, NM.
Diniz, E.V. 1995. “When is a Diversion Dike a Dam?” American Society of Civil Engineers, New Mexico-Texas Joint Section Meeting, El Paso, TX.

Diniz, E.V. 1994. “Regional Water Planning for New Mexico.” American Society of Agricultural Engineers Annual Meeting, Socorro, NM.


Diniz, E.V. 1987. “Flood Potential on Urbanized Alluvial Fans as a Result of Dam Breaks.” Fourteenth Annual Conference, Water Resources Planning and Management Division, American Society of Civil Engineers, Kansas City, MO.


Diniz, E.V. 1981. “Comparison Between Soft and Hard Lined Channels.” American Society of Civil Engineers, Las Cruces, NM.


• Diniz, E.V. 1979. “Modeling of Non-Point Pollution Generated by Storm Water Runoff.” American Society of Civil Engineers, Santa Fe, NM.


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Professional Associations

- American Society of Civil Engineers: Life Member, Past President – New Mexico Section; National Committee on Urban Erosion and Sediment Control, Past-Chairman; National Urban Water Resources Committee, Past-Member; New Mexico Section, Past-Water Resources Director
- New Mexico Floodplain Managers’ Association, Technical Committee Chairman, Past-Vice Chair
- American Water Resources Association – New Mexico Section, Past-President
- Association of State Flood Plain Managers
- Association of State Dam Safety Officials
- International Erosion Control Association
Qualifications Summary

- 20+ years experience as a biologist and environmental scientist.
- Research experience with many aspects of aquatic and riparian habitats, including water and sediment characterization (toxicity, biotic community, chemistry), and the effects of adjacent land use on in-stream conditions.
- Experience with NEPA impact and cumulative affects assessments on projects with high public and interagency interest within sensitive aquatic habitats, including wetlands and riparian systems.
- Extensive experience developing and evaluating USACE permits applications and related documents. Experienced with the complex regulatory framework affecting projects that potentially impact aquatic habitat (NEPA, ESA, CWA, etc.).
- Habitat restoration featuring beneficial uses of dredge material to restore estuarine marsh and sea grass beds, coupled to coastal marsh preservation. Also habitat restoration in mixed urban/industrial riparian areas where there were potential toxicant/exposure concerns contrasted with significant cultural and environmental benefits including community education and recreation opportunities, and ecosystem enhancement.
- Board member of the Texas Association of Environmental Professionals (TAEP): President of the Board (2010- present) and Education Director (2008- present).
- Board Member of the South Central Regional Chapter of the Society of Environmental Toxicology and Chemistry (SETAC) since 2010: Vice-President (2012-13).
- Galveston Bay Council: current member of the Monitoring and Research Subcommittee of the TCEQ Galveston Bay Estuary Program.
- Board Member of the Galveston Bay Foundation: Advisor on the Land Committee (Conservation Holdings) and the Permit Review Committee (2009- present).

Education

- M.S., Environmental Science, University of Houston Clear Lake
- M.S., Environmental Management, University of Houston Clear Lake
- B.A., Life Sciences, Concordia University Portland

Certifications and Licenses

- Completed: GIS Techniques in Environmental Assessment. SETAC short course conducted by the University of North Texas, 2011.
- Completed: Application of Adaptive Management to Address Climate Change Related Challenges. Restore America’s Estuaries (RAE) Special Program conducted by the NOAA Coastal Service Center and the PBS&J
Ecosystem Restoration Division, 2010.

- Completed: Benthic Mapping Techniques aboard the Alletta Morris. Benthic mapping techniques including sidescan sonar, underwater video, sediment profile cameras, and soil cores. RAE Special Program conducted by the EPA, USDA-NRCS, and the University of Rhode Island, 2008.
- Completed: Sampling Benthic Sediments: Methods, Analyses, and Judgments. SETAC short course conducted by the University of North Texas Institute of Applied Sciences, 2006.
- Completed: Conserving Land with Conservation Easements short course, a program of the National Land Trust Alliance’s 2006 Land Conservation Leadership Program.

**Summary of Professional Experience**

**Academia**

**Lee College, Environmental Science and Biology—Faculty**

- Faculty and lead instructor of environmental science in the Mathematics, Engineering, and Science Division at Lee College. Ongoing research in ecotoxicology and ecosystem function in aquatic estuarine communities, the results of which have been featured through organizations including Restore America’s Estuaries (RAE) and the Society of Environmental Toxicology and Chemistry (SETAC). Current grant funded projects include “A functional assessment of created/restored coastal marsh” examining biotic and abiotic elements of estuarine ecosystems (NOAA/TCMP), and “Project TES: Teaching Environmental Sciences”, providing funding for equipment (including GC Mass Spec) and materials aimed at developing curricula and skills for education majors interested in teaching in the sciences (US Dept. of Ed.).
- Editor and contributor to Laboratory and Field Exercises in Environmental Science (Lehmberg, 2010).
- Chair, Faculty Screening (Hiring) Committee for Environmental Science/Biology (2012).
- Member on the Professional Development Committee (a subcommittee of the Lee College Faculty Assembly).
- Member of the Faculty Learning Community of Lee College, working to develop improved teaching methods for critical thinking.
- Chair, Faculty Screening (Hiring) Committee for Environmental Science/Biology (2012).
- Member, Screening (Hiring) Committee for the HIS STEM Grant Data Analyst position (2012)
- 2010: Session Chair at the Restore America’s Estuaries Conference (Galveston, TX) session titled “Opportunities, Challenges, and Lessons Learned with the Use of Dredged Materials”.
- 2009: Session Chair at the Galveston Bay Estuary Program’s Ninth Biennial State of the Bay Symposium (Galveston, TX) session titled “The Science of Estuarine Wetlands”.
- 2007-2008: Member of the Technical Advisory Committee of the Chambers County (TX) Greenprint Project of the Trust for Public Land.

**Grant Funding Acquired**

- 2012 Lee College HSI Stem Faculty Mini-grant. $9K to fund a student research project investigating aquatic habitat restoration on private land in cooperation with the Galveston Bay Foundation. Funding four student researchers. The results are proposed for presentation at the 2012 Restore America’s Estuaries Conference, Tampa, FL.
- 2011 NOAA/Texas General Land Office (GLO) Coastal Management Program (CMP) grant awarded in partnership with Lee College and the University of Houston Clear Lake. $79K to fund research titled “Science-based Monitoring of Created Wetlands and Restored Habitat within the Galveston Bay System.” Project to commence November 2012.
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- 2011 US Department of Education Hispanic Serving Institution (HSI) STEM grant awarded to Lee College, including the $162K subcomponent “Project TES: Teacher Education Science”, providing funding for equipment (including GC Mass Spec) and materials aimed at developing curricula and skills for education majors interested in teaching in the sciences.

**Project Management, Research, and Field Experience**

**Center for Sustainability: Noblis, Inc. — SubContractor**

- NEPA and biologist panel member for the following Independent External Panel Reviews:
  - USACE Missouri River Recovery Program (MRRP) National Environmental Policy Act Project

**HB EcoGIS: Environmental Consulting and GIS Services — Vice President**

- 2012: Assisting with all aspects of start-up and operational development of small environmental consulting and services firm.
  - Environmental consultant specializing in aquatic habitats, assisting clients with project needs related to USACE (Sec. 404/10) permitting, NEPA compliance, habitat assessment and wetland delineation, impact and risk assessment, and project design/implementation/management.

**The Galveston Bay Foundation — Environmental Scientist**

- Land Programs Manager, working as an environmental scientist and regulatory specialist, focusing on wetlands and other aquatic habitats. Experienced team member on numerous aquatic habitat restoration projects aiding in project design, funding development, safety and toxicity issues, and habitat quality/needs. Projects included numerous aquatic habitat (stream/river, estuarine wetland) restoration projects, stream bank erosion protection, and stream/estuarine aquatic habitat assessments, including lifecycle and habitat needs. Extensive experience developing and evaluating U.S. Army Corps of Engineers permits applications and related documents for the Galveston Bay Foundation. Experienced with the complex regulatory framework affecting projects that potentially impact coastal habitat (NEPA, ESA, CWA, etc.).
  - Worked in the area of habitat conservation, overseeing the Foundation’s Land Conservation program managing more than 2,500 acres of protected coastal habitat (terrestrial and aquatic). Included conservation easements, fee-simple acquisition, and development of habitat assessments, project cost models, and easement contracts. The management focus of these holdings to protect and enhance important, complex habitats for biologic communities at all trophic levels, including threatened and endangered species.
  - Habitat restoration experience at all phases, including project development, permit acquisition, fundraising/grant development, and project implementation. Projects include:
    - Emergent estuarine marsh and seagrass habitat beneficially using dredge material from onsite, coupled to preservation (conservation easement) of associated coastal high marsh and prairie (buffer) habitat in west Galveston Bay and Galveston Island.
    - Emergent estuarine and palustrine marsh within riparian corridors of lower Galveston Bay.
    - Estuarine marsh and correction of erosional losses of shoreline in high wave energy areas of east Galveston Bay.
    - Subsided marsh within mixed urban/industrial areas of upper Galveston Bay and the San Jacinto River where potential toxicant/exposure concerns contrasted with significant cultural and environmental benefits including community education and recreation opportunities, and ecosystem enhancement.
  - Project manager for a number of federal grant funded habitat research and educational projects at all phases. This includes fund raising, project design and implementation, reporting, and public outreach. Example projects include:
    - “Science Based Monitoring of Created Wetlands and Restored Habitat within the Galveston Bay System”, a joint project in partnership with the University of Houston Clear Lake. This research focused on the functional aspects (biotic community, sediment, and water quality) of multiple wetland habitat restoration
sites, generating data regarding the vegetation and faunal uses of created marshes relative to natural ones. The research was framed along the recommendations from “Science-based Restoration Monitoring of Coastal Habitats (NOAA Coastal Ocean Program, Decision Analysis Series No. 23, Volumes 1 and 2). Funding partners included NOAA, the Texas General Land Office Texas (GLO) Coastal Management Program (CMP), and the Galveston Bay Estuary Program (GBEP). Data was collected according to the Quality Assurance Program Plan (QAPP) prepared by Jim Dobberstine and Cynthia Howard to meet EPA and TCEQ requirements for scientific data. Data collected is anticipated to aid habitat restoration managers with the design and implementation of future projects in the lower Galveston Bay watershed.

- “Discover Galveston Bay Interpretive Sign Project”: Two-tier grant funded project placing educational signs on the natural history specific to 40 locations around the Galveston Bay watershed in cooperation with multiple private and public agency partners. Funded by NOAA and the Texas GLO CMP.

- Project manager for a number of successful projects linking science to policy, including:
  - The Galveston Bay Foundation’s Wetland Permit Review Program working proactively with citizens, local business, and federal, state and regional policy makers to affect positive change to both individual actions and the underlying policies affecting the Galveston Bay watershed. Coordinated with federal, state, and local agencies to review project proposals within the lower Galveston Bay watershed, providing comments on impacts, alternatives analysis, mitigation requirements, and project design, aimed at reducing any given project’s adverse impacts to Galveston Bay. Also conducted rulemaking reviews and comment development, and worked to establish clear links between the relevant science and policy affecting aquatic habitat management within the bay system.
  - The federally funded (USFWS) Living Shorelines programs, assisting local landowners with permitting, fundraising, and project implementation for shoreline restoration and alternative shoreline stabilization on private lands within the bay system to correct habitat losses due to erosion and subsidence.
  - GBF representative on citizen advisory panels (CAPs) facilitating communication between local petrochemical industry and neighboring communities, including the Bay Area Citizens Advisory Panel (Baycap) and the Seashore Area Citizens Advisory Panel (Seacap).
  - 2005: Public Participation and Education Plenary Session moderator at the GBEP “State of the Bay” Symposium, January 25th, Houston TX.

Grant Funding Acquired
- 2007 NOAA/Texas GLO Coastal Impact Assistance Program (CIAP) grant award to the Galveston Bay Foundation. $71K to fund the GBF Living Shorelines Program.
- 2007 Galveston Bay Estuary Program grant awarded to the University of Houston Clear Lake in partnership with the Galveston Bay Foundation. $10K to supplement the NOAA/Texas GLO Coastal Management Program (CMP) grant for “Science-based Monitoring of Created Wetlands and Restored Habitat within the Galveston Bay System.”
- 2006 US Fish and Wildlife Service Coastal Program grant to the Galveston Bay Foundation. $30K to fund the Living Shorelines Program.
- 2006 Fish America Foundation/NOAA Restoration Center grant to the Galveston Bay Foundation. $50K to fund a portion of the coastal habitat restoration at Snake Island Cove.
- 2006 NOAA/Texas GLO CMP grant awarded to the University of Houston Clear Lake in partnership with the Galveston Bay Foundation. $42K to fund a portion of a research project titled “Science-based Monitoring of Created Wetlands and Restored Habitat within the Galveston Bay System.” Project to complete Summer 2008.
- 2006 NOAA/Texas GLO CMP grant awarded to the Galveston Bay Foundation. $33K to fund the Drive and Discover Galveston Bay Interpretive Sign Project (Phase 2).

The Houston Advanced Research Center (HARC)—Contract Consultant
- Assisted information management, technical communications, and stakeholder facilitation related to the Galveston Bay Freshwater Inflows Group, a program of the Galveston Bay Estuary Program. Required extensive knowledge of stream and estuarine ecology, water quality, and research methods.

The University of Houston Clear Lake (UHCL)—Graduate Research Assistant
- Research assistant to Dr. Cindy Howard, working on estuarine habitat assessments (water, sediment, benthic
community), sediment toxicity (internship completed with the PBS&J Environmental Toxicology Laboratory, Houston under Dr. Jim Horne), and sediment contaminants (heavy metals, organics).

**Public zoo and aquarium field—Senior Biologist, Aquatic Habitat Specialist**

- Extensive experience working with aquatic organisms, water quality, and aquatic habitats with organisms including fish, birds, and marine mammals.

## Related Publications


- 2008: Platform presentation at the 4th National Restore America’s Estuaries Conference (Providence, RI) on ongoing research titled “Comparing salt marsh ecosystem responses to different restoration techniques”. Also presented at the 2009 Texas Coastal Conference hosted by the Texas General Land Office (Galveston, TX).


- 2007: Co-author of a research poster presented at the Eighth Biennial State of the Bay Symposium (Galveston, TX) titled “Identifying suitable reference sites for impacted sites along the Houston Ship Channel” (J. Dobberstine, J. Horne, L. Brzuzy, C. Howard). Full paper in the conference proceedings, viewable at [http://gbic.tamug.edu/gebepubs/sobviii/sobviii_rpr.htm#Dobberstine](http://gbic.tamug.edu/gebepubs/sobviii/sobviii_rpr.htm#Dobberstine). This work was also presented as a platform at the 2006 Society of Environmental Toxicology and Chemistry National Conference (Montreal, Canada) and at the American Association for the Advancement of Science (AAAS) Southwestern and Rocky Mountain Division Annual Meeting (Clear Lake, TX), April 2007, where it was awarded “Honorable Mention” for outstanding student paper presentation.


- 2007: Presenter at the Texas Association of Environmental Professionals Environmental Challenges and Innovations Conference; presented a platform titled “Public Comments and the role of an NGO in the NEPA process; an overview of the Galveston Bay Foundation’s volunteer Permit Review Committee.” Also presented at the Society for Wetland Scientists annual conference in June 2007.


- 2006: Round Table presenter and panelist at the Texas A&M University Chapter of Sigma Xi’s Spring Symposium (College Station, TX) on “Sea-level rise, hurricanes, and the future of our coasts”.


- 2005: Co-author of a platform presentation, “PAHs Environmental Overview: Occurrence in Houston Area
Sediments” (I. Rhodes, J. Dobberstine, L. Brzuzy), presented at the SETAC SW Regional Meeting (Marble Falls, TX).


Research manuscripts in progress:
- “An Assessment of Restored Wetlands in the Lower Galveston Bay Watershed”. Co-Author: Cynthia L. Howard, University of Houston Clear Lake.

Professional Associations

- Texas Association of Environmental Professionals (TAEP): Board member since 2008.
  - President (2010-present)
  - Education Director (2008-present; oversees the association’s Chuck Glore Memorial Scholarship program, which awards $1000 scholarships to environmental science and engineering students at several southeast Texas universities)
  - http://taep.org/
- South Central Regional Chapter of the Society of Environmental Toxicology and Chemistry (SETAC):
  - Board Member (2010 to present)
  - Vice-President (2012-13)
  - http://www.setac.org/socentral/
- The Galveston Bay Foundation:
  - Board member 2009-present
  - Delegate Trustee representing TAEP
  - Advisor for the Land Committee working with conservation land holdings
  - Advisor for the Wetland Permit Review Committee reviewing regulatory notices and advising on actions
  - http://www.galvbay.org/
- Galveston Bay Council (Galveston Bay Estuary Program):
  - Vice-Chair of the Public Participation and Education Subcommittee (2003-2006)
  - Member of the Monitoring and Research Subcommittee (2007-present)
  - Member of the Council on Undergraduate Research (2010 to present)

Awards

- 2009 Phi Theta Kappa “Certificate of Appreciation” in recognition of valuable contributions to the 2009 student inductees.
- 2007 “Honorable Mention” for outstanding student paper presentation. “Identifying suitable reference sites for impacted sites along the Houston Ship Channel” at the American Association for the Advancement of Science (AAAS) Southwestern and Rocky Mountain Division Annual Meeting (Clear Lake, TX).
- 2004 Student Scholarship to attend the SETAC 4th World Congress, Portland OR to present a research poster titled “Is there a Suitable Reference Site for Impacted Sites along the Houston Ship Channel?”
- 2002 student scholarship for the “State of the Bay” symposium from the Texas Commission on Environmental Quality Galveston Bay and Estuary Program.
Jennifer Johnson, JD

Qualifications Summary

- Jennifer Johnson is a principal with over 12 years’ experience
- Offering a unique blend of consulting experience and formal legal training.
- Specializes in providing ecological, land use, permitting, and planning support to multidisciplinary development projects and commercial enterprises.
- Has developed numerous regulatory compliance documents to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).
- Understands the myriad regulatory requirements and processes required for large-scale projects with regulatory agencies such as the Bureau of Land Management (BLM), California Public Utilities Commission (CPUC), U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USFWS), National Oceanic Atmospheric Association/National Marine Fisheries Service (NOAA/NMFS), California Department of Fish and Game (CDFG), Regional Water Quality Control Board (RWQCB), California Coastal Commission (CCC), California State Land Commission (CSLC), and the San Francisco Bay Conservation and Development Commission (BCDC).

Education

- JD, Environmental Law – Vermont Law School
- BS, Environmental Policy – Juniata College

Summary of Professional Experience

Dudek—Principal

PROJECT EXPERIENCE

Water/Wastewater

- Los Vaqueros Reservoir Expansion Project EIS/EIR, Contra Costa Water District, Contra Costa County, California. Ms. Johnson was the deputy project manager for this project. Through her 9 years on this project, Jennifer had many roles, including coordinating the facilities siting exercise as part of the larger alternatives development and screening effort, which entailed investigating multiple water supply sources, diversion point/intake locations, conveyance corridors, reservoir sizing, and distribution options; developing the project description, aesthetics, and recreation sections for the environmental document; and managing the preparation of the biological and cultural resources sections. She also oversaw the regulatory compliance component of this project, primarily focusing on staff and agency coordination in regards to the federal and state Endangered Species Acts compliance and Section 404(b)(1) Alternative Analysis for impacts to wetlands, which provided a broad-ranging review of storage alternatives considered through the Integrated Storage Investigation as well as conceptual alternatives related to project objectives.

- Fairfield-Suisun Sewer District Master Plan EIR and Construction Monitoring Services, Fairfield-Suisun Sewer District, Fairfield, California. Ms. Johnson oversaw the construction monitoring services provided during the construction of the master plan project. During the CEQA phase, Ms. Johnson managed day-to-day activities and provided both technical and regulatory expertise. For the EIR, she wrote the executive summary, project description, alternatives, and cumulative analyses. Additionally, Ms. Johnson coordinated and attained project permits from the Reclamation Board and the City of Fairfield. The district proposed to implement near-term Master Plan collection system, treatment plant, and discharge facility improvements in the 2005–2009 timeframe and to plan implementation for program improvements to meet ultimate demand.

The near-term projects from the Master Plan consist of improvements and modification to the collection system including one pipeline project, two pump station expansions, and the relocation of one pump station to meet near-term capacity needs. Near-term projects in the Master Plan also include primary and secondary treatment expansions at the wastewater treatment plant and the installation of a new outfall to increase discharge capacity.
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and reliability. All components of the project are constructed and are in operation.

- **Pajaro Valley Water Management Agency (PVWMA) Basin Management Plan 2000 EIR/EIS, PVWMA, Watsonville, California.** Ms. Johnson managed the permitting effort for PVWMA’s Import Pipeline and Coastal Distribution System Project. Permits included Streambed Alteration Agreements from CDFG and coastal development permits from Monterey and Santa Cruz Counties as well as the CCC. The project is constructed and in operation.

**Energy**

- **Rio Mesa Solar Electric Generation Facility Plan Amendment (PA)/ Environmental Impact Statement (EIS), BLM and BrightSource Energy, Inc., Riverside County, California.** Ms. Johnson managed the preparation of an EIS under NEPA for two 250-megawatt (MW) (nominal) solar concentration thermal power plants situated on the Palo Verde Mesa in Riverside County, California, 13 miles southwest of Blythe near the California–Arizona border. Both plants would be situated solely on private land leased from the Metropolitan Water District of Southern California. Only the project gen-tie line, telecommunication line, electrical power line, and access road would be located on public land managed by the Bureau of Land Management. Key issues included biological resources, cultural resources, water resources (ground and surface), and aesthetics. In January 2013, the Applicant suspended the application. The Administrative Draft EIS, which had been prepared in 12 weeks, was being reviewed by the BLM at this time.

- **McCoy Solar Energy Project PA/EIR/EIS, BLM and NextEra Energy Resources LLC, Riverside County, California.** Ms. Johnson managed the preparation of a joint EIS/EIR under NEPA and CEQA for an up-to 750-megawatt (MW) photovoltaic (PV) solar power plant and related infrastructure within an approximately 7,700-acre right-of-way (ROW) near the California–Arizona border. Due to a lawsuit in Riverside County, the environmental review process was bifurcated. Key issues included biological resources, cultural resources, water resources (ground and surface), and aesthetics. The Draft EIS was issued for agency and public review on May 25, 2012.

- **First Solar Desert Sunlight Solar Farm Project Support Services and PA/Final EIS, BLM, Riverside County, California.** As project manager/director, Ms. Johnson acted as extension of BLM staff facilitating the permitting process for the project, which included a PA and ROW permit. For the PA/Final EIS, Ms. Johnson provided technical assistance and strategic guidance for the preparation of the environmental document as well as the CEQA Findings of Fact. This project will be a solar PV energy-generating facility with a total capacity of 550 MW. The project site is located on federal lands managed by the BLM and located approximately 6 miles north of the community of Desert Center, in Riverside County, California. Key issues associated with this project were biological resources, cultural and paleontological resources, and hydrology. Secretary of the Interior Ken Salazar approved the Record of Decision (ROD) for the project on August 9, 2011, with a ROW grant approved on August 11, 2011. Construction of the project began in September 2011 and the facility is expected to be fully operational by 2015.

- **Genesis Solar Energy Project Support Services and PA/Final EIS, BLM and NextEra Energy Resources LLC, Riverside County, California.** As project manager/director, Ms. Johnson acted as extension of BLM staff to facilitate the permitting process for the project, which included a PA and ROW permit. For the PA/Final EIS, Ms. Johnson provided technical assistance and strategic guidance. The project would construct, operate, maintain, and ultimately decommission a 500 MW (utility-scale) concentrated solar thermal electric generating facility that would use solar parabolic trough technology to generate electricity. The project site is located primarily on BLM-administered public land in the California inland desert in Riverside County. Key issues included biological resources, cultural resources, water resources (ground and surface), and aesthetics. The Final EIS and ROD were completed in May and July 2011, respectively. The developer has since gone bankrupt and the site was recently acquired by BrightSource.

- **Blythe Solar Power Project Support and PA/Final EIS, BLM and Solar Millennium LLC, Riverside County, California.** As project manager/director, Ms. Johnson acted as extension of BLM staff to facilitate the permitting process for the project, which included a PA and ROW permit. For the PA/Final EIS, Ms. Johnson provided technical assistance and strategic guidance. The project would construct, operate, maintain, and ultimately decommission a 500 MW (utility-scale) concentrated solar thermal electric generating facility that would use solar parabolic trough technology to generate electricity. The project site is located primarily on BLM-administered public land in the California inland desert in Riverside County. Key issues included biological resources, cultural resources, water resources (ground and surface), and aesthetics. The Final EIS and ROD were completed in May and July 2011, respectively. The developer has since gone bankrupt and the site was recently acquired by BrightSource.

24 May 2013
As project manager/director, Ms. Johnson acted as an extension of BLM staff to facilitate the permitting process for the project, which included a PA and ROW permit. For the PA/Final EIS, Ms. Johnson managed the preparation of the document. When approved in 2010, the project was the world’s largest concentrated solar power plant: one with the nominal capacity to generate a gigawatt (1,000 MW) of power using solar parabolic trough technology.

It more than doubled the nation’s then-existing solar output. Key environmental issues included potential impacts to desert tortoise (Gopherus agassizii) and other biological resources, cultural resources, water resources (ground and surface), and visual resources. Secretary of the Interior Ken Salazar approved the ROD for the project on October 25, 2010, with the ROW grant being issued on November 11, 2010. The developer has since gone bankrupt and the site was recently acquired by NextEra Energy Resources.

- **Rice Solar Energy Project Support, BLM and Rice Solar Energy LLC, Riverside County, California.** Ms. Johnson acted as extension of BLM staff to facilitate the permitting process for the project. The BLM was a cooperating agency with the Western Power Authority being the lead agency for NEPA purposes. The BLM authorized two ROW grants for the proposed construction, operation, maintenance, and termination of a 161/230 kilovolt (kV) gen-tie, access road, and substation on BLM-administered lands in an undeveloped area of the Sonoran Desert in eastern Riverside County. It also would approve a California Desert Conservation Area Plan amendment made necessary by the approval of the ROW grants for these activities. Secretary of the Interior Ken Salazar approved the ROD for the project on December 8, 2011, with a ROW grant issued on April 13, 2012.

- **Pacific Gas and Electric Company (PG&E) California Clean Energy Transmission (C3ET) Project EIS/EIR; CPUC; Kern, Tulare, Kings, Fresno, and Madera Counties, California.** Ms. Johnson managed a team of technical specialists to assist the CPUC in completing the CEQA/NEPA review for the C3ET project, which is a controversial electric transmission line project proposed by PG&E. Activities were limited to pre-application review and coordination as the project was put on hold due to California Independent System Operator (CAISO) studies. The study area for the project and preliminary alternative routes includes Kern, Tulare, Kings, Fresno, and Madera Counties.

### Professional Associations

- Member of the State Bar of California
Appendix C – Charge for IEPR Panel

The general charge questions provided by the USACE to support the IEPR for the Lower Snake River Draft PSMP/EIS are listed below. Additional charge questions may be added subject to USACE concurrence. This charge is provided to the panel to guide its review.

OBJECTIVES


Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, the validity of the research design, the quality of data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product.

This IEPR will analyze the adequacy and acceptability of economic and engineering methods, models, data and analyses employed, and environmental compliance. The independent review will be limited to technical review and will not involve policy review. The peer review will be conducted by subject matter experts with extensive experience in environmental compliance, fisheries biology, sediment engineering, and risk and reliability as specifically related to sediment management in inland navigation, and preparation of programmatic NEPA documents. The subject matter experts will be “charged” with responding to specific technical questions as well as providing a technical evaluation of the overall project.

The subject matter experts (i.e., peer review panel members) will identify, recommend, and comment upon assumptions that underlie the analyses and evaluate the soundness of models, methods, and assumptions. The panel members will evaluate whether the interpretations of analyses and conclusions are technically sound and reasonable, provide effective review in terms of both usefulness of results and of credibility, and have the flexibility to bring important issues to the attention of decision makers. The panel members may offer opinions as to whether there are sufficient technical analyses upon which to base the ability to implement the project. The panel members will address factual inputs, data, and the use of economics and cost engineering models, analyses, assumptions, and other scientific and engineering tools/methodologies to inform decision-making.

DOCUMENTS PROVIDED

The following is a list of documents and reference materials that will be provided for the review. **The documents and files presented in bold font are those which are to be reviewed.** Although these draft documents may be changing during the course of the IEPR to address public comments, IEPR panel will be required to only review the draft document released to the public in December 2012. Changes to the document will not be part of the IEPR effort. All other documents are provided for reference.
- Lower Snake River Programmatic Sedimentation Management Plan and Draft Environmental Impact Statement
  - Draft EIS (392 Pages)
  - Appendices A-E (394 Pages)
  - Appendix F, Hydrology (604 Pages)
  - Appendices G-L. (243 Pages)


**CHARGE FOR PEER REVIEW**

Members of this peer review panel are asked to determine whether the technical approach and scientific rationale presented in the Lower Snake River Programmatic Sedimentation Management Plan and Draft Environmental Impact Statement are credible and whether the conclusions are valid. The reviewers are asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The panel is being asked to provide feedback on the environmental and engineering analyses. The reviewers are not being asked whether they would have conducted the work in a similar manner.

**GENERAL CHARGE GUIDANCE**

Please answer the scientific and technical questions listed below and conduct a broad overview of the Lower Snake River Programmatic Sedimentation Management Plan and Draft Environmental Impact Statement. Please focus on your areas of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the panel will be asked to provide an overall statement related to 1 and 2 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Assess the adequacy and acceptability of the environmental and engineering methods, models, and analysis used.
2. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation for construction, authorization, or funding.
3. Evaluate whether the interpretations of analysis and conclusions are reasonable.
4. Please focus the review on scientific information, including factual inputs, data, the use and soundness of models, analyses, assumptions, and other scientific and engineering matters that inform decision makers.
5. Please do not make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also please do not comment on or make recommendations on policy issues and decision making.
6. If desired, panel members can contact one other. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review.

7. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

**GENERAL QUESTIONS**

1. Are the assumptions that underlie the environmental and engineering analyses sound?
2. Please comment on the adequacy and acceptability of the models and analyses used, as well as any assumptions made.
3. Are the interpretations of analysis and conclusions based on the analysis reasonable?
4. Please comment on the adequacy of the document as a programmatic EIS.
**Conflicts of Interest Questionnaire**

[Independent External Peer Review]

[Lower Snake River EIS]

The purpose of this document is to help the U.S. Army Corps of Engineers identify potential organizational conflicts of interest on a task order basis as early in the acquisition process as possible. Complete the questionnaire with background information and fully disclose relevant potential conflicts of interest. Substantial details are not necessary; USACE will examine additional information if appropriate. Affirmative answers will not disqualify your firm from this or future procurements.

NAME OF FIRM: Noblis

REPRESENTATIVE'S NAME: Ahmad Faramarzi

TELEPHONE: 703-610-2137

ADDRESS: 3150 Fairview Park Drive South, Falls Church, VA 22042

EMAIL ADDRESS: ahmad.faramarzi@noblis.org

I. INDEPENDENCE FROM WORK PRODUCT. Has your firm been involved in any aspect of the preparation of the subject study report and associated analyses (field studies, report writing, supporting research etc.)? (No) Yes (if yes, briefly describe):

II. INTEREST IN STUDY AREA OR OUTCOME. Does your firm have any interests or holdings in the study area, or any stake in the outcome or recommendations of the study, or any affiliation with the local sponsor? (No) Yes (if yes, briefly describe):

III. REVIEWERS. Do you anticipate that all expert reviewers on this task order will be selected from outside your firm? No (Yes) (if no, briefly describe the difficulty in identifying outside reviewers):

IV. AFFILIATION WITH PARTIES THAT MAY BE INVOLVED WITH PROJECT IMPLEMENTATION. Do you anticipate that your firm will have any association with parties that may be involved with or benefit from future activities associated with this study, such as project construction? (No) Yes (if yes, briefly describe):
V. ADDITIONAL INFORMATION. Report relevant aspects of your firm’s background or present circumstances not addressed above that might reasonably be construed by others as affecting your firm’s judgment. Please include any information that may reasonably: impair your firm’s objectivity; skew the competition in favor of your firm; or allow your firm unequal access to nonpublic information.

YOUR SIGNATURE

DATE

2/22/2013