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Final Independent External Peer Review Report: Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Ecosystem Restoration Planning Center of Expertise
Norfolk District

Contract No. W911NF-07-D-0001
Task Control Number: 10007
Delivery Order: 0835

March 17, 2010

SHORT-TERM ANALYSIS SERVICE (STAS)

on

Final Independent External Peer Review Report Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River

by

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505 King Avenue
Columbus, OH 43201

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Scientific Services Program

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FINAL
INDEPENDENT EXTERNAL PEER REVIEW REPORT
for the

Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River

EXECUTIVE SUMMARY

The Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River provides National Environmental Policy Act (NEPA) coverage for the ongoing program of mechanical maintenance and construction of ESH as identified in Reasonable and Prudent Alternative Element IV B.3 in the U.S. Fish and Wildlife's Biological Opinion on the Operation of the Missouri River Main Stem System 2000, as amended in 2003 (BiOp). The BiOp identifies habitat goals (acres of ESH per mile) for specific riverine segments, as well as the upper end of Lewis and Clark Lake, needed to attain a desired minimum fledge ratio for two target species: the endangered interior least tern (*Sternula antillarum*) and the threatened Great Plains population of the piping plover *(Charadrius melodus)*. The Record of Decision (ROD) for this PEIS will be the decision document for implementing this program annually to provide sufficient habitat to meet each species' biological metrics. Due to uncertainty with regard to the number of acres needed for species recovery, the ROD will select an initial program construction goal that may be modified through adaptive management if monitoring data indicate that the acreage goals need to be adjusted.

The PEIS is a single-purpose effort intended to maintain and construct ESH for the purpose of increased least tern and piping plover productivity. When conditions on the Missouri River do not result in sufficient emergent sandbar habitat, the U.S. Army Corps of Engineers (USACE) will take appropriate actions to mechanically create and maintain ESH to meet the amended BiOp habitat goals. The need for this action is to ensure that operation of the Missouri River System (as described in USACE's revised Missouri River Mainstem Reservoir System Master Water Control Manual and Final Environmental Impact Statement) will not result in jeopardy to these listed species.

USACE is conducting an independent external peer review (IEPR) of the PEIS for the Mechanical Creation and Maintenance of ESH on the Upper Missouri River (ESH PEIS). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to coordinate the IEPR of the ESH PEIS. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2010), USACE (2007) and OMB (2004). This final report describes the IEPR process, describes the IEPR panel members and their selection, and summarizes the Final Panel Comments of the IEPR panel.

Four panel members were selected for the IEPR from more than 20 identified candidates. Corresponding to the technical content of the ESH PEIS Project, the areas of technical expertise of the four selected IEPR panel members included bird biology/threatened and endangered species, biology/National Environmental Policy Act (NEPA), hydraulics/hydrology, and recreation/socioeconomics.

The IEPR panel was provided with electronic versions of the ESH PEIS documents, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. The IEPR panel and Battelle were briefed by the ESH PEIS Project Delivery Team during a kick-off meeting held via teleconference prior to the start of the review. Other than this teleconference, there was no direct communication between the IEPR panel and the USACE during the peer review process. More than 400 individual comments were received from the IEPR panel in response to the 126 charge questions.

Following the individual reviews of the ESH PEIS documents by the IEPR panel, a teleconference was conducted to review key technical comments, discuss charge questions for which there were conflicting responses, and reach agreement on the Final Panel Comments to be provided to USACE. The Final Panel Comments were documented according to a four-part format that included description of: (1) comment statement; (2) the basis for the comment; (3) significance of the comment (high, medium, and low); and (4) recommendations on how to resolve the comment. Overall, 14 Final Panel Comments were identified and documented. Of the 14 Final Panel Comments, 9 were identified as having high significance, 5 were identified as having medium significance, and none were identified as having low significance.

Table ES-1 summarizes the Final Panel Comments by level of significance. Detailed information on each comment is contained in Appendix A of this report.

Table ES-1. Overview of 14 Final Comments Identified by the ESH PEIS IEPR Panel

Significance – High	
1	Consideration of other current and future beneficial consequences of emergent sandbar habitat (ESH) creation and maintenance activities should be included, aside from the benefits to piping plover and least tern populations.
2	The justification for including the estimated costs and how the costs were used in the decision-making process is not clearly described.
3	Episodic flows should be considered in conjunction with mechanical maintenance of emergent sandbar habitat (ESH) to benefit the target species.
4	The ultimate goal of the ESH project is unclear.
5	The characterization of soil types is incorrect and incomplete so the potential impacts of soil disturbance on turbidity cannot be determined.
6	The ESH project is dependent on sediment and a sediment budget has not been completed.
7	The rule to not allow construction during the peak of recreation season is too restrictive.
8	Insufficient information was provided on the potential for vegetation removal to serve as an alternative method for emergent sandbar habitat (ESH) creation.

9	The decision to impact environmental buffers in the creation of emergent sandbar habitat (ESH) on the Gavins Point Segment under the preferred alternative needs to be justified and explained.
Significance – Medium	
10	The purpose of the recreational discussion is unclear.
11	The "no-rise" impact should be a pre-determining factor and not a post-determining analysis.
12	The habitat mapping protocol and mapping products should be better explained.
13	The term "fledge ratio" is not well-defined, despite it being a critical monitoring variable.
14	The term "significant" with regard to environmental impacts needs to be better defined.

The IEPR panel generally agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE 2010) in the PEIS document. The following statements provide a summary of the panel's findings, which are described in more detail in the Final Panel Comments (see Appendix A).

Overall: The panel is impressed with the enormity of the task undertaken in this PEIS and appreciative of the effort to provide comprehensive information pertinent to the Emergent Sandbar Habitat project.

Economics: Given the nature of the adaptive management proposed, it becomes clear from reading the main report (and its associated documentation) that much of the detail on the project's economics and engineering is conditional and may be changed in response to monitoring data on fledge and population targets for the piping plover and least tern. The discussion of recreation opportunities, economic impacts, and sensitive areas appears complete but could be better organized and utilized to more effectively determine the best time windows for conducting ESH creation and maintenance activities. Identifying these time windows has important implications for engineering details, project costs, and associated environmental impacts. The costs of various alternatives are substantial, and a good economic justification for these costs and a consideration of less expensive alternatives was not provided.

Engineering: Engineering predictive models were briefly discussed in the PEIS with the acknowledgement of the recently-completed Upper Missouri River Bank Stabilization Analysis (USACE 2005) and the Upper Missouri River Fluvial Geomorphological Analysis (Biedenharn et al. 2001). However, the panel was not clear how these data studies were to be used in the final design. Although the panel had concerns about when the "no-rise" analysis should be completed, the engineering design process from concept to construction is clear and well-defined. The panel was in agreement with the use of the adaptive management approach to review and adjust the engineering design process over time to develop the best engineering practices for the mechanical creation of ESH. The final component of the engineering process is the cost or "engineers estimate" and there was concern by the panel that the purpose of the estimated costs in the report was not clearly explained and thus could be incorrectly interpreted.

Environmental: The report summarizes a wealth of environmental information, from the biology of endangered species and other wildlife to topics that include erosion, sedimentation, and vegetation encroachment. Background information on the two focal species, the piping plover and least tern, was extensive and included a lot of information from targeted studies of

both species in the Upper Missouri River Basin. However, some key analyses were either not completed or not completely presented. This is a concern for the review panel, because the completion or complete presentation of these analyses could affect the alternatives analysis and the selection of the preferred alternative. Other beneficial consequences from ESH creation, while possibly viewed as secondary project objectives, are in need of more direct discussion.

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LIST OF ACRONYMS

ATR	Agency Technical Review
BiOp	USFWS' Biological Opinion (2003)
EC	Engineering Circular
ESH	Emergent Sandbar Habitat
IEPR	Independent External Peer Review
NEPA	National Environmental Policy Act
NTP	Notice to Proceed
OMB	Office of Management and Budget
OEO	Outside Eligible Organization
PEIS	Programmatic Environmental Impact Statement
ROD	Record of Decision
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WRDA	Water Resources Development Act

1. INTRODUCTION

The Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River provides National Environmental Policy Act (NEPA) coverage for the ongoing program of mechanical maintenance and construction of ESH as identified in Reasonable and Prudent Alternative Element IV B.3 in the U.S. Fish and Wildlife's Biological Opinion on the Operation of the Missouri River Main Stem System 2000, as amended in 2003 (BiOp). The BiOp identifies habitat goals (acres of ESH per mile) for specific riverine segments, as well as the upper end of Lewis and Clark Lake, in order to attain a desired minimum fledge ratio for two target species: the endangered interior least tern (*Sternula antillarum*) and the threatened Great Plains population of the piping plover *(Charadrius melodus)*. The Record of Decision (ROD) for this PEIS will be the decision document for implementing this program annually to provide sufficient habitat to meet each species' biological metrics. Due to uncertainty with regard to the number of acres needed for species recovery, the ROD will select an initial program construction goal which may be modified through adaptive management if monitoring data indicate that the acreage goals need to be adjusted.

The PEIS is a single-purpose effort intended to maintain and construct ESH for the purpose of increased least tern and piping plover productivity. When conditions on the Missouri River do not result in sufficient emergent sandbar habitat, the USACE will take appropriate actions to mechanically create and maintain ESH to meet the amended BiOp habitat goals. The need for this action is to ensure that operation of the Missouri River System (as described in USACE's revised Missouri River Mainstem Reservoir System Master Water Control Manual and Final Environmental Impact Statement) will not result in jeopardy to these listed species.

The objective of the work described here was to conduct an IEPR of the PEIS for the Mechanical Creation and Maintenance of ESH on the Upper Missouri River in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers Engineer Circular (EC) No. 1165-2-209, *Civil Works Review Policy*, dated January 31, 2010 (USACE, 2010) and the Office of Management and Budget (OMB) *Final Information Quality Bulletin for Peer Review* released December 16, 2004 (OMB, 2004). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to coordinate the IEPR of the ESH PEIS. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

This final report details the IEPR process, describes the panel members and their selection, and summarizes the Final Panel Comments of the IEPR panel on the existing environmental, economic, and hydrologic and hydraulic engineering analyses contained in the ESH PEIS. Detailed information on the Final Panel Comments is provided in Appendix A.

2. PURPOSE OF INDEPENDENT EXTERNAL PEER REVIEW

To ensure that USACE documents are supported by the best scientific and technical information, a peer review process has been implemented by USACE that utilizes IEPR to complement the

Agency Technical Review (ATR), as described in USACE (2010) and USACE CECW-CP Memorandum dated March 30, 2007 (USACE, 2007).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the economic, engineering, and environmental analysis of the project study. In particular, the IEPR addresses the technical soundness of the report's assumptions, methods, analyses, and calculations; and the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the ESH PEIS was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) eligible under section 501(c)(3) of the U.S. Internal Revenue Code. Battelle is an independent objective science and technology organization with experience conducting IEPRs.

3. METHODS

This section describes the methodology followed in selecting the IEPR panel members and in planning and conducting the IEPR. The IEPR was conducted following procedures described in USACE's guidance cited above (Section 2 of this report) and in accordance with OMB (2004). Supplemental guidance on evaluation for conflicts of interest was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

3.1 Planning and Schedule

In terms of planning, one of the first actions Battelle conducted after receiving the notice to proceed (NTP) was to hold a kick-off meeting between the USACE and Battelle. The purpose of the meeting was to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Any revisions to the schedule were submitted as part of the final Work Plan. Due dates for milestones and deliverables in the table below are based on the NTP date of November 16, 2009. Table 1 defines the schedule followed in execution of the IEPR.

Table 1. ESH PEIS IEPR Schedule

TASK	ACTION	DUE DATE
1	NTP	November 16, 2009
	Draft Review documents available	December 3, 2009
	Final Review documents available	December 23, 2009
	Submit Draft Work Plan [a]	December 17, 2009
	USACE provides comments on Draft Work Plan	December 24, 2009
	Conference Call, if necessary	N/A
	Submit Final Work Plan [a]	December 31, 2009
	USACE approves Final Work Plan	January 4, 2010

TASK	ACTION	DUE DATE
2	Battelle requests input from USACE for the COI for recruiting panel members	November 23, 2009
	Recruit and screen up to 8 potential panel members; prepare summary information	December 9, 2009
	Submit list of selected panel members [a]	December 9, 2009
	USACE comments on panel members' COI	December 16, 2009
	Complete subcontracts for panel members	January 4, 2010
3	Submit Draft Charge (combine with Draft Work Plan – Task 1) [a]	December 17, 2009
	USACE provides comments on draft charge	December 23, 2009
	Submit Final Charge (combined with Final Work Plan – Task 1) [a]	December 31, 2009
	USACE approves Final Charge	January 5, 2010
4	USACE/Battelle Kick-off Meeting	November 19, 2009
	USACE/Battelle/panel Kick-off Meeting	January 7, 2010
5	Review documents sent to panel members	January 5, 2010
	IEPR panel members complete their review	February 5, 2010
	Collate comments from panel members	February 9, 2010
	Convene panel review conference call	February 11, 2010
	Panel members provide Final Panel Comments to Battelle	February 25, 2010
6	Submit Final IEPR Report [a]	March 17, 2010
7	Input Final Panel Comments to DrChecks [a, b]	March 19, 2010
	USACE PDT provides draft Evaluator responses and clarifying questions to Battelle	March 26, 2010
	Teleconference between Battelle, panel members, and USACE to discuss Final Panel Comments, draft responses and clarifying questions	April 9, 2010
	USACE inputs final Evaluator responses in DrChecks	April 26, 2010
	Battelle inputs IEPR panel responses in DrChecks (i.e. BackCheck responses)	May 17, 2010
	Battelle submits pdf printout of DrChecks Phase I project file [a, b]	May 18, 2010
	Project Closeout/Period of Performance Ends	June 30, 2010

[a] Deliverable
[b] Task occurs after the submission of this report

Note that the work items listed in Task 7 occur after the submission of this report. The 14 Final Panel Comments will be entered in to DrChecks by Battelle for review and response by USACE and the IEPR panel. USACE will provide Evaluator Responses to the Final Panel Comments and the IEPR panel will respond to the Evaluator Responses (via Backcheck responses). All USACE and IEPR panel responses will be documented by Battelle.

3.2 Identification and Selection of Independent External Peer Reviewers

Corresponding to the technical content of the ESH PEIS and overall scope of the ESH project, the technical expertise areas for which the candidate panel members were evaluated focused on four key areas: bird biology/threatened and endangered species, biology/National Environmental Policy Act (NEPA), hydraulics/hydrology, and recreation/socioeconomics.

Battelle initially identified approximately 20 candidate IEPR panel members, evaluated their technical expertise and inquired about potential conflicts of interest. Of those initially contacted Battelle chose seven of the most qualified candidates and confirmed their interest and availability. Of those seven candidates, four were proposed as primary reviewers and three were proposed as backup reviewers. The four proposed primary reviewers constituted the final panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed conflicts of interest, or because they did not possess the precise technical expertise required.

The candidates were screened for the following *potential* exclusion criteria or conflicts of interest.[1] As noted below, participation in previous USACE technical peer review committees and other technical review panel experience was also considered.

- Involvement by you or your firm in any part of the PEIS for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat on the Upper Missouri River.
- Involvement by you or your firm in any work related to the Upper Missouri River, including the Missouri River Recovery Program, Missouri River Ecosystem Restoration Plan, and Missouri River Recovery Implementation Committee.
- Involvement by you or your firm in any work on the original or revisions to the Missouri River Main Stem Reservoir System Master Water Control Manual.
- Involvement by you or your firm in any work on the draft or final Environmental Impact Statement on the Missouri River Main Stem Reservoir System Master Water Control Manual.
- Involvement by you or your firm in any work on the original or amended U.S. Fish and Wildlife's Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System.
- Current employment by the USACE.
- Involvement with paid or unpaid expert testimony related to the Upper Missouri River Ecosystem.
- Current or previous employment or affiliation with members of the cooperating agencies, including the U.S. Fish and Wildlife Service (USFWS) or National Park Service (NPS) and currently working on Missouri River Recovery Program-related projects (for pay or *pro bono*).
- Past, current or future interests or involvements (financial or otherwise) by you, your spouse or children related to the Upper Missouri River Ecosystem.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes,

[1]Note: Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See the OMB memo p. 18, " ….when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Omaha District.

- Current firm involvement with other USACE projects, specifically those projects/contracts that are with the Omaha District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role.
- Previous employment by the USACE as a direct employee or contractor (either as an individual or through your firm) within the last 10 years, notably if those projects/contracts are with the Omaha District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Other USACE affiliation [e.g., scientist employed by USACE (except as described in NAS criteria, see EC 1105-2-410 section 8d)].
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning avian habitat restoration, and include the client/agency and duration of review (approximate dates).
- Pending, current or future financial interests in Upper Missouri River-related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm revenues within the last 3 years came from USACE contracts.
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Upper Missouri River, including the USFWS Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, the Missouri River Main Stem Reservoir System Master Water Control Manual, and/or the PEIS for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat on the Upper Missouri River.
- Participation in relevant prior Federal studies/programs relevant to this project, such as, the Missouri National Recreational River, Nebraska and South Dakota.
- Is there any past, present or future activity, relationship or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe:

In selecting final panel members from the list of candidates, an effort was made to select experts who best fit the expertise areas and disclosed no conflicts of interest. Based on these considerations, four IEPR panel members were selected from the potential list (see Section 4 of this report for names and biographical information on the panel members). The four panel members selected were from academic institutions, consulting companies, or were independent consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of conflicts of interest through a signed conflict of interest form.

Prior to beginning their review and within three days of their subcontracts being finalized, all members of the IEPR panel were required to attend a kick-off meeting teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication, and other pertinent information for the IEPR panel.

3.3 Preparation of the Charge and Conduct of the Peer Review

A draft charge document, including specific charge questions and discussion points, was drafted by Battelle, reviewed and approved by USACE, and provided to the IEPR panel to guide their review of the ESH PEIS. The charge was prepared by Battelle to assist the USACE in the development of the charge questions that will guide the peer review, according to guidance provided in USACE (2008) and OMB (2004). The draft charge was submitted to the USACE for evaluation as part of the draft Work Plan. USACE provided minor clarifications to the final charge questions. In addition to a list of 126 charge questions/discussion points, the final charge included general guidance for the IEPR panel on the conduct of the peer review (as provided in Appendix B of this final report).

Battelle planned and facilitated a final kick-off meeting via teleconference during which USACE presented project details to the IEPR panel. Before the kick-off meeting, the IEPR panel members were provided an electronic version of the ESH PEIS documents and the final charge. A full list of the documents that were reviewed by the IEPR panel is provided in Appendix B of this report. The IEPR panel was instructed to address the charge questions/discussion points within a comment-response form provided by Battelle.

3.4 Review of Individual Comments

In response to the charge questions/discussion points, approximately 400 individual comments were received from the IEPR panel. Battelle reviewed these comments to identify overall recurring themes, potential areas of conflict, and other overall impressions. As a result of this review, Battelle developed a preliminary list of 20 overall comments and discussion points that emerged from the IEPR panelists' individual comments. Each panel member's individual comments were shared with the full IEPR panel in a merged individual comments table.

3.5 Panel Review Teleconference

Battelle facilitated a three-and-a-half hour teleconference with the IEPR panel to provide for the exchange of technical information among the panel experts, many of whom are from diverse scientific backgrounds. This information exchange ensured that this final IEPR report would accurately represent the panel's assessment of the project, including any conflicting opinions. The panel review teleconference consisted of a thorough discussion of the overall negative comments, positive comments, and comments that appeared to be conflicting among IEPR panel. In addition, Battelle used the teleconference to confirm each comment's level of significance to the panel, add any missing issues of high-level importance to the findings, resolve whether to "agree to disagree" on the conflicting comments, and to merge related individual comments into one "Final Panel Comment." The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments and to decide which panel member would serve as the lead author for the development of each Final Panel Comment.

In addition to identifying which issues should be carried forward as Final Panel Comments, the IEPR panel discussed responses to four specific charge questions where there appeared to be disagreement among the panel members. The conflicting comments were resolved based on

professional judgment of the IEPR panel; each comment was either incorporated into a Final Panel Comment or determined to be a non-significant issue (i.e., either a true disagreement did not exist, or the issue was not important enough to include as a Final Panel Comment).

During the panel teleconference, the panel identified 14 comments and discussion points that should be brought forward as Final Panel Comments.

3.6 Preparation of Final Panel Comments

Following the teleconference, a summary memorandum documenting each Final Panel Comment (organized by level of significance) was prepared by Battelle and distributed to the IEPR panel. The memorandum provided the following detailed guidance on the approach and format to be used in the development of the Final Panel Comments for the ESH PEIS:

- Lead Responsibility: For each Final Panel Comment, one of the IEPR panel members was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Lead assignments were modified by Battelle at the direction of the IEPR panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed merged individual comments in the comment-response form table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and a template for the preparation of the Final Panel Comments.

- Directive to the Lead: Each lead was encouraged to communicate directly with other IEPR panel members as needed, to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Comments: Each Final Panel Comment was presented using a four-part structure, including:
    1. Comment Statement (i.e., succinct summary statement of concern)
    2. Basis for comment (i.e., details regarding the concern)
    3. Significance (high, medium, low; see description below)
    4. Recommendation for resolution (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
    1. *High*: Describes a fundamental problem with the project that could affect the recommendation or justification of the project
    2. *Medium*: Affects the completeness or understanding of the reports/project
    3. *Low*: Affects the technical quality of the reports but will not affect the recommendation of the project.

- Guidance for Developing the Recommendation: The recommendation was to include specific actions that the USACE should consider to resolve the Final Panel Comment

(e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

As a result of this process, 14 Final Panel Comments were prepared. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with comment statement, and adherence to guidance on the panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the IEPR panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments were assembled and are presented in Appendix A of this report.

4. PANEL DESCRIPTION

Panel member candidates were identified using Battelle's Peer Reviewer Database, targeted Internet searches using key words (e.g., technical area, geographic region), searches of websites of universities or other compiled expert sites, and through referrals. A draft list of primary and backup candidate panel members (which were screened for availability, technical background, and conflicts of interest) was prepared by Battelle and provided to USACE. The final list of panel members was determined by Battelle.

An overview of the credentials of the final four IEPR panel members and their qualifications in relation to the technical evaluation criteria is presented in Table 2. Some of the panel members were multi-disciplinary and had experience beyond that for which they were recruited; this is indicated in Table 2. More detailed biographical information regarding each panel member and their technical area of expertise is presented in the text that follows the table.

Table 2. ESH PEIS IEPR Panel: Technical Criteria and Areas of Expertise

Discipline	Dinsmore	Rains	Keehn	Stoll
Bird Biology / Threatened and Endangered Species	X			
At least 10 years experience in bird biology and familiarity with the biota of the Missouri River ecosystem, including	X			
Least terns, piping plovers, or other comparable shoreline birds	X			X
Bird population dynamics	X			
Adaptive management	X			
Endangered species recovery	X			X
An understanding of population biology for the least tern and the piping plover	X			
An understanding of the analysis of bird data to predict trends	X			X
Biology / NEPA		X		
At least 10 years experience in biology, NEPA, and riverine systems ecology		X		X
Knowledge of the interaction of riverine system with natural and created sandbars		X		
Hydraulics / Hydrology			X	
At least 10 years experience in hydraulic engineering with an emphasis on large public works projects, associated with ecosystem restoration and emergent sandbar habitat design			X	
Registered Professional Engineer			X	
Familiar with standard USACE hydrologic and hydraulic computer models		X	X	X
Experience with both computer simulation and physical modeling of large river systems		X	X	X
Recreation / Socio-economics				X
At least 10 years experience in water resources recreation studies and socioeconomics evaluation and review				X
A focus on the recreational and socioeconomic uses and functions of river systems				X
Familiar with USACE processes for recreational benefits and impacts evaluation				X

Stephen Dinsmore

Role: This panel member was chosen primarily for his bird biology and threatened and endangered species experience and expertise.
Affiliation: Iowa State University
Dr. Steve Dinsmore earned his Ph.D. in fishery and wildlife biology from Colorado State University in 2001, while studying the population biology of mountain plovers. He is a trained ornithologist/avian ecologist and population ecologist with over 20 years of professional experience and expertise in adaptive resource management. Currently, he is an associate professor of wildlife ecology in the Department of Natural Resource Ecology and Management at Iowa State University, and has taught graduate and undergraduate courses in ornithology, avian ecology, and applied wildlife population ecology. He is familiar with the Missouri River ecosystem mainly through his work with least terns and piping plovers, but has also done breeding bird survey work in the Iowa/Nebraska portion. Much of Dr. Dinsmore's work focuses on studying bird population dynamics, including the analysis of shorebird population dynamics and trend data. He has conducted monitoring studies of nesting piping plovers and least terns in Iowa since 1988, assisted with a piping plover study in North Carolina, and studied nesting least terns in coastal Mississippi. Dr. Dinsmore is familiar with the population biology of, and recovery plans for, the piping plover and least tern, and has recently worked with the Interior Least Tern Working Group. He has endangered species recovery experience with the piping plover and interior least tern and was involved in an unsuccessful proposed listing (as threatened) for the Mountain Plover. Dr. Dinsmore has utilized the Habitat Evaluation Procedures (HEP) for mountain plovers in Montana and piping plovers on the Atlantic Coast and is broadly familiar with other approaches for assessing wildlife habitat use. He has extensive knowledge of bird use of the entire Mississippi Valley, both from personal interests as an avid birder and his research activities. He has conducted intermittent contractual bird surveys for the USACE Rock Island District, Saylorville Lake Project, and is familiar with large public works projects. He currently serves as an Associate Editor for The Auk. He has been a routine participant in the Missouri River and North American Piping Plover and Least Tern habitat workshop/symposium. Additionally, Dr. Dinsmore has published more than 30 peer reviewed journal articles, including articles on both the piping plover and least tern.

Mark Rains

Role: This panel member was chosen primarily for his biology and National Environmental Policy Act experience and expertise.
Affiliation: University of South Florida
Dr. Mark Rains earned a Ph.D. in hydrologic sciences from the University of California at Davis in 2002 and has 18 years of experience in hydrology and hydraulics. Dr. Rains is currently an Associate Professor of Ecohydrology in the Department of Geology at the University of South Florida, teaching a variety of courses in the hydrologic sciences, including interdisciplinary courses which address the interactions between hydrology, hydraulics, geomorphology, ecology, and the human environment. This includes teaching a graduate course on fluvial hydrology and geomorphology covering the mechanics of open-channel flows and the geomorphic responses to work performed by open-channel flows, including sandbar formation, maintenance, and migration. Alongside his graduate students, he conducts research on the roles that hydrologic and hydraulic processes at the subsurface-surface-atmospheric interface play in governing ecosystem structure and function in wetland, river, estuary, and nearshore marine

ecosystems. He has more than 15 years experience in consulting, with a special emphasis on mapping, assessment, permitting, restoration, and monitoring on projects with unavoidable impacts to aquatic environments. This includes ensuring compliance with NEPA and the state equivalents (e.g., California SEQA). Many of these were large public works projects, including the restoration of North Creek in the Puget Sound Lowlands as part of the compensatory mitigation for the construction of the University of Washington-Bothell/Cascadia Community College colocated campus just north of Seattle, Washington. Others were large consensus building efforts with federal, state, and/or local resource and regulatory agencies, including extensive involvement in the development and implementation of the Hydrogeomorphic Approach to Functional Assessment, now a standard protocol for functional assessment in numerous federal, state, and local regulatory programs. He is familiar with standard USACE and related hydrologic and hydraulic models, and has used such models in the course of some of his projects. He also has experience with impact analysis, having evaluated the hydrologic effects of a pond and plug stream restoration in a mountain meadow and the impacts of reservoir operations on shallow groundwater and vegetation distributions in reservoir-fringe ecosystems. He has received over $2.2M in academic-related funding from a variety of federal, state, and local agencies, and has authored 20 peer-reviewed publications, one edited volume, three online teaching tools, 29 technical reports, and 56 presentations/posters, many of which are on the roles that hydrologic and hydraulic processes play in governing ecosystem structure and function in river systems.

Rocky Keehn

Role: This panel member was chosen primarily for his hydrology and hydraulics experience and expertise.

Affiliation: Short Elliott Hendrickson (SEH), Inc.

Mr. Rocky Keehn, P.E. is currently a Principal/Senior Water Resources Engineer with SEH, Inc. In his 22 years of experience, Mr. Keehn's project work has included hydrologic and hydraulic design development, project design quality control, plans and specifications, constructability, project and engineering management, and project review. His knowledge of physical models stems from his hydraulic studies of river modeling at the University of Nebraska, and discussions of their use in project related work. Mr. Keehn is familiar with the USACE Hydrologic Engineering Centers River Analysis System (HEC-RAS) models, as well as being experienced with several of the internal design components of the models. He has 20 years of experience working as a hydraulic engineer on large flood control projects, including USACE projects in East Grand Forks, Grand Forks, MN. Mr. Keehn has completed a study of the Platte River flooding caused by vegetation growth on sandbars as part of Platte River restoration project to improve wildlife migration habitats. This project included HEC-RAS modeling of the river system, field observations, and field measurements of flood waters. The three years of field observations during this project provided information on how the river functions as it relates to vegetation, high flows and their impacts on sandbar formation. Mr. Keehn also participated in the Independent Technical Review (ITR) of the USACE St. Paul District FEMA submittal of the HEC-RAS model and mapping for East Grand Forks and Grand Forks, MN. His primary role on this ITR team was the review of project structures. He is a member of the American Society of Civil Engineers (ASCE), and has served as the Chairperson of the Minnesota ASCE Water Resources Committee. He is a registered Professional Engineer in Minnesota, Wisconsin, and Nebraska, a Professional Hydrologist in Wisconsin, a LEED

Accredited Professional, and is a Certified Floodplain Manager.

John Stoll

Role: This panel member was chosen primarily for his recreation and socioeconomics experience and expertise.
Affiliation: University of Wisconsin at Green Bay
Dr. John Stoll is a professor of Economics, Public and Environmental Affairs, at the University of Wisconsin at Green Bay, where he also serves as the Co-Director of the Environmental Management and Business Institute (EMBI) and was the previous Chairperson (9 years) of the Environmental Science and Policy graduate program. He is formally trained as an economist with specialties in natural resources, environmental and recreation economics. His broader research program has been centered upon natural resource management and valuation. Dr. Stoll has been published in both the theoretical aspects of such undertakings as well as the application of empirical methods for assessing economic value, impacts, and alternative resource usage. In most instances, the teams he has worked with have been multidisciplinary, allowing him to develop a good perspective on the approaches others take to the issues at hand. While a professor at Texas A&M University, he worked under a joint appointment between the Agricultural Economics program and the Department of Recreation, Parks, and Tourism Sciences. Throughout his career, Dr. Stoll has conducted numerous socioeconomic studies; many of these focused upon recreational usage of water resources and environmental issues. He has designed and used recreational survey research for primary data collection, having been involved in over 50 survey research studies and authoring over 100 publications, many refereed in national journals. He has been involved in conducting economic valuation of endangered species, including the whooping crane in the Aransas Refuge and its migration path. Dr. Stoll has also conducted socioeconomic analyses of bird watching activities in five different national studies in the past decade, and has published work in this area. One major project in this area was a survey of birders in relation to the Platte River area of Nebraska in the late 1990s. This work led to an additional four studies in New Jersey, Texas, California, and Wisconsin with a birding focus. He has worked as a Principal Investigator on project work funded by the USACE Galveston and Vicksburg Districts. These projects pertained to recreational aspects of flood control in Houston, flood control benefits in the South Texas coastal areas, and wetland recreation benefits in the New Orleans region of the Gulf of Mexico. He has performed benefit and impact evaluation for recreation throughout his career, and has published procedures for properly conducting these studies. Through these and other studies, Dr. Stoll has gained a familiarity with modeling and hydrologic analysis of large river systems. He is experienced with NEPA project evaluation principles, having taught courses in environmental economics as well as cost-benefit analysis for the past 30 years, and by conducting research that has fed into such analyses.

5. RESULTS — SUMMARY OF PEER REVIEW COMMENTS

The IEPR panel generally agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE 2010) in the PEIS document. The following statements provide a summary of the panel's findings, which are described in more detail in the Final Panel Comments (see Appendix A).

Overall: The panel is impressed with the enormity of the task undertaken in this PEIS and appreciative of the effort to provide comprehensive information pertinent to the Emergent Sandbar Habitat project.

Economics: Given the nature of the adaptive management proposed, it becomes clear from reading the main report (and its associated documentation) that much of the detail on the project's economics and engineering is conditional and may be changed in response to monitoring data on fledge and population targets for the piping plover and least tern. The discussion of recreation opportunities, economic impacts, and sensitive areas appears complete but could be better organized and utilized to more effectively determine the best time windows for conducting ESH creation and maintenance activities. Identifying these time windows has important implications for engineering details, project costs, and associated environmental impacts. The costs of various alternatives are substantial, and a good economic justification for these costs and a consideration of less expensive alternatives was not provided.

Engineering: Engineering predictive models were briefly discussed in the PEIS with the acknowledgement of the recently-completed Upper Missouri River Bank Stabilization Analysis (USACE 2005) and the Upper Missouri River Fluvial Geomorphological Analysis (Biedenharn et al. 2001). However, the panel was not clear how these data studies were to be used in the final design. Although the panel had concerns about when the "no-rise" analysis should be completed, the engineering design process from concept to construction is clear and well-defined. The panel was in agreement with the use of the adaptive management approach to review and adjust the engineering design process over time to develop the best engineering practices for the mechanical creation of ESH. The final component of the engineering process is the cost or "engineers estimate" and there was concern by the panel that the purpose of the estimated costs in the report was not clearly explained and thus could be incorrectly interpreted.

Environmental: The report summarizes a wealth of environmental information, from the biology of endangered species and other wildlife to topics that include erosion, sedimentation, and vegetation encroachment. Background information on the two focal species, the piping plover and least tern, was extensive and included a lot of information from targeted studies of both species in the Upper Missouri River Basin. However, some key analyses were either not completed or not completely presented. This is a concern for the review panel, because the completion or complete presentation of these analyses could affect the alternatives analysis and the selection of the preferred alternative. Other beneficial consequences from ESH creation, while possibly viewed as secondary project objectives, are in need of more direct discussion.

Table 3. Overview of 14 Final Panel Comments Identified by ESH PEIS IEPR Panel

Significance – High	
1	Consideration of other current and future beneficial consequences of emergent sandbar habitat (ESH) creation and maintenance activities should be included, aside from the benefits to piping plover and least tern populations.
2	The justification for including the estimated costs and how the costs were used in the decision-making process is not clearly described.
3	Episodic flows should be considered in conjunction with mechanical maintenance of emergent sandbar habitat (ESH) to benefit the target species.
4	The ultimate goal of the ESH project is unclear.
5	The characterization of soil types is incorrect and incomplete so the potential impacts of soil disturbance on turbidity cannot be determined.
6	The ESH project is dependent on sediment and a sediment budget has not been completed.
7	The rule to not allow construction during the peak of recreation season is too restrictive.
8	Insufficient information was provided on the potential for vegetation removal to serve as an alternative method for emergent sandbar habitat (ESH) creation.
9	The decision to impact environmental buffers in the creation of emergent sandbar habitat (ESH) on the Gavins Point Segment under the preferred alternative needs to be justified and explained.
Significance – Medium	
10	The purpose of the recreational discussion is unclear.
11	The "no-rise" impact should be a pre-determining factor and not a post-determining analysis.
12	The habitat mapping protocol and mapping products should be better explained.
13	The term "fledge ratio" is not well-defined, despite it being a critical monitoring variable.
14	The term "significant" with regard to environmental impacts needs to be better defined.

6. REFERENCES

Biedenharn, D.S. et al. 2001. Missouri River – Fort Peck Dam to Ponca State Park Geomorphological Assessment Related to Bank Stabilization. Prepared for USACE Omaha District, ERDC, Coastal and Hydraulic Laboratory, 3909 Halls Ferry Road, Vicksburg, MS 39180.

Eubanks, T.L., R.B. Ditton and J.R. Stoll. 1998. Platte River Nature Recreation Study: The Economic Impact of Wildlife Watching on the Platte River in Nebraska. Final Contract Report to the U.S. Environmental Protection Agency, Region VII, by Fermata Inc. 105 pp.

Eubanks, T.L., R.B. Ditton, and J.R. Stoll. 2004. Understanding the diversity of eight birder sub-populations: socio-demographic characteristics, motivations, expenditures, and net benefits. *Journal of Ecotourism*. 3(3):151-172.

Lilles, T.M., and R.W. Kiefer. 1994. Remote sensing and image interpretation. Third edition. John Wiley and Sons, New York, New York, USA.

The National Academies. 2003. Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12, 2003.

Office of Management and Budget (OMB). 2004. *Final Information Quality Bulletin for Peer Review.* Executive Office of the President, Office of Management and Budget, Washington, DC. Memorandum M-05-03 dated December 16, 2004.

Patten, D. T., D. A. Harpman, M. I. Voita, and T. J. Randle. 2001. A managed flood on the Colorado River; background, objectives, design, and implementation. *Ecological Applications* 11:635-643.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. Simulated changes in shallow groundwater and vegetation distributions under different reservoir operations scenarios. *Ecological Applications* 14:192-207 .

Stoll, J.R., R.B. Ditton, and T.L. Eubanks. 2006. Platte River birding and the Spring migration: humans, value, and unique ecological resources. *Human Dimensions of Wildlife*. 11(4): 241-254.

USACE. 1992. Fort Peck Dam/Fort Peck Lake Master Plan, Missouri River, Montana. Design Memorandum MFP-105D. Omaha District.

USACE. 2005. Bank Stabilization Analysis Draft Report. Prepared by HDR Engineering Inc, West Consultants, Mussetter Engineering Inc., and IIHR Hydroscience and Engineering. Omaha, NE.

USACE. 2007. Peer Review Process. U.S. Army Corps of Engineers, Washington, DC. CECW-CP Memorandum dated March 30, 2007.

USACE. 2010. Civil Works Review Policy. U.S. Army Corps of Engineers, Washington, DC. CECW-CP Circular No. EC 1165-2-209, dated January 31, 2010.

U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2006. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

APPENDIX A

Final Panel Comments

on the

Emergent Sandbar Habitat Programmatic Environmental Impact Statement

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Final Panel Comment 1:

Consideration of other current and future beneficial consequences of emergent sandbar habitat (ESH) creation and maintenance activities should be included, aside from the benefits to piping plover and least tern populations.

Basis for Comment:

The IEPR panel finds that the programmatic environmental impact statement (PEIS) reads like a cost-effectiveness analysis in the sense that the focus is upon the creation of alternative levels of emergent sandbar habitat (ESH) and the least impactful ways to do so. Levels of creation are derived on the basis of U.S. Fish and Wildlife Service (USFWS) recommendations, flow modeling, etc., which were all selected in relation to the ability to maintain least tern and piping plover fledge ratios and population levels. The result is a focus exclusively upon the adverse impacts (financial and otherwise) of achieving alternative ESH levels, that is, achievement with the least disruption to existing activities. The presumption is that the benefits of ESH creation are solely those associated with the preservation of these two species, which is a narrow presumption. Since each ESH creation level is guided by the sole criterion of maintenance of the least tern and piping plover population, it is presumed that there is no difference in other beneficial consequences.

There are ecological relationships that are being altered by ESH creation and it is these that contribute to the ability to maintain populations of least tern and piping plover. By focusing solely upon the maintenance of the populations, the overall ESH project appears one-dimensional. ESH creation indirectly benefits other species by providing greater quantities of loafing areas for migratory shorebirds, whooping cranes, and others. A dominant focus is placed upon game species when discussing recreation, yet ESH creation will affect the quality of recreational opportunities and opportunities for birding, hiking, and other wildlife observation. Other beneficial environmental impacts of ESH creation include altered (post-ESH creation) levels of biodiversity, different mixes or intensities of consumptive recreational activities, and greater opportunities for non-consumptive wildlife observation.

The National Survey of Fishing, Hunting and Wildlife-Associated Recreation conducted every 5 years since the 1950s (cited in report numerous times) also documents that recreational participation rates in hunting and fishing have been declining over time while non-consumptive recreation has been increasing (e.g., U.S. Department of the Interior (DOI), p. 6). These two trends have been related to a more urbanized population and demographic shifts in age patterns over time in the United States. Eubanks et al. (1998, 2004) and Stoll et al. (2006) have documented for the Platte River region of Nebraska that the economic benefits from birding are significant, derived from an older user population than many other forms of recreation, and are often associated with nonresidents meaning that regional economic impacts are greater (i.e., it is "outside" monies coming to the region and generating multiplier impacts).

Significance – High:

Documention of full project returns, financial or otherwise, is necessary for determining environmental and regional economic impacts as well as estimating cost-effectiveness and/or benefit-cost ratios.

Recommendations for Resolution:

To resolve these concerns:

1. Discuss biodiversity impacts arising from the creation of ESH and whether they are uniform among alternatives examined.
2. Discuss beneficial consequences of ESH creation for migratory and nonmigratory species other than the least tern and piping plover.
3. Consider the potential for more or less intense engagement in consumptive recreation such as hunting and fishing due to ESH creation.
4. Examine regional participation in non-consumptive recreation with a focus upon whether ESH creation would alter these patterns overall as well as among ESH creation alternatives.

5. Project recreation activity for 10-15 years and consider how it might change with ESH creation.
6. Discuss the degree to which participants in either consumptive or nonconsumptive recreational activities are from outside the region and the implications this has for regional impacts

Literature Cited:

Eubanks, T.L., R.B. Ditton and J.R. Stoll. 1998. Platte River Nature Recreation Study: The Economic Impact of Wildlife Watching on the Platte River in Nebraska. Final Contract Report to the U.S. Environmental Protection Agency, Region VII, by Fermata Inc. 105 pp.

Eubanks, T.L., R.B. Ditton, and J.R. Stoll. 2004. Understanding the diversity of eight birder sub-populations: socio-demographic characteristics, motivations, expenditures, and net benefits. *Journal of Ecotourism*. 3(3):151-172.

Stoll, J.R., R.B. Ditton, and T.L. Eubanks. 2006. Platte River birding and the Spring migration: humans, value, and unique ecological resources. *Human Dimensions of Wildlife*. 11(4): 241-254.

U.S. Department of the Interior (DOI), Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2006. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

Final Panel Comment 2:

The justification for including the estimated costs and how the costs were used in the decision-making process is not clearly described.

Basis for Comment:

The purpose of the estimated costs shown in Programmatic EIS (PEIS) Executive Summary, Table S-10 and PEIS, Table 4-19 is not included as part of the discussion when the tables are referenced in the text. The only documentation on the purpose of the estimated costs is included in a footnote in Appendix C (Table 16, page 33). Even if the cost estimates are meant to be used for relative comparisons of alternatives, as indicated in Appendix C, the intent of comparing alternatives from a cost standpoint is not clearly stated.

The estimated cost as presented in the Executive Summary and PEIS tables could be assumed to represent the final estimated project costs and be incorrectly used or interpreted. The conclusion of the panel was that, without knowledge of the footnote in Appendix C, the values presented in the Executive Summary and PEIS appeared to be presented as final cost estimates.

The panel agrees that the estimated costs do not appear to be an estimate of final construction costs since they do not account for several key items that would need to be in included. Some of the items not discussed are summarized below:

a. There appears to be no inflation for any of the project costs.
b. It appears that creation and maintenance costs are lumped together.
c. There is no adjustment for contractor inefficiency or unavailability.
d. There are no adjustments for weather or location.
e. There is no cost variation due to time. Clearly the expenditures will happen over time for each alternative and the numbers presented are annualized. Given this, there must be a time scenario for accomplishing the alternative and a discounting rate must be used in the process of annualization. Ten years was mentioned, with an equal amount of activity in each of the ten years, but this does not seem very likely and is more realistically represented as a declining rate of effort from heavier creation initially and more maintenance later (but variable by alternative).
f. There is likelihood that ESH creation and maintenance costs may be greater than estimated for scenarios 1-4 due to the possible decline in ESH since the estimates of baseline starting points for creation were first developed.

If the costs are presented for the purposes of comparing alternatives and are not intended as final project costs, they still need to be accurately calculated with a contingency that reflects the level of effort used to determine the costs. A 10% contingency was used, but the panel believes this to be too low for the level of detail used to determine estimated costs. Many project estimates done at this level tend to underestimate the final cost of the program and, since this is a long-term effort with significant long-term costs, a more detailed look at the estimates and contingency amount should be undertaken.

It also appeared that cost was not a factor in the selection of Alternative 3.5 or the removal from consideration of the other alternatives. Since costs do not appear to be part of the selection process, it was not clear why they should be presented in the main documentation at all.

Significance – High:

If estimated costs presented in the PEIS are misinterpreted, decisions may be based on project costs and not the scientific or technical data, diverting the focus away from the preferred alternative and impacting the success of the program.

Recommendations for Resolution:
To resolve these concerns: 1. Clearly define the purpose of the estimated costs each time they are presented outside Appendix C and discuss in detail in the main text of Appendix C the purpose of preparing the estimates. a. Alternatively, remove estimated costs from the main documentation if they are not used in the decision making process or b. Alternatively, leave the estimated costs in the main documentation and relate them to a base alternative (e.g., Alternative 1's annual cost is 32.1 times more than the existing program annual cost [based on Const. Cost/Year values from Table 4-19 page 4-25, PEIS]). 2. Redo the estimated costs in more detail by preparing a summary of how key items such as inflation, weather, contractor availability, and project location are or are not considered in the estimates and then, if necessary, adjust the contingency amount to reflect the level of effort.

Final Panel Comment 3:

Episodic flows should be considered in conjunction with mechanical maintenance of emergent sandbar habitat (ESH) to benefit the target species.

Basis for Comment:

The piping plover and least tern are both adapted to a riverine environment where episodic flows create abundant emergent sandbar habitat (ESH) necessary for nesting. Key elements of their natural history, including their relatively long lifespan, good dispersal capabilities, and ability to re-nest multiple times within a breeding season, all suggest that they can track changing nesting habitat over large geographic areas and might benefit from episodic flow events.

The Emergent Sandbar Habitat PEIS proposes to maintain populations of piping plovers and least terns along the Upper Missouri River by the use of mechanical habitat maintenance only. The panel notes that this will result in a static amount of nesting habitat if objectives are met, which may not be the best strategy for either species. Project alternatives are also based on the assumption that ESH and bird population relationships are annually independent. Preferred Alternative 3.5 will maintain a level of ESH that is based in part on assumptions about fledge ratios for each species and the amount of ESH present in the years 1998 and 2005. The panel is concerned that this logic fails to acknowledge the possible benefits of an episodic flow in 1997, which dramatically altered ESH habitat in the ensuing years and may have been responsible for the resultant higher fledge ratios through 2005. Populations may "remember" previous good years and the populations in 2005 could have been buoyed by the benefits of the preceding wet years. It is possible that ESH in 2005 could have supported the populations in 2005 in the absence of the preceding wet years. If not, then the amount of ESH in 2005 is insufficient, in and of itself. The review panel acknowledges that some of these issues can be addressed by an adaptive management program that allows ESH targets to change to ensure that populations are adequately supported.

The review panel suggests that a more biologically relevant strategy would be to incorporate periodic episodic flows into a program that also includes mechanical maintenance of ESH. Episodic flows were implemented opportunistically on the Colorado River in Grand Canyon in 1996 and 2004 (Patten et al. 2001) and a similar program could easily be implemented for ESH. However, episodic flows seem to be simply dismissed out-of-hand as being unreasonable for ESH creation and maintenance. Having episodic flows would more closely mimic natural conditions that created favorable nesting habitat for piping plovers and least terns and offers the best long-term hope for recovery of both species by managing nesting habitat. Both species are adapted to dynamic fluctuations in ESH, this is clearly illustrated in USACE monitoring data (Appendix B), and target acreages might make the most biological sense if they were "pulsed"; that is, a year with lots of ESH, followed by multiple years where ESH is allowed to degrade (and some minimum level is mechanically maintained), then another pulse.

It would be useful to at least consider the probability of future episodic flows that produce conditions similar to those in 1997. The review panel believes it would be easy to provide an order-of-magnitude estimate of the statistical probability of having these kinds of precipitation or flow years in succession while assuming that basic dam operations would remain the same under similar conditions. This modeling exercise could incorporate precipitation data (from NOAA Regional Climate Centers), reservoir discharge data (from USGS), or perhaps inflow records from the uppermost reservoir itself. A few representative, long-term records could be used to determine the probability of precipitation or discharge occurring in a given year. Presumably, the probabilities computed from the different records but in the same years would be similar but not the same as one another. In this case, a reasonable solution would be to take the mean probability of all of the records and assign that mean probability to the given year. The cumulative probability of these years occurring in succession would then simply be the product of the

probabilities for all of the years. Example: Consider a three-year period of unusually high precipitation, in which the probability of that amount of precipitation occurring each year was $^1/_{10}$. The probability of that much precipitation occurring in three consecutive years would then simply be $^1/_{10}$ times $^1/_{10}$ times $^1/_{10}$, or $^1/_{1000}$. The degree of confidence in these estimates might be low, but would certainly be better than guesses or out-of-hand dismissals. For example, a recurrence interval of approximately 10 years would indicate that controlled releases could be part of a diverse construction/flow release ESH management program, while a recurrence interval of approximately 1000 years would indicate that controlled releases could not be part of any reasonable ESH management program. This or a similar exercise is necessary to fully justify why episodic flows are being dismissed as part of the proposed ESH management plan for piping plovers and least terns.

The dismissal of episodic flows as part of the ESH management program is not well justified. The two species that are the focus of ESH management (piping plover and least tern) are biologically adapted to episodic flows, so a management program that targets their nesting habitat should seriously consider flows as a management tool.

Significance – High:

By not including episodic flows, the project may over-estimate the benefits of a static amount of mechanically created ESH and not meet the project objectives of maintaining target population numbers and fledge ratios of piping plovers and least terns.

Recommendations for Resolution:

To resolve these concerns:

1. Consider episodic flows in concert with mechanical creation of ESH as a long-term management plan for piping plovers and least terns.
2. Complete a modeling exercise similar to the one described above to better justify why episodic flows are not being considered as a part of the ESH management program.

Literature cited

Patten, D. T., D. A. Harpman, M. I. Voita, and T. J. Randle. 2001. A managed flood on the Colorado River; background, objectives, design, and implementation. *Ecological Applications* 11:635-643.

Final Panel Comment 4:

The ultimate goal of the ESH project is unclear.

Basis for Comment:

The panel was unsure about the primary goal of the Emergent Sandbar Habitat (ESH) project. The document stated a variety of goals that related to fledge ratios, population numbers (number of adults), and habitat (acreage of ESH). It is unclear if the overall goal is based on the birds or on habitat.

The ESH PEIS needs to have a clearly stated goal that guides all proposed actions. Proposed management alternatives, and ultimately a preferred alternative, should be developed directly from this goal, and the choice of a preferred alternative should provide a basis for all future actions. As the panel understands it, the primary goal is to increase fledge ratios of piping plovers (goal is 1.22 fledglings/pair) and least terns (goal is 0.94 fledglings/pair), not to just increase habitat. If this is true, the report should state this more clearly. As written, much of the report is focused on the mechanical aspects of creating ESH. This sends the wrong message – the goal is not to increase habitat per se, but to do so only as necessary to increase fledge ratios to some desired level. This suggests that the adaptive management components of the PEIS will be critical to attaining desired fledge ratios, if fledge ratios are indeed the focus of management.

With the focus on mechanical habitat creation, the document gives the impression that the choice of the preferred alternative (Alternative 3.5) was mostly arbitrary. If the goal is a bird response (measured by fledge ratios), then the level of habitat necessary to meet that goal on an annual basis should not be static, as proposed in each of the PEIS alternatives. Indeed, the amount of habitat necessary to maintain fledge ratios at the levels outlined in the 2003 BiOp might vary from year to year in response to flows (to create ESH), recruitment from previous years, and other factors.

One way to think of this is in terms of goals, strategies, and tactics. The following is an example:

- Goal: Enhance populations of piping plovers and least terns.
- Strategy: Increase ESH.
- Tactic: Mechanically create *X* acres of ESH on the *Y* segment.

Significance – High:

The alternatives analysis cannot be adequately completed without clear project goals because biological goals (i.e., fledge ratios or population numbers) might be able to be met with a variety of ESH acreages while physical goals (i.e., acreage of ESH) can only be met by creating the specified amount of ESH. In addition, to justify continuing the project as presented in the PEIS, it is necessary to clearly state the goal of the project against which its success will be measured.

Recommendations for Resolution:

To resolve these concerns:

1. Explicitly state the goal of the ESH management project more clearly, and then use this goal to better justify the choice of a preferred alternative.

Final Panel Comment 5:

The characterization of soil types is incorrect and incomplete; therefore, the potential impacts of soil disturbance on turbidity cannot be determined.

Basis for Comment:

The characterization of soils is incorrect and incomplete and does not adequately address the potential direct and indirect impacts of disturbing these soils. Section 5.1, Missouri River Basin General Characteristics, states that Vanda Havre is the dominant soil series. However, Vanda Havre is not a soil series; rather, Vanda and Havre are two different soil series. Subsequently, Section 5.2, Existing Conditions by River Segments, states that the Havre, Banks, Lohmiller, Sansarc, and Invale Series are the dominant soil series. The Vanda series is not mentioned, and soils are not discussed for the Fort Peck River Segment at all. Given the diversity of soils typically located in transitional environments (e.g., river channels to uplands), it is likely that other soil series also occur on these segments but are not mentioned.

These soils are not fully discussed with regards to particle size, particularly with regards to the presence of clay- and silt-sized particles. Data on all soil series are readily available from the Natural Resources Conservation Service Official Soil Series Description (http://soils.usda.gov/technical/classification/osd/index.html). Of particular concern is that most of these soils have relatively high clay contents and almost certainly also have large silt contents (Table 1).

Table 1. Clay content for the soils discussed in the ESH PEIS.

Series	Clay Content (%)
Sansarc	55-70
Vanda	35-60
Lohmiller	35-50
Havre	18-35
Invale	1-10
Banks	Typically negligible, though can be present in the control section.

Given these high clay and/or silt contents, earth moving and/or the erosion of emergent sandbar habitat (ESH) might be expected to mobilize large quantities of clay and/or silt which might increase turbidity in the river.

The environmental impacts of increased turbidity are myriad. High concentrations of fine-grained, inorganic particles can cause streams to fill with sediment. Fine-grained, inorganic particles can smother stream-bed and bank habitats, thereby burying and suffocating eggs and newly hatched organisms and filling interstitial spaces between sediments which are used by aquatic organisms. Fine-grained, inorganic particles also can damage gill structures, thereby decreasing resistance to disease, preventing proper egg and larval development, and interfering with particle feeding activities. Reduced light penetration may reduce the growth of aquatic plants, which may then impact aquatic organisms dependent upon aquatic plants for food, cover, and daily oxygen production. Reduced light penetration also may reduce the ability of aquatic organisms to pursue prey and/or avoid predators.

On the other hand, a moderate increase in turbidity may be beneficial to some native species. Dams are sediment traps, so turbidity on the Upper Missouri River has likely declined downstream of the dams. This may have created low-turbidity conditions under which native species adapted to moderate-turbidity conditions cannot successfully compete. Therefore, the proposed activities might actually create moderate-turbidity conditions that more favor these native species. However, even if this is the

case, there certainly is a threshold above which even native species adapted to moderate-turbidity conditions suffer.

Regardless, the effects of high turbidity must be assessed in two dimensions – the magnitude and the duration. Higher magnitudes can cause significant environmental problems if they occur infrequently and/or over short periods of time, while lower magnitudes can cause significant environmental problems if they occur frequently and/or over long periods of time.

Significance – High:

An accurate and complete analysis of the potential impacts of turbidity changes might alter the results of the alternatives analysis.

Recommendations for Resolution:

To resolve these concerns:

1. Soils should be better described and discussed for each of the segments. Currently, the PEIS references a USACE report (1992) when discussing soils. Instead, the PEIS should reference soil surveys, soil maps, and/or soil data produced by the Soil Conservation Service/Natural Resources Conservation Service. The latter are widely available through the Natural Resource Conservation Service Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/).
2. Potential impacts to soils themselves should be explicitly discussed. Soils are mapped because soils perform numerous ecosystem functions and provide numerous related ecosystem services. Psamments would not be appreciably altered; unconsolidated, undeveloped sand deposits are not significantly altered by earth moving. However, all other soils would be altered, and likely destroyed, by earth-moving activities.
3. Potential impacts related to turbidity, particularly potential direct and indirect impacts to the pallid sturgeon and potential indirect impacts to the least tern and the piping plover, should be explicitly discussed.

Literature Cited:

USACE. 1992. Fort Peck Dam/Fort Peck Lake Master Plan, Missouri River, Montana. Design Memorandum MFP-105D. Omaha District

Final Panel Comment 6:

The ESH project is dependent on sediment and a sediment budget has not been completed.

Basis for Comment:

The proposed creation of emergent sandbar habitat (ESH) will result in the mobilization of large volumes of sediments, both mechanically during ESH construction and naturally during subsequent ESH erosion. A comprehensive assessment of the proposed methods and potential impacts cannot be made without more detailed information on the availability and fate of sediments.

The mechanical construction of ESH will impact the sediment loads and erosion in each of the project's reaches. As material is removed from the river bed, the balance of the system will be upset and, over time, the system will proceed to re-stabilize. A source of sediment is required to rebalance the river. The source of the sediment (i.e. bank erosion, upstream sandbars, etc.) could negatively impact other areas of the reach unintentionally.

ESH is largely bare sand, lacking vegetation that slows flows and roots that bind sediments; therefore, it is inherently unstable and likely to be in motion during reasonably high flows. ESH construction requires a source of sand, whether its mined from on- or off-site. In either case, the availability of that sand must be ensured for the sustainability of the ESH construction program. Also in either case, mobilized sand could accumulate in and reduce the life span of the nearest downstream reservoir. This might be expected to increase if ESH is created, especially if sand is imported from outside of the active floodway.

Given that the availability and fate of sediments are central to the success of the proposed ESH construction program, a sediment budget should be completed for each segment focused that is on (a) the availability of sand for ESH and (b) the potential effects of ESH erosion on the life cycles of the downstream reservoirs. There is some reference in Appendix C to sediment and geomorphic analyses in Sections 2 and 5 of Appendix B. Section 2 of Appendix B briefly references a geomorphology report that was reviewed during the course of this analysis, though it is not clear what this report says or how this report was used to inform the PEIS with regards to sediment budgets and geomorphology. Section 5 of Appendix B briefly describes the specifics of the Fort Randall River Segment, and it is not at all clear how this relates to a sediment budget and geomorphology. The key discussion missing is how the previously conducted geomorphic analysis can or cannot be used as a sediment budget model.

Another element missing from the PEIS is a spatial analysis of changes in ESH locations on each reach. Are the ESH more or less in the same locations, albeit smaller? Or are the ESH moving downstream, as sediments are transported downstream but not replaced due to the sediment trapping efficiency dams? This is an important consideration from a sustainability standpoint, because a general trend of ESH moving in the downstream direction might imply that sand is being lost to the downstream reservoirs faster than it is being replaced by upstream reaches and the surrounding uplands. (Note, for example, Table 7-3 which indicates that there are negative sediment balances on the upper reaches and a large positive sediment balance on the lowest reach of the Fort Peck Segment, located in the backwater or the full pool of Lake Sakakawea.)

Another element missing from the PEIS is a fine-scale temporal analysis of changes in ESH on each reach. The redistribution of sediment can be rapid, particularly where daily ramping for power generation occurs. The data in this PEIS are on yearly time steps, and show changes in ESH total area of nearly 40% over the course of a year. However, it is not clear if this change is incremental or episodic. If it is incremental, then ESH creation can be effective. However, if it is episodic, then ESH creation only makes sense if ESH creation happens at a time of year when episodic erosive events are unlikely to occur for some reasonably long period of time. Perhaps this cannot be resolved in the PEIS. However, it

should be acknowledged in the PEIS and the specific study of this issue should be part of the adaptive management program.

There is a lot of discussion on using predictive models as part of an Adaptive Management Plan (Appendix H) but the plan is not very specific, especially with regards to the use of hydraulic and geomorphologic models. Table 8 in Appendix H provides anticipated annual percentage loss rates of ESH as a function of total ESH acreage within segments based not on predictive models which could simulate the sediment movement, but on a comparison of base observed data from 1998 and 2005. This is a one-time observation event that may or may not correctly predict potential future losses and could have been supplemented with loss predictions from data obtained in the geomorphology report described in Sections 2 and 5 of Appendix B. By having two sources of information, the values in Table 8, Appendix B would have better represented potential future losses. These values have a significant impact on future maintenance costs predictions and sediment movement impacts. By using both observed and predicted values a more solid foundation for several assumptions made in regards to the impact of the sediment movement in the river system can be made.

The PEIS does not address the fact that the river segments have relatively high clay and/or silt content that would be mobilized during the project, remain suspended in the water column for long distances downstream, and increase turbidity and impact aquatic organisms. It would be anticipated that the sediment balance model would be able to aid in predicting these inverse impacts once it is developed and calibrated.

Significance – High:

A complete accounting of sand availability and fate is central to the selection of the preferred alternative and future maintenance efforts. An accurate prediction of sediment budgets, therefore, impacts project recommendations, scheduling, costs, and ultimately the success of the project.

Recommendations for Resolution:

To resolve these concerns:

1. Use a sediment balance model to predict sediment balances in the river system for each individual segment to supplement the observed data used in the PEIS.
    a. Use the previously done data studies (Biedenharn et al. 2001 and USACE 2005) to create a sediment budget for each segment.
    b. If these previous studies are not complete enough to address the sediment balance concerns described by the panel, then complete a new sediment budget model analysis of each segment.
2. Include in the Adaptive Management Plan a monitoring of the annual movement of the sediment for the purpose of calibration of a predictive sediment budget model and then adjust the model annually to obtain a tool that can be used to predict future sediment imbalances.

Literature Cited:

Biedenharn, D.S. et al. 2001. Missouri River – Fort Peck Dam to Ponca State Park Geomorphological Assessment Related to Bank Stabilization. Prepared for USACE Omaha District. ERDC, Coastal and Hydraulic Laboratory. 3909 Halls Ferry Road, Vicksburg, MS 39180

USACE. 2005. Bank Stabilization Analysis Draft Report. Prepared by HDR Engineering Inc, West Consultants, Mussetter Engineering Inc., and IIHR Hydroscience and Engineering. Omaha NE.

Final Panel Comment 7:

The rule to not allow construction during the peak of recreation season is too restrictive.

Basis for Comment:

Costs of ESH creation are significantly affected by the time frame within which the creation must occur. Many of the recreation activities discussed in the PEIS are engaged in throughout the region and likely have viable substitute locations where they can continue to be performed without significant additional costs incurred by participants. When this is not true, the gains from ESH creation need to be discussed in relation to the losses from closure to recreation (if necessary) during specific time periods. In many cases, restricted access to localized areas may be possible with appropriate posting rather than full closure to recreationists. Closure or restricted access causes inconvenience to a smaller group of recreational users which needs to be weighed against the increased overall project cost that could be caused by short construction windows. These increased project costs are borne by the overall U.S. population and not specific to a smaller group of more local recreational users.

Further, disallowing construction during recreational seasons may not only lead to higher project costs but could eliminate some areas from ESH creation that could be more preferable due to biological and engineering considerations.

When recreational access is lost during specified periods, the recreationists from the region will be inconvenienced but regional economic impact will be small. It is likely these recreationists will continue to engage in other regional activities and make financial expenditures to do so, thus regional economic impacts will be offset. There will be shifting of regional impacts among economic sectors but not likely a significant change in total regional economic output. For these reasons it is important to understand the degree to which recreational participation is comprised of participants from out-of-region by recreation types. Regional impacts will be greater for those recreation types having significant out-of-region participants. This is true of both closure for construction or maintenance during selected time periods as well as expansion of recreational opportunities post ESH creation.

Overall, temporal restrictions to ESH creation activities will minimize adverse recreational impacts. However if the ESH creation and maintenance activities cannot be accomplished within the time allotted by these temporal restrictions, then adjustments to these restrictions will need to be made. Economic and other impacts of performing ESH creation and maintenance during recreation periods would be minimized by focusing on areas with a greater degree of substitute locations for affected recreational activities. One way to approach this would be to consider distributing ESH creation temporally across the entire regional area with a plan for minimizing recreational impacts. That is, developing a regional plan that temporally balances ESH construction in one area with non-construction in other areas having similar types of recreational opportunities, thereby creating maximum possibilities for geographic substitution by recreationists.

Significance – High:

Costs, determination of feasible areas for ESH creation, and regional economic impacts are all affected by not allowing construction during peak recreation season.

Recommendations for Resolution:

To resolve these concerns:

1. Discuss potential for a regional impact management plan for recreation that looks at recreation substitution among areas as ESH creation occurs.
2. Develop a contingency plan, or discuss how the contingency will be handled, when particular years have significantly higher losses of ESH that will affect quantities of necessary ESH creation.

3. Describe why it is necessary to close areas to recreation rather than use more localized posting of restricted access, if ESH creation/maintenance activities were to occur during peak recreation season.
4. Develop the recreation activity section of the PEIS in a manner that describes recreation in the region generally and then focuses upon specific regional differences in order to better focus on areas where substitute recreation possibilities for users are not available during ESH creation.
5. Discuss the degree to which recreational activity participants are from outside local regions, leading to potentially larger regional economic impacts from limited access or closure during ESH creation/maintenance.

Final Panel Comment 8:

Insufficient information was provided on the potential for vegetation removal to serve as an alternative method for emergent sandbar habitat (ESH) creation.

Basis for Comment:

In Section 4.9, vegetation removal is briefly introduced as an additional action that might be used to create ESH at a later date. A short paragraph in this section refers to an ongoing vegetation removal study but does not clearly summarize the objectives, methods, or preliminary or expected results of the study and does not clearly explain how the results of the study would be incorporated into the ESH project. Understanding more about this study would be particularly important if vegetation removal was found to be a vastly less expensive and lower impact method by which ESH can be created. This might be the case, especially in sparsely vegetated areas.

According to the PEIS, the preferred alternative would cost ~$50M/year over an unlimited number of years and would likely impact other physical, chemical, biological, and socioeconomic functions of the river. Some of these impacts might be locally acute (e.g., fish are likely to be driven away from areas in which there is active in-channel mining of sediments), while others might be widespread and chronic (e.g., turbidity might directly or indirectly impact pallid sturgeon and indirectly impact least tern and piping plover). The creation of ESH by vegetation removal would reduce these impacts, but might create other impacts (e.g., chemical removal might have unintended side effects on the nesting success of least terns and piping plovers). However, it is difficult to assess the potential benefits and unintended side effects without a more complete evaluation.

Significance – High:

The widespread use of vegetation removal in the ESH creation program could significantly change the costs and impacts of the preferred alternative.

Recommendations for Resolution:

To resolve these concerns:

1. The decision to create ESH primarily by earth moving and not by vegetation removal should be properly justified.
2. A functional hyperlink to the vegetation removal report should be included, if possible. However, such a link alone would not be sufficient. Instead, an effort also should be made to briefly summarize the objectives, methods, results, and conclusions of the report to the extent necessary for an understanding of why vegetation removal either is or is not a viable method for the creation of ESH.
3. As part of the discussion regarding vegetation removal, potential impacts unique to vegetation removal should be discussed. This is particularly a concern with regards to chemical means of vegetation removal, as chemicals or chemical by-products might have unintended side effects on the nesting success of least terns and piping plovers.
4. The method by which the results of the completed vegetation removal study will be incorporated into the final ESH creation program should be clearly described. This discussion should include the precise mechanisms by which such different and late information will be incorporated into what will otherwise be a very mature ESH creation plan.

Final Panel Comment 9:

The decision to impact environmental buffers in the creation of emergent sandbar habitat (ESH) on the Gavins Point Segment under the preferred alternative needs to be justified and explained.

Basis for Comment:

The PEIS identifies areas not suitable for ESH creation because such activities would result in "potentially significant impacts to either the natural or man-made environment" These areas are defined in Appendix B, Section 2.6:

> The basis for this evaluation assumes the existence of man-made and natural features that should be conserved or protected from the land use changes that would occur from ESH program implementation. These include known locations for the habitats of other protected plant and animal species, natural heritage and cultural resources, public and private infrastructure features, existing public and private recreational features, and other elements of the constructed environment. Included in this group are special habitats such as Clean Water Act Section 404 Jurisdictional Wetlands, and cultural and historical resources. The location of historical sites within the subject segments was incorporated into the overall exclusion area to avoid public disclosure of site locations. In addition to sensitive resources that should be avoided, a number of physical constraints limit the locations where ESH sites can be constructed. There are many high-energy or sediment starved reaches where the placement of substrate to construct sandbars would be nearly impossible. Construction and maintenance of ESH in these areas would not be feasible because of high costs, increases in occupational risks, and only brief persistence.

The avoidance of impacts to most of these features seems not only reasonable but also mandatory given the existing federal, state, and local regulatory frameworks. However, on the Gavins Point Segment, the preferred alternative requires that 146% of the area available after environmental buffers are applied be disturbed. In other words, on the Gavins Point Segment, the preferred alternative includes ~1,800 acres of programmatic impacts to features that should be avoided not only because avoidance is reasonable but also largely required by the existing federal, state, and local regulatory framework. Following the site-specific assessments, even less area than is expected to be available may be available for ESH creation. If so, then the area available after environmental buffers are applied may be even less than needed, particularly on the Garrison River Segment (where 90% of the area available after environmental buffers are applied would likely be disturbed under the preferred alternative) and certainly on the Gavins Point Segment (where 146% of the area available after environmental buffers are applied would likely be disturbed under the preferred alternative).

The PEIS states that these impacts would be incurred as part of the implementation of the preferred alternative without explanation or justification. The unfortunate consequence is that the violation of the environmental buffer guidelines in the selection of the preferred alternative appears to be arbitrary.

Significance – High:

The justification for allowing ~1,800 acres of programmatic impacts to reasonably avoided and legally protected land under the preferred alternative is not clear, making the selection of the preferred alternative appear arbitrary.

Recommendations for Resolution:

To resolve these concerns:

1. Include a better description of the environmental buffer guidelines and the conditions under which the environmental buffer guidelines can be violated.
2. Where environmental buffer guidelines are violated (e.g., Gavins Point Segment) or might be violated (e.g., Garrison River Segment) following site-specific assessments, a better description

of the specific impacts and the justification for those impacts should be provided.

3. Consideration should be given to moving ESH habitat from the Gavins Point Segment—where there is an ~1,800 acre deficit in area available after environmental buffers are applied—to another segment such as the Ft. Randall Segment—where there is an ~2,150 acre surplus in area available after environmental buffers are applied.
4. A clearer justification for the selection of Alternative 3.5 (as opposed to Alternative 4) as the preferred alternative should be provided. Both would be subject to the same adaptive management program which mandates specific population and/or fledge ratio targets be met, but the latter would not require a stated programmatic commitment to impacting ~1,800 acres of features that should be avoided.

Final Panel Comment 10:

The purpose of the recreational discussion is unclear.

Basis for Comment:

The presentation of recreation impacts resulting from the creation and maintenance of emergent sandbar habitat (ESH) is repetitive and confusing, the latter possibly because the reasoning behind the inclusion of recreation impacts is not clearly defined up front in the document. As an important aspect of the PEIS, it seems recreation has two major points of relevance. First, recreation is a critical feature in determining the time windows for ESH creation and maintenance activities, thereby having significant impacts on construction costs. Second, to the extent that recreational opportunities and quality are altered as a result of ESH creation and maintenance, understanding both the current baseline of recreational activities and changes in the post-ESH-project recreation level are important to assess.

Assessing the monetary significance of recreational impacts requires measurement of recreational values and expenditures. This is addressed in the PEIS to some extent by referring to a variety of past studies. However, this discussion is not clearly presented in one location or used to motivate the examination of recreational issues. On the one hand, recreation can be looked at as the frequency and types of activities, while on the other, as a set of activities generating economic value and regional economic impacts. Both are relevant and could be discussed more clearly in the PEIS.

Recreational values are different from expenditures, the latter being the source of regional impacts while the former are returns to society that are not reflected in expenditure data. For example, a recreator may value a day of fishing at $75 but only have to expend $50 to engage in the activity. The $50 spent will generate regional sales and multiplier effects throughout the economy (provided the money would not have been spent on other regional pursuits had the opportunity not existed, which is why the distinction between in-region and out-of-region participants is important). Yet the remaining, unspent $25 is still a benefit to the recreationist and society (i.e., consumer surplus). If ESH creation alters the quality of recreation, then the total value of the fishing day will be different. Changes in this unspent social value will be a project impact. If the frequency of activity is altered as a result of ESH creation, then both regional impacts caused by expenditure changes and altered levels of "unspent" value are relevant.

Significance – Medium:

The nature and significance of recreation impacts must be clearly described because recreation is used as a constraint on the ESH creation and maintenance timelines.

Recommendations for Resolution:

To resolve these concerns:

1. Discuss the motivation for addressing recreation prior to presenting information on recreation intensity and types.
2. Discuss why economic values, expenditures, and changes which could occur are worth considering and discuss whether the mix of in-region versus out-of-region participation could change as a result of ESH creation and maintenance.
3. Describe regional recreation that is common across all areas within the overall project region.
4. Only use segment-by-segment discussions to address unique recreational aspects of the segment that are not shared in common throughout the Missouri River Basin.
5. Consider whether the use of segment-specific recreational uniqueness could play a role in determining construction windows and identification of time periods that truly must be protected versus less "hard" time window rules for construction in segments where alternative recreational opportunities exist.

Final Panel Comment 11:

The "no-rise" impact should be a pre-determining factor and not a post-determining analysis.

Basis for Comment:

A standard statement used throughout Section 6 of the PEIS for several segments and alternatives is:

> A more detailed hydraulic/geomorphic assessment would be completed during site-specific planning, engineering and design. For all projects, designs would be developed so as to not significantly alter the conveyance capacity of the overall channel or sub-channels, recuing the potential impact on flooding. In line with the impact avoidance strategy for this program, when site-specific construction would be undertaken, a floodplain analysis would be conducted and 'no-rise' certification received prior to any construction.

This would appear to describe a floodplain analysis being conducted after the site has been selected, preliminary investigation completed, plans and specification prepared, and a contractor selected. The panel's concern is that if a no-rise certificate cannot be issued, then the site will have to be rejected after significant work had already been completed.

The PEIS describes some level of study already done for this effort and it appears that these data studies could be used to do a preliminary no-rise evaluation. There is a discussion in Appendix B, Section 2.6.3 on how the Upper Missouri River Fluvial Geomorphological Analysis (Biedenharn et al. 2001) was used in the initial screening process to eliminate areas where sandbar construction was not possible due to flow regime restriction buffers, but the analysis was not mentioned as an available tool for final site location criteria which may be more specific. The Upper Missouri River Bank Stabilization Analysis (USACE 2005) is presented in Appendix B, Section 2.1.6 as a data source, but the panel could not find where it was used in any of the analyses of the no-rise impact and thus it might need to be removed as a reference document. The use of these two data sources in any final site determination is not discussed. The panel has assumed that the two sources were not intended to be used in final design and more detailed studies for each site need to be undertaken to determine the no-rise impact of each project.

Significance – Medium:

The use of the hydraulic/geomorphic analysis to determine "no-rise" impacts affects the completeness and understanding of the water resources, surface water hydrology, and hydraulic discussions in Section 6 of the PEIS and the data collection effort required for final design.

Recommendations for Resolution:

To resolve these concerns:

1. Discuss the use and significance of Biedenharn et al. (2001) and USACE (2005) for each segment and alternative no-rise impact as described in Appendix B Sections 2.1.6 and 2.1.7.
2. Complete the hydraulic and geomorphic assessment as part of the data collection effort for the design phase as outlined in Appendix G, Section II. Final design should not proceed until the "no-rise" criteria are met.
3. If Recommendation 2 is done at an early stage in the project, then the general statement "…a floodplain analysis would be conducted and 'no-rise' certification received prior to any construction" would be better stated as "the previously done floodplain analysis is verified and 'no-rise' certification received prior to any construction" or similar wording.

Literature Cited:

Biedenharn, D.S. et al. 2001. Missouri River – Fort Peck Dam to Ponca State Park Geomorphological Assessment Related to Bank Stabilization. Prepared for USACE Omaha District. ERDC, Coastal and Hydraulic Laboratory. 3909 Halls Ferry Road, Vicksburg, MS 39180

USACE. 2005. Bank Stabilization Analysis Draft Report. Prepared by HDR Engineering Inc, West Consultants, Mussetter Engineering Inc., and IIHR Hydroscience and Engineering. Omaha NE.

Final Panel Comment 12:

The habitat mapping protocol and mapping products should be better explained.

Basis for Comment:

Consistent and accurate habitat mapping are critical components of both the alternatives analysis in the Programmatic Environmental Impact Statement (PEIS) and the proposed annual operation of the implemented emergent sandbar habitat (ESH) creation program. This is particularly true given that project objectives are so frequently stated in terms of habitat types with specific areas. However, information on the habitat mapping protocol and mapping products are inadequately presented, including the quality assurance/quality control (QA/QC) policies, the accuracy of the mapping products, the methods by which areas are corrected for changes in stage, and whether all habitat areas on all segments are corrected for changes in stage.

All of these issues are made increasingly important given the complexities of comparing mapping products produced at different times in environments with rapidly changing stages. The PEIS repeatedly acknowledges these challenges, and suggests that efforts were undertaken to correct habitat areas for stage. However, the methods used and whether the habitat areas in the tables are all stage corrected are not at all clear. For example, with regards to the methods used, it is not until Figure 10 of Appendix H that ESH-stage relationships are presented for the Gavins Point, Fort Randall, and Garrison River Segments. It is not clear how these curves were generated, or why there are not similar curves for the Fort Peck and Lewis & Clark Segments or for the many other habitats on all of the segments. Also, it is never made clear if these and/or similar curves were used to stage-correct all habitats in all segments.

Significance – Medium:

The lack of information needed to assess the mapping accuracy affects the completeness of the report and makes evaluating the conclusions reached in the PEIS difficult.

Recommendations for Resolution:

To resolve these concerns:

1. QA/QC protocols need to be clearly explained. Examples might include explanations of the standard training that each of the mapping personnel received, the reference to the standard mapping manual to which the mapping personnel had access, and the proportion of the map polygons that were reviewed for quality control purposes.
2. The methods by which the 56 quality control sites were selected need to be better explained. The report should clearly state how the QC sites were selected (randomly, regularly, or subjectively) and whether the selection was done in a stratified manner (i.e., by ensuring a certain proportion were in each habitat, on each segment, or were mapped by each of the mapping personnel).
3. The proportion of the total polygons delineated that contained at least one quality control site should be clearly stated.
4. The accuracy of the mapping products should be quantified. For example, the results could be summarized in an error matrix along with the producer, user, and overall accuracies (Lilles and Kiefer 1994, Rains et al. 2004).
5. Consider reducing the precision of the habitat acreages. Currently, habitat acreages are delineated to the nearest acre. Delineating with this degree of precision implies this degree of accuracy. However, the accuracy of the ESH and other marginal aquatic habitat mapping must be quite low, and is almost certainly greater than an acre, given the lack of control over water levels when habitats were mapped.
6. If stage-corrected values are used in all of the calculations, then this fact and the methods used need to be very clearly stated in a single section. If stage-corrected values are not used in all of the calculations, then this fact and the justification for this fact need to be very clearly stated in a

single section.

7. A more comprehensive effort should be undertaken to quantify the potential errors associated with mapping habitats subject to change in area as a function of change in stage. The results of this analysis could be used to justify reducing the precision of the habitat acreages, as suggested in Recommendation 5.

Literature cited:

Lilles, T.M., and R.W. Kiefer. 1994. Remote sensing and image interpretation. Third edition. John Wiley and Sons, New York, New York, USA.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. Simulated changes in shallow groundwater and vegetation distributions under different reservoir operations scenarios. *Ecological Applications* 14:192-207 .

Final Panel Comment 13:
The term "fledge ratio" is not well-defined, despite it being a critical monitoring variable.
Basis for Comment:
The panel was unable to find a clear definition of "fledge ratio" in the main document, yet it is a critical monitoring tool and a key element in the decision-making process. The panel recognized that "fledge ratio" was used as an index for reproductive success for both species (Appendix B, Attachment 2, pages 11-12), but the nature of the index and its assumptions are unclear. The panel also did not understand how and when the "fledge ratio" was calculated. It was unclear at what age/stage a chick gets counted as a fledgling, how many surveys are conducted to arrive at the "fledge ratio" estimates (if nesting is asynchronous, as is likely), and how the data from multiple surveys are combined.
Significance – Medium:
Fledge ratios are an important tool for assessing the strength of various ESH management options.
Recommendations for Resolution:
To resolve these concerns: 1. A clear definition of "fledge ratio," including a brief discussion of when and how it is calculated, should be included either in the beginning of the document (perhaps after Section 1.1.3.) or in the monitoring section (Appendix B, Section 1).

Final Panel Comment 14:
The term "significant" with regard to environmental impacts needs to be better defined.
Basis for Comment:
In the ESH PEIS, the section on environmental consequences (Section 6) discusses the potential impacts of actions on a variety of environmental resources. Throughout this section, the word "significant" is used to denote the severity of those impacts, yet this term is not clearly defined. It is unclear what is meant by "significant" and how its level was determined. Furthermore, no cut-off is defined to determine what is and is not "significant." For example, the subsections that describe the environmental consequences for fish and wildlife and federally listed species (i.e., subsections 6.2.1.3.2, 6.2.1.3.3, 6.2.2.3.2, 6.2.2.3.3, 6.2.3.3.2, 6.2.3.3.3, 6.2.4.3.2, 6.2.4.3.3) include many references to "significant" and "insignificant" consequences. In Section 6.5, Alternative 1, an impact to 15% of available high-bank to high-bank habitat is considered significant (page 6-122), with smaller percentages being insignificant, except in the Gavins Point Segment where 7% is considered significant for Alternative 5 (page 6-215). The percent needed for significance varies by segment, so the criteria used to define "significance" need to be explained and justified.
Significance – Medium:
The ability to understand the project, compare proposed actions, and evaluate the severity of the environmental consequences needs to be based on a clear determination of the significance of those consequences.
Recommendations for Resolution:
To resolve these concerns: 1. Add a paragraph that defines "significant" in the context of the PEIS and clearly outlines criteria for deciding the significance of an environmental consequence.

APPENDIX B

Final Charge to the Independent External Peer Review Panel

on the

Emergent Sandbar Habitat Programmatic Environmental Impact Statement

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Final Charge Guidance and Questions to the Peer Reviewers
for the
Independent External Peer Review for the Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River

BACKGROUND

The Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River provides National Environmental Policy Act (NEPA) coverage for the ongoing program of mechanical maintenance and construction of ESH as identified in Reasonable and Prudent Alternative Element IV B.3 in the U.S. Fish and Wildlife's Biological Opinion on the Operation of the Missouri River Main Stem System 2000, as amended in 2003 (BiOp). The BiOp identifies habitat goals (acres of ESH per mile) for specific riverine segments, as well as the upper end of Lewis and Clark Lake, in order to attain a desired minimum fledge ratio for two target species: the endangered interior least tern (*Sternula antillarum*) and the threatened Great Plains population of the piping plover *(Charadrius melodus)*. The Record of Decision (ROD) for this PEIS will be the decision document for implementing this program annually to provide sufficient habitat to meet each species' biological metrics. Due to uncertainty with regard to the number of acres needed for species recovery, the ROD will select an initial program construction goal which may be modified through adaptive management if monitoring data indicate that the acreage goals need to be adjusted.

The PEIS is a single-purpose effort intended to maintain and construct ESH for the purpose of increased least tern and piping plover productivity. When conditions on the Missouri River do not result in sufficient emergent sandbar habitat, the USACE will take appropriate actions to mechanically create and maintain ESH to meet the amended BiOp habitat goals. The need for this action is to ensure that operation of the Missouri River System (as described in USACE's Missouri River Mainstem Reservoir System Master Water Control Manual and Final Environmental Impact Statement) will not result in jeopardy to these listed species.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River (Emergent Sandbar Habitat PEIS) in accordance with the Department of the Army, U.S. Army Corps of Engineers, *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008 and the Office of Management and Budget *Final Information Quality Bulletin for Peer Review* (December 16, 2004).

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, validity of the research design, quality of data collection

procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

This purpose of the IEPR is to analyze the adequacy and acceptability of economic, engineering, and environmental methods, models, data, and analyses performed for the Emergent Sandbar Habitat PEIS. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by panel members with extensive experience in engineering, economics, and environmental issues relevant to the project. They should also have experience applying their subject matter expertise to coastal risk management.

The panel members will be "charged" with responding to specific technical questions as well as providing a broad technical (engineering, economic, and environmental) evaluation of the overall project. The panel members will identify, recommend, and comment upon the assumptions underlying the analyses as well as evaluate the soundness of models and planning methods. 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; the use of geotechnical, hydrologic, and hydraulic models; analyses; assumptions; and other scientific and engineering tools/methodologies used to inform decision-making.

The objectives of this task are to: a) prepare a work plan that will describe the process for conducting the Emergent Sandbar Habitat PEIS IEPR, b) identify potential panel members for the external peer review panel, and c) execute the work plan to conduct the external peer review.

DOCUMENTS PROVIDED

The following is a list of documents and supplemental information that will be provided for review. **The documents and files presented in bold font are those which are to be reviewed.** All other documents are provided for reference.

- **Draft Programmatic EIS (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River, with Appendices.**
  - **Main Report**
  - **Appendix A: Notice of Intent**
  - **Appendix B: Technical Appendix**
  - **Appendix C: Emergent Sandbar Habitat Mechanical Construction and Maintenance Assumptions**
  - **Appendix D: Missouri River Recreation Analysis**
  - **Appendix E: Scoping Summary**
  - **Appendix F: Real Estate**
  - **Appendix G: Site Selection**
  - **Appendix H: Adaptive Management and Monitoring**

- **Appendix I: Clean Water**

- U.S. Fish and Wildlife's Biological Opinion on the Operation of the Missouri River Main Stem System, November 30, 2000
- 2003 Amendment to the 2000 Biological Opinion, December 16, 2003
- Annual Reports from 2001 – 2006.
- USACE guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008;
- CECW-CP Memorandum dated March 31, 2007; and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

SCHEDULE

IEPR Task	Activity	Projected Date
1	NTP	November 16, 2009
	Draft Review documents available	December 3, 2009
	Final Review documents available	December 23, 2009
	*Submit Draft Work Plan	December 17, 2009
	USACE provides comments on Draft Work Plan	December 24, 2009
	Conference Call, if necessary	N/A
	*Submit Final Work Plan	December 31, 2009
	USACE approves Final Work Plan	January 4, 2010
2	Battelle requests input from USACE for the COI for recruiting peer reviewers	November 23, 2009
	Recruit and screen up to 8 potential peer reviewers; prepare summary information	December 9, 2009
	*Submit list of selected peer reviewers	December 9, 2009
	USACE comments on peer reviewers' COI	December 16, 2009
	Complete subcontracts for peer reviewers	January 4, 2010
3	*Submit Draft Charge (combine with Draft Work Plan – Task 1)	December 17, 2009
	USACE provides comments on draft charge	December 24, 2009
	*Submit Final Charge (combined with Final Work Plan – Task 1)	December 31, 2009
	USACE approves Final Charge	January 4, 2010
4	USACE/Battelle Kick off Meeting	November 19, 2009
	USACE/Battelle/panel Kick-off Meeting	January 7, 2010
5	Review documents sent to peer reviewers	January 5, 2010
	External peer reviewers complete their review	February 5, 2010
	Collate comments from peer reviewers	February 9, 2010
	Convene panel review conference call	February 11, 2010
	Panel members provide Final Panel Comments to Battelle	February 25, 2010
6	*Submit Final IEPR Report	March 17, 2010
7	*Input Final Panel Comments to DrChecks	March 19, 2010

IEPR Task	Activity	Projected Date
	USACE PDT provides draft Evaluator responses and clarifying questions to Battelle	March 26, 2010
	Teleconference between Battelle, panel members, and USACE to discuss final panel comments, draft responses & clarifying	April 5, 2010 (est.)
	USACE input final Evaluator responses in DrChecks	April 26, 2010
	Battelle inputs BackCheck responses in DrChecks (i.e. BackCheck)	May 17, 2010
	*Battelle submits pdf printout of DrChecks Phase I project file	May 18, 2010
	Project Closeout/Period of Performance Ends	June 30, 2010

* - denotes a deliverable

CHARGE FOR PEER REVIEW

Members of this peer review panel are asked to determine whether the technical approach and scientific rationale presented in the Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) (Emergent Sandbar Habitat PEIS) on the Upper Missouri River are credible and whether the conclusions are valid. The panel members 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 members are being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the panel members (by report section, Annex, or Appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Emergent Sandbar Habitat PEIS. 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 not 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 1105-2-410; Appendix D).

1. Assess the adequacy and acceptability of the economic, engineering, and environmental 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. Identify, explain, and comment on assumptions that underlie economic, engineering, ecological, geotechnical, hydrological, or environmental analyses.

4. Evaluate whether the interpretations of analysis and conclusions are reasonable.
5. 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.
6. 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. Comments should be provided based on your professional judgment, **not** the legality of the document.
7. If desired, IEPR reviewers can contact one another. However, IEPR reviewers **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.
8. Please contact the Battelle deputy project manager (Corey Wisneski, wisneskic@battelle.org) or project manager (Karen Johnson-Young, johnson-youngk@battelle.org) for requests or additional information.
9. In case of media contact, notify the Battelle project manager immediately.
10. Your name will appear as one of the panelists in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Corey Wisneski, wisneskic@battelle.org, no later than February 5, 2010, 7 pm EST.

Independent External Peer Review for the Programmatic Environmental Impact Statement (PEIS) for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat (ESH) on the Upper Missouri River

Final Charge Questions

GENERAL QUESTIONS

1. Comment on the adequacy and acceptability of the economic, engineering, and environmental methods, models and analyses used.

SECTION 1.0 – BACKGROUND

1.1. Project History and Authority

2. Please comment on whether the least tern and piping plover life histories are accurate and appropriate enough for the main report.

1.2. Relationship Between MRRP and ESH

No questions.

1.3. National Environmental Policy Act Overview and Programmatic EIS Objective

3. Is the NEPA strategy and tiering appropriate and consistent with other programmatic documents?

1.4. Relationship of the Programmatic EIS to the Master Manual EIS and ROD

No questions.

1.5. Tiering and Incorporation by Reference

See question 1.3.

1.6. Lead Agency and Cooperating Agency Designations

No questions.

1.7. Relevant Documents and Reports

No questions.

SECTION 2.0 – PURPOSE AND NEED FOR CORPS ACTION

2.1. Purpose and Need and 2.2 Scope

4. Are the purpose, need and scope clear and appropriate for the proposed management actions?

SECTION 3.0 – APPROACH TO PROGRAMMATIC IMPLEMENTATION AND ANALYSIS

3.1 Spatial, Topographic, Hydrologic, Substrate, and Nesting Data

5. Please comment on whether the list of key variables in this section is appropriate.

6. Please comment on whether the use of imagery performed in 1998/1999 and 2005 is sufficient, defensible, and relevant for use in predicting habitat delineations.

3.2 ESH Design, Construction, and Maintenance Assumptions

No questions.

3.3 Program Implementation within Missouri National Recreational River Segments

No questions.

3.4 Historic Preservation, Cultural Resources, and the Programmatic Agreement

No questions.

3.5 Site Selection, Monitoring, Data Management, and Reporting

No questions.

3.6 Programmatic Compliance with Section 404(b)(1) of the Clean Water Act

No questions.

3.7 Adaptive Management Plan

7. Please comment on the appropriateness of instituting the proposed adaptive management strategy for this project.

SECTION 4.0 – ALTERNATIVES

8. Please comment on the general approach to the analysis of program alternatives.

9. Please comment on the use of alternative acreages as check in points to assess biological response of the implementation of the preferred alternative.

4.1 Overview of Alternatives

10. Please comment on the basis used to identify species supporting habitat of the alternatives.

11. Please comment on the range of alternatives presented in the PEIS.

12. Please comment on whether the eight alternatives are adequately described.

13. Please comment on the decision to base the alternatives' target acreage of ESH on the amount of habitat available in the years plovers and terns had successful fledge ratios as defined in the Biological Opinion).

4.2 Programmatic Limitations on Construction and Maintenance

14. Please comment on the discussion of the spatial avoidance of sensitive resources.

15. Please comment on the discussion of the temporal avoidance of sensitive resources.

16. Please comment on the decision to allow construction activities to "continue past April 15 at the beginning of the nesting season" and to allow construction to "start before the birds leave the area in August."

17. Please comment on the decision to not allow construction during the peak of the recreational season.

4.3 Programmatic Assumptions for ESH Construction and Maintenance

No questions

4.4 Actions to Implement Alternatives by River Segment

18. Please comment on the alternative-specific ESH goals for the Fort Peck River Segment, including the magnitude of the construction activities necessary to implement each of the alternatives.

19. Please comment on the alternative-specific ESH goals for the Garrison River Segment, including the magnitude of the construction activities necessary to implement each of the alternatives.

20. Please comment on the alternative-specific ESH goals for the Fort Randall River Segment, including the magnitude of the construction activities necessary to implement each of the alternatives.

21. Please comment on the alternative-specific ESH goals for the Lewis and Clark Lake Segment, including the magnitude of the construction activities necessary to implement each of the alternatives.

22. Please comment on the alternative-specific ESH goals for the Gavins Point River Segment, including the magnitude of the construction activities necessary to implement each of the alternatives.

4.5 Summary of Construction Costs and Timeframe for the Alternatives

23. Please comment on the estimated construction costs for each of the alternatives.

24. Please comment on the estimated timeframes for each of the alternatives.

4.6 The Preferred Alternative

25. Please comment on the process by which the preferred alternative was chosen.

4.7 The Environmentally Preferred Alternative

26. Please comment on the process by which the environmentally-preferred alternative was chosen.

4.8 Alternatives Considered but Eliminated from Detailed Consideration

27. Please comment on the process by which some alternatives were eliminated from detailed consideration.

28. Please comment on whether the evidence against the use of flow manipulation warrants its exclusion from the list of alternatives.

4.9 Other Likely Actions to be Implemented (All Alternatives)

29. Please comment on whether the list of other actions likely to be implemented will have positive effects on plover and tern nesting success and fledging ratios, including:
    a. Land acquisition
    b. Public access restrictions
    c. Predation management
    d. Vegetation removal
    e. Operation and maintenance activities

30. Please comment on the completeness of the operation and maintenance discussion with regard to whether the documented activities are routine or are put into effect via site-specific trigger values.

SECTION 5.0 – AFFECTED ENVIRONMENT

5.1 Missouri River Basin General Characteristics

31. Please comment on whether the descriptions of the Missouri River Basin topographic and cultural history are accurate and adequate.

32. Please comment on whether the descriptions of the Missouri River Basin general physical and biological resources are accurate and adequate.

33. Please comment on whether the descriptions of the Missouri River Basin socioeconomic and historic resources are accurate and adequate.

34. Please comment on whether the information presented in this section sufficiently describes the soils with regard to the requirements for viable nesting habitat.

5.2 Existing Conditions by River Segments

35. Please comment on whether the description of the existing conditions of the Fort Peck River Segment – Segment 2 is appropriate and, to the best of your knowledge, accurate.

36. Please comment on whether the description of the existing conditions of the Garrison River Segment – Segment 4 is appropriate and, to the best of your knowledge, accurate.

37. Please comment on whether the description of the existing conditions of the Fort Randall River Segment – Segment 8 is appropriate and, to the best of your knowledge, accurate.

38. Please comment on whether the description of the existing conditions of the Lewis and Clark Lake Segment – Part of Segment 9 is appropriate and, to the best of your knowledge, accurate.

39. Please comment on whether the description of the existing conditions of the Gavins Point River Segment – Segment 10 is appropriate and, to the best of your knowledge, accurate.

40. Please comment on whether the segment-specific background discussions on water resources are sufficient for subsequent evaluation of the ESH program.
    a. Should any additional information be included in the analysis?

SECTION 6.0 – ENVIRONMENTAL CONSEQUENCES (Please note that there are several charge questions in this section that appear to be the same. However, each questions refers to a different segment)

41. Please comment on the use of site specific assessments to reduce the adverse impacts of construction activities on ecologically valuable habitat.

42. Please comment on the use of spatial analysis to determine the amount of non-wetland area within a river segment that can be used for project construction.

6.1. Subject Headings Eliminated from Analysis of Environmental Consequences

43. Please comment on the accuracy of the list of subject headings that will not receive further environmental consequence discussion and whether you agree with the reasons stated for foregoing further discussion on each subject.

6.2. Fort Peck River Segment – Segment 2

44. Please comment on the potential environmental consequences to physical resources in this segment during construction for each alternative.

45. Please comment on the appropriateness of the actions described to limit impacts to physical resources.

46. Please comment on the potential environmental consequences to water resources in this segment during construction for each alternative.

47. Please comment on the appropriateness of the actions described to limit impacts to water resources.

48. Please comment on the potential environmental consequences to biological resources in this segment during construction for each alternative.

49. Please comment on the appropriateness of the actions described to limit impacts to biological resources.

50. Please comment on the potential environmental consequences to socioeconomic resources in this segment during construction for each alternative.

51. Please comment on the appropriateness of the actions described to limit impacts to socioeconomic resources.

52. Please comment on the conclusion that constructing and maintaining the alternatives will result in no risk of significant encroachment into the available cross-sectional area in the Fort Peck River segment.
    a. Do you agree that other risks (such as erosion and degradation) also will be minimal?

53. Please comment on whether the proposed pre- and post-construction surveys are sufficient for evaluating the response of the Fort Peck River Segment.

6.3. Garrison River Segment – Segment 4

54. Please comment on the potential environmental consequences to physical resources in this segment during construction for each alternative.

55. Please comment on the appropriateness of the actions described to limit impacts to physical resources.

56. Please comment on the potential environmental consequences to water resources in this segment during construction for each alternative.

57. Please comment on the appropriateness of the actions described to limit impacts to water resources.

58. Please comment on the potential environmental consequences to biological resources in this segment during construction for each alternative.

59. Please comment on the appropriateness of the actions described to limit impacts to biological resources.

60. Please comment on the potential environmental consequences to socioeconomic resources in this segment during construction for each alternative.

61. Please comment on the appropriateness of the actions described to limit impacts to socioeconomic resources.

62. Please comment on whether the proposed pre- and post-construction surveys are sufficient for evaluating the response of the Garrison River Segment.

6.4. Fort Randall River Segment – Segment 8

63. Please comment on the potential environmental consequences to physical resources in this segment during construction for each alternative.

64. Please comment on the appropriateness of the actions described to limit impacts to physical resources.

65. Please comment on the potential environmental consequences to water resources in this segment during construction for each alternative.

66. Please comment on the appropriateness of the actions described to limit impacts to water resources.

67. Please comment on the potential environmental consequences to biological resources in this segment during construction for each alternative.

68. Please comment on the appropriateness of the actions described to limit impacts to biological resources.

69. Please comment on the potential environmental consequences to socioeconomic resources in this segment during construction for each alternative.

70. Please comment on the appropriateness of the actions described to limit impacts to socioeconomic resources.

71. Please comment on whether the proposed pre- and post-construction surveys are sufficient for evaluating the response of the Fort Randall River Segment.

6.5 Lewis and Clark Lake Segment – Part of Segment 9

72. Please comment on the potential environmental consequences to physical resources in this segment during construction for each alternative.

73. Please comment on the appropriateness of the actions described to limit impacts to physical resources.

74. Please comment on the potential environmental consequences to water resources in this segment during construction for each alternative.

75. Please comment on the appropriateness of the actions described to limit impacts to water resources.

76. Please comment on the potential environmental consequences to biological resources in this segment during construction for each alternative.

77. Please comment on the appropriateness of the actions described to limit impacts to biological resources.

78. Please comment on the potential environmental consequences to socioeconomic resources in this segment during construction for each alternative.

79. Please comment on the appropriateness of the actions described to limit impacts to socioeconomic resources.

80. Please comment on whether the proposed pre- and post-construction surveys are sufficient for evaluating the response of the Lewis and Clark Lake Segment.

81. Please comment on whether the design conditions specified in Section 6.5.4.2.2 sufficient to minimize the effects of aggradation, degradation, and erosion resulting from implementation of Alternative 3.5?

6.6 Gavins Point River Segment – Segment 10

82. Please comment on the potential environmental consequences to physical resources in this segment during construction for each alternative.

83. Please comment on the appropriateness of the actions described to limit impacts to physical resources.

84. Please comment on the potential environmental consequences to water resources in this segment during construction for each alternative.

85. Please comment on the appropriateness of the actions described to limit impacts to water resources.

86. Please comment on the potential environmental consequences to biological resources in this segment during construction for each alternative.

87. Please comment on the appropriateness of the actions described to limit impacts to biological resources.

88. Please comment on the potential environmental consequences to socioeconomic resources in this segment during construction for each alternative.

89. Please comment on the appropriateness of the actions described to limit impacts to socioeconomic resources.

90. Please comment on whether the proposed pre- and post-construction surveys are sufficient for evaluating the response of the Gavins Point River Segment.

91. Please comment on the potential impacts of constructing and maintaining Alternative 3.5 on the cross-sectional area and river hydraulics.

92. Please comment on the potential significant effects to aggradation, degradation, and erosion from constructing and maintaining Alternative 3.5.

93. Please comment on the exceedence of available area while construction and maintaining Alternative 3.5, and the use of Adaptive Management to implement up to the acreage goal.

6.7 Unavoidable Adverse Impacts

94. Please comment on whether the segment-specific descriptions of the unavoidable adverse impacts are accurate and complete.

95. Please comment on the stated impacts to wetland areas, fish habitat, and food webs due to the required annual maintenance of the project.

6.8 Relationship Between Short-Term Uses of the Environment/Long-Term Productivity

No questions

6.9 Irreversible or Irretrievable Commitments of Resources

No questions

6.10 List of Required Federal Permits and Other Authorizations

No questions

SECTION 7.0 – SUMMARY AND COMPARISON OF ENVIRONMENTAL EFFECTS

7.1 Summary of Environmental Effects of the Action Alternatives

No questions

SECTION 8.0 – AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

8.1 Summary of Measures to Avoid and Minimize Resources

No questions

SECTION 9.0 – COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

No questions

SECTION 10.0 – CUMULATIVE EFFECTS

10.1 Reasonably Foreseeable Future Actions

96. Please comment on whether the document adequately addresses the cumulative effects of the proposed action in the context of other basin actions.

97. Please comment on whether the document adequately describes the reasonably foreseeable future actions (e.g. spring pulse flow modification and system unbalancing).

98. Please comment on the conclusion that the implementation of the ongoing spring pulse flow modification program will not provide sufficient flow to create nesting habitat.

99. Please comment on the effectiveness of employing system unbalancing to enhance fish and wading bird habitat.

SECTION 11.0 – TRIBAL CONSULTATION

No questions

SECTION 12.0 – PUBLIC INVOLVEMENT

100. Please comment on whether there was adequate opportunity for the public to be involved in the EIS preparation process.

SECTION 13.0 – LIST OF PREPARERS

No questions

Appendix A: Notice of Intent

No questions

Appendix B: Technical Appendix

101. Please comment on the applicability of the use of 2005 data and the discussion on the necessity, number and frequency of periodic updates.

102. Please comment on the thoroughness and correctness of the technical investigation and analyses.

103. Please comment on whether the document accurately defines and describes the habitat types found within the project area.

104. Please comment on the thoroughness and accuracy of the field verification sampling.

Appendix C: Emergent Sandbar Habitat Mechanical Construction and Maintenance Assumptions

105. Please comment on the programmatic assumptions for landside improvements necessary to support ESH construction actions.

106. Please comment on the design and construction assumptions for ESH construction.

107. Please comment on the temporal and spatial restrictions designed to avoid significant environmental consequences.

108. Please comment on the calculated quantities of materials necessary for the creation and maintenance of emergent sandbar habitat for each alternative and segment.

109. Please comment on the estimated area of disturbance for each alternative and segment.

110. Please comment on the estimated days of mechanical and dredge work necessary for each alternative and segment.

Appendix D: Missouri River Recreation Analysis

111. Please comment on the approach employed to estimate recreational use in Appendix D.

112. Please comment on the extent to which the baseline recreation use and impacts of alternative projects are thoroughly and accurately described in Appendix D.

Appendix E: Scoping Summary

No questions

Appendix F: Real Estate

113. Please comment on the anticipated real estate requirements for the acquisition of undeveloped lands for the Emergent Sandbar Habitat project.

Appendix G: Site Selection

114. Please comment on the suitability and effectiveness of the three general categories of habitat selection criteria for this program.

115. Please comment on the site selection process.

116. Please comment on the design process.

117. Please comment on the staging area selection process and criteria.

118. Please comment on the construction guidelines developed to limit impacts to local hydrology.

Appendix H: Adaptive Management and Monitoring

119. Please comment on the rationale for and suitability of each of the five adaptive management objectives.

120. Please comment on the measurement and target for each of the five adaptive management objectives outlined in this Appendix.

121. Please comment on the strategy and suitability of the conceptual model for adaptive management.

122. Please comment on the accuracy and appropriateness of the uncertainties identified for the adaptive management strategy.

123. Please comment on the appropriateness of the adaptive management strategies at the different levels and scales.

124. Please comment on the scope and suitability of the monitoring plan for the ESH program.

125. Please comment on the suitability of the predictive models to be used in assessing the success of the ESH program.

126. Please comment on the various pilot-scale methods considered for creating and maintaining emergent sandbar habitat.

Appendix I: Clean Water

No questions