

Final Independent External Peer Review Report Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
National Planning Center of Expertise for Ecosystem Restoration
Mississippi Valley Division

Contract No. W912HQ-10-D-0002
Task Order: 0052

May 9, 2014

This page is intentionally left blank.

CONTRACT NO. W912HQ-10-D-0002
Task Order: 0052

Final Independent External Peer Review Report Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement

Prepared by

Battelle
505 King Avenue
Columbus, Ohio 43201

for

Department of the Army
U.S. Army Corps of Engineers
National Planning Center of Expertise for Ecosystem Restoration
Mississippi Valley Division

May 9, 2014

This page is intentionally left blank.

Final Independent External Peer Review Report Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement

Executive Summary

PROJECT BACKGROUND AND PURPOSE

The Skokomish River Basin is located on Hood Canal, a natural fjord-like arm of the Puget Sound and water of national significance. The Skokomish River Basin is located in northwest Washington, predominantly in Mason County. The project study area is comprised of the entire drainage basin, including the estuary. The river collects drainage from an approximate 240-square mile drainage basin, and eventually flows into southern Hood Canal, an arm of Puget Sound. Environmental degradation can be seen throughout the Skokomish River Basin including a loss of natural ecosystem structures, function, and processes necessary to support critical fish and wildlife habitat.

The degradation of riverine and estuarine habitat has resulted in the listing of four anadromous fish species under the Endangered Species Act (ESA) (Chinook salmon, chum salmon, steelhead trout, and bull trout) that utilize the river as their primary habitat. The impaired ecosystem has adversely affected riverine, wetland, and estuarine habitats that are critical to these and other listed species.

The increased degradation of riverine and estuarine aquatic habitat has caused a decline in the population of critical fish and wildlife species. Additionally, the channel capacity of the Skokomish River varies significantly. Limited channel capacity causes floodwater to leave the bank at various locations, ultimately causing frequent flooding of local roads, two state highways, agricultural fields, residences, and other structures.

The planning objectives of this study, for the 50-year period of analysis, are to:

1. Increase the channel capacity of the Skokomish River to allow for restoration of rearing habitat, as well as reduce stranding of ESA-listed salmonid species
2. Provide year-round passage for fish species around the confluence of the North Fork and South Fork Skokomish River
3. Restore the side channel and tributary networks in the study area including Hunter and Weaver Creeks
4. Improve the quality, quantity, and complexity of native floodplain habitats including riparian and wetland habitats in the Skokomish River mainstem and tributaries.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement (hereinafter: Skokomish DFR-EIS IEPR). As a 501(c)(3) non-profit science and

technology organization, Battelle is independent, is free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate the IEPR of the Skokomish DFR-EIS. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the Skokomish DFR-EIS review documents and the overall scope of the project, Battelle identified candidates for the Panel in the following key technical areas: plan formulation, environmental, hydraulic engineering, and civil design/construction engineering. USACE was given the list of candidate panel members, but Battelle selected the final four members of the Panel.

The Panel received an electronic version of the 599-page Skokomish DFR-EIS review documents, along with a charge that solicited comments on specific sections of the documents to be reviewed. USACE prepared the charge questions following guidance provided in USACE (2012) and OMB (2004), which were included in the draft and final Work Plans.

The USACE Project Delivery Team briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the Skokomish DFR-EIS documents individually. The panel members then met via teleconference with Battelle to review key technical comments and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of: (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, eight Final Panel Comments were identified and documented. Of these, one was identified as having medium/high significance, three were identified as having medium significance, three had medium/low significance, and one had low significance.

Battelle received public comments from USACE on the Skokomish DFR-EIS (approximately 25 verbal transcripts and written comments equating to 32 total pages of comments) and provided them to the IEPR panel members. The panel members were charged with determining if any information or concerns presented in the public comments raised any additional discipline-specific technical concerns with regard to the Skokomish DFR-EIS review documents. After completing their review, the Panel confirmed that no new issues or concerns were identified other than those already covered in their Final Panel Comments. The Panel also determined that adequate stakeholder involvement had occurred.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the engineering and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Skokomish DFR-EIS review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The

full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the Skokomish DFR-EIS is well-written and concise. The DFR-EIS addresses most of the important technical project issues in a practical, easily understood, and logical manner. In general, the models and assumptions used in the analyses are sound and applied in an appropriate manner to support the conclusions drawn from them. While the Panel believes that many technical aspects of the engineering, plan formulation, and environmental issues of the Skokomish River Basin project are reasonable and presented clearly, the Panel identified some elements of the DFR-EIS where additional documentation and clarification is warranted.

Civil Design/Construction Engineering: The civil design/construction engineering models (including data completeness and quality) are consistent with project planning and preliminary engineering using the best engineering professional judgment based on the current knowledge of, and experience in, the project area. The Panel understands that more complete data development and engineering modeling will be conducted during the subsequent project phase of pre-construction engineering and design (PED). For the IEPR, the Panel is particularly concerned that the scope and estimated costs of the Tentatively Selected Plan's (TSP) operation and maintenance (O&M) plan are underestimated. The proposed budget for O&M may not be enough to implement prevention and mitigation measures and therefore to ensure optimal project performance over the full 50-year planning period. To address this issue, USACE could explain in more detail how the O&M scope and budget will be sufficient, discuss how certain issues (e.g., sediment aggradation, erosion) will be addressed after the 10-year adaptive management period, and investigate how the TSP might be revised to minimize future O&M needs. In addition, the Panel notes that life safety issues are not discussed in the DFR-EIS, especially with regard to the Grange Levee Setback, where there may be flooding or levee overtopping issues for nearby residential structures. This can be addressed by discussing the TSP's life safety considerations in general in the DFR-EIS and documenting specific issues associated with the levee setback.

Plan Formulation: The DFR-EIS follows the planning process very well and is logical, thorough, and demonstrates good collaborative effort. The figures showing the project alternative are very clear and helpful for documenting the alternatives various components. USACE does an excellent job of addressing this complex project using the USACE SMART Planning process. The Panel is mainly concerned that the DFR-EIS does not fully address the restoration project's sustainability with regard to upstream and downstream activities. The review documents do not clearly describe and assess the current extent of activities that could negatively affect the project, such as timber harvesting, fishing, and agriculture. The Panel believes that a description of basin-wide collaborative efforts with major landholders and a discussion of the best practices that could be used to ensure the TSP's sustainability would address this concern.

Hydraulic Engineering: From a hydraulic engineering standpoint, USACE does an excellent job of documenting the uncertainties related to various components of the study, namely developing increment measures throughout the study reach and documenting project uncertainties and data deficiencies. The hydraulic and sediment transport analysis is also consistent and reasonable for a feasibility-level study. Of concern to the Panel is that the project does not appear to consider the residual risk of future channel migration during the post-adaptive management (AM) period, which could negatively affect the TSP function and performance and potentially eliminate ecosystem restoration benefits. In particular, should the channel's alignment change in the future due to sediment aggradation, floodplain habitat could be lost, migration pathways could be blocked, and tributaries could be cut off. The residual risk associated

with this should be discussed in the DFR-EIS and accounted for in the environmental benefit outputs and the cost effectiveness/incremental cost analysis (CE/ICA). Furthermore, the Panel recommends that the project time beyond the 10-year period for monitoring and adaptive management actions be extended to reduce residual risks.

Environmental: The Panel finds the salmonid components of the environmental benefits model to be appropriate and account for problems in habitat suitability methodologies. The Panel recognizes that USACE is dealing with a complex ecosystem and the risk analysis covers most of the expected biological uncertainty. The Panel concludes that environmental analyses are consistent with generally accepted methodologies for freshwater and estuarine fisheries and ecology surveys. Appendix A in particular provides a good review of the ecological literature on the Skokomish River Basin system, and the ecological data presented in the appendix are interpreted carefully. The Panel is somewhat concerned about the absence of additional juvenile salmon pond rearing habitat in the restoration plan; by incorporating redundant rearing locations, the project will be more resilient to climate-related changes and other difficult-to-predict issues. New rearing areas should be added to the floodplain in locations that provide good connections with existing channels and tributaries. The Panel also notes that the project does not have geospatial data on stranding events, which is important for assessing short-term collateral damage from the TSP and analyzing long-term project success. The DFR-EIS would benefit from the addition of baseline quantitative and spatial data on salmon stranding.

Table ES-1. Overview of Eight Final Panel Comments Identified by the Skokomish DFR-EIS IEPR Panel

No.	Final Panel Comment
Medium/High – Significance	
1	The O&M scope and costs of the TSP appear insufficient to meet the objectives and function as designed for the life of the project.
Medium – Significance	
2	The sustainability of the restoration project with regard to upstream and downstream activities has not been fully addressed.
3	The restoration project does not appear to have fully considered the residual risk of future channel migration adversely affecting the function and performance of the TSP.
4	The absence of additional rearing habitat for juvenile salmonids in the TSP reduces the plan's redundancy, resiliency, and robustness and increases the risk of diminished salmonid recovery during the life of the project.
Medium/Low – Significance	
5	The DFR-EIS does not discuss life safety issues associated with the Grange Levee Setback, a component of the TSP, including potential effects of overbank flooding and levee overtopping or breaching.

Table ES-1, continued. Overview of Eight Final Panel Comments Identified by the Skokomish DFR-EIS IEPR Panel

No.	Final Panel Comment
6	Sufficient data on stranding (including baseline metrics such as location) are not available to determine the significance of salmon pre-spawn mortality and juvenile salmon mortality and how habitat restoration would reduce stranding effects.
7	The DFR-EIS does not describe which datasets of comparable reference habitats will be used to assess the project's density of juvenile salmon per unit area, a proposed effectiveness measure for restoration success.
Low – Significance	
8	The risk that the estuarine placement of dredged sediment may damage critical salmonid habitat on the foreshore has not been clearly assessed.

Table of Contents

	Page
Executive Summary	iii
1. INTRODUCTION.....	1
2. PURPOSE OF THE IEPR.....	2
3. METHODS FOR CONDUCTING THE IEPR	2
4. RESULTS OF THE IEPR.....	4
4.1 Summary of Final Panel Comments	4
4.2 Final Panel Comments.....	4
5. REFERENCES.....	15
Appendix A. IEPR Process for the Skokomish DFR-EIS Project	
Appendix B. Identification and Selection of IEPR Panel Members for the Skokomish DFR-EIS Project	
Appendix C. Final Charge to the IEPR Panel as Submitted to USACE on February 21, 2014, for the Skokomish DFR-EIS Project	

List of Tables

	Page
Table ES-1. Overview of Eight Final Panel Comments Identified by the Skokomish DFR-EIS IEPR Panel	vi
Table 1. Major Milestones and Deliverables of the Skokomish DFR-EIS IEPR	2

LIST OF ACRONYMS

AM	Adaptive management
ATR	Agency Technical Review
CE/ICA	Cost effectiveness/incremental cost analysis
COI	Conflict of Interest
CWRB	Civil Works Review Board
DFR-EIS	Draft Feasibility Report-Environmental Impact Statement
DrChecks	Design Review and Checking System
EC	Engineer Circular
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
IEPR	Independent External Peer Review
O&M	Operation and maintenance
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PDT	Project Delivery Team
PED	Pre-construction engineering and design
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
TSP	Tentatively Selected Plan
WRDA	Water Resources Development Act

1. INTRODUCTION

The Skokomish River Basin is located on Hood Canal, a natural fjord-like arm of the Puget Sound and water of national significance. The Skokomish River Basin is located in northwest Washington, predominantly in Mason County. The project study area is comprised of the entire drainage basin, including the estuary. The river collects drainage from an approximate 240-square mile drainage basin, and eventually flows into southern Hood Canal, an arm of Puget Sound. Environmental degradation can be seen throughout the Skokomish River Basin including a loss of natural ecosystem structures, function, and processes necessary to support critical fish and wildlife habitat.

The degradation of riverine and estuarine habitat has resulted in the listing of four anadromous fish species under the Endangered Species Act (ESA) (Chinook salmon, chum salmon, steelhead trout, and bull trout) that utilize the river as their primary habitat. The impaired ecosystem has adversely affected riverine, wetland, and estuarine habitats that are critical to these and other listed species.

The increased degradation of riverine and estuarine aquatic habitat has caused a decline in the population of critical fish and wildlife species. Additionally, the channel capacity of the Skokomish River varies significantly. Limited channel capacity causes floodwater to leave the bank at various locations, ultimately causing frequent flooding of local roads, two state highways, agricultural fields, residences, and other structures.

The planning objectives of this study, for the 50-year period of analysis, are to:

1. Increase the channel capacity of the Skokomish River to allow for restoration of rearing habitat, as well as reduce stranding of ESA-listed salmonid species
2. Provide year-round passage for fish species around the confluence of the North Fork and South Fork Skokomish River
3. Restore the side channel and tributary networks in the study area including Hunter and Weaver Creeks
4. Improve the quality, quantity, and complexity of native floodplain habitats including riparian and wetland habitats in the Skokomish River mainstem and tributaries.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement (hereinafter: Skokomish DFR-EIS IEPR) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE), Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and the Office of Management and Budget (OMB) bulletin *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) 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).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, environmental, and plan formulation analyses contained in the Skokomish DFR-EIS IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted. Appendix B provides biographical information on the IEPR panel members and describes the method

Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to USACE on February 21, 2014.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012).

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 engineering, environmental, and plan formulation analyses of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies 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 Skokomish DFR-EIS was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. Table 1 presents the major milestones and deliverables of the Skokomish DFR-EIS IEPR. Due dates for milestones and deliverables are based on the award/effective date of February 7, 2014. Note that the work items listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on May 29, 2014. The actual date for contract end will depend on the date that all activities for this IEPR, including Civil Works Review Board (CWRB) preparation and participation, are conducted.

Table 1. Major Milestones and Deliverables of the Skokomish DFR-EIS IEPR

Task	Action	Due Date
1	Award/Effective Date	2/7/2014
	Review documents available	2/12/2014
2	Battelle submits list of selected panel members	2/21/2014
	USACE confirms the panel members have no COI	2/24/2014
3	Battelle convenes kick-off meeting with USACE	2/14/2014
	Battelle convenes kick-off meeting with USACE and panel members	3/6/2014

Table 1, continued. Major Milestones and Deliverables of the Skokomish DFR-EIS IEPR

Task	Action	Due Date
4	Panel members complete their individual reviews	3/20/2014
	Panel members provide draft Final Panel Comments to Battelle	3/31/2014
	Award of Task Order Modification for review of public comments	5/2/2014
	Battelle sends public comments to panel members for review	5/2/2014
	Panel confirms no additional Final Panel Comment is necessary with regard to the public comments	5/8/2014
5	Battelle submits Final IEPR Report to USACE	5/9/2014
6 ^a	Battelle convenes Comment-Response Teleconference with panel members and USACE ^b	5/27/2014
	Battelle submits pdf printout of DrChecks project file to USACE	6/9/2014
	Agency Decision Milestone (ADM) Meeting	6/10/2014
	CWRB Meeting (Estimated Date) ^c	1/15/2015
	Contract End/Delivery Date	2/6/2015

^a Task 6 occurs after the submission of this report.

^b This teleconference date is tentative, pending the availability of all participants

^c The CWRB meeting was listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: plan formulation, environmental, hydraulic engineering, and civil design/construction engineering. The Panel reviewed the Skokomish DFR-EIS documents and produced eight Final Panel Comments in response to 17 charge questions provided by USACE for the review. This charge included two questions added by Battelle that sought summary information from the IEPR Panel. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-214, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the

preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the engineering and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Skokomish DFR-EIS review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the Skokomish DFR-EIS is well-written and concise. The DFR-EIS addresses most of the important technical project issues in a practical, easily understood, and logical manner. In general, the models and assumptions used in the analyses are sound and applied in an appropriate manner to support the conclusions drawn from them. While the Panel believes that many technical aspects of the engineering, plan formulation, and environmental issues of the Skokomish River Basin project are reasonable and presented clearly, the Panel identified some elements of the DFR-EIS where additional documentation and clarification is warranted.

Civil Design/Construction Engineering: The civil design/construction engineering models (including data completeness and quality) are consistent with project planning and preliminary engineering using the best engineering professional judgment based on the current knowledge of, and experience in, the project area. The Panel understands that more complete data development and engineering modeling will be conducted during the subsequent project phase of pre-construction engineering and design (PED). For the IEPR, the Panel is particularly concerned that the scope and estimated costs of the Tentatively Selected Plan's (TSP) operation and maintenance (O&M) plan are underestimated. The proposed budget for O&M may not be enough to implement prevention and mitigation measures and therefore to ensure optimal project performance over the full 50-year planning period. To address this issue, USACE could explain in more detail how the O&M scope and budget will be sufficient, discuss how certain issues (e.g., sediment aggradation, erosion) will be addressed after the 10-year adaptive management period, and investigate how the TSP might be revised to minimize future O&M needs. In addition, the Panel notes that life safety issues are not discussed in the DFR-EIS, especially with regard to the Grange Levee Setback, where there may be flooding or levee overtopping issues for nearby residential structures. This can be addressed by discussing the TSP's life safety considerations in general in the DFR-EIS and documenting specific issues associated with the levee setback.

Plan Formulation: The DFR-EIS follows the planning process very well and is logical, thorough, and demonstrates good collaborative effort. The figures showing the project alternative are very clear and helpful for documenting the alternatives various components. USACE does an excellent job of addressing this complex project using the USACE SMART Planning process. The Panel is mainly concerned that the DFR-EIS does not fully address the restoration project's sustainability with regard to upstream and downstream activities. The review documents do not clearly describe and assess the current extent of activities that could negatively affect the project, such as timber harvesting, fishing, and agriculture. The

Panel believes that a description of basin-wide collaborative efforts with major landholders and a discussion of the best practices that could be used to ensure the TSP's sustainability would address this concern.

Hydraulic Engineering: From a hydraulic engineering standpoint, USACE does an excellent job of documenting the uncertainties related to various components of the study, namely developing increment measures throughout the study reach and documenting project uncertainties and data deficiencies. The hydraulic and sediment transport analysis is also consistent and reasonable for a feasibility-level study. Of concern to the Panel is that the project does not appear to consider the residual risk of future channel migration during the post-adaptive management (AM) period, which could negatively affect the TSP function and performance and potentially eliminate ecosystem restoration benefits. In particular, should the channel's alignment change in the future due to sediment aggradation, floodplain habitat could be lost, migration pathways could be blocked, and tributaries could be cut off. The residual risk associated with this should be discussed in the DFR-EIS and accounted for in the environmental benefit outputs and the cost effectiveness/incremental cost analysis (CE/ICA). Furthermore, the Panel recommends that the project time beyond the 10-year period for monitoring and adaptive management actions be extended to reduce residual risks.

Environmental: The Panel finds the salmonid components of the environmental benefits model to be appropriate and account for problems in habitat suitability methodologies. The Panel recognizes that USACE is dealing with a complex ecosystem and the risk analysis covers most of the expected biological uncertainty. The Panel concludes that environmental analyses are consistent with generally accepted methodologies for freshwater and estuarine fisheries and ecology surveys. Appendix A in particular provides a good review of the ecological literature on the Skokomish River Basin system, and the ecological data presented in the appendix are interpreted carefully. The Panel is somewhat concerned about the absence of additional juvenile salmon pond rearing habitat in the restoration plan; by incorporating redundant rearing locations, the project will be more resilient to climate-related changes and other difficult-to-predict issues. New rearing areas should be added to the floodplain in locations that provide good connections with existing channels and tributaries. The Panel also notes that the project does not have geospatial data on stranding events, which is important for assessing short-term collateral damage from the TSP and analyzing long-term project success. The DFR-EIS would benefit from the addition of baseline quantitative and spatial data on salmon stranding.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

The O&M scope and costs of the TSP appear insufficient to meet the objectives and function as designed for the life of the project.

Basis for Comment

As currently stated in the DFR-EIS, the “TSP will require minimal maintenance only ... with O&M activities focusing on minor inspection and periodic levee maintenance activities” with annual costs of approximately \$5,000 or less (DFR-EIS, pp.103-104). This assumption appears to imply that, after the initial 10-year period of adaptive management (AM), the TSP will function over the subsequent project life as intended in the design with minimal or no maintenance.

The Panel is concerned that the O&M scope and cost may be seriously underestimated, given the inherent uncertainty of TSP performance over the 50-year planning period without ongoing active AM to meet the project purpose and objectives, including salmon migration, habitat restoration, and improved salmon survival. The uncertainty associated with the TSP is because of (1) the complex and dynamic behavior of the natural hydraulic and biological processes affecting TSP performance, and (2) anthropogenic activities not part of the TSP that could affect TSP performance (e.g., land-use decisions and restoration activities).

In addition, the Panel is specifically concerned that minimal O&M following active AM will not be able to implement subsequent prevention or mitigation measures that may become necessary to maintain or enhance project measures, functions, or performance. For example, it is unlikely that minimal O&M (i.e., \$5,000 per year or less) could effectively respond to changes in channel alignment due to avulsion events, sediment aggradation, or erosional effects that degrade the restored ecosystem functions (including maintenance of salmon migration pathways) or threaten human safety.

Significance – Medium/High

To ensure project success, project O&M should include scope and a budget that has the financial capacity to manage adverse changes in conditions affecting project performance during the 50-year planning period.

Recommendations for Resolution

1. Explain how the O&M scope and budget in the TSP is sufficient to maintain the desired ecological performance of the restoration plan throughout the 50-year planning period.
2. Discuss what prevention or mitigation measures could be implemented if needed to supplement an O&M scope and budget that cannot maintain ecological performance after the initial (10-year) AM period.
3. Explain how avulsion events, sediment aggradation, or erosional effects to channel alignment would be managed after the initial (10-year) AM period.
4. Explain how the TSP could be refined to minimize (or be less sensitive to) potentially needed O&M.

Final Panel Comment 2

The sustainability of the restoration project with regard to upstream and downstream activities has not been fully addressed.

Basis for Comment

The study area lies in a watershed where future upstream and downstream land use practices and dam operations have the potential to inhibit the ability of the TSP to achieve its predicted ecosystem restoration benefits in a sustainable way. The DFR-EIS indicates (Table 2-1, p. 12) that coordination efforts through the Skokomish Watershed Action Team and the Federal Energy Regulatory Commission (FERC) “Cushman Settlement Agreement” (Section 2.6) have resulted in many programs and projects that are being implemented (or will be implemented) to improve habitat quality and ecosystem health throughout the Skokomish River Basin.

A similar proactive approach to foster a basin-wide commitment to the sustainability of the TSP within the context of existing Federal and state laws, treaties with the Tribes, and other agreements is vital to the success of the proposed restoration efforts. It is the view of the Panel that all reasonable mechanisms to ensure the sustainability of the TSP (e.g., memoranda of understanding, zoning restrictions, and other documented agreements) have not been fully explored.

Since the risk of natural processes and existing sediment loads currently having a deleterious impact on the success of the TSP is not fully known (Appendix B, pp. 28 – 29; Appendix H p. 18; DFR-EIS p. 104), it is important that USACE minimize potential anthropogenic risk factors as much as possible. Some of these potential risks to sustainability identified by the Panel include timber harvesting, hatchery operations, fishing practices, agricultural practices, dam operations, and mining operations. The current extent of the impact of these activities is not clear to the Panel, but the Panel is in agreement that future impacts on the TSP are likely and should be minimized.

Significance – Medium

A basin-wide collaborative commitment to the sustainability of the proposed ecosystem restoration measures is vital to the success of the TSP.

Recommendations for Resolution

1. Review all potential options for collaboration with the major landholders within the Skokomish River Basin who may be engaged in activities that could have a negative impact on the proposed restoration project.
2. Use all potential legal and policy mechanisms available at the Federal and local government level to ensure the sustainability of the TSP by requiring or encouraging the use of best practices for activities that have the potential of reducing the benefits of restoration measures.
3. Explore options to coordinate dam operations with the power company to identify potential beneficial measures within the existing settlement agreement.
4. If any of the recommendations from 1, 2, and 3 above have occurred, are ongoing, or are being planned for future phases, clarify as such in the review documents.

Final Panel Comment 3

The restoration project does not appear to have fully considered the residual risk of future channel migration adversely affecting the function and performance of the TSP.

Basis for Comment

The Panel is concerned that future aggradation following the AM period could change channel characteristics and/or channel alignment, which may adversely impact the anticipated function and performance of the TSP, including (1) loss of side channel tributary interaction, (2) loss of floodplain habitat due to channel migration, and (3) upstream migration blockage due to subsurface flows. Future aggradation could eliminate the ecosystem restoration benefits of the TSP and reduce regained salmon productivity from restored side channels, floodplain habitat, improved spawning habitat, and river passage corridors. The residual risk associated with these impacts appears unaccounted for in the environmental benefit outputs, which may influence CE/ICA results.

The residual risk of concern stems from the dominant geomorphic process within the study area: sediment aggradation. The DFR-EIS (Appendix A) indicates that the Skokomish River within the study reach has been relatively dynamic in recent years. The aggradation trend is expected to continue over the 50-year planning period, which could have an influence on the channel characteristics and/or channel alignment. As indicated in Appendix B, the response of the Skokomish River system to future floods and sediment aggradation is highly uncertain, and could adversely affect the performance and function of the TSP.

While the project will include a monitoring and AM plan that can account for uncertainty and increase the chance of achieving the desired goals of the restoration effort in the entire Skokomish River watershed, Appendix E states that AM is scheduled for a 10-year period. The Panel is concerned with the residual risk during the post-AM period. There are no references that specify the ideal duration of an AM plan, but Williams et al. (2009) and U.S. EPA's Watershed Analysis and Management Guide for States and Communities (2003) indicate the importance of a long-term commitment of resources for the AM plan to ensure success of restoration projects.

Significance – Medium

Residual risk associated with potential channel migration after the monitoring and AM plan has ended (i.e., post-AM period) appears unaccounted for in the environmental benefit outputs, which could influence the CE/ICA results.

Recommendations for Resolution

1. Discuss the residual risk associated with future channel migration, and reconsider the influences of the residual risk in the environmental benefit outputs and the CE/ICA results.
2. Extend the project time beyond the 10-year period for monitoring and adaptive management actions to reduce residual risks.

Literature Cited:

U.S. EPA. (2003). Watershed Analysis and Management (WAM) Guide for States and Communities. EPA 841-B-03-007, Office of Water (4503T), U.S. Environmental Protection Agency, Washington, D.C.

http://water.epa.gov/learn/training/wacademy/upload/2005_02_18_watershed_wacademy_wam2003_2f-adapmanage.pdf

Williams, B.K., R.C. Szaro, and C.D. Shapiro. (2009). Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, D.C.

<http://www.doi.gov/initiatives/AdaptiveManagement/TechGuide.pdf>

Final Panel Comment 4

The absence of additional rearing habitat for juvenile salmonids in the TSP reduces the plan's redundancy, resiliency, and robustness and increases the risk of diminished salmonid recovery during the life of the project.

Basis for Comment

The Panel believes it is important to incorporate a number of redundant measures into the restoration plan (DFR-EIS, p. 74). By providing redundant habitat for rearing salmon, resilience of salmon populations to climate change and other unexpected factors can be improved (Waples, 2009), reducing risk and uncertainty.

While the TSP does incorporate a number of increments to improve a broad suite of habitats (e.g., tributary reconnections, side channel restoration, restoration of riparian vegetation, etc.), as noted in Appendix A (p. 84), there may be locations where new ponds could be constructed. Rearing ponds are key habitats, used by juvenile coho in the winter, juvenile chinook in spring and summer, as well other species important in the ecosystem such as sticklebacks. Pond habitat adds additional complexity, an important factor for rearing juvenile salmon (e.g., Jeffres et al., 2008). While the TSP includes plans to reconnect the existing ponds, given the variability in flows and uncertainty in hydraulic connection post-restoration, the Panel believes there is a need to improve redundancy in pond habitat, thus increasing the robustness and resiliency of the restored salmon ecosystems and improving their capacity to cope with change.

Significance – Medium

If redundant salmon habitat and construction of new ponds are not included as part of the TSP, resiliency and robustness will be limited, increasing the risk of reduced salmonid recovery and ability of the restored ecosystem to respond to change.

Recommendations for Resolution

1. Consider broadening the TSP to include opportunities for construction of new rearing ponds in the floodplain, focusing on sites that offer good hydraulic connection to existing channels and tributaries.

Literature Cited:

Jeffres, C. A., J.J. Opperman, and P.B. Moyle. (2008). Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes*, 83(4):449-458.

http://www.academia.edu/2460655/Ephemeral_floodplain_habitats_provide_best_growth_conditions_for_juvenile_Chinook_salmon_in_a_California_river

Waples, R.S., T. Beechie, and G.R. Pess. (2009). Evolutionary history, habitat disturbance regimes, and anthropogenic changes: what do these mean for resilience of Pacific Salmon populations? *Ecology & Society*, 14(1):3.

<http://www.ecologyandsociety.org/vol14/iss1/art3/>

Final Panel Comment 5

The DFR-EIS does not discuss life safety issues associated with the Grange Levee Setback, a component of the TSP, including potential effects of overbank flooding and levee overtopping or breaching.

Basis for Comment

Although the purpose of the ecosystem restoration feasibility study does not include flood risk management, it is the Panel's opinion that the DFR-EIS should acknowledge potential life safety issues from flooding associated with the TSP. One specific component of the TSP with potential life safety issues is the Grange Levee Setback, Increment 37, where the proposed levee is being moved adjacent to three or four residential structures. The movement of the levee in relation to the risk for loss of life and/or property damage is not clearly acknowledged or discussed in the DFR-EIS.

Significance – Medium/Low

For completeness, the DFR-EIS would benefit from a discussion of life safety issues associated with flooding and how it may impact the TSP.

Recommendations for Resolution

1. Discuss pertinent life safety issues in the DFR-EIS.
2. Document or acknowledge the potential of any life safety issues associated with the Grange Levee Setback, Increment 37, where the proposed levee is being moved adjacent to residential structures.

Final Panel Comment 6

Sufficient data on stranding (including baseline metrics such as location) are not available to determine the significance of salmon pre-spawn mortality and juvenile salmon mortality and how habitat restoration would reduce stranding effects.

Basis for Comment

The Panel believes that geospatial data on stranding and how many adult and juvenile salmon are affected would improve the baseline data for the AM plan. Only anecdotal information is available on where the stranding is occurring (DFR-EIS, p. 48), but every year some proportion of the adult salmon spawning population is stranded (Appendix F, p. 22) and dies before laying its eggs. Stranding could affect salmon by increasing pre-spawn mortality, by decreasing juvenile survival, and as well as by egg/embryo desiccation. The Panel noted reduction in stranding is an assumed aid in population recovery (Appendix F, p. 23) to be achieved in the long term by increasing the channel capacity and sediment management measures in the lower Skokomish River. It is not clear if, in the short term, downstream sediment will increase stranding in the chinook salmon spawning areas on the lower mainstem (Appendix A, p.109) after the levee breach proposed in the TSP. Geospatial data on current stranding locations and their effects would provide important baseline data for the TSP and its associated AM plan.

Significance – Medium/Low

Securing baseline data on stranding of juvenile and adult salmon is important to assess short-term collateral damage from the TSP and long-term success from improvement to channel capacity, tributary reconnections, and other components of the ecosystem restoration plan.

Recommendations for Resolution

1. Obtain quantitative and spatial information on stranding of adult and juvenile salmon to develop baseline data for the AM plan.

Final Panel Comment 7

The DFR-EIS does not describe which datasets of comparable reference habitats will be used to assess the project's density of juvenile salmon per unit area, a proposed effectiveness measure for restoration success.

Basis for Comment

The Panel noted that density of juvenile salmonids (number per square meter) is proposed as an ecological metric relating to floodplain reconnection and enhancement and is a measure of either success or requirement for further action in the AM plan (Appendix E, p. 18). According to Crawford (2011), when project density approaches the density in a similar habitat, the restoration may be considered successful. Density of juvenile salmonids (and its variation) is an important measure for the TSP and needs thoughtful consideration. The Panel concluded that the AM plan should specify the sources for the reference data on density of juvenile salmonids (i.e., what variation is expected, what river or suite of rivers will be used, how density was measured), together with justification for using the metrics.

Significance – Medium/Low

Because adjustments to the TSP will be made based on salmonid density data collected as part of the AM plan, the basis for that metric needs to be carefully established early in the planning process.

Recommendations for Resolution

1. Provide detailed information on sources of reference data on juvenile salmonid density that will be used to compare this post-restoration metric for floodplain reconnection and enhancement components of the TSP.

Literature Cited:

Crawford, B. (2011). Protocol for monitoring effectiveness of floodplain enhancement projects (dike removal/setback, riprap removal, road removal/setback, and landfill removal, offchannel habitat creation, side channel creation). MC-5/6, Washington Salmon Recovery Funding Board, Olympia, Washington.
http://www.rco.wa.gov/documents/monitoring/MC-5&6_Floodplain_Enhancement.pdf

Final Panel Comment 8

The risk that the estuarine placement of dredged sediment may damage critical salmonid habitat on the foreshore has not been clearly assessed.

Basis for Comment

The Panel believes the draft plans for placing dredged material on the estuary (DFR-EIS Plans 7, 23, 28, 45, 60; dredged material volumes given in Table 4-3) may not account for the likely high risk of damage to critical salmonid habitat in the foreshore. Damage to eelgrass habitats is mentioned (DFR-EIS, p. 49), but unvegetated habitats (mud and sand flats) are not. Estuary foreshore areas are well-recognized as critical juvenile salmon habitats (e.g., juvenile chinook on the foreshore of the Nisqually River estuary in south Puget Sound [Lind-Null et al., 2008]).

A reference in the DFR-EIS suggests recovery of impacted habitat occurs in about one year, but most of the studies in the cited report (Bolam and Rees, 2003) did not deal with salmonid estuaries and are not directly comparable to the study area. Additionally, the Panel notes that even if recovery does occur within a year, critical salmon habitat will be temporarily unavailable to Skokomish River salmon and other salmon populations in Hood Canal. The dredged material would blanket the salmon food organisms (invertebrates) living in the mud and sand. Recruitment of replacement food organisms could take at least a few months and during that time juvenile salmon food populations would be reduced.

Significance – Low

A risk assessment would help account for the risks of damage to salmonid habitat in the foreshore.

Recommendations for Resolution

1. Include a risk assessment for damage to foreshore salmonid habitat should future planning include dredge material disposal to the foreshore.

Literature Cited:

Bolam, S.G., and H.L. Rees. (2003). Minimizing impacts of maintenance dredged material disposal in the coastal environment: a habitat approach. *Environmental Management*. 32(2):171-188.

http://download.springer.com/static/pdf/854/art%253A10.1007%252Fs00267-003-2998-2.pdf?auth66=1397151107_21165d3e58398a2dc739000c890218b1&ext=.pdf

Lind-Null, A.M., K.A. Larsen, and R. Reisenbichler. (2008). Characterization of estuary use by Nisqually Hatchery Chinook based on otolith analysis. U.S. Geological Survey Open-File Report 2008-1102, 12 pp.

<http://pubs.usgs.gov/of/2008/1102/pdf/ofr20081102.pdf>

5. REFERENCES

- Bolam, S.G., and H.L. Rees. (2003). Minimizing impacts of maintenance dredged material disposal in the coastal environment: a habitat approach. *Environmental Management*. 32(2):171-188.
http://download.springer.com/static/pdf/854/art%253A10.1007%252Fs00267-003-2998-2.pdf?auth66=1397151107_21165d3e58398a2dc739000c890218b1&ext=.pdf
- Crawford, B. (2011). Protocol for monitoring effectiveness of floodplain enhancement projects (dike removal/setback, riprap removal, road removal/setback, and landfill removal, offchannel habitat creation, side channel creation). MC-5/6, Washington Salmon Recovery Funding Board, Olympia, Washington.
http://www.rco.wa.gov/documents/monitoring/MC-5&6_Floodplain_Enhancement.pdf
- Jeffres, C. A., J.J. Opperman, and P.B. Moyle. (2008). Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes*, 83(4), 449-458.
http://www.academia.edu/2460655/Ephemeral_floodplain_habitats_provide_best_growth_conditions_for_juvenile_Chinook_salmon_in_a_California_river
- Lind-Null, A.M., K.A. Larsen, and R. Reisenbichler. (2008). Characterization of estuary use by Nisqually Hatchery Chinook based on otolith analysis. U.S. Geological Survey Open-File Report 2008-1102, 12 pp.
<http://pubs.usgs.gov/of/2008/1102/pdf/ofr20081102.pdf>
- OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.
- 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.
- USACE (2012). Water Resources Policies and Authorities: Civil Works Review. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Circular (EC) 1165-2-214. December 15.
- U.S. EPA. (2003). Watershed Analysis and Management (WAM) Guide for States and Communities. EPA 841-B-03-007, Office of Water (4503T), U.S. Environmental Protection Agency, Washington, D.C.
http://water.epa.gov/learn/training/wacademy/upload/2005_02_18_watershed_wacademy_wam2003_2f-adapmanage.pdf
- Waples, R.S., T. Beechie, and G.R. Pess. (2009). Evolutionary history, habitat disturbance regimes, and anthropogenic changes: what do these mean for resilience of Pacific Salmon populations? *Ecology & Society*, 14(1):3.
<http://www.ecologyandsociety.org/vol14/iss1/art3/>
- Williams, B.K., R.C. Szaro, and C.D. Shapiro. (2009). Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, D.C.
<http://www.doi.gov/initiatives/AdaptiveManagement/TechGuide.pdf>

This page is intentionally left blank.

APPENDIX A

IEPR Process for the Skokomish DFR-EIS

This page is intentionally left blank.

A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the schedule followed in executing the Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement Independent External Peer Review (hereinafter: Skokomish DFR-EIS IEPR). Due dates for milestones and deliverables are based on the award/effective date of February 7, 2014. The review documents were provided by the U.S. Army Corps of Engineers (USACE) on February 12, 2014. Note that the work items listed under Task 6 occur after the submission of this report. Battelle will enter the eight Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

Table A-1. Skokomish DFR-EIS Complete IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date	2/7/2014
	Review documents available	2/12/2014
	Battelle submits draft Work Plan ^a	2/19/2014
	USACE provides comments on draft Work Plan	2/21/2014
	Battelle submits final Work Plan ^a	2/21/2014
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	2/14/2014
	USACE provides comments on COI questionnaire	2/18/2014
	Battelle submits list of selected panel members ^a	2/21/2014
	USACE confirms the panel members have no COI	2/24/2014
	Battelle completes subcontracts for panel members	3/3/2014
3	Battelle convenes kick-off meeting with USACE	2/14/2014
	Battelle sends review documents to panel members	3/6/2014
	Battelle convenes kick-off meeting with panel members	3/6/2014
	Battelle convenes kick-off meeting with USACE and panel members	3/6/2014
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	3/13/2014
4	Panel members complete their individual reviews	3/20/2014
	Battelle provides panel members with talking points for Panel Review Teleconference	3/24/2014

Table A-1, continued. Skokomish DFR-EIS Complete IEPR Schedule

Task	Action	Due Date
	Battelle convenes Panel Review Teleconference	3/24/2014
	Battelle provides Final Panel Comment templates and instructions to panel members	3/24/2014
	Panel members provide draft Final Panel Comments to Battelle	3/31/2014
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	3/31-4/8/2014
	Panel finalizes Final Panel Comments	4/9/2014
	Award of Task Order Modification for review of public comments	5/2/2014
	Battelle sends public comments to panel members for review	5/2/2014
	Panel confirms no additional Final Panel Comment is necessary with regard to the public comments	5/8/2014
5	Battelle provides Final IEPR Report to panel members for review	4/11/2014
	Panel members provide comments on Final IEPR Report	4/17/2014
	Battelle submits Final IEPR Report to USACE ^a	5/9/2014
6^b	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	5/12/2014
	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	4/18/2014
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	4/22/2014
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	5/16/2014
	Battelle provides the panel members the draft PDT Evaluator Responses	5/19/2014
	Panel members provide Battelle with draft BackCheck Responses	5/22/2014
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses ^c	5/23/2014 ^c
	Battelle convenes Comment-Response Teleconference with panel members and USACE ^c	5/27/2014 ^c
	USACE inputs final PDT Evaluator Responses to DrChecks	5/30/2014
	Battelle provides final PDT Evaluator Responses to panel members	6/2/2014
	Panel members provide Battelle with final BackCheck Responses	6/5/2014
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	6/6/2014
	Battelle submits pdf printout of DrChecks project file ^a	6/9/2014

Table A-1, continued. Skokomish DFR-EIS Complete IEPR Schedule

Task	Action	Due Date
	Agency Decision Milestone (ADM) Meeting	6/10/2014
	CWRB Meeting (Estimated Date) ^d	1/15/2015
	Contract End/Delivery Date	2/6/2015

^a Deliverable.

^b Task 6 occurs after the submission of this report.

^c These teleconference dates are tentative, pending the availability of all participants

^d The CWRB meeting was listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.

At the beginning of the Period of Performance for the Skokomish DFR-EIS IEPR, Battelle held a kick-off meeting with USACE 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. In addition, 15 charge questions were provided by USACE and included in the draft and final Work Plans. Battelle added two questions that seek summary information from the IEPR Panel. The final charge also included general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and within three days of their subcontracts being finalized, all members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge as well as the Skokomish DFR-EIS review documents and reference materials listed below. The documents and files in bold font were provided for review; the other documents were provided for reference or supplemental information only.

- **Skokomish River Basin, Mason County, Washington, Draft Integrated Feasibility Study Report & Environmental Impact Statement – January 2014 (129 pages)**
- **Appendix B. Skokomish River Flooding & Sedimentation Baseline (140 pages)**
- **Appendix E: Monitoring & Adaptive Management Plan (36 pages)**
- **Appendix G: Economics (35 pages)**
- **Appendix H: Engineering (127 pages)**
- **Appendix I: Hazardous, Toxic, and Radioactive Waste (13 pages)**
- **Appendix K: Cost Engineering (119 pages)**
- Appendix A: Biological Sampling in the Skokomish River (255 pages)
- Appendix C: Wetlands Inventory (55 pages)
- Appendix D: Cultural Resources (34 pages)
- Appendix F: Environmental Benefits Analysis (105 pages)
- Appendix J: Real Estate Plan (35 pages)

- Decision Log (4 pages)
- Risk Register (4 pages)
- USACE guidance Civil Works Review, (EC 1165-2-214) dated 15 December 2012
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

About halfway through the review of the Skokomish DFR-EIS IEPR documents, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted 20 panel member questions to USACE. USACE was able to provide responses to all of the questions during the teleconference or later that week via email.

In addition, throughout the review period, USACE provided documents at the request of panel members. These documents were provided to Battelle and then sent to the Panel as additional information only and were not part of the official review. A list of these additional documents requested by the Panel is provided below.

- U.S. Fish and Wildlife Service, Appendix F - Outmigration Sampling: Methods and General Results (2011)
- USACE, Skokomish GI: Final Array of Alternatives, orthophoto and map (August 2013)
- USACE, Skokomish DFR-EIS, Appendix C figures (2011).

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response table provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments in a preliminary list of nine overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

A.3 IEPR Panel Teleconference

Battelle facilitated a three-hour teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

At the end of these discussions, the Panel identified eight comments and discussion points that should be brought forward as Final Panel Comments.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle prepared a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the Skokomish DFR-EIS IEPR:

- **Lead Responsibility:** For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.
- **Directive to the Lead:** Each lead was encouraged to communicate directly with the other panel member as needed and 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 Panel Comments:** Each Final Panel Comment was presented as part of a four-part structure:
 1. Comment Statement (succinct summary statement of concern)
 2. Basis for Comment (details regarding the concern)
 3. Significance (high, medium/high, medium, medium/low, and low; see description below)
 4. Recommendation(s) 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 issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a “showstopper” issue.
 2. **Medium/High:** Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the SMART Planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models, and/or analyses available at this stage in the SMART Planning process and has determined that if the issue is not addressed, it could lead to a “showstopper” issue.
 3. **Medium:** Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the SMART Planning process. Comments

rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue were not appropriately addressed.

4. **Medium/Low:** Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses.
 5. **Low:** Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented.
- **Guidelines for Developing Recommendations:** The recommendation section was to include specific actions that 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).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the 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. At the end of this process, eight Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments are presented in the main report.

A.5 Conduct of the Public Comment Review

Battelle received a PDF file containing 32 pages of public comments on the Skokomish DFR-EIS (approximately 25 verbal transcripts and written comments) from USACE on April 9, 2014. Following the receipt on May 2, 2014 of the task order modification award for the review of the public comments, Battelle modified the subcontracts of the IEPR panel members. Battelle then sent the public comments to the panel members on May 2, 2014 in addition to two charge questions:

1. **Does information or concerns raised in the public comments raise any additional discipline-specific technical concerns with regard to the overall report?**
2. **Has adequate stakeholder involvement occurred to identify issues of interest and to solicit feedback from interested parties?**

The panel members were charged with responding to the two charge questions above.

The Panel produced individual comments in response to the two charge questions. Battelle reviewed the comments to identify any new technical concerns that had not been previously identified during the initial IEPR. Upon review, Battelle determined and the Panel confirmed that no new issues or concerns were identified other than those already covered in their Final Panel Comments. The Panel also determined that adequate stakeholder involvement had occurred.

This page is intentionally left blank.

APPENDIX B

Identification and Selection of IEPR Panel Members for the Skokomish DFR-EIS

This page is intentionally left blank.

B.1 Panel Identification

The candidates for the Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement (hereinafter: Skokomish DFR-EIS IEPR) Panel were evaluated based on their technical expertise in the following key areas: plan formulation, environmental, hydraulic engineering, and civil design/construction engineering. These areas correspond to the technical content of the Skokomish DFR-EIS IEPR review documents and overall scope of the Skokomish DFR-EIS project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected four experts for the final Panel.

The four selected reviewers constituted the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

The candidates were screened for the following potential exclusion criteria or COIs.¹ These COI questions serve as a means of disclosure and to better characterize a candidate's employment history and background. Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

- Previous and/or current involvement by you or your firm² in the Skokomish DFR-EIS or the Skokomish River Ecosystem Restoration Project.
- Previous and/or current involvement by you or your firm² in ecosystem restoration studies in the Puget Sound region.
- Previous and/or current involvement by you or your firm² in the Skokomish DFR-EIS-related projects (including the Skokomish River Ecosystem Restoration Project).
- Previous and/or current involvement by you or your firm² in the conceptual or actual design, construction, or O&M of any projects in the Skokomish DFR-EIS-related projects (including the Skokomish River Ecosystem Restoration Project).

¹ 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 OMB (2004, 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."

² Includes any joint ventures in which the candidate's firm is involved and if the firm serves as a prime or as a subcontractor to a prime.

- Current employment by the U.S. Army Corps of Engineers (USACE).
- Previous and/or current involvement with paid or unpaid expert testimony related to Skokomish DFR-EIS or the Skokomish River Ecosystem Restoration Project.
- Previous and/or current employment or affiliation (for pay or pro bono) with the non-Federal sponsors (the Skokomish Indian Tribe and/or Mason County, Washington) or any of the following cooperating Federal, State, County, local, and regional agencies, environmental organizations, and interested groups: National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Forest Service, U. S. Bureau of Reclamation, Washington State Department of Ecology, and/or Washington State Department of Transportation.
- Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to the Puget Sound region.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, 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 Seattle District.
- Previous or current involvement with the development or testing of models that will be used for or in support of the Skokomish DFR-EIS (e.g., IWR Planning Suite, Skokomish River Ecosystem Restoration Project Environmental Benefits Analysis model, HEC-RAS, Bureau of Reclamation 2-D Model (SRH-2D), and/or MCACES)
- Current firm² involvement with other USACE projects, specifically those projects/contracts that are with the Seattle District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Seattle District. Please explain.
- Any previous employment by USACE as a direct employee, notably if employment was with the Seattle District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by USACE as a contractor (either as an individual or through your firm²) within the last 10 years, notably if those projects/contracts are with the Seattle District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning ecosystem restoration and include the client/agency and duration of review (approximate dates).
- Pending, current, or future financial interests in Skokomish DFR-EIS-related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm² revenues within the last 3 years came from USACE contracts.
- A significant portion (i.e., greater than 50%) of personal or firm² revenues within the last 3 years from contracts with the non-Federal sponsors (the Skokomish Indian Tribe and Mason County, Washington).
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Skokomish DFR-EIS or the Skokomish River Ecosystem Restoration Project.

- Participation in relevant prior and/or current Federal studies relevant to the Skokomish DFR-EIS and/or the Skokomish River Ecosystem Restoration Project.
- Previous and/or current participation in prior non-Federal studies relevant to the Skokomish DFR-EIS and/ or the Skokomish River Ecosystem Restoration Project.
- 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?

Other considerations:

- Participation in previous USACE technical review panels
- Other technical review panel experience.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Two of the four final reviewers are affiliated with a consulting company; the other two are independent consultants. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

An overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria is presented in Table B-1. More detailed biographical information regarding each panel member and his area of technical expertise is presented in Section B.3.

Table B-1. Skokomish DFR-EIS IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Pugh	Levings	Bahner	Vita
Plan Formulation				
Minimum 10 years of experience in plan formulation	X			
Expertise in the USACE plan formulation process, procedures, and standards	X			
Experience with evaluation of alternative plans for ecosystem restoration projects	X			
Extensive experience with the IWR-Planning Suite model for cost effectiveness and incremental cost analysis (CE/ICA)	X			
M.S. degree in an appropriate field of study	W ¹			
Environmental				
Minimum 10 years of experience in the environmental field		X		
Expertise in Northwest biology		X		
Familiarity with USACE environmental analyses, feasibility reports, and ecosystem restoration studies		X		
Extensive knowledge of:		X		
salmonid biology (spawning, rearing, freshwater migration)		X		
wetlands		X		
riparian habitats		X		
riverine systems		X		
restoration		X		
M.S. degree in an appropriate field of study		X		
Hydraulic Engineering				
Minimum 10 years of experience in hydraulic engineering			X	
Extensive knowledge of the hydraulic evaluation of river restoration actions			X	
Knowledge of:			X	
1-D and 2-D hydraulic models			X	
1-D sediment transport models			X	
river control structures			X	
large woody debris structures			X	
Extensive geomorphology expertise			X	
Expertise in riverine sediment transport			X	
M.S. degree or higher in appropriate field of study			X	
Civil Design/Construction Engineering				
Minimum 10 years of experience in civil design/construction engineering				X
Experience in:				X
performing design and construction of levees				X
large woody debris structures				X

Technical Criterion	Pugh	Levings	Bahner	Vita
channel construction				X
fish passage weirs				X
Familiarity with similar projects across U.S.				X
Familiarity with construction industry practices used in ecosystem restoration in the Puget Sound region				X
M.S. degree or higher in civil engineering				X

¹ Waiver statement presented as part of Task 2 deliverable and approved by USACE.

B.3 Panel Member Qualifications

Steven Pugh

Role: Plan formulation expertise.

Affiliation: Independent Consultant

Mr. Pugh has 21 years of experience in aquatic ecosystem restoration and water resources planning and is knowledgeable in current Civil Works planning policies, methodologies, and procedures. He is an independent consultant with a focus on ecosystem restoration planning, model development for ecosystem restoration, and review of various planning documents for ecosystem restoration.

For seven years with the USACE Baltimore District, Mr. Pugh worked on special projects for the Institute for Water Resources (IWR) focusing on planning for ecosystem restoration. He was also a PROSPECT instructor for the course "Planning for Ecosystem Restoration." Two planning case studies he developed for IWR were related to multi-purpose efforts, including ecosystem restoration, in the Pacific Northwest; both case studies were developed in collaboration with the Portland District and Northwest Division. Before this position, he worked for seven years with two agencies at the U.S. Fish and Wildlife Services' Patuxent Wildlife Research Center where he focused on wetland restoration including the development of indices of biotic integrity for the purposes of planning and evaluating projects.

Mr. Pugh is experienced in the development and application of ecosystem models such as Habitat Evaluation Procedures and has worked on large USACE ecosystem restoration studies such as the Chesapeake Marshlands Restoration Study evaluating the restoration of up to 20,000 acres of marshlands, the Lower Potomac River Watershed Study, and the Anacostia River Watershed Restoration Comprehensive Plan. He is proficient in the application of the IWR Planning Suite and used it on USACE studies as an employee of the Baltimore District. He has participated in CE/ICA on many Civil Works planning studies as a planner and ecologist with the USACE Baltimore District; taught modules on CE/ICA in the context of watershed and ecosystem restoration studies for the PROSPECT course; and has been a panel member on several IEPR teams reviewing large-scale ecosystem restoration studies, including the Willamette River Floodplain Restoration Study.

Mr. Pugh is an active member of the Society for Ecological Restoration. He is a graduate of the Planning Associates (PA) Program (class of 2003) and a former instructor for the PA Program including modules on ecosystem restoration and watershed studies.

Colin Levings, Ph.D.

Role: Environmental expertise.

Affiliation: Independent Consultant

Dr. Levings, an independent consultant in Lions Bay, British Columbia, Canada, earned his Ph.D. in fisheries/oceanography from Dalhousie University in Halifax, Nova Scotia in 1972 and has more than 40 years of experience in the environmental field. He has extensive experience in Pacific Northwest (PNW) biology with special expertise in estuarine ecology. He worked as a Research Scientist for the Canadian Department of Fisheries and Oceans, Science Branch, Pacific from 1972 until 2006 and continues his work there as an Emeritus Scientist. He retired at the Senior Scientist rank with over 200 publications to his credit and over 40 years of extensive collaboration with researchers on salmonid estuarine ecology and restoration in the PNW. He was a founding member of the Pacific Estuarine Research Society and is a member of the American Fisheries Society, Washington - British Columbia Chapter.

Dr. Levings is familiar with USACE environmental analyses, feasibility reports, and ecosystem restoration studies through his involvement in the Independent Science Review Panel to the Northwest Power and Conservation Council, Portland, Oregon (2005-2014). He reviewed an estimated 125 proposals for estuarine restoration projects in the Columbia River and estuary. Many of these projects were sponsored or co-sponsored by the USACE Portland District or partner agencies. Additionally, as member of the Independent Science Advisory Board to National Marine Fisheries Service, Columbia River Indian Tribes, and Northwest Power and Conservation Council, Portland, Oregon (2005-2014), he co-authored reports advising on strategic planning methodology and monitoring for estuarine restoration projects in the Columbia River and estuary and reviewed numerous reports for projects sponsored or co-sponsored by the USACE Portland District.

Dr. Levings' experience in PNW biology has resulted in a comprehensive understanding of salmonid biology, including spawning, rearing, and freshwater migration. He is well-published in the ecology of salmon in rivers and estuaries as well as in wetland ecology and salmonid estuarine habitat. He has published approximately 50 papers and reports on rearing ecology of chinook, coho, sockeye, and pink salmonids in rivers and estuaries^{3,4,5} and is currently authoring a book, *Ecology of Salmonids in Estuaries*. Dr. Levings has extensive expertise in the study of riparian habitats, riverine systems, and environmental

³ Levings, C.D. 1994. Feeding behaviour of juvenile salmon and significance of habitat during estuary and early sea phase. *Nordic Journal of Freshwater Research* 69: 7-16.

⁴ Levings, C.D., and R.B. Lauzier. 1989. Migration patterns of wild and hatchery reared juvenile chinook salmon (*Oncorhynchus tshawytscha*) in the Nicola River, British Columbia. p. 267-275. *Proc. 1988 Chinook and Coho Workshop*, Bellingham, U.S.A. American Fish. Soc. North Pacific International Chapter. Oct. 2-4, 1988. (B.G. Shepherd, Rapporteur)

⁵ Levings, C.D., C.D. McAllister, J.S. Macdonald, T.J. Brown, M.S. Kotyk, and B. Kask. 1989. Chinook salmon and estuarine habitat: A transfer experiment can help evaluate estuary dependency. p. 116-122. *Can. Spec. Publ. Fish. Aquat. Sci.* 105. 199 p.

restoration in the PNW ^{6,7} and has published an estimated 20 papers and reports on wetland ecology in estuaries, including some directly relevant to the USACE dredged material research program. Additionally, he has published approximately 10 reports on riparian habitats, and was one of the first ecologists to recognize the marine riparian area as a key salmonid habitat. He has also published approximately 30 reports on the ecology of salmonids in rivers, including papers focused on the Fraser River in British Columbia and the Columbia River in the U.S. Dr. Levings has participated in extensive field reviews and proposals for studies on resident and anadromous salmonids in the Columbia River (subbasins in Washington, Oregon, Idaho, and Montana), has published an estimated 25 reports on restoration of salmonid estuarine habitat, and has participated in extensive reviews of proposed estuary restoration projects in British Columbia, Washington, and Oregon.

Chris Bahner, P.E.

Role: Hydraulic engineering expertise.

Affiliation: WEST Consultants, Inc.

Mr. Bahner is a senior hydraulic engineer with WEST Consultants, Inc. and has over 20 years of experience in hydraulic engineering and numerical modeling. He holds an M.S. in water resources engineering and is a registered professional civil engineer in California, Oregon, and Nevada. His work experience encompasses various hydraulic and sedimentation analyses for flood control studies, hydraulic modeling, sediment erosion, and deposition modeling, and design of hydraulic structures. Mr. Bahner has worked on large flood control and restoration projects that required providing data necessary for design and potential impacts related to the project. He has performed flow-duration analysis, low flow evaluations, fish passage design and evaluations, hydrologic analyses, hydraulic analyses, and sedimentation analyses in support of these projects.

Mr. Bahner has developed and reviewed a variety of steady and unsteady 1D hydraulic models and 2D hydraulic models including HEC-RAS (unsteady), SMS, AdH, RMA2, SRH-2D, TUFLOW, and FLO-2D. He also has experience developing and reviewing 1D sediment models, including using HEC-RAS (sediment transport) for assessing the sedimentation of slag deposits on the upper Columbia River and Cochiti Reservoir; HEC-6T and SAM for designing a bypass channel for the Plattsburgh Bend Project; and HEC-6 for evaluating degradation and aggradation of the Lower Las Vegas Wash Project.

He has also designed grade control and/or re-directive structures for the Murrieta Creek Flood Control and Restoration Project, Santa Cruz Bank Stabilization Project, Lower Las Vegas Wash Stabilization Project, Gunnerson Pond Restoration Project, Pico Bridge Replacement Project, Santa Paula Creek Project, and San Luis Rey River Project. Mr. Bahner is also an instructor for the American Society of Civil Engineers (ASCE) Streambank Restoration that covers both grade control and re-directive countermeasure structures.

⁶ Alldredge, R., Congleton, J., Fausch, K., Levings, C.D., Myers, K., Naiman, R.J., Reiman, B., Ruggerone, G., Saito, L., Scarnecchia, D., and C.C. Wood, 2012. Review of the Columbia Estuary Ecosystem Restoration Program. ISAB 2012-6. 16 p.

⁷ Levings, C.D. and J.S. Macdonald. 1991. Rehabilitation of estuarine fish habitat at Campbell River, British Columbia. American Fisheries Society Symposium 10: 176-190.

Mr. Bahner has been involved in the design of wood structures for the City of Montesano Wastewater Treatment Plant Emergency Protection Project, Mary's River Lumber Mill Erosion Protection Measure Project, and Lolo Pass Road Emergency Repair Work, and has reviewed projects that included wood structures including East Fork Cliff House Project and Cedar Creek Bridge Replacement.

Mr. Bahner has performed geomorphology evaluations for the Lower Las Vegas Wash Project, Murrieta Creek Flood Control and Restoration Project, Mill Creek Geomorphic Assessment, Bradwood Landing Proposed LNG Facility on the Lower Columbia River, and Fluvial Performance Evaluation of several bridge replacements in Oregon. He has also been involved in several studies that focus on sediment transport such as Bradwood Landing Proposed Liquefied Natural Gas Facility on the Lower Columbia River, Lower Las Vegas Wash Project, Cochiti Reservoir Operation Modification Evaluation, Sediment Transport Analysis of the Columbia River Between Grand Coulee Dam and U.S. Border, San Luis Rey River Flood Control Project, and Murrieta Creek Flood Control and Restoration Project.

Charles Vita, P.E., G.E., Ph.D.

Role: Civil design/construction engineering expertise.

Affiliation: AECOM Technical Services, Inc.

Dr. Vita, a Senior Technical Advisor with AECOM, has 40 years of professional civil and geotechnical engineering experience, with an extensive background in large river processes in complex systems and in geotechnical theory and practice. He earned a Ph.D. in civil engineering from the University of Washington in 1985, and a B.S. and M.S. in civil engineering from the University of California Berkeley. He is a registered professional civil engineer in California, Alaska, and Washington State and a registered geotechnical engineer in California.

Dr. Vita is experienced in performing design and construction of levees. He served as a principal engineer on the California Levee Evaluation Project, Puyallup River Sha Dadx Habitat Restoration Project, and was a peer reviewer on various levee projects in Louisiana, including the greater New Orleans Hurricane and Storm Damage Risk Reduction System Design Guidelines, the Morganza to the Gulf Project, and the New Orleans to Venice Project. He also has experience with large woody debris structures as the principal engineer and feasibility study manager on the Coeur d'Alene River Project (Superfund) for EPA. Dr. Vita served as the principal engineer and developed a probabilistic risk analysis of proposed modifications to rectify flood passage deficiencies from accumulation of large woody debris at Seattle's Landsburg Diversion Dam on the Cedar River. He is knowledgeable in the design and construction of channels based on work with the Coeur d'Alene River Basin Project, California Levee Evaluation Program, Washington Department of Transportation projects (box culverts), and the Los Angeles County Flood Control District.

His work on ecological restoration issues associated with the Coeur d'Alene River Basin Project and focused study of natural channel design in dam removals and fish passage included fish passage weirs. Dr. Vita is familiar with river ecosystem restoration projects across the U.S. through projects in Washington, Idaho, California, and Louisiana; he is currently serving on an IEPR panel for the Los Angeles River Ecological Restoration project. He is familiar with construction industry practices used in ecosystem restoration in the Puget Sound region through the Puyallup River Sha Dadx Habitat Restoration project and geotechnical engineering support of similar projects.

APPENDIX C

Final Charge to the IEPR Panel
as Submitted to USACE on February 21, 2014
for the Skokomish DFR-EIS

This page is intentionally left blank.

CHARGE QUESTIONS AND GUIDANCE TO THE PANEL MEMBERS FOR THE IEPR OF THE SKOKOMISH RIVER BASIN DRAFT INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

BACKGROUND

The Skokomish River Basin is located on Hood Canal, a natural fjord-like arm of the Puget Sound and water of national significance. The Skokomish River Basin is located in northwest Washington, predominantly in Mason County. The project study area consists of the entire drainage basin, including the estuary. The river collects drainage from an approximate 240-square mile drainage basin, and eventually flows into southern Hood Canal, an arm of Puget Sound. Environmental degradation can be seen throughout the Skokomish River Basin, including a loss of natural ecosystem structures, function, and processes necessary to support critical fish and wildlife habitat. The degradation of riverine and estuarine habitat has resulted in the listing of four anadromous fish species under the Endangered Species Act (ESA) (Chinook salmon, chum salmon, steelhead trout, and bull trout) that utilize the river as their primary habitat. The impaired ecosystem has adversely affected riverine, wetland, and estuarine habitats that are critical to these and other listed species. The increased degraded riverine and estuarine aquatic habitat has caused a decline in the population of critical fish and wildlife species. Additionally, the channel capacity of the Skokomish River varies significantly. Limited channel capacity causes floodwater to leave the bank at various locations, ultimately causing frequent flooding of local roads, two state highways, agricultural fields, residences, and other structures.

The planning objectives of this study, for the 50-year period of analysis, are to:

1. Increase the channel capacity of the Skokomish River to allow for restoration of rearing habitat, as well as reduce stranding of ESA-listed salmonid species
2. Provide year-round passage for fish species around the confluence of the North Fork and South Fork Skokomish River
3. Restore the side channel and tributary networks in the study area including Hunter and Weaver Creeks
4. Improve the quality, quantity, and complexity of native floodplain habitats including riparian and wetland habitats in the Skokomish River mainstem and tributaries.

OBJECTIVE

The objective of this work is to conduct an independent external peer review (IEPR) of the Skokomish River Basin Integrated Feasibility Study and Environmental Impact Statement (hereinafter: Skokomish DFR-EIS IEPR) in accordance with the Department of the Army, USACE, Water Resources Policies and Authorities' *Civil Works Review* (EC 1165-2-214; December 15, 2012), and the Office of Management and Budget's (OMB's) *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.

The purpose of the IEPR is to assess the “adequacy and acceptability of the engineering and environmental methods, models, and analyses used” (EC 1165-2-214; p. D-4) for the Skokomish River FR/EIS documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in plan formulation, environmental, hydraulic engineering, and civil design/construction engineering issues relevant to the project. They will also have experience applying their subject matter expertise to ecosystem restoration.

The Panel will be “charged” with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-214, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review

The following documents are to be reviewed by designated discipline:

Review Document	Plan Formulation	Environmental	Hydraulic Engineer	Civil Design/ Construction Engineer
Reference Documents				
Skokomish River Basin, Mason County, Washington, Draft Integrated Feasibility Report & Environmental Impact Statement – January 2014	129	129	129	129
Appendix B. Skokomish River Flooding & Sedimentation Baseline	140	140	140	140
Appendix E: Monitoring & Adaptive Management Plan	36	36	36	36
Appendix G: Economics	35			
Appendix H: Engineering			127	127
Appendix I: HTRW	13	13	13	13
Appendix K: Cost Estimate				119
Total reference document page count for each panel member (out of a possible 599 pages)	353	318	445	564
Supporting Documentation				
Appendix A: Biological Sampling in the Skokomish River		225	225	
Appendix C: Wetlands Inventory	55	55		
Appendix D: Cultural Resources	34	34		
Appendix F: Environmental Benefits Analysis	105	105	105	105
Appendix J: Real Estate Plan	35	35		
Total supporting document page count for each panel member (out of a possible 454 pages)	229	454	330	105

Documents for Reference

- USACE guidance *Civil Works Review*, (EC 1165-2-214; December 15, 2012)
- OMB's *Final Information Quality Bulletin for Peer Review* (December 16, 2004).

SCHEDULE

This final schedule is based on the February 12, 2014 receipt of the final review documents.

Task	Action	Due Date
Conduct Peer Review	Battelle sends review documents to panel members	3/4/2014
	Battelle convenes kick-off meeting with panel members	3/4/2014
	Battelle convenes kick-off meeting with USACE and panel members	3/6/2014
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	3/11/2014
	Panel members complete their individual reviews	3/20/2014
Prepare Final Panel Comments and Final IEPR Report	Battelle provides panel members with talking points for Panel Review Teleconference	3/24/2014
	Battelle convenes Panel Review Teleconference	3/25/2014
	Battelle provides Final Panel Comment templates and instructions to panel members	3/26/2014
	Panel members provide draft Final Panel Comments to Battelle	4/2/2014
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	4/2 - 4/10
	Panel finalizes Final Panel Comments	4/10/2014
	Battelle provides Final IEPR Report to panel members for review	4/14/2014
	Panel members provide comments on Final IEPR Report	4/16/2014
	Battelle submits Final IEPR Report to USACE ^a	4/18/2014
Comment/Response Process	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	4/21/2014
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	4/22/2014
	USACE provides draft PDT Evaluator Responses to Battelle	4/25/2014
	Battelle provides the panel members the draft PDT Evaluator Responses	4/28/2014
	Panel members provide Battelle with draft BackCheck Responses	5/1/2014
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	5/2/2014
	Battelle convenes Comment-Response Teleconference with panel	5/5/2014

Task	Action	Due Date
	members and USACE	
	USACE inputs final PDT Evaluator Responses to DrChecks	5/12/2014
	Battelle provides final PDT Evaluator Responses to panel members	5/13/2014
	Panel members provide Battelle with final BackCheck Responses	5/16/2014
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	5/22/2014
	Battelle submits pdf printout of DrChecks project file ^a	5/23/2014
Civil Works Review Board (CWRB)	Panel prepares and/or reviews slides for CWRB	TBD
	Civil Works Review Board meeting	January 2015

^a Deliverables

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Skokomish DFR/EIS IEPR documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the 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 (by report section 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 Skokomish DFR/EIS IEPR documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Your response to the charge questions should not be limited to a "yes" or "no." Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the engineering and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.

3. Assess the adequacy and acceptability of the environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable
7. Please focus the review on assumptions, data, methods, and models.

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.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review (ATR).
2. Please contact the Battelle Project Manager (Corey Wisneski, wisneskic@battelle.org) or Program Manager (Karen Johnson-Young (johnson-youngk@battelle.org)) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Karen Johnson-Young (johnson-youngk@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Corey Wisneski, wisneskic@battelle.org, no later than March 20, 2014, 10 pm ET.

IEPR of the Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement

CHARGE QUESTIONS AND RELEVANT SECTIONS

General Review Considerations:

1. Were all models in the analysis used in an appropriate manner?
2. Were risk and uncertainty sufficiently considered?
3. Are potential life safety issues accurately and adequately described?
4. Were economic, environmental, and engineering analyses used for this study consistent with generally accepted methodologies?

Existing and Future Without-Project Resources:

5. Do you agree with the general analyses of the existing natural resources within the study area?
6. Was the discussion of natural resources sufficient to characterize current baseline conditions and to allow for evaluation for forecasted conditions (with and without proposed actions)?

Plan Formulation:

7. Were the assumptions made for use in developing the future with- and future without-project conditions for each alternative reasonable? Were adequate scenarios considered? Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified when different?
8. Are the uncertainties inherent in our evaluation of benefits, costs, and impacts, and any risk associated with those uncertainties, adequately addressed and described for each alternative?

Recommended Plan:

9. Please comment on the completeness of the recommended plan, i.e., will any additional efforts, measures, or projects be needed to realize the expected benefits?
10. Please comment on the effectiveness of the recommended plan, i.e., what is the extent to which the recommended plan alleviates the specified problems and realizes the specified opportunities?

Ecosystem Restoration:

11. Please comment on the reasonableness of the quantification of project benefits using the environmental outputs model. Are the expected changes in the quality and abundance of desired ecological resources clearly and precisely specified in justifying the ecosystem restoration investment?
12. Do the planning models and procedures clearly link habitat improvements to the needs of the targeted ecological resources?
13. Are the assumptions associated with rough estimates of benefits associated with reduction of fish stranding and improvement of shellfish habitat reasonable?
14. As the foundation of each alternative, do the “base” plans result in substantive increases in critical habitat?

15. Does the economic model (IWR-PLAN) appropriately present the results of the cost effectiveness and incremental cost analysis (CE/ICA)? Do the inputs, outputs, and technical assumptions of this model appear reasonable?

Summary Questions

16. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.
17. Please provide positive feedback on the project and/or review documents.

Public Comment Questions (provided to the Panel separately for their review of the public comments)

18. Does information or concerns raised in the public raise any additional discipline-specific technical concerns with regard to the overall report?
19. Has adequate stakeholder involvement occurred to identify issues of interest and to solicit feedback from interested parties?

This page is intentionally left blank.

