



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTHWESTERN DIVISION
PO BOX 2870
PORTLAND OR 97208-2870

CENWD-PDD

13 December 2012

MEMORANDUM FOR Commander, Portland District (CENWP-PM-F/Jeffrey Ament)

SUBJECT: Review Plan (RP) Approval for the Lower Columbia River Ecosystem Restoration
General Investigation Study

1. Reference EC 1165-2-209, Civil Works Review Policy, 31 January 2012.
2. The enclosed RP for the Lower Columbia River Ecosystem Restoration General Investigation Study been prepared in accordance with the reference guidance.
3. The RP has been revised to address NWD review comments. All comments have been back-checked and closed out.
4. I hereby approve this RP, which is subject to change as study circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this RP or its execution will require review by CENWD-PDD and approval by this office.
5. The RP should be posted to the internet and available for public comment.
6. Please contact Jeremy Weber, at 503-808-3858, if you have further questions regarding this matter.

Encl

ANTHONY C. FUNKHOUSER, P.E.
COL, EN
Commanding



DEPARTMENT OF THE ARMY
PORTLAND DISTRICT, CORPS OF ENGINEERS
333 SW FIRST AVENUE
PORTLAND, OREGON 97204

REPLY TO
ATTENTION OF

CENWP-DE

DEC 4 2012

MEMORANDUM FOR Commander, Northwestern Division (CENWD-DE)
(David Ponganis, Chief, Planning and Environmental; Resources and Support Division,
CENWD-PDD)

SUBJECT: Lower Columbia River Ecosystem Restoration General Investigation Study Review
Plan submittal, for Decision Document

1. Enclosed for Major Subordinate Command (MSC) Commander approval is the Lower Columbia River Ecosystem Restoration General Investigation Study Review Plan. This Review Plan has been prepared according to EC 1165-2-209, Civil Works Review Policy.
2. The District point of contact (POC) for questions or requests for additional information may be referred to Jeff Ament, Project Manager, at (503) 808-4713 or email at Jeffrey.M.Ament@usace.army.mil. A secondary POC is Technical Lead Keith Duffy, at (503) 808- 4969 or email at Keith.B.Duffy@usace.army.mil.

FOR THE COMMANDER:

A handwritten signature in black ink, appearing to read "Kevin J. Brice".

Kevin J. Brice, P.E., PMP
Deputy District Engineer
for Project Management

Encl

CF:
CENWD-RBT (Combs)

**REVIEW PLAN
FOR
LOWER COLUMBIA RIVER ECOSYSTEM RESTORATION,
OREGON AND WASHINGTON
General Investigation
FEASIBILITY STUDY**

December 3, 2012

1. INTRODUCTION

The Lower Columbia River Estuary watershed is divided along the state boundaries of Oregon and Washington; is bounded to the east by Bonneville Dam and terminates at the mouth of the Columbia River, 146 miles downstream. The project is dominated by the Columbia River mainstem which is tidally influenced from the mouth to Bonneville dam but also includes terrestrial stream tributaries. The project includes abundant opportunities for estuary restoration projects as well as potential sites in the stream tributaries, with the notable exception of the Willamette River basin, which is covered under separate GI studies.

2. PROJECT BACKGROUND

A Corps Reconnaissance Report was approved in August 2001, identifying a Federal interest in pursuing the feasibility phase study to investigate, in detail, ecosystem restoration measures in the Lower Columbia River. The Columbia River basin has experienced considerable changes in water resource needs and uses. In addition, significant environmental degradation has occurred within the lower Columbia system. Modification of the system by human activities has led to a marked change in the hydrologic regime, and caused pollution and substantial losses of instream, riparian and wetland habitats, and a concomitant reduction in fish and wildlife resources. Thirteen different populations of anadromous salmonids that reproduce in the Columbia River Basin have been listed as threatened or endangered and they all use the estuary to some extent. Such listings have broad implications to existing water resource uses, and future developments.

Historic losses of 52,000 acres of wetland/marsh habitats, 13,800 acres of riparian forest habitat, and 27,000 acres of forested wetland habitat downstream of Portland have significantly impacted this ecosystem's ability to produce and sustain fish and wildlife resources. Much of this wetland loss can be attributed to the 84,000 acres encompassed by diking districts and the 20,000-acre increase in urban development along the lower Columbia River.

3. STUDY PURPOSE

The purpose of the study is to investigate and recommend appropriate solutions to accomplish ecosystem restoration in the lower Columbia River and estuary, including wetland/riparian habitat restoration, stream and fisheries improvement, water quality, and water-related infrastructure improvements. The study was initiated by Congress in response to environmental degradation, including loss of wetland habitats, in the lower Columbia River and estuary. The lower Columbia River has experienced considerable changes in water resource needs and uses. In addition, significant environmental degradation has occurred within the lower Columbia system. Modification of the system

REVIEW PLAN
 FOR LOWER COLUMBIA RIVER ECOSYSTEM RESTORATION, OREGON AND
 WASHINGTON
 December 3, 2012

by human activities has led to a marked change in the hydrologic regime, and caused pollution and substantial losses of instream, riparian, and wetland habitats, with a reduction in fish and wildlife resources. To date, four salmonid species from the lower Columbia River region have been listed under the Endangered Species Act (ESA). Such listings have broad implications to existing water resource uses and future developments.

The purpose of the review plan is to assign the appropriate level and review independence, establish the procedures, and assign responsibilities for conducting the agency technical reviews (ATRs) of all applicable decision documents to ensure the quality and credibility of all decision documents developed during the GI. This plan is compliant with ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007. This plan also is compliant with the EC 1105-2-412, Assuring Quality of Planning Models, 31-March 2011. This plan is also compliant with EC 1165-2-209, Water Resources Policies and Authorities, Civil Works Review Policy, 31 January 2012.

The project delivery team is presented in Table 1. The project manager, Jeff Ament, is the main point of contact at Portland District for more information about this project and the review plan.

TABLE 1.
FEASIBILITY PHASE PROJECT DELIVERY TEAM

<u>Discipline</u>	<u>Name</u>	<u>Office/Agency</u>
Project Manager	Jeff Ament	CENWP-PM-FP
Program Manager (GI)	Laura Hicks	CENWP-PM-F
Program Analyst	Cheryl Masuo	CENWP-PM-P
Plan Formulation	Jeff Ament	CENWP-PM-FP
Environmental Coordinator	Tina Teed	CENWP-PM-E
Cultural Resources	TBD	CENWP-PM-E
Civil Design	Guy Fielding	CENWP-EC-DC
Survey/ CADD Mapping/GIS	Gregg Bertrand	CENWP-EC-TG
Geotechnical	Jeremy Britton	CENWP-EC-DC
Hydraulics & Hydrology	Keith Duffy	CENWP-EC-H
Economic Evaluation	Louis Landre	CENWP-PM-FE
Cost Engineering	TBD	CENWP-EC-CX
Real Estate	TBD	CENWS-RE
Public Affairs Office	TBD	CENWP-PA

REVIEW PLAN
FOR LOWER COLUMBIA RIVER ECOSYSTEM RESTORATION, OREGON AND
WASHINGTON
December 3, 2012

Office of Counsel	Jennifer Richman	CENWP-OC
Sponsor Rep. OR		ODFW
Sponsor Rep. WA		LCRFRB
PCX POC	TBD	CEMVD-RV-T

4. PROJECT SIGNIFICANCE

Myriad efforts are underway in the Lower Columbia River relating to ecosystem health and function, this summary attempts to place each major effort in context to the broader needs of the Lower Columbia and explain how the various efforts relate to and inform one another. Specifically this overview attempts to explain the possible uses and advantages of the General Investigations Study in relation to the ongoing efforts in the Lower Columbia River. Following the general discussion on linkages is a short summary of each of the actions discussed. Additionally, a figure is included illustrating these relationships (Figure 1).

The Federal Columbia River Power System (FCRPS) biological opinion and the Lower Columbia River Estuary Partnership's Comprehensive Conservation Plan (CCMP) provide broad direction and framework for actions from the perspective of NOAA Fisheries and the Estuary Partnership. The actions outlined in the Biological Opinion focus on salmonids specifically. The CCMP outlines actions (actions 1-12) that will serve fish and wildlife habitat and water quality through prevention of further loss, protection and enhancement of existing resources, and restoration of habitat where degradation has occurred.

The Subbasin plans developed through the BPA fish and wildlife program and the habitat mapping efforts will provide baseline information necessary for long term implementation planning. These plans, both mainstem and tributary, will provide the goals for fish, wildlife and habitat, objectives to measure progress and will outline strategies to meet those objectives.

Generally, projects executed under the Bonneville Power Administration and the Corps' Research Monitoring & Evaluation programs will provide information to further the region's understanding of how salmon use the environment of the lower Columbia River and plume and what factors affect their overall survival and fitness. The information obtained from the research monitoring and evaluation adaptive management actions can be used to adjust the restoration activities in the subject area accordingly.

While much investigation and planning is complete, ongoing or planned, gaps remain in the knowledge base. Also, the efforts listed above do not identify methods for a programmatic environmental impact statement (EIS) or long term funding for implementation of habitat restoration, protection and enhancement. The General Investigation study is one vehicle to identify site-specific actions, provide for programmatic National Environmental Policy Act (NEPA) and Endangered Species Act consultation as well as secure long term funding for 65% of implementation efforts. The General Investigations study and process can also identify easily implemented projects that can be pursued under the Corps' Continuing Authorities Program (CAP), the Columbia River Restoration Authority, Section 536, or through other partners' capabilities.

REVIEW PLAN
FOR LOWER COLUMBIA RIVER ECOSYSTEM RESTORATION, OREGON AND
WASHINGTON
December 3, 2012

To provide the most extensive leveraging of resources available the study will build upon, not duplicate, existing information. Additionally, efforts that contribute necessary information to the long-term implementation of these actions should be captured to provide cost share opportunities to the states of Oregon and Washington as well as the Estuary Partnership's funding recently secured from Bonneville Power Administration.

The need for a long-term source of funding for implementation is critical to the success of large-scale restoration in the Lower Columbia River. The Estuary Partnership's proposal with BPA covers a 3-year timeframe and is thus limited in longevity and scope (~\$3 million). Projects pursued under the Corps Continuing Authorities program must compete on a national basis for relatively limited funding. The Corps authority for the lower Columbia River, Section 536 program, is limited to 30-million. This limitation includes any projects the Tillamook Estuary portion of the authorization should identify. It is anticipated the overall construction costs for a basinwide flood damage reduction system will be significant.

5. PROPOSED PLANNING MODELS

The primary expected output of alternatives developed and evaluated in this feasibility study will be ecosystem restoration benefits. The benefits and costs will be determined separately for the estuary and the Washington and Oregon tributary restoration alternatives. For each of the 3 study areas, the PDT will develop a single framework for combining several existing habitat models to produce quantitative estimates of ecological outputs as a single restoration "index". The combined model for each of the 3 areas will be developed based on previous recommendations of expert panels regarding the types of indicators that should be used to represent natural ecosystem functions. Indicators include species, plant communities, and hydrogeomorphic functions. Indicator attributes to be considered include the actual physical or biological features or processes that can be measured either in the field or via GIS analysis, including features such as channel length, area of cottonwood community, temperature, pieces of large woody debris, etc.

For each study area, the proposed ecological evaluation model will provides an indicator of the existing and potential future conditions for salmonid populations and their habitat, with other existing Habitat Evaluation Procedure (HEP) or equivalent models that estimate ecological outputs for other aquatic and terrestrial species.

The resulting outputs of the combined model will be used as the basis of the incremental cost analysis/cost effectiveness (ICA/CE) for all ecosystem restoration and mitigation plans. This analysis compares the potential costs of each proposed alternative to the potential ecological benefits. This analysis is facilitated by developing a single numeric value for the ecological benefits for each alternative. Thus, the general framework of the model, as shown above, results in a single "score" for each alternative. Such a single numeric value is most certainly an oversimplification of a highly complex ecosystem.

REVIEW PLAN
FOR LOWER COLUMBIA RIVER ECOSYSTEM RESTORATION, OREGON AND
WASHINGTON
December 3, 2012

However, if the model is completely transparent so that both users and decision-makers can view the relationships and equations used in each part of the model; the inputs and outputs of the model; and understand how each score is derived, it will be a highly useful tool for comparing the relative benefits of potential restoration alternatives. It is not intended to be a rigorous prediction of fish and wildlife production or geomorphic rates of change.

Upon completion of the ICA/CE process, the NWW Cost Estimating PCX will be consulted and review selected plan cost estimates as part of finalizing the FR/EA in FY 10 (contingent upon Federal funding).

Monitoring and evaluation of baseline versus post-implementation conditions can provide a valuable evaluation of the accuracy of the model in predicting benefits to specific species or ecosystems over time and within other reaches or subbasins of the Willamette River and will be considered for implementation as part of this project.

It is not anticipated that the feasibility report will disseminate influential scientific information or a highly influential scientific assessment.

The PDT will utilize existing hydrologic and hydraulic model information to describe baseline conditions. The outputs of the models will provide important information concerning habitat effects and attributes that will be incorporated into the ecological models described above. H&H information will be used to inform the potential risk associated with potential induced adverse affects (i.e. flooding), provide input for habitat function analyses (ecological output) as well as providing a basis for sizing management measures such as channels, hydraulic control structures, etc..

All models determined to require Center of Expertise certification will be formally provided for review.

6. REVIEW SCHEDULE

ATRs will be conducted for all major GI phase documents and major engineering and scientific documents products (e.g., cultural resources overview, Hydraulics and Hydrology report, programmatic methodologies, and programmatic biological assessment). The review schedule is included in the Project Management Plan and will be updated as reviews are scheduled. Low funding levels for the study have, and will continue to drive the schedule.

SMART Planning Milestones			
<u>Milestone Code</u>	<u>P2 Recommended Activity Name</u>	<u>P2 Milestone Name</u>	<u>Date</u>
CW261	Alternatives Milestone	Alternatives Milestone	1 February 2012
CW262	Tentatively Selected Plan	TSP Milestone	TBD
CW263	Agency Decision Milestone	Agency Decision Milestone	TBD
CW160	*Submit Final Report	*Final Report Submittal	TBD
CW270	*Submit Chief's Report	*Chief's Report	TBD

7. INDEPENDENT EXTERNAL PEER REVIEW

A Type I independent external peer review (IEPR) is required for the draft final combined feasibility/EIS report. This is because of the large geographical scale of the project, the environmental importance of the project area, the potential of construction costs exceeding \$100 million, and the potential for residual flooding risks in populated areas. Management measures include levee breaching, tide gate installation and retrofits, pile structure removal, and various tidal connection/reconnection measures. NWD was coordinated with and approves the recommendation of EPR.

8. PUBLIC REVIEW OPPORTUNITIES

The public will be provided numerous opportunities for review of study products. A formal public review will be held following the Conceptual Alternatives review public review will be held for the feasibility/EIS report prior to approval by the Chief of Engineers. The public will be encouraged to continue to provide input to the review process through public scoping meetings and public review periods programmed into the feasibility schedule. The public will be asked to participate in the recommendation of an IEPR Panel for the review of the feasibility report and EIS.

9. AVAILABILITY OF PUBLIC COMMENTS TO ATR TEAM

Public input from the NEPA workshops and the public scoping meetings will be available to the ATR members to ensure that public comments have been considered in the development of the without-project conditions report, plan formulation documents, and the draft FR/EIS. The draft FR/EIS will be independently reviewed prior to the conclusion of the public comment period, and, therefore, these comments will not be available to the ATR members. In the event that the final FR/EIS is significantly revised from the draft, another ATR will be scheduled and public comment on the draft will be available to the reviewers.

10. ANTICIPATED NUMBER OF REVIEWERS

The current ATR plan is to include at least 10 independent reviewers. This number is based on the disciplines required to develop the feasibility products and the draft and final FR/EIS.

11. PRIMARY DISCIPLINES AND EXPERTISE NEEDED FOR THE ATR

The disciplines and expertise required for the ATR team are presented in Table 2.

TABLE 2
INDEPENDENT TECHNICAL REVIEW TEAM

<u>Discipline</u>	<u>Description</u>	<u>Reviewer</u>
ATR Team Leader	Plan Formulation experience on ecosystem restoration projects, particularly involving restoration of natural floodplain function on large regulated western rivers in a maritime climate	Elliot Stefanik
Plan Formulation	Plan Formulation experience on ecosystem restoration projects particularly involving restoration of natural floodplain function on large regulated western rivers in a maritime climate	TBD
Environmental	Fisheries biologist and/or riparian ecologist with experience on ecosystem restoration projects associated with ESA-listed salmonids species	TBD
Cultural Resources	Archaeologist	TBD
Geotechnical	Geologist or geotechnical engineer with experience on restoration of gravel bedded rivers	TBD
Economic Evaluation	Economist with experience on ecosystem restoration projects	TBD
Cost Engineering	Cost engineer/estimator with flood control or ecosystem restoration experience (grading, levees, revegetation, wood or boulder in-stream habitat structures)	TBD
Real Estate	Agricultural, parks, and gravel mining property experience (knowledge of Oregon's land use laws and related	TBD

REVIEW PLAN
 FOR LOWER COLUMBIA RIVER ECOSYSTEM RESTORATION, OREGON AND
 WASHINGTON
 December 3, 2012

	policy ramifications will be helpful)	
Geomorphology	Geologist or hydraulic engineer with wood in-stream habitat structures, gravel-bedded rivers, and ecosystem restoration project experience	TBD
Civil Design	Civil engineer with experience in designing grading plans, levees (and levee and bank-protection removal or modification), and habitat structures,	TBD
Hydraulics and Hydrology	Hydrologist or hydraulic engineer with floodplain mapping, and ecosystem restoration experience	TBD
Structures	Civil or structural engineer experienced with design and construction of structures related to environmental projects.	TBD

The main reviewers will be technical experts with expertise sufficient to validate the methods, assumptions and completeness of the study. They must be familiar with the models and techniques used in the study. This information will be updated as the study progresses.

Policy Review. Policy review of the feasibility report/EIS will be conducted primarily at the Division and Headquarters level. External review is for technical matters only, and is not used to resolve policy issues.

Quality Control will be maintained by the technical leads for the separate Portland District technical offices and the project managers of consultants. The PDT and the sponsor will also review products for technical excellence.

The Agency Technical Review Team will be selected on the basis of having the proper knowledge, skills, and experience necessary to perform the task and their lack of affiliation with the development of the feasibility report/EIS and associated appendixes (through the NWD nomination and selection from all division districts). The review team will be approved by the Ecosystem Center of Expertise to ensure that the technical work and products from each discipline achieve a quality product. Funding of reviewers may include travel to Portland District for the review conference. All ATRs will be completed through DRCHECKS where comments and comment resolution are captured.

Technical review will use appropriate analytical methods for each technical area. Technical review will rely on periodic technical review team meetings to discuss critical

REVIEW PLAN
FOR LOWER COLUMBIA RIVER ECOSYSTEM RESTORATION, OREGON AND
WASHINGTON
December 3, 2012

plan formulation or other project decisions, and on the review of the written feasibility report documentation and files. Independent technical review will ensure that:

- the feasibility report/EIS is consistent with current criteria, procedures and policy
- clearly justified and valid assumptions that are in accordance with established guidance and policy have been utilized, with any deviations clearly identified and properly approved
- concepts, features, analytical methods, analyses, and details are appropriate, fully coordinated, and correct
- problems/issues are properly defined and scoped
- conclusions and recommendations are reasonable and justified.

12. INDEPENDENT EXTERNAL PEER REVIEWERS

IEPR will be conducted by nationally recognized technical experts outside of the Corps of Engineers. They may be from the National Academy of Sciences, universities, or other scientific institutions. A panel of reviewers will be selected with input from the general public, Corps Centers of Expertise, stakeholders, and the sponsors. NWD will nominate members of the panel and the PCX will approve them. External review will use appropriate analytical methods for each technical area. The review panel will meet with the study PDT and the public to determine areas of controversy in the feasibility report, and will review the written feasibility report documentation and files, including the technical appendices. The panel will tour the study area and interview participants as needed. The external review team will be qualified to review and ensure:

- Scientific data used in the study was accurate and complete.
- Modeling methods used were pertinent to the type of study results required, and sound modeling methodology was used
- The analysis contained clearly justified and valid assumptions
- concepts, features, analytical methods, analyses, and details are appropriate, fully coordinated, and correct
- problems/issues are properly defined and scoped
- conclusions and recommendations are reasonable and justified.

Following their reviews, the reviews will submit comments as a panel. The disciplines and expertise required for the IEPR panel team are presented in Table 3. These areas of expertise are appropriate and will address the majority of comments and issues raised in similar multipurpose studies. The areas of expertise are also responsive to the needs identified by the PDT and City of Portland Staff. Although controversy beyond these disciplines is not expected, the composition of the IEPR panel will be flexible to respond appropriately.

Table 3.
INDEPENDENT EXTERNAL PEER REVIEW PANEL

<u>Discipline</u>	<u>Description</u>	<u>Reviewer</u>
Plan Formulation	Plan Formulation experience on ecosystem restoration projects particularly involving restoration of natural floodplain function on large regulated western rivers in a maritime climate	TBD
Environmental	Fisheries biologist and/or riparian ecologist with experience on ecosystem restoration projects associated with ESA-listed salmonids species	TBD
Economic Evaluation	Economist with experience on ecosystem restoration projects	TBD
Hydraulics and Hydrology	Hydrologist or hydraulic engineer with HEC-RAS unsteady state, floodplain mapping, ecosystem restoration experience	TBD

13. PUBLIC SELECTION OF IEPR REVIEWERS

The public may be asked to participate in the selection of external reviewers prior to the Alternative Formulation Briefing. The public will have an opportunity to review and comment on the draft Project Management Plan and Review Plan prior to initial approval, and through out the study process.