

**Final Compiled Comments and Responses
from the
Independent External Peer Review
Of the
Willamette River Floodplain Restoration Study**

June 27, 2013

1

Final Comment-Response Record

Comment-Response Record

This page is intentionally left blank

Final Panel Comment 1

Certain design features of the recommended restoration plan may not be self-sustaining and may require perpetual maintenance.

Basis for Comment

The Panel is concerned that certain design features of the recommended restoration plan (e.g., invasive species removal, native species plantings, and large woody debris [LWD] placement) presented in the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment are not self-sustaining and may require perpetual maintenance. Because the issues being addressed by these floodplain restoration design features are consequences of flow alteration and flow restoration is not included in the project design for the recommended restoration plan, the Panel believes that some other mechanism would be needed to maintain these features. For example, in a natural system, LWD would be imported from upstream during high flow events. In the section of the Willamette River basin where hydrology has been significantly altered and source areas for woody material are blocked by the dams, material that washes away during high flow events will not be replaced by supplemental materials from upstream. Consequently, there may be a need for continued wood loading or other maintenance activities. It may not be possible to realize and sustain project benefits without including continued maintenance in this design feature.

The Panel understands that the restoration work will be a one-time construction engineering event. However, this is implied and not clearly stated. The feasibility report states that invasive species will be removed and that native vegetation will be planted over a period of a few years. However, under a natural flow regime, periodic flooding was likely one reason that invasive species could not be established. In the absence of this mechanism, invasive species may continuously attempt to re-colonize the floodplain. The monitoring and adaptive management plan indicates that the non-Federal sponsor will actively manage the plant community as needed in the future. If active management is viewed as the permanent solution, this should be stated. The monitoring and adaptive management plan should indicate more clearly how sustainability of these design features will be monitored and how potential adaptive management strategies will be implemented.

It also does not appear that the potential of large-scale grazing from Canada geese has been considered. In areas where resident Canada goose populations exist, impacts from goose herbivory on vegetation plantings have been known to be problematic and have resulted in the destruction of the targeted plant species while more aggressive non-native species have persisted (Baldwin 2013).

Significance – High

Absence of a strategy to address continuous design issues without a self-sustaining solution could potentially affect the projected cost to meet the restoration goals or the

possibility of reaching all restoration goals.

Recommendations for Resolution

1. Either:
 - a. Identify any design features or other mechanisms not clearly evident that are expected to maintain woody debris and keep invasive species under control once established. For example, this may include naturally occurring upstream sources of LWD that existing flows can deliver to the restoration reaches, planting of riparian areas that may in the future generate LWD, or
 - b. Identify any costs and associated assumptions required if perpetual maintenance of these design features is in fact is anticipated.
2. If resident Canada goose populations are present in or near the proposed project area, include the potential impacts from goose herbivory in the adaptive management strategy.

PDT Draft Evaluator Response (FPC#1):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation:

The PDT concurs that certain design features will require future maintenance actions over the life of the project, particularly related to on-going management of invasive species. This has been an assumption of the project from the earliest plan formulation (operation and maintenance costs were included in the preliminary costs used for the incremental cost analysis, see Section 5.5 in report and Appendix C, preliminary costs).

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1a: Adopt Not adopt

Explanation: The purpose of the recommended restoration plan is to restore natural floodplain functions along the Lower Coast and Middle Forks of the Willamette River. However, this study has been conducted within the context of existing development and management of the system and other actions being conducted by a variety of other stakeholders. The PDT and stakeholders recognized early in the plan formulation process that this study could not address all problems and limiting factors in the subbasins and that floodplain restoration projects would not be entirely self-sustaining over the long term. Plan formulation focused specifically on the three objectives of the study to: 1) increase channel

complexity and diversity; 2) restore connectivity of the rivers to floodplain habitats; and 3) restore native floodplain habitats (cottonwood gallery forests, riparian areas, wet prairie habitats).

Specific to the sustainability of native vegetation communities and the placement and long-term recruitment of large woody debris, this project is being conducted on several sites partly or wholly owned by the Nature Conservancy as the Willamette Confluence site (project sites C1C, M1A, M1B, and M2A). The Nature Conservancy has developed a draft management plan (TNC 2011) that includes the identification of all invasive species present on the sites in 2011 with an invasive species management program that prioritizes management for each species based on the level of impact to native habitats/species and the relative feasibility of management. Species were then categorized into “high priority,” “early detection rapid response,” “containment,” and “project-specific” categories. Species in the high priority category have a high level of impact and are easy to moderate to control. Species in the early detection and rapid response category have the potential to cause significant impacts if left untreated, but are in localized areas or low populations and could potentially be eradicated from the sites. Species in the containment category are widespread with moderate level of impact and are difficult to control. These species will be contained to reduce in localized areas and prevent further spread, but cannot be eradicated. Species in the project-specific categories are present in areas where future projects such as the recommended restoration plan sites and grading and other substantial work will be occurring and the goal will be to remove the species in graded areas and treat in other locations (i.e. ponds) to remove as much as possible. This type of strategy will be implemented on the other project site (C1B) as well in conjunction with management by Lane County and the Friends of Buford Park. The Corps will additionally enter into an operations and maintenance agreement with the Nature Conservancy for the lifetime of the restoration project that will outline expected short-term and long-term actions to manage invasive species within the project footprint. It is not anticipated that invasive species will be eradicated from any of the sites, but will be managed to not diminish the expected habitat functions of the sites.

The majority of the project sites will include two primary types of habitat where invasives species are currently dominant or could require management in the future: 1) cottonwood riparian gallery forest; and 2) gravel mined ponds that will be converted to more wetland/riverine side channel habitats. The primary invasive species of concern in the cottonwood riparian gallery forest areas are blackberry species (*Rubus* sp.) and knotweed species (*Polygonum* sp.). Both of these species are widespread throughout the Pacific Northwest and there is a long history of treatment and control. The primary invasive species of concern in the gravel mined ponds include Eurasian watermilfoil (*Myriophyllum spicatum*), purple loosestrife (*Lythrum salicaria*), yellow flag iris (*Iris pseudacorus*) and reed canary grass (*Phalaris arundinaceae*). These species are also very widespread throughout the Pacific Northwest but control has been more difficult due to their presence in aquatic habitats and rapidly spreading nature. These species will be managed to reduce their populations and promote hydrologic changes that will discourage their survival – by

promoting seasonal flow-through and then drying down over the summer/fall, these species will have less suitable habitat and other measures such as shading with riparian vegetation (i.e. willows), spot cutting/herbicide applications, project-specific grading, etc. will also be used to reduce their populations and diminish their effects on habitat and native species.

Invasive fish and wildlife species are also of concern such as bullfrogs, snapping turtles, warmwater fish species, etc. These will also be removed as feasible (only one snapping turtle has been observed and will be trapped; fish species may be netted from individual ponds) and the introduction of a more natural hydrologic regime with seasonal flow-through and then summer/fall dry down will also reduce habitat for these warmwater species that thrive in the isolated and warm gravel ponds currently.

The proposed large wood and engineered log jams included as restoration measures in the recommended restoration plan are intended to provide medium-term habitat function (i.e. 10-30 years) to provide a deposition site for other large wood in the system, promote formation of in-channel habitats (pools, riffles, side channels), provide in-channel cover, and provide floodplain cover and habitat for wildlife species and may also be recruited into the channel during high flow events. In conjunction with these medium-term benefits, the restored riparian zone that will extend for two miles along the Middle Fork and 1 mile along the Coast Fork will be growing and maturing for eventual contributions of wood into the rivers. In addition, other stakeholders are undertaking riparian revegetation in many locations upstream of the project sites on both the Middle Fork and Coast Fork that will also contribute to future recruitment of large wood into the rivers. The wood is not expected to create a static habitat situation over the life of the project, but promote formation of habitats in multiple locations and work in concert with environmental flows and other actions undertaken separate from this project.

Additional explanation can be provided in the project documents to identify the primary invasive species present on the sites and proposed management strategies. For sites within the recommended restoration plan, short-term actions include a fairly intensive 5-year program starting the year construction begins at each site to include mowing, cutting, application of approved herbicides, as well as grubbing and grading to remove and control these species. Particularly for blackberry species, a 3 to 5 year regimen of mowing, cutting, and spot herbicide application has been demonstrated to control blackberry populations and once native tree and shrub species become established in the five year period, the future recolonization by blackberries is diminished due to shading and general ground coverage (Bennett 2007).

References:

Bennett, M. 2007. Managing Himalayan blackberry in Western Oregon riparian areas. Oregon State University Extension Service, Document EM8894.

The Nature Conservancy. 2011. Willamette Confluence Preserve Management Plan. Draft,

in review.

Recommendation #1b: Adopt Not adopt (Adopt in future)

Explanation: During the conceptual level design development, expected operation and maintenance activities were identified and included in the costs used for the cost effectiveness and incremental cost analysis. These costs included the intensive 5-year initial maintenance of invasive species and then periodic future maintenance for the life of the project. During final design and construction a detailed operation and maintenance manual will be developed that outlines the responsibilities of the non-Federal sponsor and expected frequency and potential costs of this maintenance. The Nature Conservancy anticipates on-going maintenance for the life of the project and is committed to provide this management effort.

Recommendation #2: Adopt Not adopt

Explanation: Canada geese are both resident and migratory in the Willamette Valley. They are widely present in urban areas on golf courses, parks with large lawn areas, and agricultural fields. Areas with grass cover adjacent to ponds and other open waterbodies appear to be highly preferable to resident geese, whereas migratory geese are often observed in more natural emergent wetlands or fallow agricultural fields. However, on the project sites, the current condition has virtually no grass cover and the gravel mined ponds are primarily surrounded with shrubby vegetation (predominantly blackberries) or highly compacted bare ground. The planting plan surrounding the ponds is directed at restoring shrub and forested conditions or submerged or emergent fringing wetlands. The shrub and tree species tend to discourage use by geese, but temporary actions during the first five years could include placement of goose deterrent flagging in areas of emergent wetland.

Panel Draft BackCheck Response (FPC#1):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concurs

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Reference:

Baldwin, Andrew H. (2004). Restoring complex vegetation in urban settings: The case of tidal freshwater marshes. *Urban Ecosystems* 7:125-37.

Final Panel Comment 2

The long-term benefits of floodplain connectivity and natural processes cannot be determined because the degree to which the sediment, gravel, and wood supply has been reduced and the importance of this supply to meeting project objectives are not clear.

Basis for Comment

One of the project objectives discussed in the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment (FR/EA) is to restore natural ecosystem function and conditions to the Coast and Middle Fork subbasins of the Willamette River. In Sections 3.2.2, Geomorphology, and 6.0, Environmental Baseline, sediment and wood supply are noted as key components, along with other parameters, driving river and floodplain morphology and influencing spatial and temporal patterns of erosion and sedimentation. These same sections of the FR/EA also note that human activities have disrupted natural flow and sediment transport processes by altering the controlling factors, hence altering the rates and types of habitat forming processes.

However, the degree to which sediment, gravel and wood supply has been decreased by past human activities is not clear, as the discussion on existing conditions in Section 6.0, Environmental Baseline, does not include any analysis of current or historic sediment supply or the importance of sediment supply to channel migration and floodplain connectivity. The Panel assumes that only a small fraction of the historic bedload is currently available to the project area. Two of three major tributaries in the Coast Fork and every major tributary in the Middle Fork, which constitute the majority of the sediment supply area in the headwaters, are dammed, and it is not clear to the Panel whether any or all dams are configured with sediment bypass systems for passing bedload or suspended sediments, fitted for systems that are partially working or non-functional, or containing all sediments from the production zone upstream.

While the Panel agrees that the restoration measures will have a positive influence on geomorphic conditions within the reaches where they are implemented, there is concern that these positive influences will be short-lived. Transport and temporary storage of sediment in the active channel is the primary driver creating natural habitat, and the system of dams has likely eliminated the majority of the historic bedload for the system. Without ongoing sediment supply, it is possible that channel incision will persist, and gains in floodplain connectivity will be diminished over time.

Significance – High

If the project does not directly address the issue of sediment, gravel and wood supply, the benefits of the project may not be realized long term.

Recommendations for Resolution

1. Provide an analysis of current and historic sediment, gravel and wood supply conditions.
2. Factor the relevance of sediment, gravel and wood supply into the alternatives evaluation.
3. Discuss the likelihood of channel incision under existing and proposed conditions.
4. Provide a discussion of how long-term benefits will be achieved with respect to sediment, gravel and wood supply.
5. As appropriate, include the transport of wood and gravel as a potential restoration measure and rerun the analyses.

PDT Draft Evaluator Response (FPC#2):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The PDT agrees that upstream sediment and wood supply and the effects of the dams in trapping or otherwise changing this supply are important considerations in the overall restoration of natural processes in a watershed.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: The Willamette Subbasin Plan (WRI 2004) identified that up to 90% of the historic sediment supply in both subbasins is being affected by the upstream dams and that some coarsening of the bed has been observed downstream of the dams. Wood yield upstream of the dams has been heavily modified due to timber harvest and other development, although the dams do provide a barrier to the transport of the limited wood that is recruited upstream. While this is an important consideration, a detailed analysis of the likely sediment and wood yield of the upstream watersheds is beyond the scope of this study and is being considered separately by other stakeholders in the salmon recovery context and the Corps associated with Biological Opinion compliance. The Corps has recently been undertaking drawing down Fall Creek Reservoir to pass juvenile Chinook safely downstream and to allow sediment to pass downstream. The Corps will be monitoring the sediment volume and making recommendations for future actions separate from this project.

For reference, an evaluation of sediment supply was conducted for another Willamette River tributary (the North Santiam River) in 2009 (Tetra Tech 2009). The anticipated

average annual sediment delivery to the upstream reservoir (Detroit Lake) is on the order of 18,000 tons from a watershed of 425 mi². This information could be extrapolated to the Middle Fork subbasin that has a watershed of over 1,000 mi² upstream of the dams, so sediment yields could be 2-3 times the value for the North Santiam River (36,000 to 54,000 tons/year). The Coast Fork has a similar watershed area upstream of the dams as the North Santiam River.

Additional clarifying information from this response will be added to the report to provide more context and reasoning on why an analysis of sediment and wood supply and transport was not conducted as part of this study.

Reference:

Tetra Tech, Inc. 2009. Upper North Santiam River Gravel Augmentation Study, Linn and Marion Counties, OR. Final report prepared for U.S. Army Corps of Engineers, Portland District.

Recommendation #2: Adopt Not adopt

Explanation: There is a sediment and wood deficit in both subbasins from multiple causes including the dams, active removal (gravel mining and removal of wood in the rivers), and revetments that prevent bank erosion and channel migration. However, there are still substantial localized opportunities to restore erosion and deposition processes and both place wood and restore riparian zones for the long-term recruitment of wood.

Separate from this project the Nature Conservancy and the Corps, along with a long list of stakeholders including University of Oregon and Oregon State University researchers, have been implementing the first phase of the Sustainable Rivers Project (SRP) that seeks to modify dam operations throughout the Willamette basin to provide environmental and habitat benefits. Some of the actions to date have included providing environmental flows on the Middle Fork Willamette River during rainfall or other runoff events to mimic more naturally occurring peaks, while still meeting flood risk management requirements. These environmental flows have been conducted and monitored from 2008-2012 to identify if these flows can initiate geomorphic changes in the river and stimulate the formation of habitat features. Preliminary results indicate that there have been increases in bar deposition and localized bank erosion that can contribute both sediment and wood into the system (McDowell, draft 2012, in progress).

Summary information from this response will be added to the report to provide more context and reasoning on why sediment and wood placement is not included as a restoration measure in this study.

Reference:

McDowell, P. 2013. Willamette Sustainable River Project Phase 2: Development of a

Monitoring Plan for Environmental Flow Recommendation on the Middle Fork Willamette River, Oregon. Review Draft, in progress.

Recommendation #3: Adopt Not adopt

Explanation: Because the project area is located immediately upstream of the Cities of Eugene and Springfield, there are substantial concerns on the part of landowners and cities with the idea of placing additional gravel into the river. Some of the gravel bar deposition that has occurred in recent years in the project area has been identified as a concern by local landowners concerned about flooding and channel migration. As a result, this project has been focused on reconnecting and enhancing floodplain habitats rather than promoting larger-scale natural processes. In the context of the lifetime of these projects and their function, it is likely that other entities will implement sediment transport and nourishment downstream of the dams in the future, and the risk of channel incision in the lowest mile or two of these rivers is lowest over the lifetime of these projects. Some channel incision associated with historic gravel mining has already occurred in the project area, but has stabilized and channel deposition is now occurring. The placement of wood in the rivers adjacent to the project sites will tend to trap sediments and reduce the rate of transport through these lowest reaches while other actions occur separately that will likely include sediment nourishment.

Summary information from this response will be added to the report to provide more context relative to channel incision in this study.

Recommendation #4: Adopt Not adopt

Explanation: If no separate projects were to occur that provided sediment transport past the dams or placed gravel downstream of the dams, then over a 50-100 year period, channel bed coarsening and incision could occur adjacent to the project sites that could reduce the frequency of connections between the rivers and the floodplains. However, as sediment transport is already being conducted experimentally at Fall Creek Dam and plans for further such projects are being considered, it is likely that sediment nourishment or gravel transport will occur. The future recruitment of large wood into the rivers will be much greater than currently occurs as riparian restoration projects mature and localized bank erosion is allowed to occur downstream of the dams associated with environmental flows.

Additionally, while the project includes a number of engineered connections to the floodplains, during flood events it is expected that additional channels will be scoured and the floodplain connections will not be static but will form and be destroyed and reform. Removal and lowering of some of the impediments (informal revetments) that prevent such channel migration is part of the recommended restoration plan (i.e. at Sites M1A and M1B).

Summary information from this response will be added to the report to provide more context relative to the long-term benefits and conditions in this study.

Recommendation #5: Adopt Not adopt

Explanation: The small-scale placement of gravel downstream of Dexter Dam on the Middle Fork was considered as an alternative measure in the study (Measure M5D). This measure did not rank highly in the cost-effectiveness and incremental cost analysis because its benefits primarily accrued to salmon (in-channel habitat) and did not benefit other species. Gravel transport and sediment nourishment downstream of the dams is being considered separately from this project.

The small-scale placement of gravel was mistakenly not described as a measure under consideration in Section 5.2. A summary description will be provided.

Panel Draft BackCheck Response (FPC#2):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Final Panel Comment 3

The transport of wood and gravel from above the dams is identified as a restoration opportunity but not carried forward into the development of restoration alternatives.

Basis for Comment

One of the Willamette River Floodplain Restoration project objectives is to restore floodplain habitat. The Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment (FR/EA) identifies that habitat complexity in the Willamette River floodplain has been greatly reduced because, “The supply of large wood and gravel are limited and habitat forming processes have been reduced,” resulting from dams that have reduced peak flows (Table 4.) The FR/EA establishes the importance of wood and gravel supply to natural systems, and to the project area specifically, and the transport of wood and gravel from above the dams is listed as a restoration opportunity (Table 22, Specific Restoration Problems and Opportunities). However, transport of wood and gravel is not established as a restoration measure (it is not listed in Table 24, Potential Restoration Measures). There is no discussion or reasoning provided for this decision.

Significance – Medium

The process for the selection of the recommended restoration plan is not completely explained because the transport of wood and gravel was established as being important to natural processes and habitat complexity, but it was eliminated from consideration as a potential restoration measure.

Recommendations for Resolution

1. Explain the decision to eliminate the transport of wood and gravel from above the dams as a potential restoration measure.

PDT Draft Evaluator Response (FPC#3):

1. Please indicate below whether the PDT ‘concur’ or ‘non-concur’ with the comment statement in the first row above and provide a clear explanation for the ‘concur’ or ‘non-concur’ response.

X Concur ___ Non-Concur

Explanation: The transport of wood and sediment from above the dams was considered as an opportunity, but was not developed as a restoration measure. Placement of large wood and engineered log jams is included as a restoration measure to address channel complexity and diversity.

2. For each recommendation, please indicate whether the PDT will ‘adopt’ or ‘not adopt’ the recommendation and provide an explanation. If ‘adopt’, please provide information on how

this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: Further explanation can be provided in the report documentation as to why this measure was not carried further in plan formulation. Because of the concerns of potential effects on flooding and large-scale channel migration, this measure was not carried forward. Additionally, other entities are separately considering such measures for longer-term implementation for Biological Opinion compliance and salmon recovery.

Panel Draft BackCheck Response (FPC#3):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concurs

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Comment-Response F

Final Panel Comment 4

It is not clear why certain alternatives, such as modifying dam operations, were removed from consideration for this study.

Basis for Comment

The Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment (FR/EA) evaluates engineering alternatives for restoring habitat losses caused by past alterations of flow regime in the Willamette River Basin resulting from dam operation. Elements such as connectivity between floodplain pools and the presence of large woody debris (LWD) are important for preserving floodplain habitats, and natural flow regime is partially responsible for maintaining these habitat elements. Restoring natural flow is one approach commonly used for restoring floodplain habitat, including modifying dam operations to achieve a more natural hydrologic and hydrodynamic flow regime throughout the wet months, as well as alterations that may improve the passage of bedload sediments. However, the discussion in the FR/EA presents proposed engineering alternatives without explaining why other potentially more cost-effective operational alternatives, such as restoring river hydrology functions through controlled releases via dam operations, were eliminated from consideration.

During a mid-review teleconference facilitated by Battelle on April 15, 2013 to provide the Panel an opportunity to ask clarifying questions about the review documents and the project, the Project Delivery Team clarified why these options were not brought forward from the Phase I framework planning process and considered further. However, the FR/EA does not explain these decisions. Because dam operation is a root cause of habitat loss, the Panel has determined that added discussion would strengthen the reasoning for the selected alternatives.

Significance – Medium

The reasons for selecting the recommended restoration plan cannot be fully understood without explaining why modifying dam operations, and other potentially more cost-effective alternatives for restoring floodplain habitat, were eliminated from consideration in the early stages of project planning.

Recommendations for Resolution

1. Explain the rationale for not bringing forward or considering the modification of dam operations and any other non-engineering alternatives from the Phase 1 framework planning process as an alternative for restoring habitat to the Willamette River Basin floodplain. Sections 1.4 and/or 1.5 may be appropriate places for this added discussion.

PDT Draft Evaluator Response (FPC#4):

1. *Please indicate below whether the PDT ‘concur’ or ‘non-concur’ with the comment*

statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The PDT concurs that the rationale for not carrying alternatives such as modifying dam operations further into the plan formulation process was not fully explained.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: The purpose of this study is to restore natural floodplain ecosystem functions that have been degraded by multiple causes (including, but not limited to upstream dams). Of specific interest were locations where revetments or other actions had isolated the floodplain from the river.

Separate from this project the Nature Conservancy and the Corps, along with a long list of stakeholders including University of Oregon and Oregon State University researchers, have been implementing the first phase of the Sustainable Rivers Project (SRP) that seeks to modify dam operations throughout the Willamette basin to provide environmental and habitat benefits. Some of the actions to date have included providing environmental flows on the Middle Fork Willamette River during rainfall or other runoff events to mimic more naturally occurring peaks, while still meeting flood risk management requirements. These flows will support the on-the-ground floodplain restoration actions by providing flows that will inundate the newly-connected habitats at the project sites. In addition, the environmental flows are expected to generate geomorphic changes such as gravel/sediment movement in the river, which will support formation of habitat features. Currently, monitoring is ongoing to evaluate geomorphic changes associated with the environmental flow releases. Preliminary results indicate that there have been increases in bar deposition and localized bank erosion that can contribute both sediment and wood into the system (McDowell, draft 2012, in progress). The information being developed as part of this program will be used to develop a long-term operational plan that will include similar types of flow modifications.

Reference:

McDowell, P. 2013. Willamette Sustainable River Project Phase 2: Development of a Monitoring Plan for Environmental Flow Recommendation on the Middle Fork Willamette River, Oregon. Review Draft, in progress.

Panel Draft BackCheck Response (FPC#4):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: The PDT discussion provided furnishes the desired information and could be directly imported to the document to satisfy the Panel's recommendation.

Comment-Response Record

Final Panel Comment 5

It is not clear how the “bullfrog constraint” was used in the formulation of project alternatives, nor is it clear how maintaining a depth of less than 6 feet will minimize bullfrog habitat.

Basis for Comment

The bullfrog is a non-native predator in the Willamette River floodplain that is one of the factors that inhibits the recovery of the Oregon chub in the Willamette River system (Willamette River Floodplain Restoration Study Draft Feasibility Report/Environmental Assessment [FR/EA], p. 55) and has resulted in the decline of other native frog and fish species (FR/EA, pp. 72, 76, 80). The FR/EA states, “...the bullfrog was instead used as a constraint in the formulation of the alternatives to design conceptual projects that would specifically reduce bullfrog habitat (i.e., perennial ponds with depths greater than six feet)” (p. 116), and the bullfrog is used as a negative component in the Habitat Evaluation Procedure (HEP) Habitat Suitability Index (HSI) model so that restoration alternatives with negative effects on the bullfrog would score more highly. However, the FR/EA does not define the “bullfrog constraint” or provide details on how the constraint was used in the evaluation of alternative plans.

The report also states, “Oregon chub also requires perennial ponds or sloughs, but generally uses waters less than 6 feet in depth, so the focus to reduce bullfrog habitat is to design features that reduce the depth of perennial ponds or slough channels...” (p. 116). The document does not clarify if the depth of 6 feet is derived from specific habitat requirements for the Oregon chub, the bullfrog, or a combination of both. It appears that the presence of the bullfrog has a negative impact on the targeted habitat goals primarily due to predation; however, there is no detailed information to explain how bullfrog habitat has been addressed in the feasibility study, or which of the targeted species the bullfrog is expected to prey on.

Significance – Medium

The alternatives analysis process is not clearly supported without specific information regarding how the bullfrog constraint was used in the HSI model for evaluating alternative restoration plans.

Recommendations for Resolution

1. Define the bullfrog constraint. For example, optimal bullfrog breeding and reproduction habitat requires “x” depth of water for “x” period of time.
2. Indicate how the bullfrog constraint was used during plan formulation and evaluation.
3. Include more detail to explain how the bullfrog constraint was used in the evaluation of restoration alternatives.
4. Clarify the relationship between the bullfrog and the targeted species.
5. Indicate which of the targeted species the bullfrog is expected to prey on.

PDT Draft Evaluator Response (FPC#5):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The PDT concurs that text discussing bullfrog habitat and use as a design constraint were not clearly explained and some text from earlier versions of the report may have inadvertently been left in that indicated the bullfrog would be included in the HEP evaluation: it was not used in the HEP evaluation.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: From the Bullfrog HSI model (Graves and Anderson 1987) optimal bullfrog habitat is year-round standing water. Factors necessary for breeding are permanent, calm water with air temperatures above 27C. Water temperatures from 18 to 32C are also preferred. Water level fluctuations are not desirable. Water depths greater than 1.5 meters are required for escape from predators.

Reference:

Graves, B.M and S.H. Anderson. 1987. Habitat suitability index models: bullfrog. U.S. Fish Wildl. Serv. Biol. Rep. 82(10.138). 22 pp.

Recommendation #2: Adopt Not adopt

Explanation: The habitat preferences for bullfrog were kept in mind when development restoration measures at each site, to maximize seasonal fluctuations and promote drawdown of ponds during low flow periods and also provide shallower areas for emergent wetlands to replace deeper water areas. Habitat for bullfrog cannot be eliminated and preferred habitat for bullfrog also overlaps with preferred habitat for Oregon chub and Western pond turtle. Thus, the overall design criteria are to promote natural hydrologic fluctuations that favor native species and tend to reduce habitat quantity and quality for non-native warmwater species including bullfrog.

Recommendation #3: Adopt Not adopt

Explanation: The bullfrog constraint was not used in the evaluation of alternatives. Text indicating that it was used will be deleted.

Recommendation #4: Adopt Not adopt

Explanation: Bullfrog can prey on small fish, turtles, and amphibians both native and non-native species. Of the native species of interest, bullfrog can prey on Oregon chub, small Western pond turtles (hatchlings), and native amphibian eggs, tadpoles, larvae, and smaller adults. Bullfrog do occur in locations with these native species and do not eliminate them from habitats, necessarily, but if prey is limiting then predation on native species can be severe. Competition between bullfrog tadpoles/smaller frogs and native amphibians may also occur.

Recommendation #5: Adopt Not adopt

Explanation: Bullfrog can prey on small fish, turtles, and amphibians both native and non-native species. Of the native species of interest, bullfrog can prey on Oregon chub, small Western pond turtles (hatchlings), and native amphibian eggs, tadpoles, larvae, and smaller adults. Bullfrog do occur in locations with these native species and do not eliminate them from habitats, necessarily. Competition between bullfrog tadpoles/smaller frogs and native amphibians may also occur.

Panel Draft BackCheck Response (FPC#5):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Final Panel Comment 6

Potential limitations in channel bank or bedform survey data may yield hydraulic model results that are not representative of current conditions.

Basis for Comment

The data used for hydraulic and hydrologic (H&H) modeling presented in the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment were compiled from various studies, years, and collection methods. Datasets that are compiled from multiple studies have limitations, including how representative the data may be, given how long ago they were collected. The primary concern is the degree to which the channel banks or bedforms have changed since the data were collected and how those changes may affect the results. For example, if a flood event or significant bed-moving event changed the channel or bedform considerably, using data collected prior to the event would likely yield model results that are not representative of current conditions.

Using data that are not representative of existing conditions could result in over- or under-predicting water surface elevations, instream velocities, expected future conditions, or affect the accuracy of future effectiveness monitoring.

Significance – Medium

Without a discussion of how well the survey data used for the H&H modeling represents current conditions, the level of uncertainty associated with the hydrology and hydraulic analysis cannot be fully understood.

Recommendations for Resolution

1. Describe the relevance of the channel bank and bedform data used in the hydraulic model.
2. If data used were collected prior to a significant hydrologic event (e.g., a flood event), spot check to confirm data are still representative of current conditions.

PDT Draft Evaluator Response (FPC#6):

1. Please indicate below whether the PDT ‘concur’ or ‘non-concur’ with the comment statement in the first row above and provide a clear explanation for the ‘concur’ or ‘non-concur’ response.

X Concur ___ Non-Concur

Explanation: The PDT agrees that channel changes have occurred since the various surveys from 2008 to 2011 in the project area and this could affect hydraulic model results.

2. For each recommendation, please indicate whether the PDT will ‘adopt’ or ‘not adopt’ the

recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: Survey data was collected over several years and included a repeat survey in Reach M2 to compare to a previous survey. For feasibility level designs, channel changes are unlikely to significantly affect quantities and costs and overall contingency adopted for this report is 33.8% to adjust for more detailed designs during the PED phase.

Recommendation #2: Adopt Not adopt (Adopt in future)

Explanation: Additional reach-scale surveying and spot checks for confirmation will occur during the PED phase when reach-scale HEC-RAS modeling is conducted for both design flows and 100-year effects.

Panel Draft BackCheck Response (FPC#6):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concurs

Does not concur

Please provide a clear explanation for the Panel's choice:

The responses provided are adequate and we believe that appropriate measures are in place to ensure that the system will be evaluated appropriately.

Final Panel Comment 7

The monitoring and adaptive management plan does not fully explain how project targets were derived or if successfully meeting targets is an indication that the proposed project benefits are being achieved.

Basis for Comment

The Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment lists potential items of risk and uncertainty (Table 35, Section 6.8, pp. 146–147). One item is the possibility of proposed fish and wildlife benefits not being realized. One of the mitigation measures proposed to address this risk is to “...develop [a] detailed monitoring and adaptive management plan to document primary success metrics.” The monitoring and adaptive management plan includes targets, monitoring protocols, and adaptive management triggers for each of three project objectives. However, the plan does not clearly indicate how the project targets were developed and if they are correlated to Habitat Suitability Indices (HSIs) used in the Habitat Evaluation Procedures (HEP) platform for evaluating the ecological benefits of the potential alternatives (i.e., whether a specific target correlated with a specific HSI value).

For example, under project objective number 1 (p. 181), “Restore lost historic channel complexity and diversity,” three targets are given using a variety of percentages and timeframes:

1. Target 1 – Increase pool habitat... by 25% by 2020
2. Target 2 – Increase large woody debris (LWD) abundance...by 50% by 2020
3. Target 3 – Increase diversity of habitat unit types...by 25% by 2025

The monitoring and adaptive management plan does not explain how the percentages and timeframes correlate to the projected ecosystem outputs derived during the planning process. It also does not explain whether not achieving those percentages is an indication of whether the proposed project benefits are being achieved.

Significance – Medium

Explaining how the established targets were derived and describing the correlation between the targets and the projected ecosystem outputs will clarify the purpose and effectiveness of the monitoring and adaptive management approach.

Recommendations for Resolution

1. Explain how each project target in the monitoring and adaptive management plan was developed and how each correlates to the projected outputs of the recommended restoration plan for all three project objectives, including quantifiable elements such as percentages and timeframes.
2. Explain how it will be determined whether proposed project benefits are being achieved.

PDT Draft Evaluator Response (FPC#7):

1. Please indicate below whether the PDT ‘concur’ or ‘non-concur’ with the comment statement in the first row above and provide a clear explanation for the ‘concur’ or ‘non-concur’ response.

X Concur ___ Non-Concur

Explanation: The PDT concurs that the targets included in the monitoring plan are not fully explained as to their origin (such as relevant parameters from the HEP model used to evaluate the alternatives).

2. For each recommendation, please indicate whether the PDT will ‘adopt’ or ‘not adopt’ the recommendation and provide an explanation. If ‘adopt’, please provide information on how this recommendation will be adopted. If ‘not adopt’, please explain why.

Recommendation #1: X Adopt ___ Not adopt

Explanation: Project targets were developed to quantify key habitat suitability parameters in the relevant models used in the alternative evaluation such as percent pools during low water period and instream cover present in the native salmonids model. Vegetation percent cover targets were based on percent deciduous shrub crown cover, overall canopy cover, percent of shrub canopy comprised of hydrophytic shrubs (e.g. yellow warbler model). Will add text to report documents outlining this more clearly. Will also add conducting the multi-species HEP evaluation on the post-construction condition at Year 10 for direct comparison to predicted quality of habitat. The Nature Conservancy is currently conducting monitoring on their property to obtain pre-restoration baseline data. The elements from this monitoring effort will be incorporated into the monitoring plan as appropriate.

Measurable impact on habitat and species -- Table 2: Monitoring

Goals	Objectives ¹	Pre-restoration baseline data	Post-restoration monitoring: short-term outcomes	Post-restoration monitoring: long-term outcomes
-------	-------------------------	-------------------------------	--	---

¹ There are no unaltered sites in this area, so no potential reference projects. As an alternative, we are using historic data being gathered for the basin to develop quantitative goals and objectives for river and floodplain restoration.

Increase in the amount of floodplain and off-channel habitat	Increase river/floodplain connectivity & improve channel and floodplain complexity in the lower Middle & Coast Forks and mainstem Willamette River	Stream flow and inundation levels in river and floodplain ² ; river channel and floodplain bathymetry ³	Inundation frequency and duration in the side channels and floodplain	Stream channel and floodplain morphology (complexity and geometry of side and main channels)
	Improved extent and condition of floodplain and side channel habitat	Topography of floodplain and gravel bars ²	Acres connected floodplain habitat; total channel length	Cover of native floodplain plants; cottonwood recruitment
Widespread improvements in habitat and water quality conditions resulting in upward trends in ESA-listed salmon populations	Water temps within and downstream of restored habitat are within desired range for salmon & other target species	Water temperature in Pudding Creek and off-channel sloughs ³	Water temperatures within and downstream of habitat	Water temperatures within and downstream of habitat
	Habitat is used by spring Chinook and Oregon chub	Fish surveys in connected floodplain habitat ²	Fish species composition and abundance	Fish species composition and abundance
	Habitat restoration does not lead to fish entrainment	Fish surveys in connected floodplain habitat ²	Timing of fish use; seasonal fish counts	n/a
	Habitat restoration does not promote non-native fish colonization	Fish surveys in connected floodplain habitat ²	Ratio of native to non-native fish in floodplain habitats	n/a
	Restored floodplains and instream habitat is used by other floodplain obligates	Red-legged frog and western pond turtle surveys ²	# red-legged frog egg masses and adult western pond turtles	# red-legged frog egg masses & adult western pond turtles
Application of lessons learned to other sites	Increase in restoration of floodplain habitat where there are gravel ponds throughout the Pacific Northwest	Inventory of existing gravel mine restoration projects ²	n/a	# restoration projects permitted and acs. floodplain habitat being restored by 2020

Recommendation #2: Adopt Not adopt

² Baseline data collection in progress

³ Baseline data collection completed

Explanation: Adaptive management plan states that if targets are not met then project benefits are not being realized and adaptive management actions are then recommended.

Panel Draft BackCheck Response (FPC#7):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Comment-Response Record

Final Panel Comment 8

Monitoring and evaluating the biological and physical responses may not be possible based on the proposed monitoring plan protocols.

Basis for Comment

It is not clear to the Panel that the monitoring approach for the monitoring and adaptive management plan presented in the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment will allow determination of whether restoration objectives are being met for certain biological and physical responses. This could result in missed adaptive management opportunities.

For example, one value of the restored habitat is to provide nursery areas for recovering salmon species, thus parr and smolt production is a valid measure of success. However, the monitoring protocol does not specify which fish species or life-history stages will be monitored or the frequency of monitoring other than to say that, "Sampling will occur every two weeks during the connection period (i.e., October through June) and include at least one night-time sampling per month" (Section 10, p. 182). The monitoring and adaptive management plan indicates that other monitoring will occur at 1, 5, and 10 years. The monitoring and adaptive management plan also indicates that methods such as fyke nets, seining, and/or electroshocking will be used.

Fish population monitoring frequency should ideally be annual or at least occur more frequently than at 5-year intervals in order to determine whether salmon populations are recovering. The frequency of fish population monitoring could be designed to determine parr densities of salmonid fish at reasonable intervals, and the spatial and temporal monitoring frequency should be stated in the monitoring plan. In addition, smolt trapping could be used to evaluate the number and size of smolt being produced within the area. Otherwise, it may not be feasible to effectively determine if the restoration elements are successful in promoting recovery of fish populations.

Hydrologic events such as high flows may also affect stream features such as gravel bars or large woody debris (LWD) jams. The monitoring plan should include scope to evaluate how these events have physically affected (or benefited) the project. Changes to geomorphology and LWD should be monitored after hydrologic high flow events occur. To determine whether restoration goals are being met, increased monitoring frequency or additional monitoring may be necessary, including monitoring channel stability, growth or loss of LWD, snags, and channel geomorphology.

Significance –Medium

Without fully explaining the approach and methods in the monitoring and adaptive management plan and how the monitoring data will help determine whether restoration goals have been met, the protocol is incomplete and may not effectively inform the adaptive

management plan.

Comment-Response Record

Recommendations for Resolution

1. Clearly identify specific evaluation goals for biological and physical responses in the monitoring plan and how they are linked to restoration goals. Include a brief discussion linking specific Primary Constituent Elements for salmon recovery to specific elements in the alternative and how these will be documented, and also linking to any potential biological recovery criteria in the salmon recovery planning documents (e.g., smolt densities or number of returning adults, etc.).
2. Add survey sections across the floodway and through the active channel to document changes in floodplain connectivity and identify potential negative outcomes such as channel incision.

PDT Draft Evaluator Response (FPC#8):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The PDT agrees that detailed methods have not been described in this plan.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: The targets in the monitoring plan have been developed based on the habitat suitability criteria in the multi-species HEP model and additional text describing this will be added to the report documents as identified for the previous comment. The primary constituent elements (PCEs) for the species that have them are fairly general and do not lend themselves to developing monitoring targets. Similarly, individual restoration projects cannot be monitored for overall salmon recovery and the larger watershed-scale monitoring of salmon smolts produced and adults returning is being undertaken separately from this project.

Specific to fish monitoring, the monitoring plan will be revised to indicate juvenile fish sampling will occur in Years 1,3, and 5 following construction to provide more rapid documentation of fish access and use of the reconnected sites during the January through June time period when salmonids use off-channel sites for rearing and refuge.

Recommendation #2: Adopt Not adopt

Explanation: The addition of physical cross-section monitoring (in addition to the habitat unit monitoring) is a good suggestion and will be added to the monitoring plan, see response to

Comment #7 regarding incorporating monitoring elements from current Nature Conservancy monitoring into the plan.

Panel Draft BackCheck Response (FPC#8):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: Inclusion of Habitat Suitability Criteria as targets provides reasonable, measurable physical metrics by which to evaluate the project that has a direct link back to the biological species that the project is trying to support.

Comment-Response Rec

Final Panel Comment 9

Expected impacts on the existing fringe wetlands from implementing the recommended restoration plan have not been quantified, and there is no description of how these impacts will be addressed.

Basis for Comment

The Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment (FR/EA) states, "There are wetlands present on all of the sites, primarily associated with the existing gravel mined ponds (fringing wetlands around the ponds) and in floodplain overflow channels." The document goes on to say that, "During construction, some wetlands will be disturbed" (Section 7.6, p.163), however, no information is provided regarding how existing wetlands will be impacted by implementing the recommended restoration. The FR/EA indicates that wetland delineations will be conducted during the design phase of the project and the quantity of wetlands to be removed will be determined at that time (Section 7.6, p. 163). However, preliminary information such as where wetlands are most likely to be impacted, the approximate percentage of wetlands that will be impacted, the general quality and species composition of the wetlands that will be impacted, and how wetland species composition may change would provide a better understanding of the anticipated impacts from construction. Furthermore, no information is provided regarding how these impacts will be addressed (i.e., whether impacted wetlands will be restored at the same location or at another location).

Significance –Medium

The lack of qualitative or quantitative information on the existing fringe wetlands and how they may be affected by implementation of the recommended restoration plan limits the understanding of the significance of the potential impacts from construction and how they should be addressed.

Recommendations for Resolution

1. Provide quantitative and/or qualitative information on the composition of the plant community and the condition of the existing wetlands that may be impacted by construction. For example, explain whether the existing wetlands are composed of mostly native plants that provide high quality habitat, if they are primarily low quality habitat composed of non-native species, or if there is a mix of both high and low quality wetland habitat. If there is a mix of both, provide estimates of the relative percentages of high and low quality habitat.
2. Provide information regarding where existing wetlands are most likely to be impacted and quantitative information regarding the amount of existing fringe wetlands that may be impacted by implementing the recommended restoration plan.
3. Explain how and where impacted wetlands will be restored.
4. Explain whether changes in wetland class and/or habitat types are anticipated as a

result of the project.

PDT Draft Evaluator Response (FPC#9):

1. Please indicate below whether the PDT ‘concur’ or ‘non-concur’ with the comment statement in the first row above and provide a clear explanation for the ‘concur’ or ‘non-concur’ response.

X Concur Non-Concur

Explanation: The PDT concurs that current fringe wetland area and potential effects were not quantified in the report documents.

2. For each recommendation, please indicate whether the PDT will ‘adopt’ or ‘not adopt’ the recommendation and provide an explanation. If ‘adopt’, please provide information on how this recommendation will be adopted. If ‘not adopt’, please explain why.

Recommendation #1: X Adopt Not adopt

Explanation: The Nature Conservancy conducted wetland mapping throughout their properties and only identified minimal fringing wetlands as the ponds typically are steep sided and drop immediately into deeper water. However, using this information and NWI mapping, an estimate of wetland acreage to be affected has been developed. Table 37 has been developed for the report. For the most part, the wetlands are of low quality and dominated by non-native species, however, the forested wetlands do have native tree canopy cover and the project seeks to enhance these areas by removing non-native shrubs and planting native shrub species.

Table 1. Wetland Areas Affected by the Recommended Plan

Site	Pond/Fringing Wetland Acreage Existing	Riparian/Floodplain Wetland Acreage Existing	Wetland Area to be Changed in Type or Created	Net Result
C1B	18 acres	30 acres	Change 7 acres	Change pond wetlands by providing more shallow water emergent wetland (approximately 7 acres); remove invasive species and connect to river.
C1C	20 acres	12 acres	Change 5 acres	Change pond wetlands by providing more shallow water emergent wetland (approximately 3.5 acres); route connector channels through riparian wetland (change 1.5 acres of shrub or forested wetland to a mix of seasonal channel, emergent wetland and forested

				riparian. Promote creation of more floodplain wetlands via more frequent connections.
M1A	25 acres	2 acres	Change 4 acres; create 1 new acre	Change pond wetlands by providing more shallow water emergent wetland (approximately 4 acres), remove invasive species, and create 1 acre of new channel/emergent wetlands from uplands.
M1B	90 acres	4 acres	Create 16 acres	Change steep/deep pond banks to more shallow emergent wetlands (approximately 16 acres); remove invasive species and connect through uplands to river and other ponds.
M2A	24 acres	4 acres	Enhance 4 acres	Enhance four acres of existing pond fringe wetlands by removing invasive species and providing more shallow emergent habitat.

Recommendation #2: Adopt Not adopt

Explanation: See response to Recommendation #1, above.

Recommendation #3: Adopt Not adopt

Explanation: The total area of wetlands is expected to increase with the recommended restoration plan by converting deeper water areas to wetland, thus no mitigation is proposed, as is typical for this type of restoration. Some wetlands will be converted to channel conditions, but the overall resulting condition is an improvement to the environment.

Recommendation #4: Adopt Not adopt

Explanation: Yes, as shown in Table 37, some areas of wetlands would change in type such as from forested wetland to channel. Deep water pond will be converted to emergent and shrub wetlands.

Panel Draft BackCheck Response (FPC#9):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concurs

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Final Panel Comment 10

The Primary Constituent Elements of the targeted species that are listed under the Endangered Species Act are not specifically linked to elements of the recommended restoration plan.

Basis for Comment

The Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment (FR/EA) indicates that floodplain restoration will directly benefit targeted species, and states (p.9):

“The purpose of this floodplain restoration feasibility study is to restore natural floodplain ecosystem functions along the lower Coast and Middle Forks of the Willamette River. These functions include fish and wildlife habitat, groundwater recharge, incidental flood storage, and sediment and erosion processes. This project is needed because of the need to restore large floodplain sites to contribute to the recovery of sensitive fish and wildlife species in the subbasins.”

Because many of the targeted species are listed under the Endangered Species Act (ESA), the Panel believes it is important to explicitly state how the recommended restoration plan will benefit these species. Recovery of fish populations in the Willamette River basin listed under the ESA is linked to the goals of the recommended restoration plan by Primary Constituent Elements (PCEs), which are habitat elements that are essential or critical to the recovery and proliferation of the targeted species. It can be inferred that the PCEs identified for these species will benefit from the recommended restoration plan; however, the FR/EA does not describe the PCEs in a way that clearly and explicitly links specific PCEs to proposed habitat improvements to support how the selected alternatives will directly benefit the targeted species.

Significance – Medium

Including a discussion of how PCEs will be addressed by each of the alternatives selected for the recommended restoration plan will more clearly demonstrate the purpose of each alternative and help inform the scope of the monitoring and adaptive management plan.

Recommendations for Resolution

1. Include a brief discussion of, or reference to, how the alternatives selected for the recommended restoration plan will affect the PCEs related to recovery of the affected ESA species.
2. Incorporate the PCEs into the narrative describing specific habitat improvements and applicable monitoring plans.

PDT Draft Evaluator Response (FPC#10):

1. Please indicate below whether the PDT ‘concur’ or ‘non-concur’ with the comment statement in the first row above and provide a clear explanation for the ‘concur’ or ‘non-

concur' response.

Concur Non-Concur

Explanation: Table 5 (pages 48-50) in the Biological Assessment (Appendix D) identify the proposed effects on PCEs from the recommended restoration plan. This information was not included in the main report as it was more detailed than warranted.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: This information has already been provided in the Biological Assessment, and was considered too detailed to incorporate into the main report.

Recommendation #2: Adopt Not adopt

Explanation: The PCEs are fairly general and do not provide quantitative targets for incorporating into the monitoring plan. For example, PCE-1 for Chinook salmon is "Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development."

Panel Draft BackCheck Response (FPC#10):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: Appendix D adequately documents the nexus of PCE's to the project.

Final Panel Comment 11

The basis for the selected discount rate of 3.75% for the economic analysis and costing for the life of the project is not explained, and a sensitivity analysis is not provided to demonstrate potential differences in total project costs if the discount rate changes over time.

Basis for Comment

The discount rate chosen for use in the economic analysis in the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment introduces an uncertainty in the estimate of the total project costs. The discount rate is usually determined by applying generally accepted economic methodology to estimate the average interest rate over the period in question, in this case, the life of the project. The current FY13 Federal discount rate of 3.75% was chosen for the 50-year economic analysis period of this project (Section 5.6.2, p. 122). Typically, this would be the discount rate used in determining annualized cost (average annual costs) over extended periods of time. The discount rate of 3.75% seems somewhat low as an average when considering a 50-year analysis period. The Panel did not find any sensitivity analyses of the effect of applying different discount rates.

The report states that, "The cost estimated for each alternative is divided by 50 to yield an average annual cost that can be used with average annual habitat units" (Section 5.6, p. 119). This is not consistent with generally accepted engineering economic methods, and the reason for using this alternative approach is not explained. The Panel could not find calculations for determining annualized costs that were based on the engineering economics concept of time-value-of-money (i.e., the change in the value of money over the 50-year period based on applying a compound interest rate of 3.75%).

Significance – Medium

Whether the methods for the cost engineering analysis are appropriate cannot be determined because the methods used for estimating changes in cost over time are not explained.

Recommendations for Resolution

1. Explain how the discount rate was selected.
2. Include a sensitivity analysis to show the impact of using different discount rates on total project costs.
3. Include time-value-of-money for determining annualized costs rather than dividing by 50 to yield an average annual cost or explain why the accepted engineering concept of time-value-of-money was not used in determining annualized costs.

PDT Draft Evaluator Response (FPC#11):

1. *Please indicate below whether the PDT 'concur' or 'non-concur' with the comment*

statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The PDT concurs that the use of the discount rate of 3.75% was not explained other than referring to it as the current FY13 Federal discount rate.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: The discount rate used in economic analyses for USACE Civil Works projects is dictated annually by USACE Economic Guidance Memorandum 13-01. The following is an excerpt from the guidance:

Project Evaluation and Formulation Rate (Discount Rate): FY 2013 – 3.750 %

The Principles and Guidelines states: "Discounting is to be used to convert future monetary values to present values. Calculate present values using the discount rate established annually for the formulation and economic evaluation of plans for water and related land resources." (Section 1.4.11) The interest rate for discounting, that is, converting benefits and costs to a common time basis, is set each fiscal year in accordance with Section 80 of Public Law 93-251. HQUSACE obtains the rate from U.S. Department of the Treasury, which computes it as the average market yield on interest-bearing marketable securities of the United States that have 15 or more years remaining to maturity. The computed rate is effective as of 1 October of each year. It is based on yield data for the entire previous fiscal year, and thus the discount rate for the fiscal year above is based on average yields during the previous fiscal year. According to law the rate may not be raised or lowered more than one quarter of one percentage point in any year. The table below shows the discount rate historical series going back to 1957. Column headings identify the source of authority for the rates, and not necessarily the organization that actually computed the rates.

Additional text will be added to the report to reference EGM 13-01.

Recommendation #2: Adopt Not adopt

Explanation: The future maintenance costs after project construction are low cost in comparison to the construction costs. Fully funded costs for construction have been estimated to the mid-point of construction. If construction was delayed by five years, the change in discount rate would be a maximum of +/- 0.025 as required by law (change to Federal discount rate). Text will be added to the report to clarify that a sensitivity analysis was conducted for this 5-year delay scenario and it did not affect the plan formulation or recommended restoration plan results. Also, while this slightly increases costs, the cost is

still worth the benefits achieved.

Recommendation #3: Adopt Not adopt

Explanation: The referenced sentence which implies costs were divided by 50 was included in error. All costs were annualized using the 3.75% discount rate to calculate annual payments over the 50 year period using Excel's PMT function. The referenced sentence will be corrected to state, *"The cost estimate for each alternative is then annualized over the 50 year period of analysis using the FY13 discount rate of 3.75%, yielding an average annual cost that can be used with the average annual habitat units."*

Panel Draft BackCheck Response (FPC#11):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Comment-Response

Final Panel Comment 12

The basis for the contingencies applied in the cost analysis is not explained.

Basis for Comment

Contingency percentages are applied to different costs as well as to project time (schedule) in the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Study/Environmental Assessment, and these appear to be very well done. However, the basis for the cost contingencies is not clearly explained, and the magnitude of this cost contingency (33.8%) seems excessively large considering there likely will not be significant design changes. There is a disclaimer (Executive Summary [ES], p. 2) related to the size of the contingency added that states, “the Portland District Cost Estimating Section considers the “high” level of contingency to be appropriate at this time.” This statement is very well placed, however, the document does not explain which cost elements are uncertain at this stage of project development, why the level of uncertainty associated with these cost elements is considered to be high, and how these cost elements and contribute to the 33.8% contingency. The application of cost adjustments for risk, such as increasing costs by a risk-determined percentage (i.e., the contingency) is very important because it can significantly impact total project costs, and the basis for the contingency should be explained to support the contingency value selected.

Furthermore, at one place in the Project Cost and Schedule Risk Analysis Report, the contingency to be applied to the baseline project cost is given as 24.5% (ES Section 6.2, Table ES-1). This percentage is given as the baseline cost contingency at the 80% confidence level that is used for this project and initially seems to conflict with the 33.8% contingency. In the Executive Summary (Table ES-1), however, there is an indication that a contingency of 33.8% is to be applied to all costs, and later in ES Section 7.2.1, there is a clarifying statement that the 33.8% is the total contingency to be applied and that 24.5% included in this figure represents “cost growth potential.” However, the other contingencies contributing to the 33.8% are not provided. It would be helpful to explain all of the contingencies that contribute to the 33.8% early in the Project Cost and Schedule Risk Analysis Report as well as the basis for each of those contingencies. A table showing all of the contingencies that contribute to the 33.8% contingency would also help clarify how the 33.8% contingency was selected.

Significance – Low

Support for the cost estimates will be improved if the reasons for using excessively large values for contingency costs are explained and all of the contingencies that contribute to the total contingency are provided.

Recommendations for Resolution

1. Provide a breakdown of the cost elements and their percentages that are uncertain and how they are included in the final total of the 33.8% cost contingency to be added to all project costs.
2. Explain why these cost elements are not finalized to the extent that the contingency could be more accurately determined at a value perhaps less than 33.8%.

PDT Draft Evaluator Response (FPC#12):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The PDT concurs that the basis for the contingencies is not explained in the main report.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: Appendix C includes a detailed Cost Schedule Risk Analysis Report as required by ER 1110-2-1302 (requires a formal risk based analysis for development of contingencies). Key members of the PDT developed a risk register and the level of effect that these risks could have on cost and schedule. Thirteen primary risks were identified and their expected dollar value effects were estimated based on recent bid information and other data. Because the Corps is moving towards finalizing decision documents early in the design process, particularly for watershed-scale studies, the contingencies are higher than might be developed for more detailed designs.

Recommendation #2: Adopt Not adopt

Explanation: The recommended restoration plan has been designed to the feasibility level appropriate for decision-making. The contingency has been developed using a formal risk based analysis at the current level of design and the resultant contingency of 33.8%, while higher than "rule of thumb" contingencies (perhaps closer to 25%) is appropriate based on the risks identified that could affect both schedule and cost.

The report will be modified to remove any reference to the "high" contingency value and state that it resulted from the detailed formal risk analysis appropriate to this stage of design.

Panel Draft BackCheck Response (FPC#12):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Comment-Response Record

Final Panel Comment 13

The Work Breakdown Structure in the Project Cost Summary does not provide enough detail to identify how the costs are being distributed across the different work elements.

Basis for Comment

The Cost Analysis (Appendix C) of the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental consists of several items including a:

- Preliminary Costs for Conceptual Alternatives (February 2011)
- Draft Cost Estimate Report, which has the Baseline Cost Estimate Narrative for the Total Project Cost Summary (3/1/2013)
- Total Project Cost Summary (dated 3/1/2013).

In the Preliminary Cost sheets for Conceptual Alternatives (pp. C-4 – C-43) and the Total Project Cost Summary sheets for the recommended restoration plan (Enclosure 3, pages 1 – 8), costs are broken out by each of the proposed restoration sites in the study area within the Willamette River basin. However, the Total Project Cost Summary does not show the same level of detail as the Preliminary Cost sheets.

The Preliminary Cost sheets show the costs of each work element (e.g., site preparation, debris removal, install culvert, place woody debris, real estate acquisition), and the same work elements are used and shown for each restoration site regardless of whether that work element is a component for restoration at that site. This allows for comparison of costs across the individual restoration sites and provides information about what work is proposed for each location.

The more recent Total Project Cost Summary only shows costs at a higher level (e.g., project management, planning and environmental compliance, engineering and design, engineering during construction, etc.) without any reference to specific work elements, as in the Preliminary Cost sheets. Therefore, which restoration work elements, and the cost of implementing each of those elements, are being implemented at each of the restoration sites is not clear in the Project Cost Summary. Being able to compare the cost of similar work elements at a high level of detail provides valuable statistical cost information on the total project cost and the work element costs contributed by each restoration alternative and at each restoration site in the recommended restoration plan.

Significance – Low

Providing more detail on the costs of specific work elements in the Work Breakdown Structure would improve the quality of information presented in the Total Project Cost Summary.

Recommendations for Resolution

1. Provide a more detailed presentation of the total project costs that follows the WBS level of detail used to show the Preliminary Costs Developed for Conceptual Alternatives (Appendices C-4 through C-43).

PDT Draft Evaluator Response (FPC#13):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The level of cost detail as shown in the project Cost Summary is appropriate for public distribution. The level of detail suggested, although useful as discussed in the comment, should not be disclosed since that level of detail could harm the interest of the Government during future procurement actions. Per ER 1110-1-1300 Civil Works Cost Engineering, Section 8.e.(5) "Access to the estimate and its contents should be limited to those persons whose duties require knowledge of the estimate."

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: The complete MCACES results pdf file was provided via CD. The panel can review this document if desired.

Panel Draft BackCheck Response (FPC#13):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Final Panel Comment 14

The rationale for non-ecologically based decisions and whether they affected the selection of the recommended restoration plan is not discussed.

Basis for Comment

The Willamette River Floodplain Restoration Study Draft Integrated Feasibility Report/Environmental Assessment documents a couple of logical and practical decisions that were made at critical points during the planning process that were not primarily ecologically based:

1. The decision to analyze the Lower Coast and Middle forks separately and then combine the results and
2. The decision to narrow down the number of alternative sites considered to meet the limitations of the IWR Planning Suite.

Good explanations of why these decisions were made are provided. What is missing is a brief statement of why these decisions are not expected to have a negative impact on the outcome of the analysis resulting in the recommended restoration plan.

Significance – Low

The technical credibility of the study documentation would be improved by describing why these two decisions did not impact the selection of the recommended restoration plan.

Recommendations for Resolution

1. Explain how analyzing the lower Coast and Middle Forks of the Willamette River separately and then combining the results for the alternatives analysis does not reduce the quality of the findings from an ecological perspective.
2. Explain how the sites were narrowed down to meet the limitations of the IWR Planning Suite analysis tool without reducing the quality of the findings from an ecological perspective.

PDT Draft Evaluator Response (FPC#14):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

X Concur ___ Non-Concur

Explanation: The PDT concurs that the explanation provided in Section 5.5 may not have been clear.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how

this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: Screening the sites with very high average cost per unit output does not affect selection because these sites would have been included only in those alternatives that are far up on the graphs (high cost) and would have been screened out during the cost-effectiveness analysis. That is, these sites with very high cost per unit would not have been included in any cost effective alternative plan that was within the sponsor's cost sharing capabilities, and thus it was determined that pre-screening these sites from the CE/ICA would make the software analysis more expedient. Additional text will be provided in Section 5.5.6 to state that the pre-screening did not have an effect on plan formulation or plan selection.

Recommendation #2: Adopt Not adopt

Explanation: More explanation will be provided in the report on which sites were pre-screened and what habitat benefits they might have provided, if cost was not a factor.

Panel Draft BackCheck Response (FPC#14):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.

Final Panel Comment 15

There are inconsistencies in the presentation and discussion of project goals and objectives in the documentation.

Basis for Comment

There are at least three sections in the Willamette River Floodplain Restoration Study Draft Integrated Feasibility Study/Environmental Assessment that list different project goals and objectives. Table 2 (p. 8) provides one restoration goal with three objectives, as well as two study goals with one and six study objectives, respectively. Section 10 (p.181) lists three project objectives that are similar but slightly different from those listed in Table 2. Section 5.9.1 (p. 137) lists six project objectives, three of which are similar to those in Table 2 and Section 10, but three of which are different.

These sections can be summarized as follows:

Table 2 (p. 8)	Section 10 (p. 181)	Section 5.9.1 (p. 137)
<p>Restoration Goal 1: Restore natural floodplain ecosystem function and condition to the Coast and Middle Fork Subbasins.</p> <p>Restoration Objective 1: Increase channel complexity and diversity</p> <p>Restoration Objective 2: Restore connectivity of river to floodplain habitats</p> <p>Restoration Objective 3: Restore native floodplain habitats, including cottonwood gallery forests, riparian and wet prairie habitats</p>	<p>Project Objectives:</p> <ol style="list-style-type: none"> 1. Restore lost historic channel complexity and diversity 2. Restore connectivity of river to floodplain habitats 3. Restore and protect native floodplain habitats including riparian and wetland habitats 	<p>Project Objectives:</p> <ol style="list-style-type: none"> 1. Restore channel complexity and diversity 2. Restore the connectivity of the river to floodplain and off-channel habitats 3. Restore and enhance the floodplain habitats (including riparian and wetland habitats) 4. Reduce invasive non-native species, primarily plant species such as reed canary grass and blackberries 5. Contribute to a reduction in water temperatures to meet native species needs by providing more effective connections to the river, shading, and groundwater recharge 6. Contribute to a reduction in bacteria and nutrient loading by providing improved riparian buffers and provide more frequent connections to floodplain habitats that provide nutrient and sediment deposition opportunities during storm events.

The objectives in Table 2 and Section 10 focus on restoration of habitat structure, while Section 5.9.1 also includes water quality objectives. These differences would be expected to

influence the alternatives analysis and the scope of the monitoring and adaptive management plan.

Significance – Low

Variances in the description of the restoration project goals and objectives may affect the understanding of the purpose of the proposed actions.

Recommendations for Resolution

1. Use a consistent description of the project goals and objectives throughout the report.

PDT Draft Evaluator Response (FPC#15):

1. Please indicate below whether the PDT 'concur' or 'non-concur' with the comment statement in the first row above and provide a clear explanation for the 'concur' or 'non-concur' response.

Concur Non-Concur

Explanation: The PDT agrees that the discussion on project goals and objectives was confusing as the reconnaissance phase identified a number of goals (study and restoration goals) that are beyond the current scope of the study and mission of the Corps.

2. For each recommendation, please indicate whether the PDT will 'adopt' or 'not adopt' the recommendation and provide an explanation. If 'adopt', please provide information on how this recommendation will be adopted. If 'not adopt', please explain why.

Recommendation #1: Adopt Not adopt

Explanation: The goals and objectives discussion will be streamlined in all areas to reflect one project goal: 1) restore natural floodplain ecosystem function and condition to the Coast and Middle Fork subbasins; and three project objectives: 1) increase channel complexity and diversity; 2) restore connectivity of river to floodplain habitats; and 3) restore native floodplain habitats, including cottonwood gallery forests, riparian, and wet prairie habitats.

Panel Draft BackCheck Response (FPC#15):

With regard to the concur/non-concur final Evaluator Response in the row above, the Panel

Concur

Does not concur

Please provide a clear explanation for the Panel's choice: No additional comment.