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Seattle District



Washington Department of
FISH and WILDLIFE

Puget Sound Nearshore General Investigation

Revisions to Project Management Plan Nearshore Work Plan



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Background/Preface

The Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) is a large-scale, comprehensive initiative to protect and restore the natural processes and functions in the nearshore zone of Puget Sound. The program is organized around a federal cost share agreement between the U.S. Army Corps of Engineers (Corps) and the Washington Department of Fish and Wildlife (WDFW) using the Corps General Investigation (GI) methodology. Seven federal agencies are active participants and contributors to the program (U.S. Geological Survey, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Environmental Protection Agency, U.S. Navy, U.S. Department of Energy, and the Army Corps of Engineers). Non-federal partners include five state agencies, tribes, local governments, ports, non-governmental organizations (NGOs), the shellfish industry, and private citizens.

The original Feasibility Cost Share Agreement (FCSA) for PSNERP was executed 25 September 2001. In signing the FCSA, the Corps and WDFW, along with their partners, have committed to completion of a General Investigation study.

The original project management plan (PMP) is available at www.pugetsoundnearshore.org, and supports the FCSA. The PMP anticipated the study would be completed in 2007 at a total cost of \$12 million. The overall scope of the project has not changed. However due to funding shortfalls in the early years of the project and additional time required to build a scientifically defensible basis for the project, a change in the overall project cost and schedule is necessary.

In anticipation of the update of the FCSA and corresponding revision to the PMP the Corps/Sponsor team tasked the project contractor to review other large-scale restoration projects around the country and outline different alternatives PSNERP could consider for completing the feasibility study and report. Four alternative paths forward were developed based on interviews with PSNERP stakeholders and a review of three large-scale, nationally significant authorized projects including; Comprehensive Everglades Restoration Plan (CERP), Louisiana Coastal Area (LCA), and the Illinois River Basin Restoration Comprehensive Plan. The Project Management Team in consultation with the Steering Committee selected one of the four outlined alternatives for completing the feasibility report. Under this alternative, the Corps/Sponsor team will develop a comprehensive plan and recommend an initial set of priority sites for authorization. A preliminary draft feasibility report will be complete in February 2010. Completion of this preliminary report will initiate a series of technical, policy and public reviews which will culminate with a final report being presented to congress in October 2011. These dates assume an unconstrained funding schedule. Milestones for a constrained budget can be found in Volume II. The feasibility report would also recommend authorization of a science and technology program and include demonstration or pilot sites. This study alternative is the preferred approach for revising the PMP and directing the Corps/Sponsor team to complete a feasibility report. This approach best balances the need to

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seek authorized projects for implementation while embracing the Corps/Sponsor team's scientific methods thus allowing them to continue examining the comprehensive restoration and protection needs of the Puget Sound Nearshore ecosystem. This study alternative is extremely ambitious, as it outlines prioritized schedules that require strict adherence to deadlines to be ready for authorization by 2011. This alternative is similar to the Everglades, LCA and Illinois large-scale restoration projects mentioned earlier when those studies were at a stage of development comparable to the Nearshore project.

Although the scope of the project has not changed appreciably, the framing of the work tasks to complete the feasibility study have been modified to focus efforts on deliverables necessary to meet Corps of Engineers feasibility study/decision document requirements. Many of the tasks defined generally in the original PMP are now more completely described based on progress to date and an understanding of Puget Sound Nearshore Feasibility Report outcomes. Rather than using stages 1-3 as outlined in the 2001 PMP, in this revision document tasks are aligned more directly with the Corps six step planning process. Sections 1 thru 7 of the PMP Revisions focus on the workplan and approval process, replacing section 2.3 (Feasibility Study Staging: Programmatic and Project Specific) of the September 2001 PMP. The study tasks and subtask descriptions from the original PMP are included in Section 8. These tasks are largely unchanged; however, they have been updated to reflect inclusion of both a comprehensive plan and initial portfolio sites. Section 10 elaborates on several knowledge areas, as defined by the Project Management Institute, to more fully lay out the planned work.

Nearshore General Investigation Project Management Plan Revisions

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Volume II: Revised Project Management Plan by Knowledge Areas

Volume II is a separate document including the following sections:

- ◆ Revised Study Task and Subtask by Work Breakdown Structure (WBS) Codes
- ◆ Revised Project Management Plan by Knowledge Areas
 - Cost Management
 - Time Management
 - Risk Management
 - Acquisition (Procurement) Management
 - Communications Management
 - Review Management (Quality Management)
 - Peer Review Plan
 - Model Certification Plan

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Volume I: Revised Workplan Plan by Corps Six-Step Planning Process

The feasibility report, a decision document, is required by the Corps to inform the Nation of nationally significant water resource problems and recommended solutions. The feasibility report will describe the economic, environmental, and social benefits of the recommended plan and alternative plans considered. More specifically the report will:

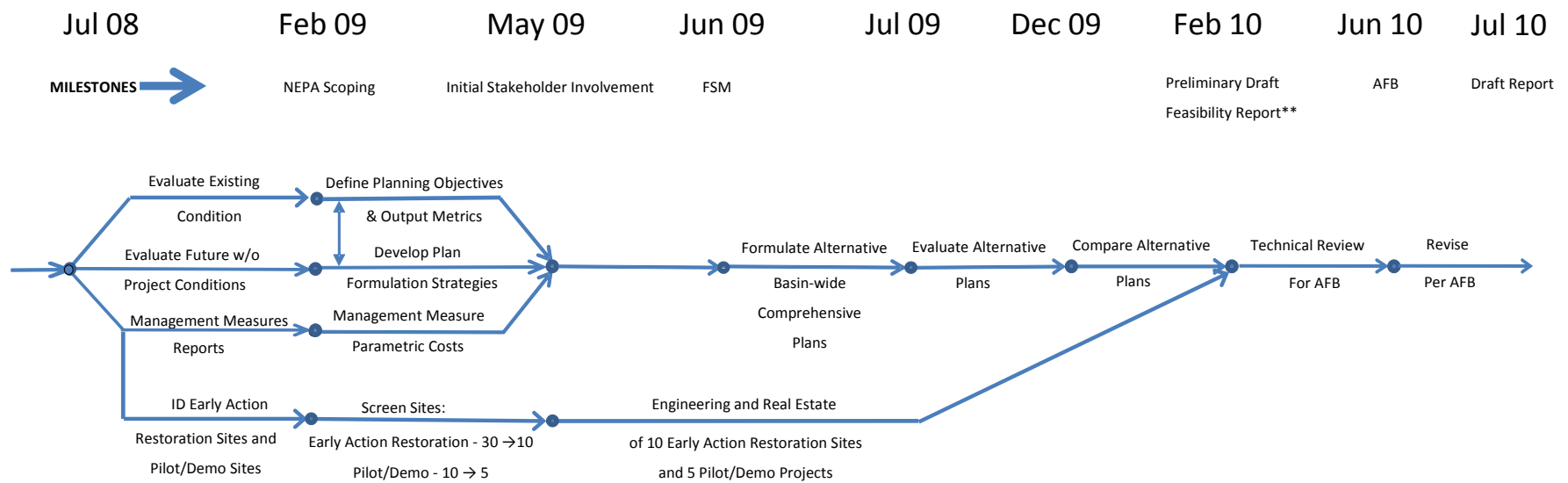
- ◆ document the Corps six step planning process for formulation and evaluation of alternatives and selection of the recommended plan;
- ◆ complete sufficient design to support reliable estimates of costs and benefits;
- ◆ establish sponsor, agency and public support for implementation and
- ◆ show decision makers compliance with applicable laws and policy.

Plans will be developed for both a Basin-wide comprehensive plan and for an initial portfolio of restoration opportunities.

Other basic requirements of the feasibility study include: 1) developing plans and designs for the initial portfolio sites; 2) preparing construction as well as operation and maintenance cost estimates for each of the viable sites 3) computing average annual benefits and costs; 4) evaluating technical and economic feasibility of the plan; 5) assessing environmental impacts, including impacts on biological resources, cultural resources, and recreation; 6) addressing the views of the public through workshops and public meetings; 7) formulating plan mitigation measures; and 8) preparing the draft and final feasibility report and integrated environmental impact statement (EIS) with required documentation to present the investigations and evaluations that support the recommended plan.

The end products will be a feasibility report and combined National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) integrated EIS. These documents will describe the identified problems and opportunities, plans formulated, engineering and economic feasibility and public acceptability of each alternative, the social and environmental constraints and impacts for each alternative, and the plan recommended for implementation.

Tasks, Milestones and Timeline *



Notes:

- * Assumes unconstrained funding schedule.
- ** Preliminary report to include documentation of alternative analysis and tentative plan selection.
- NEPA – National Environmental Policy Act
- FSM – Feasibility Scoping Meeting
- AFB – Alternative Formulation Briefing

The PMP defines and limits the work to that necessary to meet the above requirements for a complete feasibility report. Specific tasks for accomplishing the work, especially engineering, economic and real estate studies to support the recommended project are further outlined in Section 8. There will be close coordination between the Corps of Engineers and the project sponsor throughout the study.

1.0 Problems and Opportunities

The PSNERP GI study presents an opportunity to better understand many of the identified problems through a comprehensive evaluation of changes in the nearshore environment as well as the opportunity to identify and evaluate potential solutions to address documented impairments. In terms of the workplan this task includes documentation of the problems and opportunities to be considered as part of the GI.

The reconnaissance report found that historic and current development along the Puget Sound shoreline has resulted in a significant loss in estuarine and nearshore habitats. The Washington State Department of Natural Resources estimates that almost 80% of the original eastern nearshore habitat of Puget Sound's central basin (King, Pierce, and Snohomish counties) has been modified through the construction of bulkheads and docks, filling of intertidal habitat, and removal of shoreline vegetation. Changes in physical structure have resulted in changes which include loss of shade, reduction in leaf fall, which limits terrestrial food sources and nutrient inputs; lowering of the beach profile; coarsening of beach sediment; narrowing of the beach; loss of area through dredging and filling; and the alteration of groundwater flows. The direct link between physical conditions and habitat, and habitat and biological resources have resulted in significant impacts to critical fish and wildlife resources, including habitat that supports all species of salmonids. Remnant habitat patches have now become critical support features to remaining fish and wildlife populations, including two threatened salmonid species (Chinook salmon and bull trout).

http://www.pugetsoundnearshore.org/program_documents/section905.htm

The integrity of the nearshore ecosystem is in jeopardy with potential adverse impacts to humans and natural resources. These impacts include contaminated shellfish and reduced availability of commercially and recreationally harvested marine resources. Nine of the ten species listed as endangered or threatened within the Puget Sound region inhabit the nearshore. Pollution in parts of Puget Sound has caused lesions and tumors in flatfish that eagles, seals, and birds eat. Urban and suburban developments along the Puget Sound shoreline have taken away critical shoreline, and estuarine and nearshore habitats. Changes in the physical processes include limiting food and nutrient sources for marine life, deteriorating beach sediment movement, and altering the flows of surface and groundwater.

2.0 Inventory & Forecast Conditions

2.1 Evaluate Existing Conditions

This task includes an inventory and quantitative assessment of the existing condition in the following two general areas:

- ◆ Identification and documentation of existing knowledge base, existing data, or any inventory necessary that is consistent with the needs of the study; inventory is not limited to those areas traditionally used to develop analyses directly related to Corps project planning. Identification of existing evaluation tools (such as GIS) and models, with a discussion of compatibility of models and/or existing data. Quantitative evaluation of the existing condition and the historic condition of the Puget Sound nearshore ecosystem utilizing a change analysis methodology.
- ◆ Identification and documentation of ongoing agency programs and capabilities. Determination of jurisdictional delineations (who does what and why). Identification of current regulatory and land management practices.

Work to date on the evaluation of existing conditions has focused primarily on the second bulleted item above. Deliverables to address the second bulleted item have included development of a conceptual model of the Puget Sound nearshore, Valued Ecosystem Components (VECs), nearshore geomorphic classification system, and historic and current conditions assessments. These deliverables have largely been completed. Work on the change analysis is currently ongoing and will continue through December of 2008. In-house and sponsor labor to complete this task beginning 1 October 2008 through December 2008 will be included in the current revision of the workplan.

2.1.1 Conceptual Model of the Puget Sound Nearshore

The Nearshore Science Team has developed a framework for using Conceptual Models to understand the relationships among natural processes and the structure of Puget Sound nearshore ecosystems (Simenstad et al., 2006).

The PSNERP Conceptual Model enables the Nearshore Science Team to develop and document a process-based understanding of how the Puget Sound nearshore works. This is expressed in terms of how natural nearshore processes shape the structure (what we see) and the dynamics of the Sound's nearshore (how it changes), how these processes are affected by stressors (such as shoreline development), and how restoration of degraded ecosystem processes can restore or improve ecological functions of the nearshore.

The Conceptual Model provides a template for understanding the relationships between Valued Ecosystem Components and the nearshore processes that support them. In application to evaluate restoration alternatives, the Conceptual Model provides a tool that can be used to evaluate: (1) the effect of restoration actions on nearshore processes, and ultimately, VECs; (2)

the potential interactive and cumulative effects of multiple actions; (3) possible undesirable effects of actions; and (4) the effects of no action.

2.1.2 Valued Ecosystem Components

A series of technical reports have been prepared on nine Valued Ecosystem Components (VECs). These VECs include; Coastal Forests (Brennan, 2007), Beaches and Bluffs (Johannessen, and MacLennan, 2007), Eelgrass and Kelp (Mumford, 2007), Forage Fish (Pentilla, 2007), Great Blue Heron (Eissinger, 2007), Juvenile Salmon (Fresh, 2006), Orca (Kriete, 2007), Native Shellfish (Dethier, 2007) and Marine & Shorebirds (Buchanan, 2006). The technical papers outline the cause and effect relationships between the natural ecosystem process in nearshore Puget Sound and the range of factors that limit them. A tenth paper in this series relates human values to these nearshore dependent natural resources (Leschine, 2007). The VEC list will be used largely as a communication tool to translate the benefits of nearshore ecosystem process restoration to more readily understood ecosystem outputs that are important to humans.

2.1.3 Nearshore Geomorphic Classification System

A geomorphic classification framework has been developed for nearshore ecosystems to provide a uniform, process based method of classifying shore forms in Puget Sound (Shipman, 2008). This geomorphic classification system will allow for a spatially explicit understanding of predominant nearshore processes as indicated by observed shore forms. Building from the system, we will construct a list of natural processes important to ecosystem structure and function. This list will be used to establish links between ecosystem restoration needs and categories of restoration activities, and thus ultimately guide site-specific restoration actions.

This task has been completed.

2.1.4 Historic Conditions Assessment

The Historic Conditions Assessment has developed a spatially-explicit characterization of the natural ecosystems in estuaries and along marine shorelines of Puget Sound that occurred prior to European settlement of the region as a baseline for comparison with the Current Conditions Assessment resulting in a Puget Sound-wide Change Analysis. This Change Analysis will be used to develop the Strategic Needs Assessment. The Historic Conditions Assessment focused on the physical structure of estuaries and shoreline in the period 1850-1875, based upon records, notes, field journals, sketches, and cartography from the Government Land Office and the U.S. Coastal and Geological Survey. The assessment utilized the PSNERP geomorphic classification as an organizing framework through which estuaries, deltas and beaches were classified and delineated; this framework will be used throughout the Change Analysis. These data will be digitized, organized in a GIS geodatabase, tabulated, displayed and made accessible through the Nearshore project website. The results will be presented in a report that will describe the historic - and comparatively unaltered by non-native human actions - character of nearshore ecosystem structures sustained by nearshore processes.

Documentation for this task will be accomplished under the current workplan.

2.1.5 Current Conditions Assessment

The Current Conditions Assessment will provide a spatially-explicit, comprehensive assessment of the current physical and biological conditions in Puget Sound estuaries and on the shoreline of Puget Sound, circa ~2000-2006 that can be directly compared to the Historic Conditions Assessment. Current Conditions will be based primarily upon selected existing data sets that comprehensively describe the existing physical and biological condition of nearshore ecosystems in Puget Sound; while most of the identified physical change will be constrained to that which is unambiguously attributable to human actions, much of the biological change cannot be included in the Change Analysis (and thus not included in the Current Conditions Assessment) because of the lack of comparability within the Historic Conditions Assessment data set. However, all ecosystem processes, and their alteration by historic change, will be related to ecosystem functions, goods and services that include biological resources and other benefits valued by society, and represented in part by Valued Ecosystem Components. The analysis will utilize the PSNERP geomorphic classification to spatially link current condition to historic conditions (see Historic Conditions Assessment above) and to relate observed shoreform to variability of the occurrence and qualities of ecosystem processes.

2.1.6 Change Analysis

Change Analysis is defined as a measurement of changes between historic (pre-1900) and current conditions (circa 2000) of shoreline and estuarine landscape features. This analysis follows Army Corps of Engineers (Corps) requirements for a conditions analysis of historic and current landscape features. This will be used to inform a strategic assessment of Puget Sound nearshore restoration needs in support of the PSNERP GI.

This task (Change Analysis) will use data resulting from the Historical Conditions and Current Conditions assessments to analyze the type, location and scale of change between historic and current conditions of Puget Sound's Nearshore ecosystems.

By linking the kinds and levels of nearshore ecosystem processes associated with the different shoreform structures and those processes altered by anthropogenic modifications, this analysis will provide an understanding of the types of factors that have altered and constrained the natural processes in Puget Sound. These results will form the basis of the subsequent Strategic Needs Assessment. It is anticipated that findings of the change analysis will be reported by sub-basin. The following table helps convey the scale and scope of the study area and the changes being evaluated.

Linear Miles by Sub-Basin

Marine Sub-Basins	Linear Shoreline Miles
South Puget Sound	445
South Central Puget Sound	377
North Central Puget Sound	128
Whidbey Basin (Island)	354

Linear Miles by Sub-Basin

Marine Sub-Basins	Linear Shoreline Miles
San Juan Islands/Georgia Straits	715
Hood Canal	245
Strait of Juan de Fuca (East and West)	204
Puget Sound Total	2468

Change Analysis will be conducted across multiple spatial scales. These range from the “accounting units,” that are the primary components within nearshore ecosystem boundaries (e.g., sediment drift cells, and large river deltas) to seven marine sub-basins, and the Puget Sound basin overall. Observed changes in nearshore ecosystems will be characterized in four ways:

- Tier 1: Changes in shoreforms
- Tier 2: Changes in anthropogenic stressors along shoreline of process units
- Tier 3: Changes in the 200-m nearshore zone of influence associated with adjoining uplands
- Tier 4: Changes in the landcover of associated drainage areas

The primary data resulting from the Change Analysis will be in GIS form, organized in the geodatabase, tabulated, displayed and made accessible through the Nearshore Partnership. The results will be presented in a report that will describe the current character of nearshore ecosystem structures that are associated with both natural and modified nearshore processes.

List of Stressors to Evaluate in Change Analysis
Shoreline Armoring
Jetties, Breakwaters
Marinas
Overwater Structures (OWS)
Parcels
Levees and Dikes
Impervious Surfaces
Dams
Roads
Land Cover by Humans
Intertidal Fill
Railroads
Stream Crossings

The three reports prepared (Historic Conditions Assessment, Current Conditions Assessments and Change Analysis) will be included as appendices to the feasibility report that describes the scientific approach to this change analysis and how the results will be used for development of the Strategic Needs Assessment.

The change analysis and the documentation reports are anticipated to be completed by December 2008.

2.1.7 Research Plan

Central to the overarching Strategic Science Plan (described in section 3.11.2) was the development of a Research Plan to identify and address priority research needs specific to completion of this Nearshore Partnership Work Plan. The PSNERP Research Plan (Gelfenbaum et al, 2006) was developed in collaboration with U.S. Geological Service research scientists. The Research Plan defines the near-term science needs of PSNERP required for implementation of the technical elements of the GI as a component of the larger science plan for Puget Sound.

This task is complete.

2.2 Evaluate Future Without Project Conditions

This task includes forecasting the future condition of the Puget Sound nearshore ecosystem. A completed task, the Puget Sound Future Scenarios analysis (Alberti et al., in press) resulted in the identification of six divergent alternative future scenarios for the Puget Sound region. These scenarios were derived using subject matter experts for two key drivers (climate change; human perceptions and behavior) and eight supporting drivers of potential future change (demography, development patterns, economy, governance, knowledge and information, natural hazards, public health, technology, and infrastructure). These six scenarios and the projected conditions of drivers will be used to inform our understanding of future conditions and associated future threats to nearshore ecosystem integrity

2.2.1 Future Without Project Background

The Future Without Project (FWOP) Analysis will establish projections or possible outcomes for future change for the Puget Sound nearshore based upon the Change Analysis under different scenarios. This will inform the GI on a magnitude of restoration responses necessary to both restore past process interruptions but also to prevent or minimize those expected from future conditions. This analysis will ultimately support a comparison of “with” and “without” implementation of the recommended restoration and protection plan (Figure 1).

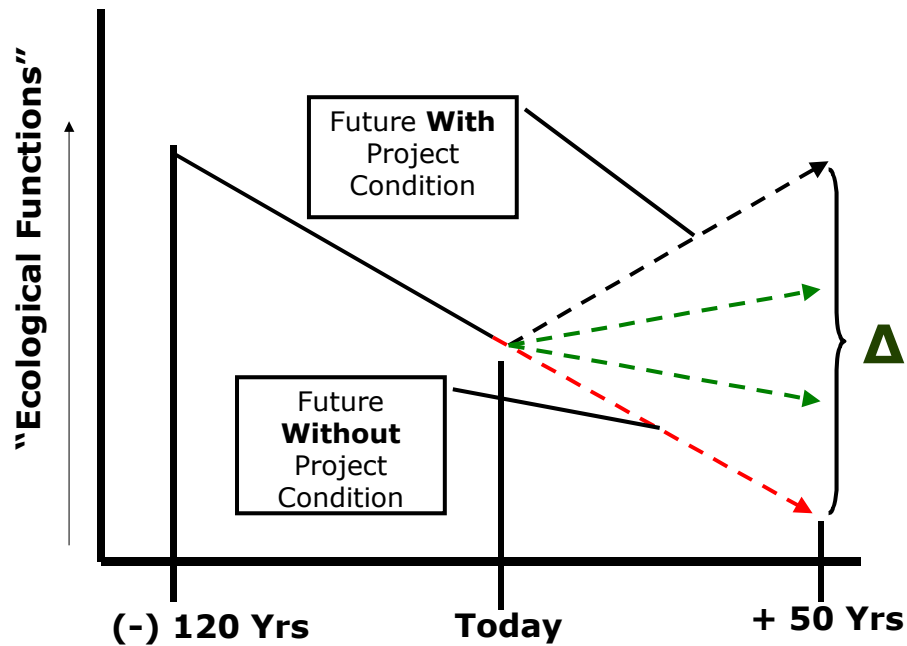


Figure 1: Comparison of Future With and Without Project Conditions

2.2.2 Future Risk Assessment

The Future Risk Assessment Project (FRAP) will assess future risks to the integrity of Puget Sound nearshore ecosystems. FRAP will identify the location and type of potential changes in land use, land cover and associated physical (anthropogenic) alterations to nearshore ecosystems (e.g., beaches, estuaries, deltas) of Puget Sound region by the year 2060 and more intermediate time intervals. To do so, we will complete a Future Risk Assessment Project that examines future conditions under three scenarios:

- ◆ Continuation of existing regional population growth trends
- ◆ Unregulated control and growth in population along with an increase in natural resource utilization and land conversions from natural conditions; and,
- ◆ Decreased or extensively managed growth and increases in environmental consciences and conservation activities

The Future Risk Assessment Project (FRAP) includes the following tasks:

- ◆ Predictions of change in the classified land use and land cover of the Puget Sound basin between present time and the year 2060; and,
- ◆ Predictions of anthropogenic alterations along the shorelines (beach, estuaries and deltas) of Puget Sound between the present time and the year 2060.

The FRAP will also provide an assessment of potential future development of the Puget Sound basin, with particular focus on shoreline changes. It is anticipated that this will allow for an evaluation of the potential risk that continued or increased regional urbanization may pose to the successful nearshore restoration activities. The findings will be presented in terms of a most likely condition with screening factors to account for other risk factors.

This task is expected to be initiated in October 2008 and completed in March 2009 with an interim submittal provided in February 2009 for inclusion in the plan formulation process.

2.3 Strategic Needs Assessment/Comprehensive Restoration Needs

The primary objective of the Strategic Needs Assessment task is to identify impaired processes and restoration and preservation needs based on interpretation of the change analysis data. Recommended actions will be grounded in guidance on restoration and conservation strategies derived from the peer-reviewed literature. The end product for the entire Puget Sound Basin and each of the seven component sub-basins includes identification of strategic areas upon which to focus integrated restoration and preservation efforts. The following outlines subtasks to be applied Basin-wide and each sub-basin to assess nearshore change to provide input into the Strategic Needs Assessment:

1. Review products of Change Analysis data queries.
2. Summarize major (Tier 1) changes, stressor attributes (Tier 2) and impaired processes (inferred from conceptual model) within the sub-basin.
3. Identify dominant stressors within and across areas of equivalent impairment.
4. Quantify rarity of specific shoreform types within sub-basins.
5. Consider characteristics of adjacency.
6. Relate observed condition of impairment to ecosystem functions, goods and services.
7. Consider effects on VECs as informed by conceptual models that would aid in the illustration of the significance of observed impairment.
8. Develop “storylines” specific to groups of observed change and associated stressors that define the problem and prescribe a solution.
9. Summarize findings at the scale of sub-basins and develop narratives.
10. Use sub-basin strategies to develop a list of potential management measures that could be applied to address identified impairments.
11. Roll-up sub-basin strategies and assess for Sound-wide problems and potential solutions.
12. Work with GIS staff to produce explanatory map products.

This approach will be first applied as a pilot in the Whidbey sub-basin. The methodology will be refined and finalized in October 2008. Evaluation of other sub-basins and the Sound-wide analysis will be completed between November 2008 and January 2009.

This task will culminate in a Strategic Needs Assessment Report which will be an appendix to the feasibility report.

2.4 Stakeholder Involvement for Existing Conditions

The Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) is a partnership among local, state and tribal governments in Washington State, the U.S. Army Corps of Engineers and other federal agencies, industries and environmental organizations committed to:

“Protect and restore the functions and natural processes of the Puget Sound nearshore ecosystem in support of the natural resources and beneficial uses of Puget Sound and the Puget Sound basin.”

As the GI has progressed, PSNERP has attracted considerable attention and support from a diverse group of individuals and organizations interested and involved in improving the health of Puget Sound nearshore ecosystems and the biological, cultural, and economic resources they support. In 2004, we selected “Puget Sound Nearshore Partnership” as the name to describe this growing and diverse group. It serves to label the work we are collectively undertaking that ultimately supports the goals of PSNERP, but is beyond the scope of the GI Study. Collaborating with the Puget Sound Action Team, the Nearshore Partnership has worked to implement portions of their Work Plan pertaining to nearshore habitat restoration issues. We understand that the mission of PSNERP remains at the core of the Nearshore Partnership. However restoration projects, information transfer, scientific studies and other activities can and should occur to advance our understanding, and ultimately, the health of the Puget Sound nearshore beyond the original focus and scope of the on-going GI Study.

Beyond PSNERP, a number of programs are responsible for identifying and implementing nearshore habitat protection and restoration projects within Puget Sound. A partial list includes:

- ◆ Salmon Recovery Watershed 3 year plans
- ◆ Lead Entity annual Salmon Recovery Funding Board (SRFB) prioritization
- ◆ Coastal Ecosystem Land Conservation Program (CELCP)
- ◆ Alliance for Puget Sound Shorelines
- ◆ Marine Resource Committee projects through Northwest Straits Commission
- ◆ Estuarine and Salmon Restoration Program (ESRP)
- ◆ NOAA Community Restoration Program
- ◆ US Fish and Wildlife Service Coastal Program and Partners for Fish and Wildlife
- ◆ Pacific Coast Joint Venture
- ◆ National Fish and Wildlife Foundation Community Salmon Fund projects

Informally, coordination has occurred between many of these programs to incorporate the interim findings of PSNERP. More recently, State capital budget legislation has acknowledged the need to better coordinate funding, using consistent criteria in order to maximize the effectiveness of investments. ESRP, SRFB technical review teams and NOAA Community

Restoration Partnership have begun to more formally adopt restoration project guidance provided by PSNERP and review projects for consistency with the Regional Nearshore Recovery Chapter. Both of these actions have incrementally improved the ability to make more strategic investments based on the collaborations among Nearshore Partnership members.

2.4.1 Valuation of Ecosystem Functions Goods and Services

The outputs of the Change Analysis will be translated into a currency of impaired ability for nearshore ecosystems to provide functions, goods, and services. Stakeholder input combined with the scientific findings are needed in defining which of the many ecosystem functions, goods and services provided by Puget Sound nearshore ecosystems are of higher relative importance. This helps both to focus our restoration actions and to express the description of project benefits in socially relevant terms.

2.4.2 Stakeholder/ Public Involvement for NEPA Compliance

Compliance with the National Environmental Policy Act (NEPA) includes specific requirements for public involvement. The first milestone includes conducting public meetings to convey findings of the change analysis and Strategic Needs Assessment. A NEPA scoping meeting is anticipated to be held in winter/spring of 2009.

2.5 Future Without Project Conditions Report

The findings from the Future Without Project scenarios will be compiled with the findings from the Future Risk Assessment and the Current Conditions assessment (Strategic Needs Assessment) to document the most likely future without project (without comprehensive Basin-wide restoration) conditions over the 50-year project evaluation period. The Corps planning process evaluates the merits of alternative plans when compared to the without project condition. The documentation of the current conditions and future without project conditions will form the baseline condition or without project condition. This baseline condition also provides the basis for federal requirements (Corps and EPA) to conduct cumulative effects and alternative plan analysis through NEPA.

This task includes feasibility report preparation to document the first two steps in the Corps planning process. This deliverable will be the basis for the Feasibility Scoping Meeting.

3.0 Formulate Alternative Plans

3.1 Restoration Planning Objectives Development

Restoration planning objectives are specific measurable statements about restoration needs that are to be addressed by the project. Specific planning objectives will be developed utilizing the results of the Change Analysis and Strategic Needs Assessment that will provide a clear and concise summary of the problems and needs. The objectives will then be related to ecological outputs. The outputs of the various alternatives will then be assessed through the cost effectiveness analysis and incremental cost evaluation. This evaluation is a Corps tool that will

be used to assess the ecological merits of all alternatives. The cost-benefit evaluation will be used to measure the success of various restoration alternatives.

Objectives will vary from one Puget Sound sub-basin to another reflecting sub-regional difference in ecosystem conditions, desired level of ecosystem improvements, project constraints, and socio-political willingness to engage in certain types of restoration. It is anticipated that both Sound-wide and sub-basin level objectives will be developed.

3.1.1 Stakeholder Involvement for Restoration Planning Objectives

Restoration objectives are as much a social science exercise as they are a direct output of any PSNERP technical analyses. While strategic needs can inform stakeholders about the relative extent and associated impacts of nearshore ecosystem loss and degradation, this exercise will help us assess the magnitude of restoration acceptable to the public must be assessed in the context of their broader goals for economic development, clean up of Puget Sound and willingness to expend public dollars. Workshops implemented at the sub-basin scale will be necessary to capture the variability of these perspectives across Puget Sound.

As specific restoration planning objectives emerge, we will need to vet these with stakeholders. The important question of “how much is enough” requires substantial stakeholder input at both the sub-basin and Sound-wide scales. Our program can explain benefits and costs associated with different levels of restoration and protection in helping stakeholders understand the consequences of these choices.

3.2 Plan Formulation Strategy

Development of a plan formulation strategy includes the task of laying out how the findings of the Strategic Needs Assessment, planning objectives, management measures, project lists, project outputs (such as ecosystem goods and services) will be utilized to develop and evaluate project alternatives. Given the feasibility report strategy the team is moving forward, the plan formulation framework must identify a method to develop a comprehensive plan and also a method to screen and select an initial portfolio of critical projects. The feasibility report must be able to document that these projects fit within the comprehensive plan, are consistent with sub-basin and/or Sound-wide objectives and are among the most cost-effective projects with a high probability of success.

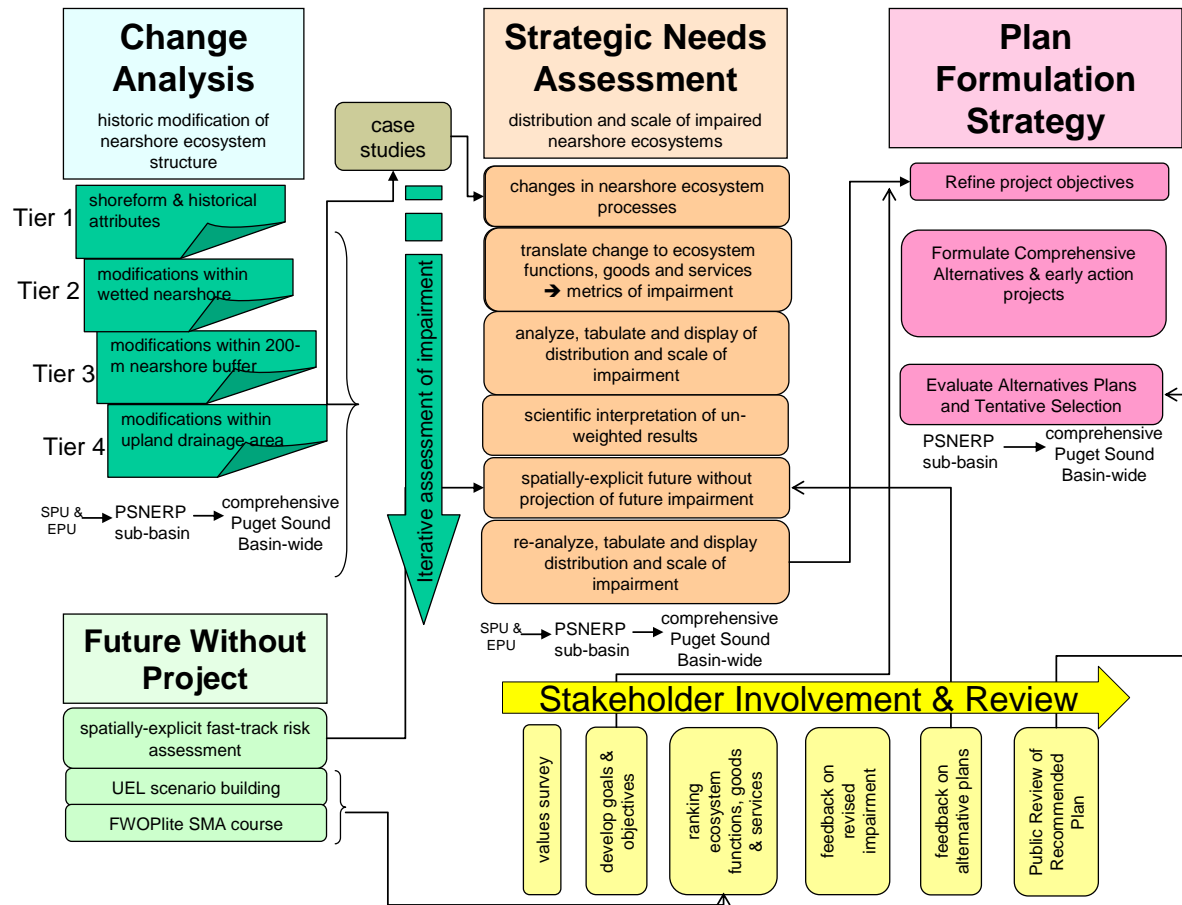


Figure 2: Relationship between GI Study Analytical Tasks.

3.2.1 Overview

The strategic needs assessment combined with development of specific restoration objectives will be the foundation for development of a Puget Sound-wide plan formulation strategy. It is anticipated that the formulation strategy will move forward on two parallel paths once strategic needs have been identified: one to identify and screen projects for early implementation (Section 3.3) and another to develop Basin-wide and comprehensive, Sound-wide alternatives (Section 3.4) that together will result in a comprehensive solution set or recommended plan. Management measures are an integral component to developing both initial portfolio sites and building comprehensive basin-wide alternatives. Tasks related to management measures follow in section 3.5.

3.2.2 Existing Conditions and Plan Formulation Strategy Report

This step or task includes documentation of the existing and future without project conditions and will also describe the plan formulation strategy. This document will be the basis for review

and discussion at the feasibility scoping meeting and is also the first chapters of the feasibility report.

3.3 Identify and Describe Candidate Sites for the Initial Portfolio

The PSNERP Implementation Team will develop a list of potential nearshore restoration and preservation sites for authorization under WRDA. As results for specific geographic areas from the Strategic Needs Assessment become available, the team can begin to compare these candidate sites with identified needs, highlighting those projects that provide the best match for further analysis. The screening at this level is anticipated to be based on the type of project (appropriateness for Corps participation), scale of project and whether it generally appears to be aligned with the study objectives.

Existing project ideas will form the pool of initial priority sites to be considered. An existing nearshore project data base will be the source for most of these potential projects. There will be limited opportunity to develop new proposals as part of the initial portfolio. Initial sites will be selected based on screening criteria developed from the Strategic Needs Assessment, implementation feasibility and stakeholder considerations. Specifics of the screening process and screening criteria will be developed once the strategic needs assessment is complete for the Whidbey sub-basin and number of potential projects is better defined. For scoping purposes it is assumed from the entire pool of candidate sites that 100 sites will be identified for further consideration. Sites will be broken into two categories:

Strategic Priority Restoration Sites: These are sites where project features/design and ecosystem responses are well understood in terms of expected performance and benefits.

Scientific Demonstration Sites: These are sites where there is either some uncertainty in terms of design, ecosystem process response, and/or expected benefit or the site expanded learning or teaching opportunities about different restoration approaches. Accordingly, it is anticipated that these sites will require considerable more scientific investigation, monitoring and adaptive management investment than the strategic priority restoration Sites. Some of these will likely become dedicated cases studies for integrated natural and social science study.

3.3.1 Stakeholder Involvement for: Nearshore Project Database population

Our program requires an understanding of the broad range of locally identified restoration and protection opportunities. Strategic Needs Assessment provides a tool for evaluating these opportunities, and developing a portfolio of projects that most efficiently meets identified restoration needs. Stakeholder input of project concepts into the nearshore project data base is needed to feed this cycle.

3.4 Develop Basin-wide Comprehensive Alternative Plans

Alternative plans include alternative courses of restoration and preservation action and their expected outcomes, alternative ways to address identified needs through agency programs, and alternative combinations of future efforts, Basin-wide and sub-basin strategies, and other

"alternatives." Alternative plans will be developed in the context of options or choices and their resultant projected outcomes. There may be a myriad of ways to address the needs of the Puget Sound nearshore; and assessment of the pros and cons of pursuing various courses over time allows a comparison of alternatives based upon expected results. The PSNERP GI Study involves a wide variety of other Federal, Tribal, State, and local agencies, NGOs, universities and other stakeholders; and the desired outcome of the study is a comprehensive plan that identifies a combination of recommended actions to be undertaken by these various partners. The level of detail involved in the development of individual Basin-wide comprehensive alternative plans is less than a typical Corps feasibility study proposing independent and discrete projects.

Corps guidance requires the formulation of a National Ecosystem Restoration (NER) Plan for federal water resource studies. Identifying a NER plan requires formulating alternative plans. The team will formulate an array of plans that meet the planning objectives and address known constraints. This will ensure that a plan that maximizes net NER benefits has been identified. The number of alternative plans depends on the complexities and extent of problems and opportunities in the study area, study resources, the availability of different appropriate measures, and the preferences of the stakeholders. Therefore, this task will involve combining management measures to form discrete alternative plans based on strategies developed in the previous step as well as on stakeholder preferences.

3.4.1 Nearshore Restoration Portfolio

As part of the plan formulation strategy, we anticipate development of a list of strategic, process-based, ecosystem scale restoration actions that address protection and restoration of ecosystem processes beyond the scale of ongoing restoration programs. These actions will be organized as portfolios, or packages of different actions for a particular portion of the Puget Sound nearshore that provide different levels of ecosystem goods and services while contributing to the recovery of Valued Ecosystem Components.

3.4.2 Alternative Strategies for Puget Sound Comprehensive Restoration

Since the Nearshore project is a basin level study addressing approximately 10 percent of the area of the State of Washington – approximately 15,000 square miles – some modification of the general formulation approach used for a site-specific project will be required. A Basin-wide analysis, termed (see my comment here – I think we're talking about the change analysis here) Strategic Needs Assessment, with specific focus on direct and indirect effects to marine and estuarine shorelines is being conducted in Stage II. The Strategic Needs Assessment Report (SNAR) will provide a comprehensive, spatially explicit identification of the highest impaired sites along the shoreline; 200 meter zone adjacent to the shoreline; and to a lesser degree, the coastal watersheds draining to the marine waters of Puget Sound. The restoration planning objectives will be set to address the specific resource problems identified in the SNAR for each sub-basin. Next, the focus will shift to identifying suitable strategies to apply restoration measures and alternatives to meet the stated objectives. In general, the system alternatives will not specifically address particular sites (e.g. Skokomish River Estuary, Bainbridge Island Drift Cells, etc.), but instead focused on the level of restoration effort needed to reach system restoration planning objectives. More detailed cost information using MCACES software (Corps

Cost-Estimating Tool) and benefits using habitat models will be defined as part of additional site-specific project evaluations.

3.5 Management Measures

Management measures are actions, including restoration or other physical alterations, as well as management and regulatory changes, that address the objective of recovering or improving nearshore ecosystem functions, structure, and/or processes (Simenstad et al., 2006). In a large-scale restoration program, management measures are vital to describing the varied combination of actions employed at restoration sites. The individual measures serve as building blocks for restoration actions at the individual site scale and will form the basis of large-scale alternatives at the basin or sub-basin scale. The selection of measures for implementation reflects the nature of the nearshore degradation; expected utilization and ecosystem function of the site, and desired habitat improvements, tempered against any existing constraints at each location. The National Research Council and others have identified four general types or categories of ecosystem recovery actions: protection, restoration, rehabilitation, and substitution/creation. These four categories and their respective contribution to ecosystem recovery have been identified in earlier project stages (Fresh et al. 2004). In addition, PSNERP recognizes education and regulation/policy change as categories of measures potentially used in Puget Sound restoration efforts.

3.5.1 Identify Management Measures

Management measures are not restricted to actions the Corps has the authority to implement. For example, PSNERP managers acknowledge the utility of large-scale toxic chemical cleanup and environmental regulatory measures but recognize that other federal and state authorities are better equipped to utilize these management measures. The team is empowered by the Corps' regulations and guidance to develop plans that can be implemented by other Federal agencies, State and local government, or other organizations. The list of management measures selected by PSNERP was developed by simplifying a list of National Estuary Restoration Inventory restoration 'techniques'. This was then compared to the list of measures used for reporting by the Pacific Coastal Salmon Recovery Fund (administered by the Salmon Recovery Funding Board). Finally, the PSNERP Implementation Team reviewed the resulting list. The management measures being considered under the PSNERP program are listed below.

This task has been completed.

- ◆ Armor Modification or Removal
- ◆ Beach Nourishment
- ◆ Berm or Dike Modification or Removal
- ◆ Channel Rehabilitation or Creation
- ◆ Contaminant Removal or Remediation
- ◆ Debris Removal
- ◆ Habitat Protection Policy or Regulations

- ◆ Hydraulic Modification
- ◆ Physical Exclusion
- ◆ Invasive Species Control
- ◆ Large Wood Placement
- ◆ Overwater Structure Removal or Modification
- ◆ Physical Exclusion
- ◆ Pollution Control
- ◆ Property Rights Acquisition
- ◆ Public Education and Involvement
- ◆ Revegetation
- ◆ Species Habitat Enhancement
- ◆ Species Reintroduction (non-plant)
- ◆ Substrate Modification
- ◆ Topography Restoration

3.5.2 Management Measure Technical Report

PSNERP is in the process of developing a technical report covering each of 20 Management Measures. The purpose of the technical report is (1) to help the PSNERP determine how to most effectively use management measures to accomplish process-based restoration in Puget Sound, (2) to describe the relationship of these measures to the ecosystem processes, structure, and functions as well as the goods and services provided by the Puget Sound nearshore and (3) to provide project engineering, planning and design guidance to ensure consideration of relevant constraints and best practices. This task is expected to be completed in April 2008.

3.5.3 Parametric Cost Estimates for each Management Measure

This task will utilize the case study examples identified in the management measure technical report and develop standardized design and parametric cost information that could be applied to sites across the study area. Phase II will focus only on those measures that would be most appropriate for Corps of Engineers implementation. Of the management measure identified, PSNERP has identified primary nearshore process-based restoration actions to include armor modification or removal, berm or dike modification or removal, channel rehabilitation or creation, hydraulic modification, overwater structure removal or modification, and topography restoration.

3.5.4 Output/Benefit Quantification for each Management Measure

Phase II will also include quantifying benefits or outputs for each management measure. This analysis will be used to ensure cost-effective alternatives are selected for initial implementation. A plan formulation strategy will be further developed as a task item in the revised PMP.

3.6 Model Certification

Discussion of plans for Model Certification can be found in the Review (Quality) Management Plan in Volume II.

3.7 Agency Technical Review

Discussion of plans for the Agency Technical Review can be found in the Review (Quality) Management Plan in Volume II.

3.8 External Peer Review

Discussion of plans for External Peer Review can be in the Review (Quality) Management Plan in Volume II.

3.9 Feasibility Scoping Meeting

Once Current and Future Without Project Conditions have been documented and a plan formulation strategy fully developed, a feasibility scoping meeting (FSM) will be held with Corps Division and Headquarters staff. We anticipate convening the FSM in spring 2009.

This task includes development of supporting material for the FSM and completing appropriate policy compliance documentation.

3.10 Stakeholder Involvement for Plan Formulation

By necessity the plan formulation strategy must integrate a broad strategy for stakeholder involvement to ensure the success of the program. The following outlines five broad activities that will occur through the planning process.

3.10.1 Relationship with Other Restoration Programs and Partners

Our program vision of improved restoration and protection benefits derived from widespread application of best science and a common restoration blueprint depends on strong positive relationships with the “restoration and protection community”. Our tools need to be informed by their needs, and we must improve our visibility and awareness within this community. Some of the elements required for this task include:

- ◆ Publishing PSNERP updates in the newsletters of partner organizations,
- ◆ Use of existing networks and relationships by PSNERP “team members” to increase general awareness of PSNERP outside the program

State agencies, NGOs and other entities involved in the study include the following:

King Conservation District
King County
Lead Entities

National Wildlife Federation
Northwest Indian Fisheries Commission
Northwest Straits Commission
People for Puget Sound
Pierce County
Puget Sound Partnership
Recreation and Conservation Office
Salmon Recovery Funding Board
Taylor Shellfish Company
The Trust for Public Lands
The Nature Conservancy
Pacific Northwest National Laboratory
University of Washington
Washington Department of Ecology
Washington Department of Fish and Wildlife
Washington Department of Natural Resources
Washington Public Ports Association
Washington Sea Grant
WRIA 9

3.10.2 Support for Puget Sound Nearshore General Investigation

Ultimately, our success is dependent on support for our program from local project proponents. There is much work to be done in order to complete the PSNERP GI, requiring sustained local, state, and federal investment. We anticipate a request to Congress for a Puget Sound Nearshore Restoration authority requiring strong support from restoration proponents. This task includes preparing material and staff support. This task does not cover efforts that local jurisdictions may pursue by way of lobbying.

3.10.3 Broad Program Understanding and Support

In addition to the focused and specific needs for stakeholder input to PSNERP, there is a need to develop general support within the Puget Sound region. Public understanding and support for agency activities is good government. Changes in attitudes and behaviors necessary to restore the health of Puget Sound derive from an informed public. Some of the elements necessary to deliver this broad support include:

- ◆ Toolbox of communication products (program fact sheets, website updates)
- ◆ Outreach and communication through and with the Puget Sound Partnership
 - Funding needs (PSNERP GI match, ESRP)
 - Relationship between programs
- ◆ Special events (open houses, demonstration site tours)

3.10.4 Cooperating Federal Agency Coordination & Involvement

The Nearshore Partnership formed around the Washington State Dept of Fish and Wildlife's (WDFW) agreement with the U.S. Army Corps of Engineers (the Corps) to investigate the fundamental causes of ecosystem declines and potential feasible solutions. Since September

2001 when the original agreement was signed, many federal agencies beyond the Corps have joined the Nearshore Partnership. Their participation has broadened the base of federal support, and expanded the technical and financial resources being applied to both the GI and the broader activities of the Nearshore Partnership.

The Office of the President, Council on Environmental Quality (CEQ), published *Collaboration in NEPA - A Handbook for NEPA Practitioners* dated October 2007 describes policy for federal agencies to collaborate on federal decisions and actions. The Nearshore Partnership and the collaborating federal agencies conform to the central tenets of the National Environmental Protection Act (NEPA), Section 101 and CEQ policy. Also, by assembling a team of federal agency representatives, the Nearshore Partnership is well poised to develop a comprehensive plan with cooperating agencies conforming to Corps of Engineers policy, ER 1105-2-100. The following describes each agency's involvement in the Nearshore study and the broader Nearshore Partnership activities.

National Marine Fisheries Services (NMFS)

NMFS serves on the Nearshore Science Team and Executive Committee. NMFS has contributed staff time to numerous Nearshore technical papers, including a white paper describing the relationship between juvenile Pacific salmonids and nearshore ecosystems of Puget Sound.

National Oceans and Atmospheric Administration (NOAA)

NOAA Restoration Center serves on the Nearshore Steering Committee and Implementation Team. NOAA provides contract services for the Estuary and Salmon Recovery Funding Program administration. NOAA funds WDFW for Nearshore activities affiliated with the Community-Based Restoration Program through a competitive, 3-year grant. NOAA provides Pacific Coast Salmon Recovery Funds for marine nearshore restoration projects administered by Washington State Salmon Recovery Funding Board and guided by Nearshore Partnership technical papers.

Northwest Straits Commission (NWSC)

Northwest Straits Marine Conservation Initiative is mandated by Congress to facilitate the protection and recovery of the Northwest Straits. The Northwest Straits Commission and its seven member Marine Resources Committees (MRCs) receive federal funds through NOAA for these activities. Representatives of the NWSC serve on the Nearshore Steering and Executive Committees. The MRCs play a role in identifying and supporting nearshore restoration projects for seven northwest Washington State counties.

U.S. Department of Energy, Pacific Northwest National Laboratory (PNNL)

PNNL serves on the Steering and Executive Committees. PNNL expertise has helped PSNERP scope important technical issues including data management, with additional staff time contributed to program support, such as the annual retreat.

U.S. Environmental Protection Agency (EPA)

EPA serves on the Nearshore Steering and Executive Committees and contributes staff labor and funding to the Future-Without-Project investigation. EPA funded faculty to conduct a University of Washington graduate class that examined future conditions of the southern King

County (WRIA9) marine shorelines. EPA serves as the National Environmental Protection Act (NEPA) lead agency for the Nearshore project. EPA has aligned funding and activities of the National Estuary Program with the Nearshore partnership. During plan formulation, EPA has agreed to assign NEPA coordinators to the formulation team to contribute to the recommended plan and streamline agency reviews.

U.S. Fish & Wildlife Service (USFWS)

USFWS and Corps fund 25% of a senior biologist's labor cost for participation on the Nearshore Science and Implementation Teams through the Fish and Wildlife Coordination Act. USFWS contributes staff to WDFW through Cooperative Agreement for Nearshore GI project management who are funded with state appropriations. USFWS serves on Nearshore Executive Committee. USFWS actively seeks opportunities to align their restoration authorities with Nearshore projects implemented by the state-funded Estuary and Salmon Recovery Program, such as the Skokomish River Estuary Restoration Project.

U.S. Geological Survey (USGS):

USGS developed a science program, Coastal Habitats in Puget Sound (CHIPS), which complements and supports the Nearshore project through studies to better understand nearshore ecosystem processes and the effects of anthropogenic stressors such as urbanization and delta modification. USGS contributes staff time to Nearshore Science, Steering and Executive committees and Future-Without-Project and Monitoring and Adaptive Management Working Groups. USGS has organized peer-review and publication of technical papers written by and for the Nearshore Science Team. USGS served as co-lead on the technical paper "Coastal Habitats In Puget Sound: A Research Plan in Support of the Puget Sound Nearshore Partnership". USGS conducts a wide range of multi-disciplinary research in the Puget Sound basin (and Hood Canal), including sediment and nutrient cycling, fisheries health and ecology, food web dynamics, invasive species, ecosystem and groundwater water quality, and watershed stream gaging collectively to provide support for decision making related to the management and restoration of the nearshore and baseline data for future monitoring.

U.S. Navy Region Northwest (Navy)

The Navy serves on the Steering and Executive Committees with additional staff time contributed to project activities. Navy shore facilities are commonly located within the marine nearshore. Collaborative products, such as the Strategic Needs Assessment Report, are expected to guide Navy military construction and associated mitigation sites within Puget Sound.

3.10.5 Government to Government Tribal Activities

Twenty tribes have usual and customary fishing areas within Puget Sound. Many of these tribes have reservations within the basin and have formed interrelated organizations for their mutual benefit, such as the Point-No-Point Treaty Council, Skagit River Cooperative, and Northwest Indian Fisheries Commission. The tribes are co-managers of Washington State fisheries with the Nearshore non-Federal sponsor, WDFW.

The Nearshore Partnership has developed several technical products with the tribes and their organizations. Tribal members and staff routinely participate on working groups, Implementation Team, Steering Committee, and Executive Team activities. Those activities and newly identified

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activities are expected to continue being developed with the tribes. In particular, as stakeholder involvement activities evolve, tribal participation will likely increase.

Government-To-Government meetings and activities are more formal interactions between the federal and tribal governments, which will be used sparingly or not at all depending upon situational needs and findings. Although, final agency review will likely include government-to-government correspondence among federal, state and tribal governments.

3.11 Science & Technology

Development of the Science and Technology (S&T) Program, under the purview of the Nearshore Science Team, involves development of ongoing science-related activities and organizational context and structure for the GI. The S&T Program will be designed to provide the fundamental scientific and technical decision support process, tools and structure for the GI, both for implementation of the WRDA projects and the Comprehensive Plan. Development of the S&T Program will involve: (1) establishing a process to determine science and technology needs, assessing their feasibility, and setting priorities among the needs; (2) developing an organizational and coordination structure for the S&T Program and its interface with other study components that would be implemented with the WRDA projects and continued with the Comprehensive Plan; (3) integration of the existing PSNERP Strategic Science Peer Review process (see 10.6.1) into the two programs; (4) designing the monitoring and adaptive management approaches and processes for both the WRDA projects and the Comprehensive Plan; (5) identifying and coordinating integrated natural and social science case studies for strategic priority restoration and preservation projects; and, (6) providing for science and technology information (see Communications Management, 10.5) of the proposed studies. The S&T Program is also the overall mechanism for identifying critical science needs to inform nearshore ecosystem restoration/preservation in Puget Sound and developing and coordinating GI science initiatives with ongoing and planned science activities in other research and development programs. These research and development programs include those of Federal and State agencies, universities, private interests and non-governmental organization.

3.11.1 Basic Science and Technology Decision Support

Working closely with the Project Management Team and Implementation Team, the Nearshore Science Team is tasked with determining science and technology needs of the GI, and assuring that both scientists and the Implementation Team are involved in establishing needs, ranking the importance of each need, and determining feasibility. This coordination role includes: developing science and technology guidance for site and project selection, design, monitoring and adaptive management, and assessment; facilitating information transfer; planning periodic science symposia, and assessment of new innovative science.

3.11.2 Support of WRDA and Comprehensive Plan

As described earlier, the GI formulation strategy considers two paths forward: (1) initial portfolio restoration/preservation sites for early implementation, including both strategic priority restoration sites and scientific demonstration sites; and (2) a Basin-wide comprehensive plan. In addition to large-scale restoration actions, the GI study process provides the opportunity to study and recommend other actions outside the GI process, although these

actions may not reside in and will be implemented independently of the GI portfolio. The GI Portfolio List is planned as an iterative process, that future actions will become more specific as the results of already implemented projects emerge. A fundamental strategy under the GI is to improve the quality of protection and restoration decision-making through active monitoring and adaptive management.

A hallmark of national ecosystem programs is the incorporation of long-term monitoring, adaptive management projects, monitoring and ecological modeling to continually improve information and scientific knowledge regarding restoration actions and the restoration decisions that are based on scientific understanding. This effort will include development of an implementation process that incorporates an adaptive assessment strategy for project implementation. This strategy will recognize that once restoration measures are implemented and monitoring begins, feedback is provided based on new insights gained from the response of the ecosystem and that sequential adjustments may be made to the project and future elements. The risk and uncertainties (e.g., ecosystem response, etc.) associated with each alternative plan can be addressed with these new insights

Scientific demonstration projects include programmatic actions (restoration and preservation actions and monitoring/adaptive management studies) designed to address high uncertainties about future restoration/preservation actions. These will be specifically designed to generate critical science and technology information needs by providing learning experiences from extensively and intensively studied actions. Measures would be consistent with the GEPs (e.g. process-based), and address critical information needs on behalf of the GI (e.g. hypothesized link between a management measure and an ecosystem process and/or VEC). It is anticipated that this information need will be best addressed if demonstration projects are established as adaptive management experiments, with clearly stated hypotheses, and monitoring plans specifically developed to evaluate hypotheses. Objectives for demonstration projects include illustration of restoration concepts; testing of hypotheses; developing experiments in monitoring, restoration, outreach and education; reducing uncertainty and risk; comparing effectiveness among techniques; and dealing with issues and concerns over techniques. Examples of project types will include evaluation of overwater structure removal, dike breach vs. dike removal, eelgrass transplant, and experimental monitoring techniques that presently have little to no scientific baseline. The S&T Program will develop appropriate project sites, research questions, monitoring and evaluation costs.

The S&T Program will also establish a Strategic Science Plan (SSP) to guide a long-term, multi-agency science program for the acquisition, review, management, and distribution of new or existing data and knowledge in support of the Comprehensive GI plan. The SSP will provide the framework and process for comprehensive restoration planning within the Puget Sound, including actions outside of the GI study.

Activities under the SSP will be ongoing development and interactions with the GI external peer review process; cumulative effects and impact assessment; information management; identification of long-term data gaps and research needs; compilation and access to new and existing information; and science outreach. The plan will be integrated with adaptive management and modeling plans listed above and case studies and demonstration projects

listed below. An external peer review process has been developed and began operation in 2008; the SSP will continue operation of the review process. Cumulative effects analysis includes initial work of the Change and Futures Analysis under the GI as well as developing tools for long-term assessment of GI and partner ecosystem restoration impacts. The SSP will integrate work from the GI stakeholder interaction process and plan for ongoing interactions with other science programs.

Long-term analysis will require development of decision support tools such as a modeling framework and information management system. The modeling framework will include analytical tools to address problems and opportunities for future restoration actions, including conceptual and quantitative ecological and hydrodynamic models that can be used to evaluate restoration project alternatives and benefits. To be effective in providing data and information to the GI, the S&T program will consider data needs in geographic hierarchy for purposes of restoration planning, construction, management and maintenance, monitoring relative success of project, and long-term research needs. Through monitoring and data acquisition, the S&T Program would strategically develop a monitoring system and collect existing data from partners and research programs within Puget Sound and integrate this effort with the other ongoing monitoring systems as appropriate. This network of geospatial and scientific data would allow project managers to incorporate lessons learned and adjust restoration strategies to best achieve management goals.

3.11.3 Scientific Peer Review

A peer review plan has been developed by the Nearshore Science Team and approved by the Corps Center of Expertise. This plan includes external review of individual technical reports, as well as a more comprehensive, “programmatic” Strategic Science Peer Review Panel (SSPRP) peer review. The scope of programmatic peer review includes external review of the sufficiency of science used in the GI Study, as well as the application of science. To date, peer review of technical reports has been routinely completed, and the first SSPRP review conducted.

Integral to the S&T Program will be a contiguous scientific peer-review process that will provide on-going guidance that the Program, and the GI overall, is following the best available science. This S&T Program component will be based on the existing PSNERP Peer Review Plan (see 10.6.1) with modifications adapted from experience and recommendations from the existing SSPRP and guidance from other large-scale restoration programs (e.g., LCA S&T Program). As with the SSPRP, we anticipate that the peer review component (i.e., a panel or committees, depending on the level of science and technology departmentalization) will coordinate with the S&T Program but report to the overall study’s management structure, as it presently reports to the PSNERP Executive Committee.

3.11.4 Monitoring and Adaptive Management

Active monitoring of already completed and developing restoration projects is an essential component of advancing and improving the science and management of ecosystem restoration. Monitoring of restoration projects under the GI will be an integral component of an Adaptive Environmental Assessment and Management (AEAM) based plan. The integrated monitoring and adaptive management plan will include recommended techniques for specific ecosystems by management measure.

AEAM prescribes a management process wherein future action can be changed by observing the efficacy of past actions on the ecosystem through the use of monitoring and modeling. The AEAM approach recognizes that uncertainty is unavoidable in implementing large-scale ecosystem management programs. Recognizing and understanding past actions can sequentially improve management actions so that future system conditions become more consistent with program goals and objectives than past actions. AEAM allows development of an iterative and flexible approach to management and decision-making. The GI study is designed to integrate Adaptive AEAM into its management process. The S&T Program will develop a management plan and an action plan to implement AEAM through both the WRDA projects and the Comprehensive Plan. Studies within this category include: 1) assessing the effectiveness of previously completed restoration projects to verify benefits; 2) development of reference sites to serve as templates of properly functioning conditions; and 3) incorporation of existing studies outside the GI to provide additional information.

As an essential learning component to adaptive management is rapid and effective transfer of monitoring results and adaptive management experiences, as well as more intensive scientific studies of associated nearshore ecosystem processes, to restoration and conservation practitioners and managers. In addition to disseminating other GI science and technology products, these AEAM experiences will be a major source for the Science and Technology Information Transfer component (see 3.8.6) of the S&T Program. Mechanisms for dissemination will include both electronic serving of data on the internet, hard-copy reports, and workshops and conferences that are specifically designed to provide comprehensive feedback on the GI results.

A 50-year adaptive management and a monitoring and modeling plan will be developed as a stand-alone report for the feasibility study including plans for initial projects and comprehensive project planning.

3.11.5 Case Studies

Case studies are in-depth evaluations of changes in nearshore processes, locations (places), or actions (stressors or restoration) that affect the nearshore. The Change Analysis provides a coarse scale analysis, while Case Study descriptions from local areas will be developed with finer resolution through additional time points of analysis and added dimensions of analysis (i.e., ecological and social drivers of change). Examples of Case Study data and information are described under the Change Analysis. The S&T Program will develop and implement a series (2 to 4) of case studies that can be applied to historic, current, and future conditions analyses and to aid in restoration planning and evaluation. The S&T Program will develop study plans and guide the execution and interpretation of the studies.

3.11.6 Science and Technology Information Transfer

The S&T Program will play a significant role in providing scientific and technical results from the GI and resulting WRDA and Comprehensive Plan projects to the information management component of the study. As described under 3.8.4, Monitoring and Adaptive Management, the focus of this activity will be to provide rapid and informative dissemination of the results from monitoring and adaptive management experiences from restoration/preservation projects

implemented under WRDA and the Comprehensive Plan. This will include conventional information transfer tools but will also design tools that are more instructive than simple data and data interpretation, such as dynamic internet models and interactive workshops. Various forms of workshops and conferences, styled on such successful and effective models as the CALFED Science conferences, will also be devised.

4.0 Evaluating Alternative Plans

Similar to the development of alternative plans outlined in Section 3, evaluation of plans will take place along two parallel paths. The first path is related to evaluation of initial portfolio restoration sites and the second related to broad Basin-wide comprehensive alternatives.

4.1 Screen and Evaluate Early Candidate Initial Portfolio Restoration Sites

The screening outlined in Section 3.3 will result in a list of approximately 100 candidate restoration sites. For scoping purposes it will be assumed that from the initial 100 identified sites, 30 will be selected as the initial portfolio for further consideration based on the further screening. The strategic needs assessment will be complete at this point so the findings can be used more explicitly to further screen sites. It is anticipated that other screening criteria will also be developed at this point.

The feasibility report will include initial cost estimates and expected outputs (benefits) for this preliminarily screened set of sites. It is also anticipated that project fact sheets will be developed for each of these projects and will include the cost and benefit information. The fact sheets will consider conceptual alternatives at the individual site and optimize to the extent practicable. We do not anticipate a site-specific cost-effectiveness analysis will be completed at each site. However a cost effectiveness analysis and incremental cost analysis (CEA/ICA) will be used to compare the 30 sites. Based on the results of the CEA/ICA and other criteria the list of 30 candidate projects will be further screened. The end product will be a strategic set of 10-15 projects that are recommended for further evaluation. For scoping purposes 10 of the projects will be initial portfolio restoration sites and 5 will be pilot/demonstration projects.

4.1.1 Stakeholder Review of the PSNERP GI Project List

Stakeholder input is needed throughout the project screening and evaluation process, and GI success will depend on broad support for the final list of sites proposed to Congress for authorization under an anticipated Puget Sound Ecosystem Restoration authority. To accomplish this, workshops will be convened to discuss the results in each of the seven sub-basins.

4.2 Evaluate Basin-wide and Sub-basin Comprehensive Alternative Plans

Evaluation of alternative plans is a two-part process: assessment (quantification) and appraisal (judgment). Several alternative plans will be developed and compared with the no action alternative, allowing for the identification of the National Ecosystem Restoration (NER) plan.

This task will consist of analyzing the effects of the plans against various sets of evaluation categories and criteria to determine effectiveness in meeting the planning objectives. The evaluation categories and criteria will include effects on items such as significant resources, outputs, and plan costs (construction, real estate, operations and maintenance, etc.). The results of these evaluations will then be compared to identify significant differences among the plans.

Once site evaluations are performed, an interim step before the alternative-comparisons step is to formulate portfolios consistent with restoration planning objectives at the sub-basin and Basin-wide levels. At this step, the site-specific alternatives can be organized by sub-basins to facilitate stakeholder and public consultations. This assemblage of portfolios may also be necessary to perform alternatives comparisons within IWR-Plan depending on the number of possible permutations and computer software limitations. The outcome of this analysis will be the generation of portfolios comprised of multiple site-specific restoration and preservation alternatives evaluations for each of the seven sub-basins and comprehensively for the broader Puget Sound Basin. They include:

1. Central Puget Sound
2. Southern Puget Sound
3. Hood Canal
4. Whidbey Basin
5. San Juan
6. Northeastern Puget Sound
7. Strait of Juan de Fuca
8. Puget Sound Basin-wide

5.0 Comparing Alternative Plans

5.1 Compare Basin-wide Comprehensive Alternative Plans

All benefits and impacts must be identified including non-monetary and/or non-quantifiable benefits and impacts. The major benefit categories should be identified. Available economic data that includes cost and benefit information (e.g., traditional benefit-cost analysis, cost-effectiveness analyses, and incremental cost analyses) will be utilized. Cost-effectiveness and incremental cost analyses are used to compare the different outputs resulting from various levels of expenditures. This effort will include development of an implementation process that incorporates an adaptive assessment strategy for project implementation. This strategy will recognize that once restoration measures are implemented and monitoring begins, feedback is provided based on new insights gained from the response of the ecosystem and that sequential adjustments may be made to the project and future elements. The risk and uncertainties (e.g., ecosystem response, etc.) associated with each alternative plan are addressed.

5.2 Compare and Justify Initial Portfolio Sites for Authorization

This task further develops the screened strategic and pilot/demonstration sites and relates them to the Comprehensive Basin-wide Alternatives. For restoration actions to be justified and recommended for implementation in WRDA they must be fully consistent with the identified

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Basin alternatives. For the strategic priority restoration sites the task will focus on filling data gaps. For the demonstration/pilot sites protocol will be further developed based on findings from the S&T tasks related to monitoring and adaptive management.

5.3 Basin-wide Comprehensive Plan

Selecting a plan is the decision-making stage of the plan formulation process. The Corps/Sponsor team members are not necessarily the decision-makers, and their recommendations may or may not be followed. The purpose of the selection step is to try to purposefully choose the best alternative future path for the nation. Corps guidance has established a method for making this choice. The first choice is do nothing. The second choice is to implement the NER plan. The third choice is to do something else. There must be good reasons for the final selection. For ecosystem restoration projects, the significance of the restored habitat to national, state, and local interests is critical. Data on the scarcity and sustainability of the restored or protected ecosystem and what the project does to achieve diversity are also needed. The selection criteria favor a plan that is cost effective and that objectively maximizes net benefits through an incremental cost analysis. Further, the plan's relative importance to the programs of the various agencies responsible for water resources management in the study area should be considered; for example, how the comprehensive plan integrates with other systems would be an important consideration.

Initiatives that would systematically improve the Puget Sound nearshore ecosystem will be collectively determined – among and within appropriate partnerships and stakeholders. Also, a probable best schedule will be determined for implementing tasks, including identification of which agency is best suited for accomplishing such tasks. Impacts of political and budgetary uncertainties on project implementation will also be addressed.

5.4 Alternative Formulation Briefing

Once alternatives have been evaluated, a tentatively selected plan identified and the evaluation process fully documented, an Alternative Formulation Briefing (AFB) is held with Corps Division and Headquarters staff.

6.0 Selecting a Plan

6.1 Engineering & Design and Real Estate Requirements of 1st Portfolio Projects

Additional engineering and design for the initial portfolio will ensure the individual restoration actions at selected sites are optimized and that the restoration action is viable and cost-effective. This will also include necessary real estate and other studies to support authorization. For scoping purposes the PMP has assumed that 10 sites will be taken to this level. Seven of the 10 sites will have costs between \$3-15 million for implementation (plans and specifications, construction and real estate). Three of the sites will be more significant in scale –for scoping it was assumed that they are in the range of \$50 million for implementation. For the revised PMP to be internally consistent, the types of restoration actions that will form the basis for technical scoping are assumed to include: dike removal, armor modification (bulkhead removal), channel

rehabilitation, hydraulic modifications, fill and over water structure removal and hydraulic modification (jetty, groins). However, the full group of management measures is expected to be examined to determine the actual initial portfolio of project sites.

Site investigations by inter-disciplinary teams are appropriate to identify site conditions and constraints that will affect the technical feasibility, cost, and environmental soundness of the recommended plan. Site investigations in the plan formulation stage usually are of a limited scope and extent to satisfy concerns about the feasibility of the recommended plan. Lengthy or expensive field explorations are only performed when necessary at this stage. The likely types of feasibility site investigations include: Geotechnical, Biological, Topographical/Bathymetrical, Existing Infrastructure, Property Boundary, Real-Estate, Cultural or Historical Resources, Hazardous, Toxic, and Radiological Waste (HTRW). The revised study task and subtask description by work breakdown structure in Volume II provides a more detailed description of the requirements for each section. Outlined below is a general description of these items.

6.1.1 Real Estate

A real estate plan will be developed for the selected sites and will be included as an appendix to the feasibility report. The plan will contain a real estate write-up describing the lands, easements, rights-of way required for each of the proposed sites. It will also include a gross appraisal of land values, and an estimate of the sponsor's administrative and acquisition costs.

6.1.2 Engineering and Design

This task includes engineering and design studies of the 15 1st portfolio projects and the preparation of an engineering appendix to the feasibility report. Engineering and design studies will be performed at the minimum level needed to establish conceptual designs for project features/elements and for the development of construction cost estimates and estimates of operation, maintenance. These studies will focus on civil design, hydraulics, hydrology and Geotechnical considerations. A Value Engineering study will be completed for the recommended sites.

6.1.3 Cost Estimating

This task includes development of cost estimates for the 1st portfolio sites. An MII estimate shall be prepared for the recommended sites. All cost estimates will include all federal and non-federal costs for lands and damages, all construction features, relocation of facilities and utilities, mitigation (if required) planning, engineering and design, supervision and administration, contingencies and cost escalation associated with each of these activities through mid-point of construction.

6.1.4 Economics

An economic analysis related to both the comprehensive Basin-wide alternatives and the 1st portfolio sites will be performed. This analysis includes a cost-effectiveness and incremental cost analysis which is used to assist in selection and optimization of the preferred plans and the plan that contributes to national ecosystem restoration – the NER plan.

6.1.5 Site Survey

. It is assumed that the majority of designs will be based on existing survey information and that detailed survey work will be accomplished in PED. The survey task will be limited to review of existing information and some limited work to support quantity take-offs, elevation point estimates and project boundaries.

6.1.6 Hazardous, Toxic, and Radiological Waste Studies

The objective of Hazardous, Toxic, and Radiological Waste (HTRW) studies is to determine the presence and character of contamination identified in an initial screening of the 15 sites selected for detailed study. For scoping purposes, a Phase I screening will be completed on 5 of the sites. If the screening shows significant contaminants exist at the site, consideration will be given first to selecting another site or developing an estimate of the HTRW studies that would need to be conducted in the (PED) phase

6.2 Environmental Compliance

Environmental compliance in support of PSNERP will require national and state permitting but at different scales. National permitting requirements for the program such as National Environmental Policy Acts (NEPA), Endangered Species Act, and National Historic Preservation Act (Section 106) are anticipated to take a programmatic approach in which the main documents focus on Puget Sound scale issues and impacts from which site specific permitting actions can be developed. Permitting and coordination requirements best suited for site scale development will be delayed until specific designs are created.

6.2.1 National Environmental Policy Act (NEPA)

A programmatic environmental impact assessment (EIS) that covers Puget Sound should be pursued throughout the PSNERP plan formulation process with public scoping occurring early in the process. Integration of the EIS and any resultant public meetings into the PSNERP stakeholder involvement plan should occur to maintain continuity with the rest of the program. The EIS should focus on the nature of potential impacts and benefits of the program at the Puget Sound scale to provide a regional perspective on actions likely to occur under the PSNERP program. A process for developing specific environmental assessments (EAs) for proposed projects should be included that offer more detail at the site scale.

6.2.2 Endangered Species Act

Regional assessments for restoration programs are required to assess their affects on listed species. Previous efforts have developed several programmatic biological assessments to address this Endangered Species Act requirement. PSNERP will take advantage of the work already completed for NOAA Fisheries and USFWS restoration programs to streamline this effects analysis. The impacts analysis and resultant biological opinions for appropriate listed species will be focused at the management measure level.

6.2.3 Clean Water Act (Section 404/401) and Rivers & Harbors Act (Section 10)

As part of the US Corps of Engineers permitting responsibility PSNERP will also need to be coordinated under Sections 404 and 401 of the Clean Water Act (CWA). Like other federal consultations, the CWA compliance will occur at both the regional and site specific scales. As

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part of the NEPA documentation and its public involvement/review requirements, a substantive equivalency document for Section 404 will be prepared and made available. Since PSNERP is a Corps authority, the Corps does not work directly with its' regulatory department to obtain permits but instead, develops a substantive equivalency analysis to assure its' actions are consistent with its own regulatory requirements. Where site specific projects are proposed, a more detailed analysis may be provided as part of the NEPA documentation that references the programmatic analysis.

Section 401 of the CWA is administered by the Washington Department of Ecology and is primarily a construction permit designed to handle stormwater and other aspects of construction projects that have the potential to degrade water quality. Site specific documents are the most efficient means to accomplish this coordination. Regional coordination with the Environmental Protection Agency (EPA), which oversees this permit at the national level, would be beneficial so that overall perspective and consistency with other EPA interests within PSNERP are maintained.

Section 10 of the Rivers and Harbors Act regulates hazards to navigation and is administered by the US Army Corps of Engineers. Section 10 permits are required whenever there is potential to install a structure in navigable waters that may have an impact on navigation (buoys, reefs, etc).

PSNERP is a US Army Corps of Engineers project and as such does not issue Section 404 or Section 10 permits to itself. The PSNERP project will develop substantive compliance documents for both Section 404 and Section 10 once restoration site plans are initiated. The Washington Department of Ecology will be consulted on a site by site basis after completion of the Feasibility Report and restoration project authorization.

6.2.4 Cultural Resources (Section 106)

Historic settlements and Native American activities often occurred in estuaries, deltas and accessible areas around the nearshore. Initiation of a large scale restoration program focused in the nearshore areas is likely to encounter remnants of those earlier settlements. A programmatic consultation with the State Historic Preservation Office to establish protocols for identifying and avoiding significant cultural resources known to occur around Puget Sound is essential to the project selection process. Upon site selection, additional investigations should be conducted to ensure unknown resources are avoided or mitigated, if found.

6.2.5 State Permits

In most cases, environmental permits administered by the State of Washington are not applicable to Federal projects. There are a few exceptions for construction related permits that are pursued at the time a site has been selected and designs are initiated. In some instances the pursuit of advisory versions of state permits are warranted to ensure significant concerns are documented.

6.3 Feasibility Report & Integrated EIS Preparation

Building on report chapters developed for the Feasibility Scoping Meeting and the Alternative Formulation Briefing this task includes documentation on the effects of the recommended plan and completes all other NEPA and feasibility report requirements.

Upon completion of the preliminary draft feasibility report and integrated EIS, the sponsor will make a determination on whether to proceed forward with the project through the Corps review process.

7.0 Project Management, Review & Approval Process

7.1 Project Management

Project management includes a wide variety of tasks and activities. These include overall coordination and local, state, tribal and federal governmental agencies, interest groups, and the general public; oversight management of Corps of Engineer, sponsor, and contracted study tasks and related activities; coordination between the Corps and the sponsor; attending and conducting meetings and briefings throughout the study; responding to congressional and other inquiries; and oversight and management of review of the draft and final feasibility activities. This task does not include plan formulation, report preparation, or Washington level review support, which are separately accounted for.

7.1.1 Local Sponsor Project Management

This line item in the budget accounts for the local project manager and supporting staff.

7.1.2 Corps Project Management

This line item in the budget accounts for federal project manager and supporting staff necessary to accomplish general project management activities.

7.2 Review and Approval

Review & Approval When the draft feasibility report and integrated EIS have been prepared and reviewed by the sponsor and the Corps Seattle District they will go through a series of technical and policy reviews. Technical reviews include Agency Technical Review (ATR), a review conducted by an independent team at a separate Corps of Engineers District office; and Independent External Peer Review, which is a review conducted outside of the Corps of Engineers. Once these are conducted, and with the concurrence of Corps vertical team, the document will be reviewed by the public and agencies. The Corps will also be reviewing the document for policy and legal issues. The project is then presented to the Corps Civil Works Review Board. Once these reviews are complete the report is transmitted to the Assistant Secretary of the Army for Civil Works, ASA (CW) and finally the Office of Management and Budget for review. The final report with recommendation and Record of Decision is signed and presented to congress. Details on the Quality Control Plan and Review schedule and sequence are provided in Volume II.

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