US Army Corps of Engineers
Walla Walla District

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MCNARY SHORELINE MANAGEMENT PLAN

Revised Programmatic Environmental Assessment

U.S. Army Corps of Engineers
Walla Walla District
Environmental Compliance Section

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McNary Shoreline Management Plan
Revised Programmatic Environmental Assessment

Table of Contents

SECTION 1—INTRODUCTION

1.1 Introduction 1-1
1.2 Purpose and Need 1-2
1.3 Background Information 1-2
1.4 Authority 1-5
1.5 Project Area 1-5
1.6 Description of the 1983 McNary Lakeshore Management Plan 1-5
 1.6.1 The 1983 LMP Shoreline Allocations 1-5
 1.6.2 Types of Permits Issued 1-7
 1.6.3 Other Shoreline Uses 1-8
1.7 Relationship of the Lakeshore Management Plan to the McNary Master Plan 1-9
1.8 Description of the Proposed Updated Shoreline Management Plan 1-9
 1.8.1 Proposed Shoreline Allocations 1-9
 1.8.2 Types of Permits Issued 1-10
 1.8.3 Other Permit Requirements 1-10
 1.8.4 Other Corps Review Requirements 1-10
 1.8.5 Special Status Docks, Existing Docks and New Docks 1-11

SECTION 2—ALTERNATIVES

2.1 Introduction 2-1
2.2 Alternative Development and Evaluation 2-1
 2.2.1 Categories 2-2
 2.2.2 Measures 2-2
 2.2.3 Screening Criteria 2-3
 2.2.4 Screening Process 2-4
2.3 Plan Alternatives 2-6
 2.3.1 Alternative 1: No Action 2-6
 2.3.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred) 2-7
 2.3.3 Alternative 3: Maximum Environmental Benefits 2-7
2.4 Alternatives Considered, but Eliminated from Further Evaluation 2-8

Table of Contents (continued)

SECTION 3—AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction ... 3-1
3.2 Water Quality ... 3-1
3.2.1 Affected Environment ... 3-1
3.2.2 Environmental Consequences ... 3-2
3.3 Soils ... 3-5
3.3.1 Affected Environment ... 3-5
3.3.2 Environmental Consequences ... 3-5
3.4 Vegetation ... 3-7
3.4.1 Affected Environment ... 3-7
3.4.2 Environmental Consequences ... 3-8
3.5 Aquatic Resources ... 3-9
3.5.1 Affected Environment ... 3-9
3.5.2 Environmental Consequences ... 3-10
3.6 Wildlife ... 3-13
3.6.1 Affected Environment ... 3-13
3.6.2 Environmental Consequences ... 3-14
3.7 Threatened and Endangered Species ... 3-16
3.7.1 Affected Environment ... 3-16
3.7.2 Environmental Consequences ... 3-24
3.8 Cultural Resources ... 3-27
3.8.1 Affected Environment ... 3-27
3.8.2 Environmental Consequences ... 3-27
3.9 Recreation ... 3-30
3.9.1 Affected Environment ... 3-30
3.9.2 Environmental Consequences ... 3-30
3.10 Socioeconomics ... 3-34
3.10.1 Affected Environment ... 3-34
3.10.2 Environmental Consequences ... 3-35
3.11 Cumulative Impacts ... 3-37
3.11.1 Resources of Interest ... 3-38
3.11.2 Past, Present, and Future Conditions and Impacts to Resources ... 3-39
3.11.3 Cumulative Impacts Summary and Conclusion ... 3-46
3.12 Climate Change ... 3-47

Table of Contents (continued)

SECTION 4—COMPLIANCE WITH APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

4.1 National Environmental Policy Act ... 4-1
4.2 Clean Water Act ... 4-1
4.3 Endangered Species Act ... 4-2
4.4 National Historic Preservation Act ... 4-3
4.5 Rivers and Harbors Act, Section 10 ... 4-3

SECTION 5—COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

5.1 Agency Coordination ... 5-1
5.2 Public Involvement ... 5-1
5.2.1 Scoping ... 5-1
5.2.2 Public Review of the Draft Plan and Environmental Assessment ... 5-2

SECTION 6—REFERENCES

LIST OF TABLES

1-1 McNary Shoreline Allocation Categories under the 1983 Management Plan ... 1-7
1-2 Proposed Shoreline Allocations ... 1-9
2-1 Screening Criteria ... 2-4
2-2 Screening Process ... 2-5
3-1 Categories within the 303(d) List ... 3-1
3-2 Recreation Facilities at Lake Wallula ... 3-31
3-3 2009 Lake Wallula Visitation, Number of Visitors by Activity ... 3-32
3-4 Education Levels in the Tri-Cities, Washington, Area ... 3-34

LIST OF FIGURES

1-1 Location Map ... 1-6
3-1 Anadromous Salmonid Migration through McNary Reservoir ... 3-10
3-2 Level of Commercial Harvest of Columbia River Chinook Salmon, 1870 to 1965 ... 3-41

Table of Contents (continued)

APPENDICES

Appendix A – Columbia River Basin Dock Design Criteria Table

Appendix B – Shoreline Use Allocation Maps

Appendix C – National Historic Preservation Act, No Potential Memo

Appendix D – Biological Assessment

Appendix E – National Marine Fisheries Service Biological Opinion

Appendix F – US Fish and Wildlife Service Letter of Concurrence

Appendix G – Lake Wallula/McNary Pool Dock Design Criteria

Appendix H – Mitigation Plan

SECTION 1—INTRODUCTION

1.1 Introduction

The U.S. Army Corps of Engineers, Walla Walla District (Corps) is proposing to update the 1983 Lakeshore Management Plan (1983 LMP) (the updated plan will hereinafter be referred to as the McNary Shoreline Management Plan or SMP). The proposed action is formal review of the 1983 LMP and subsequent implementation of the SMP. This Revised Programmatic Environmental Assessment (EA) analyzes the potential environmental impacts of those proposed changes. A programmatic document is prepared for a broad federal action, such as the adoption of a regulation, policy, plan, or program.

McNary Lock and Dam and Lake Wallula, the project's impounded reservoir, is a civil works project on the Columbia River. It is located in both Oregon and Washington (see Figure 1-1) and is operated and managed by the Corps. The 1983 LMP was originally developed to carry out the Corps' mandate as required by 36 Code of Federal Regulations (CFR) 327.19 and 36 CFR 327.30 and Engineering Regulation (ER) 1130-2-406, *Project Operation -Shoreline Management at Civil Works Projects* to protect and manage the shorelines of all water resource development projects under its civil works jurisdiction.

The National Environmental Policy Act (NEPA) is a *full disclosure* law, providing for public involvement in the NEPA process. All persons and organizations that have a potential interest in major actions proposed by a federal agency – including other federal agencies, state and local agencies, federally recognized Native American Indian tribes, interested stakeholders, and minority, low-income, or disadvantaged populations – are encouraged to participate in the NEPA process.

This EA was prepared in accordance with Engineer Regulation (ER) 200-2-2, *Procedures for Implementing NEPA* and the Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (Title 40 of the CFR Parts 1500-1508). The objective of the EA is to determine the magnitude of the environmental impacts of the proposed updating of the SMP. If such impacts are relatively minor, a Finding of No Significant Impact (FONSI) will be issued and the Corps will proceed with the federal action. If the environmental impacts are significant according to the CEQ's criteria (40 CFR 1508.27), an Environmental Impact Statement (EIS) will be prepared before a decision is reached to implement the proposed action. Applicable laws under which these impacts will be evaluated include NEPA, the Endangered Species Act, the Clean Water Act, the Clean Air Act, the U.S. Fish and Wildlife Coordination Act, and the National Historic Preservation Act (NHPA).

1.2 Purpose and Need

The proposed action is formal review of the 1983 LMP and subsequent implementation of the SMP. The purpose of the proposed action is to identify a management strategy the Corps will use to manage the shoreline in a manner that will promote the safe and healthful use of these shorelines by the public while maintaining environmental safeguards to ensure a quality resource for use by the public. The Corps' main objective is to achieve a balance between permitted private uses, compliance with the current shoreline management regulations and resource protection specifically supporting fish listed under the Endangered Species Act (ESA). The secondary objective is to reasonably limit impacts to current permit holders, if not to the detriment of the natural resource. The SMP will be reviewed every five years for its applicability and relevance to up-to-date shoreline management circumstances.

An update to the 1983 LMP is necessary because the original McNary Lakeshore Management Plan was released by the Corps in January 1980, and was revised in March 1983. Although the CFR requires a review of the plan at least every five years (36 CFR 327.30), the 1983 LMP has not been updated since 1983. Extensive changes have taken place in the region and in the Tri-Cities area during the last 28 years, including increased population, commercial, industrial, and residential development. Columbia and Snake River fish have been listed under the Endangered Species Act (ESA); Lake Wallula is now designated as Critical Habitat for the listed species. Other resources issues, such as protection of water quality and cultural resources have gained visibility in the region in the recent years.

Additionally, circumstances have led the Corps to not act comprehensively in accordance with guidelines in the 1983 LMP when issuing shoreline permits. For example, the Corps permitted fixed-floating docks, when the 1983 LMP allowed only for floating docks. Additional complexity is added to the long-term management process due to encroachment on publicly-owned shoreline by adjacent private property owners. That is, in numerous areas around Lake Wallula, adjacent private landowners have used public land as if it were their own. This action leads many people to believe that the shoreline is private property. These factors, along with changing environmental conditions, have led to a complex situation that must be resolved to assure long-term sustainable management of the lake.

1.3 Background Information

Since 1991, eight stocks of fish (upper Columbia River spring Chinook salmon, upper Columbia River steelhead, mid-Columbia River steelhead, Snake River sockeye salmon, Snake River spring/summer Chinook salmon, Snake River fall Chinook salmon, Snake River steelhead and bull trout) found in Lake Wallula have been listed as either threatened or endangered under the ESA. As a result, the entire McNary reservoir was designated as critical habitat for these fish, putting the protection of them and their habitat in potential conflict with certain uses of the shoreline (e.g., docks). Best available science at this time indicates that juvenile salmonids use the shallow area along the shoreline where light reaches all the way to the bottom for rearing (i.e., feeding, resting, refuge from predators). Riparian vegetation along the shoreline also provides benefits to fish and supports a wide range of wildlife. Approximately 85% of Washington's terrestrial vertebrate species use riparian habitat for essential life activities (Knutson, K.L. and V.L. Naef, 1997). The amount of riparian vegetation has been reduced to a fraction of historic levels throughout the United States.

The ESA prohibits the federal government from authorizing, funding or carrying out any action that will destroy or adversely modify designated critical habitat. The Corps' action of granting permits under the SMP is the authorization of an action. Consequently, this SMP must ensure that the Corps does not authorize the destruction or adverse modification of critical habitat through the issuance of a dock or vegetation modification permit, therefore consultation under Section 7 of the ESA is required.

In 2008, in recognition of the impact that docks have on habitat for ESA-listed fish, National Marine Fisheries Service (NMFS), Washington Department of Fish and Wildlife (WDFW), and the Corps developed criteria meeting requirements based upon the best available scientific data for dock designs to minimize impacts to these fish. In May, 2010, the Corps contracted Rogers Surveying, Inc. to gather shoreline depth criteria and actual reservoir depths in the entire Lake Wallula reservoir. This location survey data provided criteria necessary to better evaluate proposed changes to the existing shoreline allocation. In other words, the Corps could now more easily consider re-allocating the shoreline using depth profiles in addition to other features.

The Corps and NMFS further refined dock criteria to include requirements related to ramp length from the shoreline, ramp width, ramp elevation, grated cover of the pier/ramp and float, maximum piling diameter, shoreline anchor blocks, and shallow water habitat restrictions. The criteria were then evaluated for credibility with a review of scientific literature conducted by the U.S. Geological Survey (USGS). The USGS review concluded that maximizing depth, minimizing structure such as the number of pilings, and maximizing light levels all contribute to minimizing the negative effects that docks have on ESA-listed salmonids and other aquatic organisms (Rondorf et al. 2010). Criteria were further compared to criteria used for construction of private facilities in the upper and lower Columbia basins (Appendix A), and found to be consistent with those criteria. Consequently, docks built pursuant to these criteria will be presumed to not adversely modify critical habitat. These Lake Wallula/McNary pool dock design criteria (hereinafter referred to as "SMP dock criteria") are located in Appendix G.

In addition to fish and wildlife changes that have occurred since the 1983 LMP was published, there is an increased understanding of the impacts that development causes to historic properties. Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

The McNary shoreline has a long and rich history of human use. Recent and future development along the shoreline has the potential to adversely affect historic properties, as well as Traditional Cultural Properties (TCP). A TCP is a historic property that is significant because of the role the property plays in a community's historically rooted beliefs, customs, and practices (Parker and King 1998). It is often difficult or impossible to identify a TCP during typical research. Oftentimes, knowledge of properties of this type resides only with the communities that traditionally utilized the area, and are rooted in that community's history or culture (Parker and King, 1998). Much like an archaeological site, a TCP can also be eligible for inclusion in the National Register of Historic Places (NRHP) because of its on-going association with the cultural practices or beliefs of a living community. The 1983 LMP does not acknowledge the potential for impacting historic properties or TCPs, nor does it have provisions for protecting these sites. The updated SMP considers these cultural resources concerns, in addition to needs of the ESA-listed fish, and any other concerns identified when determining future shoreline use.

Given current laws, ESA directives, and environmental conditions, the Corps is required to find ways to manage the shoreline to carry out the congressionally authorized purpose of the McNary Program (i.e., navigation, hydropower development, irrigation and public recreation) in a manner that has minimal impact to the environment.

In January 2009, the Corps completed a draft Environmental Assessment for the McNary SMP. The Corps then held a public meeting on January 14, 2009 in Pasco, Washington to familiarize the public with the draft SMP and accompanying EA. Initially, the release of the SMP and EA were scheduled to be followed by a 30-day public review and comment period. At the request of the public, the review period was lengthened to six months. During the review period, there were a number of public comments received by the Corps regarding the SMP. In response to these concerns, the Corps began reformulation of the SMP for management of the shoreline and performed additional analysis, resulting in proposed changes to shoreline allocations and modified alternatives.

In May 2011, an updated SMP and Revised Programmatic Environmental Assessment were released for public review and a public meeting was held in Pasco on June 9, 2011. This meeting was attended by approximately 180 people and was followed by a 90 day comment period that ended on August 27, 2011. In an effort to accomplish the main objective in implementing the updated McNary SMP, which is achieving a balance between permitted private uses, compliance with the current shoreline management regulations and resource protection specifically supporting threatened and endangered fish species, the Corps again, modified the SMP and made changes to the EA in response to the public's comments and concerns. In addition, several small focused meetings with current dock owners were conducted in September and October 2011.

1.4 Authority

McNary Lock and Dam Project was authorized in 1945 by Public Law (PL) Number 79-14, for the primary purposes of navigation, power development, and irrigation. Additional laws (i.e., PL 78-534 and PL 89-72) provided authority for the Corps to develop recreation facilities and include recreation as a project purpose. The Fish and Wildlife Coordination Act of 1958 (PL 85-624) authorized more effective integration of fish and wildlife programs with Federal water resource development projects.

The 1983 LMP was prepared in accordance with the requirements of Engineer Regulation (ER) 1130-2-406, *Shoreline Management at Civil Works Projects*, and dated December 13, 1974. The updated SMP will be in accordance with the ER, as amended on October 31, 1990, September 14, 1992, and May 28, 1999 and with 36 CFR 327.30.

1.5 Project Area

Lake Wallula is located on the Columbia River in southeastern Washington. The reservoir starts at McNary Dam [River Mile (RM) 292], and extends 61.6 miles upstream to RM 353.6. The reservoir also extends one mile up the Walla Walla River, 9.7 miles up the Snake River to Ice Harbor Dam, and six miles up the Yakima River. At maximum pool, the reservoir has 37,000 surface acres of water and 242 miles of shoreline.

1.6 Description of the 1983 McNary Lakeshore Management Plan (1983 LMP)

The following paragraphs describe the major features of the 1983 LMP.

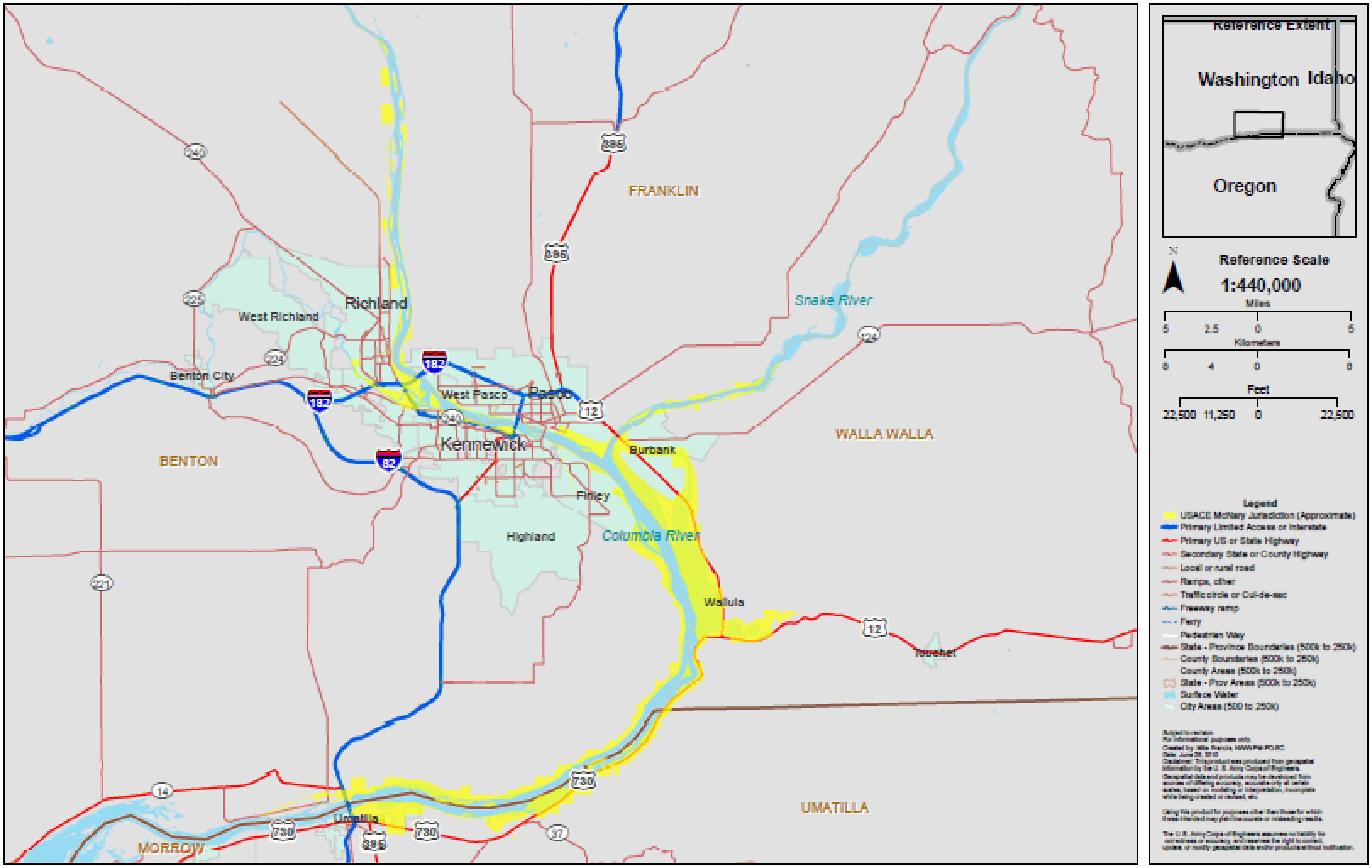
1.6.1 The 1983 LMP Shoreline Allocations

Shoreline allocation is the designation of government property into various classifications, wherein only explicit activities or actions are permitted for each classification. The Lake Wallula shoreline was classified using four different shoreline allocations defined in ER 1130-2-406 and 36 CFR 327.30: 1) limited development areas; 2) public recreation areas; 3) protected shoreline areas; and 4) prohibited access areas.

- **Limited Development** areas are areas where private facilities or activities may be allowed once a permit has been issued.

- **Public Recreation** areas are designated for commercial concessionaire facilities, and federal, state or other similar public uses. No private shoreline use facilities or activities are permitted within or near designated or developed public recreation areas. No modification of land forms or vegetation by private individuals or groups of individuals is permitted in public recreation areas.

Figure 1-1. Location Map



- **Protected Shoreline** areas are designated to maintain or restore aesthetic, fish and wildlife, cultural, or other environmental values. Shoreline may also be designated to prevent development in areas subject to excessive siltation, erosion, rapid dewatering or exposure to high wind, wave or current action; or in areas where development would interfere with navigation. No Shoreline Use Permits for floating or fixed recreation facilities (docks) will be allowed in protected shoreline areas, although some modification of vegetation by private individuals may be allowed under permit.

- **Prohibited Access** areas are areas where public access is not allowed or very limited for health, safety or security reasons. No shoreline use permits are issued in these areas.

Table 1.1 lists shoreline allocations and provides information on linear miles of shoreline and percent of shoreline for each allocation. These allocations complement and refine land use classifications identified in the McNary Master Plan (Corps of Engineers, 1982).

Table 1.1 McNary Shoreline Allocation Categories under the 1983 LMP

Allocation	Linear Miles*	Percent of shoreline
Limited Development	11	4%
Public Recreation	43	17%
Protected Shoreline	160	63%
Prohibited Access	41	16%

*Includes shoreline of islands and embayments.

1.6.2 Types of Permits Issued

All private facilities and activities on public lands administered by the Corps must be covered by a permit, lease, license, easement or other legal instrument. Under the current 1983 LMP, the Corps can issue two types of shoreline use permits:

- **Private floating recreation facility**. This shoreline permit allows an adjacent property owner to install a floating boat dock on Corps-managed shoreline property. Permits can be issued for community (group) docks for multiple property owners or an individual dock. Permits are issued for a maximum of

5 years. The applicant must pay a $10 administrative charge and a $25 inspection fee. Permits can be renewed in up to five-year increments for a fee of $35.

- **Vegetation modification.** A permit of this type allows minor modification to vegetation that does not involve changes in land form. It can include creation of a meandering path to provide access to the shoreline, minor pruning of tree branches, planting and maintenance of lawn grass and mowing. All activities must be approved by the Corps. Permits are issued for a maximum of 5 years and the applicant must pay a $10 administrative charge. Permits can be renewed in up to 5-year increments for a fee of $10.

Private facilities or activities that do not meet the requirements of a permit under the 1983 LMP may be authorized under a real estate instrument (i.e., lease, license or easement). The use, however, must not conflict with shoreline use allocation outlined in the 1983 LMP. Applicants for a real estate instrument are charged actual administrative costs incurred by the Corps to process the request. Administrative costs could comprise several thousand dollars or more depending on the extent and location of proposed development. The real estate instrument anticipated to typically be used for SMP purposes is a license. A license is issued for five years and may be renewed at the discretion of the Corps, Walla Walla District. Additional administrative costs are required to be assessed for each five-year renewal.

1.6.3 Other Shoreline Uses

The 1983 LMP regulates not only docks and vegetation modification, but all other shoreline uses, including:

- **Private launching ramps, rails and tracks.** These types of facilities are not allowed under any 1983 LMP permit, Section 10 permit, or real estate license. However, a few currently exist along the shoreline.

- **Stairways, steps, and footbridges** are not permitted under a 1983 LMP permit, but may be allowed under special circumstances through a real estate license. They must be designed to minimize impacts to the environment and must not impede public access to the shoreline.

- **Hard-surface walkways** may only be permitted under a real estate license for providing access for physically-challenged persons.

- **Erosion control devices** are allowed in situations where bank erosion causes problems or endangers adjacent private facilities. Erosion control devices are permitted through a real estate license.

- **Private irrigation systems** are meant for residential use and are allowed to cross Corps land only in limited development areas. They are permitted through a real estate license or easement.

- **Yacht club facilities** are allowed only in limited development areas and are permitted through a real estate lease.

1.7 Relationship of the 1983 LMP to the McNary Master Plan

The 1983 LMP is only one of several plans used to manage McNary project lands. The primary management plan is the McNary Master Plan (Corps of Engineers, 1982). The Master Plan assigns a land use classification to each land parcel included in the project, both shoreline and upland, and establishes how the Corps will manage these lands. Examples of land use classifications include Intensive Recreation, Intensive Fish and Wildlife Management, Project Structures, Industrial Use and Access, Marina, and Flowage Easement Lands. The 1983 LMP further defines what uses are allowed on the shoreline areas. However, shoreline use allocations in the Lakeshore Management Plan cannot conflict with Master Plan land use classifications.

1.8 Description of the Proposed McNary Shoreline Management Plan

The following paragraphs describe some of the key features of the proposed updated McNary Shoreline Management Plan.

1.8.1 Proposed Shoreline Allocations

In a concerted effort to protect threatened and endangered species and their critical habitat on Lake Wallula, the Corps is proposing to reduce the Limited Development Areas from the current 11.26 miles to 3.09 miles as shown in Table 1-2.

Table 1-2. Proposed Shoreline Allocations

Allocation	Linear Miles*	Percent of Shoreline
Limited Development	3.09	1%
Public Recreation	39.46	14%
Protected Shoreline	190.54	67%
Prohibited Access	50.80	18%

1.8.2 Types of Permits Issued

As in the 1983 LMP, all private facilities and activities on public lands administered by the Corps must be covered by a permit, lease, license, easement or other legal instrument. The types of permits the Corps can issue under the updated SMP are the same as in the 1983 LMP:

- **Private Docks**
- **Vegetation Modification**

Private upland support facilities or activities would be authorized under a real estate instrument, i.e., lease, license or easement. These types of facilities and/or activities are referred to as Other Shoreline Uses and are the same as those in the 1983 LMP. They would also have the same real estate license requirements as in the 1983 LMP.

All other features not mentioned herein would be addressed on a case by case basis.

1.8.3 Other Permit Requirements

There are other federal, state, and local permits that applicants may have to obtain prior to the issuance of an SMP permit. These include, but are not limited to, Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act from the Seattle District Corps Regulatory Office, Section 401 Certification of the Clean Water Act from the Washington Department of Ecology, Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife, a Washington Shoreline Management Act permit from the applicable local government, Aquatic Resources Use Authorization from the Washington Department of Natural Resources, and compliance with the Washington State Environmental Policy Act (SEPA). Applicants must submit a Joint Aquatic Resources Permit Application (JARPA) form to each agency for which they are applying for a permit.

1.8.4 Other Corps Review Requirements

This document is a Revised Programmatic Environmental Assessment and evaluates the environmental effects of implementing the proposed revised SMP and impacts associated with existing private uses and potential impacts associated with new private uses. Therefore, whenever the Corps receives an application for a new permit (new private use) under the revised SMP, the Corps will need to complete additional site specific environmental review of the application. This review would include the following:

- Determination of effects to historic properties. This may include literature reviews, archaeological surveys, site evaluations, and consultation with the State Historic Preservation Officer (SHPO), Tribes, and other interested parties.

- Determination of consistency with the Endangered Species Act (ESA) consultation (Appendices D, E and F). The Corps would identify the effects of each proposed action on ESA-listed species and their habitat and compare those effects with the ESA consultation and associated Appendices. If additional effects are identified, the Corps would be required to re-initiate consultation for that permit application.

- Approval of proposed mitigation. The Corps would help establish mitigation requirements for the proposed permit action and ensure the proposed mitigation is consistent with the mitigation plan (Appendix H). The Corps would need to approve the mitigation prior to issuing a permit.

1.8.5 Special Status Docks, Existing Docks, and New Docks

Prior to the development of the 1983 LMP, some private boat docks were already present along the shoreline. These existing docks and all docks that had a valid permit by November 17, 1986, and still in place as of December 31, 1989, are now considered "special status" docks. There are approximately 21 special status docks on Lake Wallula. After the effective date of the SMP, existing dock owners will be issued renewals to their expired permits. Existing docks may be allowed to remain per the conditions of the 2011 dock inspection if the dock is in a safe condition and has not been extensively modified without authorization. However, upon sale or transfer of a property associated with a special status dock, the new owner would be required to upgrade the dock to meet the SMP dock criteria. The new owner would have four (4) in-water work windows in which to upgrade the dock. In-water work windows are from November 1 through February 28.

The Water Resources Development Act of 1986 (Public Law 99-662) prohibits forced removal of previously authorized docks and appurtenant structures which were at their originally authorized locations on November 17, 1986, and still in place as of December 31, 1989, providing they are maintained in usable and safe condition; they do not occasion a threat to life or property; and the holder of the permit substantially complies with the terms of the existing permit. The public law does not exempt the permittee from complying with the conditions of the permit or any permitting requirements. Additionally, the "special status" can be overridden when deemed necessary for public purposes, navigational use, or for flood control. Modifications to special status docks required under the SMP are for the higher public purpose of protecting ESA listed species.

There are currently 73 existing private docks on Lake Wallula. Most are not compliant with SMP dock criteria developed to minimize impacts to threatened and endangered fish species. In other words, many of these docks sit in shallow water; have solid (non light-penetrating) ramps and floats, and large piling. Only four of the 73 existing permits for private docks on the McNary Reservoir have been consulted on under the ESA.

Within the newly proposed shoreline allocations there is one small reach of shoreline in Pasco which is being proposed as "protected", and contains private docks. The location of each dock would be designated as a limited development area. These docks would be allowed to remain in their locations to allow the Corps to honor past commitments as long as they are upgraded to meet the SMP dock criteria, upon sale or transfer of adjacent property, or when major components are replaced. However, upon removal of the dock for anything but temporary maintenance or replacement, the limited development status would be revoked and the dock site would be designated as "protected" from then on. A dock will be considered removed for other than temporary reasons if removed for more than 30 consecutive days, or more than twice during a calendar year, except the Corps (Ice Harbor Project Office) may authorize removal for seasonal storage if requested in writing by the permittee.

For all existing and special status docks, during replacement of major dock components, (e.g. floats, decking, walkways), permittees would be required to replace those components (e.g. floats, decking) with SMP dock criteria compliant components, as outlined in the 2011 SMP.

Permits for new docks, and permits to new owners of existing docks, will require docks that meet the SMP dock criteria. Those permittees will have four (4) full in-water work windows (November 1 through February 28) to install/or upgrade their docks. Mitigation in accordance with Appendix H will be required for new docks. Under the SMP, existing dock owners will not be issued a new SMP permit unless their dock complies with the requirements of their LMP permit including design and size.

SECTION 2—ALTERNATIVES

2.1 Introduction

Updating the McNary SMP is a complicated task. Significant changes have taken place in the region including increased human population, commercial, industrial, and residential development. Columbia and Snake River fish have been listed under the Endangered Species Act; Lake Wallula is now designated as Critical Habitat for the listed species. Other resource issues such as protection of water quality and cultural resources have gained visibility in the region in those years. Further complicating this task, circumstances have led the Corps to not act comprehensively in accordance with guidelines in the 1983 LMP when issuing shoreline permits.

2.2 Alternative Development and Evaluation

To identify and evaluate a reasonable and feasible range of alternatives, the Corps initially considered public and agency comments provided at the public scoping meeting held in Pasco, Washington, on September 18, 2006. After also considering comments received through meetings with local elected officials and interest groups, reviews of other SMPs, and input from technical staff, the Corps developed the first McNary Shoreline Management Plan EA, dated January 2009. That document was presented in a public meeting on January 14, 2009 and made available for a six month public comment period. In July 2009, upon completion of the comment period and in response to comments received, the Corps initiated reformulation of the SMP, and began work on the Revised EA and the updated SMP.

In May 2011, an updated SMP and Revised Programmatic Environmental Assessment were released for public review and a public meeting was held in Pasco on June 9, 2011. This meeting was attended by approximately 180 people and was followed by a 90 day comment period that ended on August 27, 2011. In response to comments received, the Corps again modified the SMP and made changes to the EA. In addition, several small focused meetings with current dock owners were conducted in September and October 2011.

In an effort to keep the analysis of potential alternatives as simple and straightforward as possible, the Corps used the following process to develop and evaluate the alternatives presented in this Revised EA.

The Corps:

- Initially identified the three "permit categories" in the 1983 LMP (Private Floating Facilities, Vegetation Modification, and Other Lakeshore Uses). The Corps changed "Private Floating Facilities" to "Boat Docks" since boat docks are the only type of private floating facility allowed on Lake Wallula under the new SMP. The Corps then added "Shoreline Re-Allocation" as an additional non-permit category for analysis.

- Developed a broad range of specific measures that could potentially address identified problems and the purpose and need. Measures need not completely solve all shoreline management-related problems identified by the Corps, but would have to reasonably contribute to resolving the problems.

- Developed technical and environmental screening criteria to use in determining the feasibility and effectiveness of the measures. (See Table 2-1)

- Screened all measures for potential inclusion in the SMP alternatives based on criteria noted above. (See Table 2-2)

- Developed a range of alternatives by assembling feasible and effective measures into groups that would meet the purpose and need and provide effective strategies for shoreline management.

- Evaluated the SMP alternatives to determine if implementation would meet the purpose and need, comprehensively address identified problems, and provide an effective means of shoreline management.

2.2.1 Categories

The first category is Shoreline Re-Allocation. Details of the current shoreline allocations are described in Section 1.6.1 of Chapter 1. It was determined that re-evaluation of the current shoreline allocations would be necessary to determine whether adequate resource protection is still being provided or whether changes are needed to more closely reflect the present condition to meet the Corps' main objective. Proposed changes to the shoreline allocations were developed based on shoreline depth criteria, the desire to minimize habitat fragmentation, and actual reservoir depths based on location survey data gathered in May 2010 (Rogers Surveying, Inc).

The remaining three categories are the three "permit categories":

- Boat Docks
- Vegetation Modification
- Other Shoreline Uses

2.2.2 Measures

Using input from the first scoping meeting in2006, comments received on the draft EA between January and June of 2009, comments received on the Revised EA in July and August 2011, input from current dock owners in meetings conducted in September and October 2011, interdisciplinary team workshops, as well as Federal and state agency and stakeholder coordination, the Corps developed a broad range of management measures that could potentially address identified shoreline management problems. Following is a list of these measures, classified under each of the four categories:

2.2.2.1 Measures for Shoreline Re-Allocation:

- No Change to Shoreline Allocations
- Re-allocate the shoreline and reduce Limited Development Areas
- Re-allocate the shoreline and expand Limited Development Area

2.2.2.2 Measures for Boat Docks:

- No Change: Permit New Docks, Renew Existing Dock Permits
- No New Dock Permits, No Permit Renewals
- No New Dock Permits, Renewals Allowed, No SMP Dock Criteria Required
- No New Dock Permits, Renewals Allowed, SMP Dock Criteria Required
- New Dock Permits and Renewals Allowed, No SMP Dock Criteria Required
- New Dock Permits and Renewals Allowed, SMP Dock Criteria Required

2.2.2.3 Measures for Vegetation Modification Permits:

- No Change: Allow New Permits, Renew Existing Permits
- No New Permits, No Renewals
- No New Permits, Renewals Allowed, No Mitigation required
- No New Permits, Renewals Allowed, Mitigation required
- New Permits Allowed, Renewals Allowed, No Mitigation required
- New Permits, Renewals Allowed, Mitigation required

2.2.2.4 Measures for Other Shoreline Uses:

- No Change to the SMP on how Other Shoreline Uses are Permitted
- Change the SMP to Allow Other Shoreline Uses with a Real Estate License only, No Mitigation Required
- Change the SMP to Allow Other Shoreline Uses with a Real Estate License only, Mitigation Required

2.2.3 Screening Criteria

Screening criteria help eliminate those alternatives or measures that could not reasonably or practically meet the project purpose and need. When setting up screening criteria, the Corps closely re-evaluated the purpose and need of the proposed action (identify a management strategy the Corps will use to manage the shoreline in a manner that will promote the safe and healthful use of these shorelines by the public while maintaining environmental safeguards to ensure a quality resource for use by the public). In this re-evaluation, it became evident that truly achieving a balance between permitted private uses and resource protection was key to successful implementation of the SMP.

The Corps is required by law to meet certain obligations under the Endangered Species Act while at the same time managing the shoreline in a way that best provides for limited use by private land owners. Therefore, with these objectives in mind, the Corps developed the following technical and environmental screening criteria:

Table 2-1: Screening Criteria

- Does the measure comply with environmental laws/regulations including the Endangered Species Act?
- Does the measure allow private use of the shoreline?
- Does the measure comply with shoreline management regulations?

2.2.4 Screening Process

Once the screening criteria were developed, the Corps compared all the measures against the screening criteria by placing them side-by-side in a table (Table 2-2). In each of the four categories, the measures meeting all three criteria were selected and carried forward for further alternative development. The remaining measures make up the group of alternatives considered but eliminated from further consideration.

The measures listed below (under each category) are the feasible and effective measures that meet the screening criteria and are being carried forward to formulate the SMP alternatives:

- Category 1: Shoreline Re-Allocation:
  - Re-allocate the shoreline and reduce Limited Development Areas

- Category 2: Boat Docks:
  - No New Permits, Renewals Allowed, SMP Dock Criteria Required
  - New Permits, Renewals Allowed, SMP Dock Criteria Required

- Category 3: Vegetation Modification:
  - No New Permits, Renewals Allowed, Mitigation Required
  - New Permits, Renewals Allowed, Mitigation Required

- Category 4: Other Shoreline Uses:
  - Allow OSUs with Real Estate License Only, Mitigation Required

Table 2-2: Screening Process

MEASURES	SCREENING CRITERIA		
	Comply w/ env laws/regs, including ESA?	**Allow private use of shoreline?**	**Comply with shoreline regs?**
SHORELINE RE-ALLOCATION MEASURES			
No Change		√	
Reduce Limited Development Area	√	√	√
Expand Limited Development Area		√	√
BOAT DOCK MEASURES			
No Change		√	
No New Permits, No Renewals	√		
No New Permits, Renewals Allowed, No SMP Dock Criteria Required		√	
No New Permits, Renewals Allowed, SMP Dock Criteria Required*	√	√	√
New Permits, Renewals Allowed, No SMP Dock Criteria Required		√	√
New Permits, Renewals Allowed, SMP Dock Criteria Required*	√	√	√
VEGETATION MODIFICATION MEASURES			
No Change		√	
No New Permits, No Renewals	√		
No New Permits, Renewals Allowed, No Mitigation Required		√	
No New Permits, Renewals Allowed, Mitigation Required	√	√	√
New Permits, Renewals Allowed, No Mitigation Required		√	√
New Permits, Renewals Allowed, Mitigation Required	√	√	√
OTHER SHORELINE USES (OSU) MEASURES			
No Change		√	
Allow OSUs with Real Estate License Only, No Mitigation Required		√	√
Allow OSUs with Real Estate License Only, Mitigation Required	√	√	√

*Existing docks, including special status docks, will be upgraded to meet the SMP dock criteria upon sale or transfer of the permittee's adjacent property or in stages during replacement of major dock components (e.g., decking, floats, walkway).

2.3 SMP Alternatives

The Corps then formulated a range of alternatives by assembling the measures identified above, into two (2) alternatives that would meet the purpose and need of the proposed action – one that achieves the best balance between private use and environmental protection and one that achieves the maximum environmental benefits. In accordance with NEPA, the Corps has included a No Action Alternative, defined here as no change to current practice. The preferred alternative had to be consistent with the stated purpose of managing the Lake Wallula shoreline for protecting natural resources while providing for private recreational use and compliance with the shoreline regulations. To this end, the Corps considered the following range of alternatives:

2.3.1 Alternative 1: No Action

The No Action Alternative is prescribed by the Council on Environmental Quality (CEQ) regulations to serve as the baseline against which the Preferred Alternative is analyzed. In this case, the No Action Alternative would be defined as the continuation of the activities described in the 1983 LMP. The Corps would not re-allocate the shoreline, nor change the procedure for issuing boat dock permits, vegetation modification permits and other shoreline use permits. This alternative would otherwise be rejected as not satisfying the agency's purpose and need, but will be carried forward as a baseline for comparisons with other alternatives.

The Corps would continue to issue dock permits for both individual and group docks until the maximum density of docks was reached, resulting in a total of approximately 611 docks on Lake Wallula. The total number would depend on the size of the docks, as spacing criteria currently dictates at least 75 feet between docks. Only one boat would be allowed for each private dock. Group docks, however, could accommodate more boats. Existing dock permits would be renewed every five years, as long as the dock remained in a safe condition. Under this alternative, the docks would not be required to meet fish habitat protection design criteria, effectively disregarding the needs of ESA-listed fish.

The Corps would continue to issue vegetation modification permits in the same way they have been issued under the 1983 LMP. Permits would be issued for such activities as minor cutting, light pruning, removal or seeding, clearing a meandering path to the water and limited mowing. Permits would be issued for up to five years. As long as the permittee abides by permit conditions, upon permit expiration, the Corps could renew the permit for up to five years. Under this alternative, the highly modified condition of riparian vegetation in Lake Wallula would continue to degrade, effectively disregarding the needs of ESA-listed fish.

The Corps would continue to permit actions determined to be "other shoreline uses" just as they were under the 1983 LMP.

2.3.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

Implementation of Alternative 2 would allow private use of Corps-managed federal lands and project waters while maintaining compliance with environmental laws. Under this alternative, the Corps would revise the 1983 LMP and re-allocate the shoreline (Table 1-2, maps in Appendix B), thus reducing the Limited Development Areas (LDAs). The Corps would continue to issue new permits for boat docks, however, new docks must be constructed to meet the SMP dock criteria and mitigation at a ratio of 5 to 1 would be required to be complete in one year. For existing docks (including special status docks), renewals would be allowed and dock owners may keep their existing docks until the adjacent property is transferred or sold. Existing docks may be allowed to remain per the conditions of the 2011 dock inspection if the dock is in a safe condition and has not been extensively modified without authorization. Upon sale or transfer, new dock owners will have four (4) in-water work windows to upgrade their docks to meet SMP dock criteria. In-water work windows are November 1 through February 28. Docks may need to use piling (but no more than four) to meet the SMP dock criteria.

The Corps would also continue to issue new permits and allow renewals for vegetation modification, but would require restoration of riparian habitat (mitigation, at a ratio of 2 to 1) to offset any impacts. The permittee would be required to submit a shoreline revegetation/restoration plan for approval prior to the permit being issued or renewed. The revegetation/restoration would need to be completed within one year of the permit issue or renewal date.

Other shoreline uses (stairways, steps, footbridges, hard-surface walkways, erosion control devices, and private irrigation systems, etc) would only be permitted after the applicant received a real estate license for the activity on Corps land. Restoration of riparian habitat would be required as mitigation for any ground disturbing activities and would be addressed on a case-by-case basis.

The Corps selected Alternative 2 as the Preferred Alternative. Implementation of this alternative would achieve the best balance between environmental and public/private use benefits while remaining in full compliance with the shoreline management regulations and other applicable federal laws.

2.3.3 Alternative 3: Maximum Environmental Benefits

Implementation of this alternative would provide maximum benefits to key environmental resources, specifically threatened and endangered species and their critical habitat. The Corps would revise the existing 1983 LMP to re-allocate the shoreline to further reduce the LDAs. No new permits would be issued for boat docks, however, renewals would be allowed once the dock was upgraded to meet SMP dock criteria. Once a property is sold, the dock would be removed and could not be replaced. In the case of an existing dock, dock permits are not transferable. Under this alternative, either the previous or current owner would have to remove the dock. There would initially be 73 private docks (the current number of docks) under this alternative, but this number would eventually decline to as low as about 21 (the special status docks) as property ownership changed.

No new vegetation modification permits would be issued, however, renewals would be allowed and mitigation at a ratio of 2 to 1 would be required.

Other shoreline uses would only be permitted after the applicant received a real estate license for the activity on Corps land. Restoration of riparian habitat would be required as mitigation for any ground disturbing activities and would be addressed on a case-by-case basis.

2.4 Alternatives Considered, but Eliminated from Further Evaluation

The Corps eliminated alternatives including any combination of the following measures as not satisfying the screening criteria or the proposed action's purpose and need:

- Shoreline Re-Allocation Measures:
  - Re-allocate the shoreline and expand Limited Development Areas

- Boat Dock Measures:
  - No New Permits, No Renewals
  - No New Permits, Renewals Allowed, No SMP Dock Criteria Required
  - New Permits, Renewals Allowed, No SMP Dock Criteria Required

- Vegetation Modification Measures:
  - No New Permits, No Renewals
  - No New Permits, Renewals Allowed, No Mitigation Required
  - New Permits, Renewals Allowed, No Mitigation Required

- Other Shoreline Uses (OSU) Measures:
  - Allow OSUs with Real Estate Instrument Only, No Mitigation Required

SECTION 3—AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This section describes the existing affected environment (existing condition of resources) and evaluates predicted environmental effects on those resources for each alternative.

3.2 Water Quality

3.2.1 Affected Environment

The Columbia River is a regulated river. It is controlled by a series of dams on both the main stem and its tributaries, including the Snake and Yakima rivers. Dam operations directly influence river flow within Lake Wallula.

The Clean Water Act, Section 303(d), provides a framework to identify streams that are water quality limited and, as a result, do not meet their designated beneficial uses (swimming, fishing, livestock use and irrigation, among others). If a water body does not meet water quality standards, the Washington State Department of Ecology (Ecology) must include them on the 303(d) list.

There are several listing categories within the 303(d) list. The relevant listing categories are found in Table 3-1. Within Lake Wallula, segments of the Columbia River are designated as category 5 for pH and temperature. Segments are designated as category 4A for total dissolved gas and dioxin. Segments of the Snake River within Lake Wallula are designated as category 5 for 4,4’-DDE (a break-down product of DDT), chlordane, dieldrin, temperature and total Polychlorinated Biphenyls (more commonly known as PCBs). Additional segments of the Snake River are designated as category 4A for dioxin and total dissolved gas. There is also a segment of the Snake River that is designated as category 4C for invasive exotic species.

Table 3-1. Categories within the 303(d) List

Category	Definition
5	Waters for which at least one characteristic or designated use is impaired
4A	Waters where the data show that a characteristic or designated use is impaired by a pollutant, but a TMDL addressing that impairment has already been developed and approved
4C	Waters where some characteristics or designated uses of a water body segment may be impaired due to aquatic habitat degradation that is not the result of a pollutant

All waters within the state are ranked as AA (extraordinary), A (excellent), B (good), C (fair) or lake class. Specific water quality criteria have been developed for each classification. The Columbia River, within the project area, has been given an A ranking. This means that, at a minimum, each water body shall meet or exceed the requirements for all or substantially all uses (WAC 173-201A).

Median turbidity values typically range from 2 to 3 Nephelometric Turbidity Units (NTUs) in the Columbia River between the confluence of the Snake and confluence with the Yakima River. Ecology water quality regulations state that projects shall not cause turbidity to exceed 5 NTU over background limits when the background turbidity is 50 NTU or less.

Dissolved oxygen data is available for the project area from a Corps monitoring station located between the Blue and Cable Bridges which span the Columbia River between Pasco and Kennewick. This monitoring station has recorded dissolved oxygen concentrations ranging from 8.5 mg/L to 12.1 mg/L. The water quality standard for dissolved oxygen is a minimum of 8.0 mg/L.

Water temperatures in Lake Wallula (as measured at Columbia River station CLR-326 located at river mile 326) are relatively cool in May and June during the peak flow and snowmelt period, averaging 13°C (55.4°F). Mid- to-late July temperatures usually warm up to 17°C (62.6°F). The highest temperatures generally occur in August and can exceed 20°C (68°F).

The median pH value in the Columbia River between the Yakima and Snake River confluences is 7.9 pH units. This is within the 6.5 to 8.5 pH unit range allowed per Ecology’s standards.

3.2.2 Environmental Consequences

3.2.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** This alternative would not reduce the LDAs of the shoreline. Therefore, there would be more shoreline available for boat dock construction, vegetation modification, and other shoreline uses. All of these activities would contribute to negative water quality effects, as described below.

- **Docks:** Alternative 1 could adversely affect water quality through several means. Hundreds of docks could be added to the shoreline. The higher the number of docks constructed; the higher the number of boats that would be temporarily moored on the reservoir. Watercraft using the docks could adversely affect water quality along the shoreline. Many watercraft leak small amounts of fuel and oil. Engines and hydraulic components also leak petroleum products into the bilge water, which is ultimately pumped into the reservoir. By allowing watercraft to be moored at docks along several miles of shoreline, the Corps would increase the occurrence of petroleum products contaminating water along the shoreline. Dock permittees may choose to refuel their watercraft at their private dock rather than on land or at a marina fueling station, thereby increasing the chance of a fuel spill in water. Permittees would not likely have the means to contain or clean up any fuel spill. Turbidity in the water as a result of propeller wash, and wave action against the shoreline caused by boats could also negatively affect water quality.

- **Vegetation Modification:** Certain actions allowed under vegetation modification permits (e.g., creation of a meandering path across Corps property to access the shoreline) could promote soil erosion, which would contribute to turbidity in the river. In the case of a path to the shoreline, the severity of this effect would depend on the steepness of the slope and the length of the path. However, the effects from each path are expected to be minor, since paths are supposed to follow natural contours to reduce the potential for erosion. If too many paths are permitted, the cumulative effect could have a noticeable impact on water quality.

- **Other Shoreline Uses:** Under the No Action Alternative, the Corps would continue to allow these activities just as they have under the 1983 an. At a minimum, these activities require a real estate license; therefore the Corps could minimize the number of other shoreline uses allowed.

  Because there are a wide variety of activities that are classified as other shoreline uses, the environmental effects to water quality of implementing these activities would also vary. An example of minimal impacts would be short-term suspended sediment in the water column due to ground disturbance above the shoreline, say from construction of a stairway or steps. This normally dissipates fairly quickly. A more serious impact to water quality would result from placement of fill material below the ordinary high water mark for an erosion control device.

  The level of impact to water quality could also vary from year to year depending on the types of activities requested.

3.2.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** Reallocating the shoreline and reducing the LDAs would have no direct negative effects on water quality in Lake Wallula. However, there would be beneficial indirect effects as there would be less area allocated for boat docks. There would be less petroleum products leaking into the water and less turbidity from propeller wash.

- **Docks:** Implementation of alternative 2 would have minimal negative effects on water quality. All existing docks would eventually be modified, while 27 more could be constructed. Constructing or removing docks could stir up fine sediment, increasing turbidity in the immediate area in some locations. This would be limited in both extent and duration. There could be minor, negative, short-term water quality effects during construction, but these effects would dissipate quickly.

- **Vegetation Modification:** The negative effects to water quality in the Vegetation Modification category by implementing alternative 2 are similar to those under the No Action Alternative. Because new permits would be issued and renewals allowed, there could be moderate soil erosion created from certain activities, which would contribute to turbidity in the river. However, these effects are expected to be short-term and minor. And since mitigation is required under this alternative, applicants would be required to restore riparian vegetation as set forth in the mitigation plan to offset any ground disturbing activities.

- **Other Shoreline Uses:** Construction of the activities classified as other shoreline uses such as stairways, steps, footbridges, hard-surface walkways, erosion control devices and private irrigation systems could cause minor, negative effects to water quality. Possible impacts include suspended sediment and turbidity from soil erosion upland and construction activities along the shoreline, and increased water temperature due to loss of riparian habitat. These activities would be allowed only with a real estate license; therefore the Corps could limit the activities on the shoreline in order to minimize impacts. In addition, mitigation would be required and applicants would be required to restore riparian vegetation. The location and type of mitigation required would be addressed on a case-by-case basis.

3.2.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** This alternative would reduce the LDAs along the shoreline. Because less area is allocated for development, there would be fewer negative effects to water quality.

- **Docks:** Alternative 3 would have the least amount of negative effects on water quality of all alternatives. Because no new permits would be issued for boat docks, the number of docks would decrease over time and there would be fewer boats moored along the shoreline. This would reduce the risk of a fuel spill or turbidity from propeller wash or other detrimental effects from boats to the water quality of the river.

- **Vegetation Modification:** Negative effects to water quality in this category under this alternative would also be quite minimal. There would be no new permits issued thus limiting the amount of erosion possible along the shoreline. Renewals would be allowed, therefore existing paths used to access the shoreline would still be used and a small amount of erosion could take place, contributing a small amount of turbidity to the river. However, under this alternative, mitigation would be required and applicants would be required to restore riparian habitat as set forth in the mitigation plan to help offset any ground disturbing activities.

- **Other Shoreline Uses:** For this alternative, negative effects to water quality for activities classified as other shoreline uses would be the same as alternative 2.

3.3 Soils

3.3.1 Affected Environment

The Pasco-Kennewick area is generally covered with several feet of fine sands and silts underlain by stratified and heterogeneous beds of gravels, sands and silts. Underlying these formations is an impervious formation of silts and clays know as the “Ringold Formation.” The top cover of silts and fine sands varies in thickness from a few inches to as much as 15 to 20 feet. The gravels have been river deposited and are extremely heterogeneous in character. These strata contain numerous pockets or lenses of clean gravel having a highly pervious and open structure. The open-structured lenses found in practically all open cuts and explorations in the area vary in thickness from a few inches to several feet. Drill holes indicate that the gravel stratum has an average thickness of approximately 30 feet. The underlying “Ringold Formation” has been found at a fairly uniform average depth of about 35 feet (approximately 305 feet, mean sea level).

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** This alternative would not reduce the LDAs of the shoreline. Therefore, there would be more shoreline available for boat dock construction, vegetation modification, and other shoreline uses. All of these activities would contribute to negative effects to soils, as described below.

- **Docks:** For boat docks, the No Action Alternative would have minor negative effects on soils. Dock construction could result in soil compaction if large concrete blocks continue to be placed on the shoreline to anchor the docks. There could also be some soil erosion from pathways created to access the docks or shoreline. The amount of impact to soils from this alternative would likely be small, but it could have the most impact of any alternative. Even if the maximum number of docks possible were constructed, soils would not be greatly affected.

- **Vegetation Modification:** In this category, this alternative would have minor negative effects to soils. Creation of access paths across Corps property could promote a minor amount of localized soil compaction or erosion.

- **Other Shoreline Uses:** The No Action alternative would likely have moderate negative impacts to soils, as other shoreline uses would be permitted as they were under the 1983 LMP, and there would be no mitigation requirements.

3.3.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** Under this alternative, the Corps would reallocate the shoreline and reduce the LDAs. Because less shoreline is available for development there would be fewer negative effects to soils.

- **Docks:** There would continue to be minor, negative effects to soils if alternative 2 is implemented. New SMP dock criteria-compliant docks could be constructed and existing docks would eventually be upgraded causing some minor increase in soil erosion during construction, but it will be minimal and short term. Minor, negative effects may also occur from erosion of pathways leading to the docks.

- **Vegetation Modification:** New permits and renewals would be allowed for vegetation modification, therefore, due to these activities along the shoreline, some minor soil erosion and disturbance is anticipated. However, under this alternative, applicants for vegetation modification permits are required to mitigate, therefore restoration of riparian habitat would help offset the minor negative effects caused by ground disturbing activities.

- **Other Shoreline Uses:** Minor, negative effects to soil are also anticipated in this category. Activities classified as other shoreline uses such as stairways, steps, footbridges, hard-surface walkways, erosion control devices, and private irrigation systems could potentially cause negative soil erosion and/or disturbance. However, these activities would be allowed only with a real estate license; therefore the Corps could limit the activities on the shoreline in order to minimize impacts. In addition, mitigation would be required and applicants would be required to restore riparian habitat.

3.3.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** This alternative would reduce the LDAs along the shoreline. Because less area is allocated for development, there would be fewer negative impacts to soils.

- **Docks:** For the boat dock category, this alternative would have the least negative effects to soils of all the alternatives. No new permits for boat docks would be allowed therefore there would be no new soil disturbance associated with dock construction or anchor blocks. There could still be minor, negative effects to soils from re-construction of existing docks and erosion of pathways leading to docks.

- **Vegetation Modification:** There would be no new permits issued for vegetation modification, only renewals of existing permits. Any soil disturbance associated with existing vegetation modification activities would continue and be unavoidable, however negative effects would be minor and applicants would be required to mitigate.

- **Other Shoreline Uses:** For this alternative, negative effects to soils for activities classified as other shoreline uses would be the same as alternative 2.

3.4 Vegetation

3.4.1 Affected Environment

Vegetation conditions along the shoreline vary from nonexistent along some areas of rip-rapped levee to areas of dense stands of trees and shrubs. Areas with no vegetation generally occur because the soil conditions have been modified, such as with rip-rap, but there are also many areas where vegetation has been manually trimmed or removed.

Local plant communities have established under normal pool fluctuations and periodic drought. Riparian and shallow-water habitats on the Columbia River have established under normal pool fluctuations of 3 to 5 feet. Riparian vegetation is relatively abundant along the river. This is a diverse area consisting of numerous islands, shallow-water and backwater areas, riparian forests and wetlands. In general, riparian trees associated with Lake Wallula shorelines include Russian olive, willows, black cottonwood and various non-native hardwoods. Riparian shrubs include willows and false indigo. Riparian herbs include a mixture of various forbs and grasses that occupy sand, silt and gravel bars.

The Lake Wallula shoreline is also characterized by abundant riparian habitat adjacent to shrub-steppe with sagebrush. This is interspersed with dry land and irrigated agricultural land. Shrub-steppe habitats are defined as areas that are dominated by shrubs with an absence of any trees. In the project area, sagebrush, rabbitbrush and bitterbrush dominate shrub-steppe habitats. Herbaceous plants and grasses grow among the clumps of shrubs. Common species include penstemon, mariposa lily, Indian paintbrush and various mustards. In much of the disturbed steppe community, invasive species like Russian thistle, cheatgrass, and star thistle have taken hold.

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** This alternative would not reduce the LDAs of the shoreline. Therefore, there would be more shoreline available for boat dock construction, vegetation modification, and other shoreline uses. All of these activities would contribute to negative impacts to vegetation, as described below.

- **Docks:** For boat docks, the No Action Alternative would have a negative effect on riparian vegetation due to increased recreational activity along the shoreline. Up to 611 new docks could be permitted under this alternative. As with the existing condition, riparian vegetation would likely be removed or suppressed near many of the docks. Additional access paths would also be constructed. It is likely that some riparian vegetation would be removed or suppressed along these paths.

- **Vegetation Modification:** Additional vegetation modification permits could be issued in previously undisturbed limited development areas as adjacent lands are developed in the future. Under this alternative, existing upland vegetation could be mowed or converted to lawn.

- **Other Shoreline Uses:** The No Action alternative would likely have minor negative effects to vegetation, as other shoreline uses would be permitted as they were under the 1983 LMP, and there would be no mitigation requirements. Possible negative effects to vegetation include trampling and destruction or removal of volunteer shrubs, trees, and native vegetation, which can allow the establishment of invasive weed species and construction vehicles or heavy equipment on-site disturbing ground.

3.4.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** Under this alternative, the Corps would reallocate the shoreline and reduce the LDAs. Because less shoreline is available for development, overall there would be fewer negative effects to vegetation.

- **Docks:** Since construction of new docks would be allowed, and eventual upgrading of existing docks would be required under this alternative, minor, negative effects to vegetation would still occur. Riparian vegetation would likely be removed or suppressed near many of the dock locations. Additional access paths would also be constructed. It is likely that some riparian vegetation would be removed or suppressed along these paths.

- **Vegetation Modification:** In this category, this alternative allows new vegetation modification permits and renewals and also requires mitigation, therefore any minor, negative effects to vegetation that do occur, such as removal or suppression, would be offset by the restoration of riparian habitat.

- **Other Shoreline Uses:** Minor, negative effects to vegetation are also anticipated in the other shoreline uses category. Possible negative effects to vegetation include trampling and destruction or removal of volunteer shrubs, trees, and native vegetation, which can allow the establishment of invasive weed species and construction vehicles or heavy equipment on-site disturbing ground. However, because these activities would be allowed only with a real estate license; the Corps could limit activities on the shoreline in order to minimize impacts. In addition, mitigation would be required and applicants would be required to restore riparian habitat.

3.4.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** This alternative would reduce the LDAs along the shoreline. Because less area is allocated for development, there would be fewer negative impacts to vegetation.

- **Docks:** This alternative prohibits new permits for boat docks but does allow renewals once the dock is upgraded to SMP dock criteria. Negligible, negative effects to vegetation (destruction/removal, or suppression) could still occur due to the construction activities of upgrading existing docks.

- **Vegetation Modification:** Only renewals (no new permits) for vegetation modification would be allowed under this alternative. There would be minor continuing negative effects to vegetation due to maintenance of existing lawn areas and shoreline access trails.

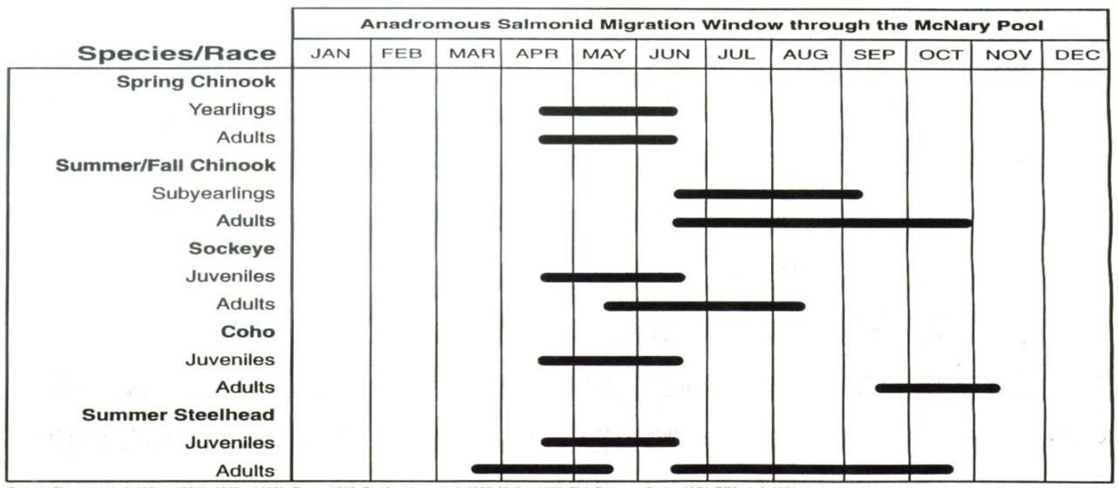
- **Other Shoreline Uses:** For this alternative, negative effects to vegetation for activities classified as other shoreline uses would be the same as alternative 2.

3.5 Aquatic Resources

3.5.1 Affected Environment

Fish species in Lake Wallula include a mixture of native riverine and introduced species that are typically associated with lake-like conditions (Hjort et al. 1981; Mullan et al. 1986). Cold water resident species (such as trout and whitefish) that were once common in the Columbia River have declined since the construction of the dams and have been replaced by cool and warm water species (such as carp, bass and walleye). Pacific lamprey runs in the Columbia River basin historically numbered in the hundreds of thousands at Bonneville Dam as recently as 1965, but their distribution and abundance has been reduced by construction of dams and diversions as well as degradation of spawning and rearing habitat (Thompson et al. 2010). Species composition has changed due to the blockage of spawning migrations and modification of habitats (Mullan et al. 1986). The prey base has also changed since the construction of the dams, shifting from dominance of emerging aquatic insects and snails while increasing the availability of crayfish and zooplankton. This shift in prey organisms might also have contributed to the decline of cold-water species (Sherwood et al. 1990). Resident fish in the reservoirs occupy numerous habitats and often use separate habitats for different life history stages (Hjort et al. 1981). Salmonids that occur in Lake Wallula include: steelhead and resident rainbow trout, bull trout, Chinook salmon, sockeye salmon, hatchery-origin coho salmon and whitefish. Figure 3-1 shows the months of the year in which the various salmonid species migrate through McNary reservoir. Some of the fish species present in Lake Wallula are listed under the Endangered Species Act. All of the listed species are discussed later in the Threatened and Endangered Species section.

Figure 3-1 – Anadromous Salmonid Migration through McNary Reservoir



Source: Chapman et al. 1994a, 1994b, 1995a, 1995b, Peven 1992; Stuehrenberg et al. 1995; Mullan 1987; Fish Passage Center 1994, BPA et al. 1994.

3.5.2 Environmental Consequences

3.5.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** This alternative would not reduce the LDAs of the shoreline. Therefore, there would be more shoreline available for boat dock construction, vegetation modification, and other shoreline uses. All of these activities would contribute to negative effects to aquatic resources as described below:

- **Docks:** Because the No Action Alternative permits unlimited dock construction along the shoreline, there could be numerous detrimental effects to juvenile salmonids and other aquatic resources in the vicinity. Turbidity resulting from construction activities and propeller wash can irritate the gills of fish. Docks and their support structures would continue to provide habitat to predatory fish species thus creating negative effects for juvenile salmonids and lamprey. Dock development would reduce the amount of riparian vegetation which is beneficial to aquatic resources, and further fragment near-shore habitat for salmonids. This alternative would benefit fish species such as largemouth bass and smallmouth bass from the increased cover. Most other types of aquatic resources would not be affected. Negative effects to all aquatic resources would increase as the level of recreation along the shoreline increased.

- **Vegetation Modification:** This alternative would have moderate negative effects on aquatic resources. Riparian vegetation is important to many aquatic resources. Changes along the shoreline such as removal of vegetation or construction of trails can impact water quality, in turn affecting aquatic resources in the river.

- **Other Shoreline Uses:** Under the No Action Alternative, the Corps would continue to allow these activities just as they have under the 1983 LMP. At a minimum, these activities require a real estate license; therefore the Corps could minimize the number of other shoreline uses allowed, thereby minimizing negative, environmental effects.

  However, because there are a wide variety of activities that are classified as other shoreline uses, the environmental effects to aquatic resources of implementing these activities would also vary. Examples of potential negative impacts include: suspended sediment in the water column due to ground disturbance above the shoreline, chemical contaminants, destruction/loss or removal of riparian habitat, placement of fill material below ordinary high water, noise and human disturbance, storm water runoff, etc.

  The level of impact to aquatic resources could also vary from year to year depending on the types of activities requested.

3.5.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** Under this alternative, the Corps would reallocate the shoreline and reduce the LDAs. Because less shoreline is available for development there would be fewer negative effects to aquatic resources.

- **Docks:** In this category, this alternative would have fewer negative effects on juvenile salmonids than the No Action Alternative. This alternative allows for construction of a limited number of new docks as long as they meet the SMP dock criteria. Renewals of existing docks are also allowed under this alternative; however these docks must be upgraded to also meet the SMP dock criteria when the adjacent property is transferred or sold. Existing dock owners may keep their existing docks until the adjacent property is transferred or sold. After the effective date of the SMP, existing dock owners will be issued renewals to their expired permits. Existing docks may be allowed to remain per the conditions of the 2011 dock inspection if the dock is in a safe condition and has not been extensively modified with authorization. Existing dock configurations would allow the continuation of current conditions at those locations and along the shoreline until the docks are upgraded. This alternative has the potential to negatively affect resident fish such as bass because SMP dock criteria-compliant docks and fewer docks on the reservoir provide less cover and hiding places for them. Pacific lamprey ammocoetes could be negatively affected due to the use of piles in possible nesting sites. However, new docks would require mitigation in the form of riparian planting at a ratio of 5 to 1, based on the square footage of each new dock.

- **Vegetation Modification:** There could be minor negative effects to aquatic resources in this category. Because new permits and renewals are allowed, this alternative would allow the most loss of and disturbance to riparian vegetation which in turn could be detrimental to aquatic resources. However, riparian losses would be mitigated at a 2 to 1 ratio, based on the square footage of the disturbance.

- **Other Shoreline Uses:** Other shoreline uses would still be allowed under this alternative, albeit in a smaller LDA. Most of the activities in this category require a real estate license at a minimum; therefore the Corps could minimize the number of other shoreline uses allowed, thereby minimizing negative, environmental effects. In addition, this alternative requires mitigation to help offset negative environmental effects that may occur due to implementation of the activity.

  Because there are a wide variety of activities that are classified as other shoreline uses, the environmental effects to aquatic resources of implementing these activities would also vary. Examples of potential negative impacts include: suspended sediment in the water column due to ground disturbance above the shoreline, chemical contaminants, destruction/loss or removal of riparian habitat, placement of fill material below ordinary high water, noise and human disturbance, and storm water runoff, etc.

  The level of impact to aquatic resources could also vary from year to year depending on the types of activities requested.

3.5.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** This alternative would reduce the LDAs along the shoreline. Because less area is allocated for development, there would be fewer negative effects to aquatic resources.

- **Docks:** Alternative 3 would have the highest benefit to juvenile salmonids among all of the alternatives because it would lead to the lowest number of docks. Resident fish such as bass could be negatively affected due to the lost cover habitat. Removal of existing docks would be conducted in a manner that minimizes effects to aquatic resources. Pacific lamprey ammocoetes could be negatively affected due to the use of piles in possible nesting sites. However, new docks would require mitigation in the form of riparian planting at a ratio of 5 to 1, based on the square footage of each new dock.

- **Vegetation Modification:** Although no new permits would be allowed under alternative 3, existing vegetation modification permits could be renewed; therefore minor negative impacts from riparian losses are expected. However, riparian losses would be mitigated at a 2 to 1 ratio, based on the square footage of the disturbance.

- **Other Shoreline Uses:** For this alternative, negative effects to aquatic resources for activities classified as other shoreline uses would be the same as alternative 2.

3.6 Wildlife

3.6.1 Affected Environment

Wildlife resources in the Lake Wallula area include upland birds, songbirds, waterfowl, shorebirds, raptors, aquatic and terrestrial furbearers, small mammals, large mammals, reptiles and amphibians. The existing vegetative cover types that wildlife utilize in the area include: shrub-steppe-upland grassland, irrigated and non-irrigated agriculture, riparian grass-forb, riparian shrub-tree and emergent wetlands. Of particular importance in the project area are the riparian habitats and wetlands that are undeveloped or relatively undisturbed.

Alteration and destruction of wildlife habitat has occurred within the project area. Losses of riparian habitat in the Tri-Cities area have been caused by commercial, industrial and residential development adjacent to the Columbia River and the flood control levees that have been built to protect those developments. Levee building has altered the physical appearance and ecological function of the project area. The overall quality of wildlife habitat on or near most levee sections is generally very low due to the site disturbance and lack of vegetation. Overstory trees, tall shrubs and other vegetation are sparse and primarily consist of weedy species having limited value to wildlife (e.g. cheatgrass). These vegetative conditions have been facilitated by the Corps levee maintenance practice of vegetation removal and by the type of substrate material on the levees which is poor for growing native plants. Under existing conditions the levees are generally not suited for growing riparian vegetation or other desirable plant species.

In or near the project area, the representative wildlife species that use the shrub-steppe/upland grassland cover type include sage thrashers, black-tailed jackrabbits, mule deer, badgers and coyotes. In grassland areas grasshopper sparrows, long-billed curlews and burrowing owls can be found. Where the shrub-steppe/upland grassland is near or adjacent to croplands, ring-necked pheasants are common. Waterfowl will nest in shrub-steppe/upland grasslands where it is adjacent to suitable brood rearing habitat. Game bird species include ring-necked pheasants, Canada geese and a variety of ducks.

Waterfowl, shorebirds and mammals such as beaver and muskrats typically inhabit the emergent wetlands in the project area. Songbirds, such as red-winged blackbirds and song sparrows, and reptiles and amphibians such as western painted turtles and tiger salamanders, may also be found in the wetlands.

Wildlife species that may use the riparian areas include waterfowl such as mallards and teal; mammals include striped skunks, harvest mice, meadow voles and raccoon; and birds include common snipes, killdeer and harriers. Song sparrows, great blue herons, juncos, red-tailed hawks and raccoons are typical species of the riparian shrub-tree cover type. Ring-necked pheasants occur in both riparian types. Species utilizing the grass-forb covertype are muskrats, beaver, geese and coyotes.

3.6.2 Environmental Consequences

3.6.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** This alternative would not reduce the LDAs of the shoreline. Therefore, there would be more shoreline available for boat dock construction, vegetation modification, and other shoreline uses. All of these activities would contribute to negative impacts to wildlife, as described below.

- **Docks:** For boat docks, the No Action alternative would have negative impacts on wildlife due to increased human activity along the shoreline, especially when additional docks are constructed. Wildlife would be negatively affected through direct disturbance and habitat alteration.

- **Vegetation Modification:** This alternative would have the greatest negative effects to wildlife for vegetation modification. Wildlife would be negatively affected through habitat alterations and an increased human presence along the shoreline.

- **Other Shoreline Uses:** This alternative would have minor negative effects to wildlife for this category. Because the No Action Alternative would not change the way the Corps permits other shoreline uses, they would only be allowed with a real estate license. Therefore the Corps could minimize these activities and thereby reduce negative environmental effects to wildlife.

Examples of these potential negative impacts include: chemical contaminants on the ground from heavy machinery and equipment, destruction/loss or removal of riparian habitat, noise and human disturbance, etc.

However, the No Action Alternative does not require any mitigation measures in exchange for construction of activities that qualify as other shoreline uses.

3.6.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** Under this alternative, the Corps would reallocate the shoreline and reduce the LDAs. Because less shoreline is available for development there would be fewer negative effects to wildlife.

- **Docks:** This alternative has the potential to cause minor, negative effects to wildlife along the shoreline in this category. Since construction of new docks would be allowed and upgrading of existing docks (within four (4) in water work windows) would be required when the adjacent property is transferred or sold, this would lead to increased human presence along the shoreline, the noise from heavy machinery, and ground disturbing activities; all of which could negatively affect wildlife in the vicinity. However, these impacts are considered to be minor and short term in nature. In addition, construction of new docks requires mitigation in the form of riparian planting at a ratio of 5 to 1 based on the square footage of the dock.

- **Vegetation Modification:** Although this alternative allows new vegetation modification permits and renewals, which could potentially have minor negative impacts to wildlife, (destruction/loss or removal of native vegetation, human presence, noise, and ground disturbance) applicants would be required to mitigate for any riparian losses.

- **Other Shoreline Uses:** Minor, negative effects to wildlife are also anticipated in the other shoreline uses category. Negative effects include such things as ground disturbance, destruction/loss or removal of native vegetation, construction activities and human presence, and noise.

- These activities would be allowed only with a real estate license; therefore the Corps could limit the activities on the shoreline in order to minimize negative impacts. In addition, mitigation would be required and applicants would be required to restore riparian habitat further off-setting negative environmental effects to wildlife.

3.6.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** This alternative would reduce the LDAs along the shoreline. Because less area is allocated for development, there would be fewer negative effects to wildlife.

- **Docks:** This alternative would have insignificant negative effects to wildlife in the docks category. No new docks would be constructed along the shoreline. Renewals would be allowed as long as the dock was upgraded to meet SMP dock criteria. Construction noise and disturbance could be present at times during this up-grading process, however wildlife would disperse and temporarily avoid the area.

- **Vegetation Modification:** This alternative prohibits new permits but allows renewals. Minor, negative effects (destruction/loss or removal of native vegetation) to wildlife could occur in areas where vegetation modification is permitted. However, because applicants for a renewal would be required to implement mitigation, most adverse impacts to wildlife would be alleviated.

- **Other Shoreline Uses:** For this alternative, negative effects to wildlife for activities classified as other shoreline uses would be the same as alternative 2.

3.7 Threatened and Endangered Species

3.7.1 Affected Environment

3.7.1.1 Anadromous Fish

Lake Wallula provides habitat for several anadromous salmon and steelhead populations listed as threatened or endangered under the Endangered Species Act (ESA). The following ESA-listed species migrate through the reservoir:

- Upper Columbia River Spring Chinook salmon (*O. tshawytscha*) (Endangered).

- Upper Columbia River steelhead (*O. mykiss*) (Endangered)

- Middle Columbia River steelhead (*O. mykiss*) (Threatened)

- Snake River spring/summer Chinook salmon (*O. tshawytscha*) (Threatened)

- Snake River fall Chinook salmon (*O. tshawytscha*) (Threatened)

- Snake River sockeye salmon (*O. nerka*) (Endangered)

- Snake River Basin steelhead (*O. mykiss*) (Threatened)

- **Spring Chinook Salmon.** Upper Columbia River Spring-run Chinook salmon were listed as endangered on March 24, 1999 and reaffirmed on June 28, 2005. This stock includes all natural-origin, stream-type Chinook salmon from river reaches above Rock Island Dam and downstream of Chief Joseph Dam, including the Wenatchee, Entiat and Methow River basins. Snake River spring/summer Chinook salmon were listed as threatened on April 22, 1992. Their threatened status was reaffirmed on June 28, 2005. This stock includes all naturally spawned populations of spring/summer-run Chinook salmon in the mainstem Snake River and the Tucannon River, Grand Ronde River, Imnaha River and Salmon River subbasins, as well as 15 artificial propagation programs.

  Adult spring Chinook salmon migrating to areas above Bonneville Dam enter the Columbia River beginning in March and reach peak abundance in the lower river in April and mid-May (Chapman et al. 1995a). Adult spring Chinook salmon pass Priest Rapids Dam from mid-April to mid-June, with 90 percent passing in May (Stuehrenberg et al. 1995; Chapman et al. 1995a). Adult spring Chinook pass Ice Harbor Dam during the same approximate timeframe. Adult passage timing in Lake Wallula would be slightly earlier, but similar to that at Priest Rapids and Ice Harbor dams. Spawning begins in late July and continues through September, usually peaking in mid- to late August, although peak spawning time varies among tributaries (Chapman et al. 1995a; Peven 1992). The primary spawning streams used by spring Chinook salmon are the Wenatchee River system, Entiat River and Methow River system (Chapman 1995a). No spring Chinook salmon spawning has been documented in Lake Wallula.

  Juvenile spring Chinook salmon passing through Lake Wallula originate from natural spawning areas in upstream tributaries and hatchery releases. Releases of spring Chinook salmon from upstream hatcheries (e.g., Winthrop, Entiat and Leavenworth National Fish Hatcheries) occur each year in late April. Both naturally- and hatchery-produced spring Chinook salmon juveniles pass Priest Rapids Dam from mid-April through mid-June, with 90 percent passage occurring in May (Mullan 1987). Juvenile passage timing in Lake Wallula would be slightly later, but similar to that at Priest Rapids Dam. Reservoir residence time of juvenile spring Chinook salmon is relatively short, indicating that juveniles are migrating actively and not using the reservoir for rearing (Giorgi and Stevenson 1994). Based on 1980-2004 returns, the average annual growth rate for this population was estimated to be 0.93 (meaning the population is not replacing itself) (Fisher and Hinrichsen 2006).

- **Summer and Fall Chinook Salmon.** Snake River spring/summer and fall Chinook salmon were listed as threatened on April 22, 1992. Their threatened status was reaffirmed on June 28, 2005. The spring/summer-run includes all naturally spawned populations of spring/summer-run Chinook salmon in the mainstem Snake River and the Tucannon River, Grand Ronde River, Imnaha River and Salmon River subbasins, as well as 15 artificial propagation programs. The fall-run includes all naturally spawned populations of fall Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and the Tucannon River, Grande Ronde River, Imnaha River, Salmon River and Clearwater River, as well as four artificial propagation programs.

Summer and fall Chinook salmon are treated as indistinguishable stocks in the mid-Columbia River because their life history characteristic of juveniles migrating as subyearlings is similar (Chapman et al. 1994a). However, adult migration is treated separately due to temporal and spatial separation in adult migration and spawning area between the two races/intrabreeding populations.

Adult summer Chinook salmon migrating to areas above Bonneville Dam enter the Columbia River beginning in late May to early June and pass through the mid-Columbia River reach from mid-June through October (Chapman et al. 1994a; Peven 1992). Ninety percent of adult summer Chinook pass Priest Rapids Dam from late June through late August (Stuehrenberg et al. 1995). Spawning occurs during late September through November, with peak spawning occurring in October (Peven 1992). The primary spawning streams used by summer Chinook salmon are the Hanford Reach of the Columbia River, Wenatchee River, Entiat River, Methow River, Okanogan River, Similkameen River and the lower reach of the Chelan River (Chapman et al. 1994a).

Ninety percent of adult fall Chinook pass through Lake Wallula to Priest Rapids Dam from mid-August through mid-October (Stuehrenberg et al. 1995; Chapman et al. 1994a). Timing past Ice Harbor is similar. Spawning occurs during early October through November, with peak spawning occurring in early November (Carlson and Dell 1992). The primary spawning area used by fall Chinook salmon is below Priest Rapids Dam at Vernita Bar and continues downstream through the Hanford Reach upstream of the influence of Lake Wallula (Carlson and Dell 1992). Some limited fall Chinook spawning also occurs below mid-Columbia River projects (Giorgi 1992), in Lower Crab and Sand Hollow Creeks (Carlson and Dell 1992) and in the Yakima River. The timing of the return and upriver spawning migration of Snake River fall Chinook overlaps the Hanford Reach Chinook returns.

Juvenile summer/fall Chinook salmon passing the project area originated from natural spawning in upstream tributaries and hatchery releases. Naturally produced juvenile summer/fall Chinook salmon are displaced downstream by flows as fry soon after emergence in April and May (Chapman et al. 1994a). Most natural and hatchery-produced juveniles migrate to the ocean as subyearlings (age 0+) (Chapman et al. 1994a). Releases of summer/fall Chinook smolts from upstream hatcheries (e.g., Priest Rapids, Wells and Chelan PUD hatcheries) occur each year in late June. Both naturally and hatchery-produced summer/fall Chinook juveniles migrate past Priest Rapids

Dam from mid-June through August (Chapman et al. 1994a). Juvenile passage timing in the project vicinity would be later than that observed at Priest Rapids Dam. Reservoir residence time of juvenile summer/fall Chinook is much longer than spring Chinook. Summer/fall Chinook juveniles may spend up to several weeks in reservoirs prior to migrating to the ocean (Chapman et al. 1994a). Summer/fall Chinook juvenile migration is characterized as a "rearing" migration instead of the "active" migration typical of spring Chinook juveniles. Migration conditions for subyearling Chinook from the Snake River have generally improved since the early 1990s (NMFS 2000a).

Studies have identified preferred habitat and diet of subyearling Chinook salmon in the Columbia and Snake Rivers. Data appear to indicate that depth and velocity are key factors in subyearling Chinook preferred habitat. Shallow water near shore may be important by providing an environment with warmer water temperatures and lower risk of predation from large piscivorous (fish eating) fish. Bennett et al. (1993) found that subyearling Chinook salmon were caught most frequently in Lower Granite reservoir at lower gradient sites. Key et al. (1994) found that there might be a minimum slope that subyearlings will inhabit in Lake Wallula. Extremely shallow water may place juveniles at higher risk of avian predation by reducing ability to escape to deeper water. Areas with very low slopes also dewater rapidly due to reservoir fluctuations, which may result in higher incidence of juvenile fish stranding. Most of the subyearling Chinook caught in Lake Wallula were caught at depths between 1.6 feet (0.5 meter) and 6.5 feet (1.9 meters) and at velocities between 0.00 feet per second (fps) and 0.66 fps (Key et al. 1994).

Availability of productive populations of macroinvertebrate prey species on rearing shoreline habitat is critical for juvenile fall Chinook salmon to ensure adequate growth and energy for their outmigration to the ocean. There is generally a low diversity of prey species in the reservoirs, where prey species are composed of only a few dominant macroinvertebrate species, such as oligochaete worms and chironomid midges. These species replaced the historically higher diversity of a mix of hard and soft substrate associated macroinvertebrate species. Key et al. (1994) proposed that subyearling Chinook salmon are generalistic feeders preying on food items in the water column. Rondorf et al. (1990) supported this proposed feeding strategy of subyearling Chinook. The diet of subyearling Chinook in Lake Wallula was found to be predominately *Daphnia* species and terrestrial insects (Rondorf et al. 1990). In the Hanford Reach, subyearling Chinook diet was found to be predominately caddisflies (Trichoptera). The shift in preferred food items to *Daphnia* species and terrestrial insects from caddisflies was primarily due to the higher availability of these food items. The shift to abundant reservoir food items enabled subyearling Chinook salmon to use the reservoirs as nursery areas (Rondorf et al. 1990).

- **Snake River Sockeye**. Snake River sockeye salmon were listed as endangered on November 20, 1991 and their endangered status was reaffirmed on June 28, 2005. This stock includes all anadromous and residual sockeye from the Snake River Basin, Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake captive propagation program.

  Snake River sockeye salmon occur in Lake Wallula below the Snake River. The much more abundant (and unlisted) Wenatchee River and Okanogan River stocks can also be found in Lake Wallula. The lower Snake River and Columbia River corridors are designated as critical habitat for migration passage of wild Snake River sockeye salmon. Critical habitat for rearing or overwintering for Snake River sockeye salmon is not present in the lower Snake River corridor. The components for designated critical habitat for juvenile and adult migration passage are present between mid-March and mid-June. No spawning habitat for sockeye salmon is present in the project area. Wild Snake River juvenile sockeye salmon generally migrate downriver during April and May, and wild adult sockeye salmon are not typically counted at Ice Harbor Dam before June or after October. During sampling in May and June 2002, Bennett (2004) found 21 and 14 juvenile sockeye salmon rearing along shallow-water shorelines in Lower Granite and Little Goose reservoirs, respectively.

- **Steelhead.** Middle Columbia River steelhead were listed as threatened on March 25, 1999. Their threatened status was reaffirmed on June 28, 2005. This population includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington and the Hood River, Oregon, upstream to, and including the Yakima River. Snake River steelhead are listed separately. Seven artificial propagation programs are included in this population. Snake River steelhead were listed as threatened in August 18, 1997. Their threatened status was reaffirmed on June 28, 2005. This population includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon and Idaho, as well as six artificial propagation programs. Upper Columbia River steelhead were listed as endangered on August 18, 1997. Their status was upgraded to threatened on January 5, 2006, then reinstated to endangered by a court decision in June 2007. This population includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border, as well as six artificial propagation programs.

  Adult summer steelhead enter the Columbia River during March through October, with peak migration occurring from late June through early September (CBFWA 1990). Most adults pass through the mid-Columbia reach from June through October although some adults arrive much later, from late March through early May, due to overwintering in the reservoirs

(Peven 1992; Chapman et al. 1994a). The Wenatchee, Entiat, Methow, Okanogan, Yakima and Walla Walla rivers support naturally spawning steelhead populations (Peven 1992).

Juvenile steelhead rear in freshwater primarily for two years, but freshwater residence time can range from one to seven years (CBFWA 1990; Peven 1992). Releases of steelhead smolts from upstream hatcheries (e.g., Chelan Falls, Wells and Eastbank Hatcheries and Leavenworth National Fish Hatchery) occur each year in late April. Both naturally and hatchery-produced steelhead juveniles pass Rock Island Dam from mid-April through late June, with 90 percent of the passage occurring in May (Chapman et al. 1994b). Juvenile passage timing in the project vicinity would be later than that observed at Rock Island Dam. Reservoir residence time of juvenile steelhead is relatively short, indicating that juveniles are migrating actively and not using the reservoir for rearing (Giorgi and Stevenson 1994).

3.7.1.2 Non-Anadromous Fish and Terrestrial Species

- **Bull trout**. Bull trout were listed as threatened in 1998. Bull trout belong to the Salmonidae family and are native to the Pacific Northwest and western Canada. Bull trout have more specific habitat requirements compared to other salmonids. Watersheds must have specific physical characteristics to provide habitat requirements for bull trout to successfully spawn and rear. Bull trout are found primarily in colder, headwater streams, although individual fish are found in larger river systems throughout the Columbia River Basin. Water temperature above 15°C (59°F) is believed to limit bull trout distribution, though they can live in warmer water for short periods.

  Bull trout typically spawn from August to September during periods of decreasing water temperatures. Temperature during spawning generally ranges from 4 to 10° C (39 to 50°F) with redds often constructed in stream reaches fed by springs or near other sources of cold groundwater. The mid Columbia River area includes watersheds of four major tributaries including the Yakima River. There are eight distinct subpopulations of bull trout in the Yakima drainage. The healthiest populations occur in Rimrock Lake. The remaining subpopulations are relatively low in abundance (Federal Register, 1998). Although some strongholds still exist, bull trout generally occur as isolated subpopulations in headwater lakes or tributaries where migratory fish have been lost.

  Bull trout in the mainstem Columbia River are usually associated with tributaries, particularly in the upper reaches, containing resident populations, such as the Wenatchee, Methow and Entiat Rivers. Some bull trout may also be associated with the Walla Walla River or Snake River. Brown (1992) describes eight resident fluvial and adfluvial populations of bull trout, but no anadromous populations in the mid-Columbia region. The species was likely never abundant in the mainstem Columbia and of the populations in Washington State only those as far south as the Chehalis River are considered anadromous (Mongillo 1993). A few bull trout adults have been observed in Wells Dam reservoir (Dell et al. 1975) and below Rocky Reach Dam as part of the incidental catch during northern pikeminnow removal angling (Welsh et al. 1994).

Anglin et al. (2010) estimated a total of 192 bull trout emigrated from the Walla Walla Basin to the Columbia River from November 2007 through December 2009. They estimated that 36 PIT tagged bull trout entered the Columbia from the Walla Walla in 2009. However, over the duration of their 2009 study, only one bull trout was detected, in June, returning to the Walla Walla River from the Columbia River. Four Walla Walla Basin bull trout were detected at mainstem Columbia River dams over the duration of the study. Detections at the juvenile facilities at John Day and McNary dams indicated two of these bull trout were moving downstream. Detections in the adult ladders at McNary and Priest Rapids dams indicated two of these bull trout were moving upstream (Anglin et al. 2010).

Faler et al. (2008) report that bull trout in the Tucannon River (tributary to the Snake River), upstream of Lower Monumental Dam, migrated upstream in spring and early summer to the spawning areas in upper portions of the Tucannon River watershed. The fish in their study quickly moved off the spawning areas in the fall, and either held or continued a slower migration downstream until March or April. By the June 1, most bull trout had ascended the Tucannon River. During late fall and winter, bull trout were distributed in the lower half of the Tucannon River basin, down to and including the mainstem Snake River below Little Goose Dam.

They observed bull trout migrations into the Lower Monumental reservoir area influenced by the lower Tucannon River and/or the Snake River for 6 individuals. Two of the fish never returned to the Tucannon River. One individual made multiple movements to and from the reservoir near the mouth of the Tucannon, but it spent much of the winter within the reservoir influence area of the Tucannon River (Faler 2008).

Two Tucannon PIT tags have also been interrogated outside of the reservoir. One by NMFS personnel conducting Avian Predation Study efforts on a Columbia River island in 2002, and the other in the Catherine Creek (tributary to the Grande Ronde River) acclimation pond in 2003 (Faler 2008).

- **Ute Ladies'-Tresses.** Ute ladies'-tresses was listed as threatened in 1992. Critical habitat for Ute ladies'-tresses has not been designated. Ute ladies'-tresses is a perennial orchid with stems that are eight to 20 inches tall arising from thick roots. Its narrow leaves are about 11 inches long at the base of the stem and decrease in size going up the stem. The flowers consist of three to

15 small, white or ivory colored flowers clustered into a spike arrangement at the top of the stem. Ute ladies'- tresses is endemic to moist soils in mesic or wet meadows near springs, lakes or perennial streams. It primarily occurs in open areas where the surrounding vegetation is not overgrown. It typically blooms from late July through September. It appears to have a very low reproductive rate under natural conditions. Many orchid species take five to ten years to reach maturity. This may be true for Ute ladies'-tresses. Further, mature plants may not flower every year. This plant is not known to occur around Lake Wallula.

- **Pygmy Rabbit.** Pygmy rabbits were listed under the Endangered Species Act as endangered in 2003 after originally being listed under an emergency action in 2001. Critical habitat for the Columbia Basin pygmy rabbit has not been designated. The pygmy rabbit is a member of the family Leporidae, which includes hares and rabbits. They are a small rabbit, usually weighing less than a pound. The pygmy rabbit is distinguishable from other rabbits by its small size, short ears, gray color, small hind legs and lack of white on the tail. The pygmy rabbit's historic range may have included northern Benton County, Washington, but they are no longer found there.

- **Canada lynx.** Canada lynx was listed as threatened in April 2000. They are listed throughout most of the Pacific Northwest. Lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short, black-tipped tail. The lynx's long legs and large paws make it well adapted for living in areas that receive deep snow. The home range of a lynx may extend over a few hundred square miles. Young lynx may disperse great distances from their birthplace. Lynx are not known to occur in the project area. It would be extremely unlikely to find a lynx near Lake Wallula.

3.7.1.3 Candidate Species

The following is a list of candidate species:

- Columbia spotted frog
- Greater sage grouse (Columbia Basin Distinct Population Segment)
- Yellow-billed cuckoo
- Umtanum desert buckwheat, plant
- Washington ground squirrel
- White Bluffs bladderpod, plant

3.7.2 Environmental Consequences

3.7.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** This alternative would not reduce the LDAs of the shoreline. Therefore, there would be more shoreline available for boat dock construction, vegetation modification, and other shoreline uses. All of these activities would contribute to negative impacts to threatened and endangered species, as described below.

- **Docks:** For boat docks, the No Action Alternative would have the most negative impact among the alternatives on ESA listed salmonids. The Corps would continue to issue dock permits for both individual and group docks until the maximum density of docks was reached, resulting in a total of approximately 611 docks on Lake Wallula. Construction activities associated with installation of new docks would negatively affect ESA listed salmonids by creating noise, turbidity in the water column, and the possibility of contaminants leaking from heavy machinery and equipment on the shoreline. Existing docks generate negative effects by providing hiding cover for predatory fish. There is also an increased human presence and accompanying noise around each dock which disturbs juvenile salmonids. The increased number of boats moored on the lake could also have a negative effect on listed fish due to contaminants that get transferred to the water and turbidity from propeller wash. Because of the low number of bull trout expected to be in the area, bull trout would not likely be affected. There would be no effect on pygmy rabbit, Ute ladies'-tresses or Canada lynx.

- **Vegetation Modification:** In the Vegetation Modification category, this alternative would have limited negative effects to threatened and endangered salmon species and potential habitat for Pygmy rabbits. Modifications to riparian vegetation reduce the amount of shade and insects near the shoreline, both of which are beneficial to salmonids. It is doubtful that Pygmy rabbits, who utilize deep soil sage brush habitat, are still in the area; however they could be adversely affected by human presence and habitat alteration if they are near the modification areas. Bull trout, Ute ladies'-tresses and Canada lynx would not be affected.

- **Other Shoreline Uses:** In this category, the No Action Alternative could have minor negative impacts to threatened and endangered species. Other shoreline uses would be allowed with a real estate license and there are no mitigation requirements. Therefore, ground disturbing activities for structures such as stairways, steps, footbridges, hard-surfaced walkways, etc. could cause soil erosion/turbidity, noise, riparian habitat destruction and other disturbances that could adversely affect threatened and endangered species in the vicinity.

3.7.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** This alternative would reduce the LDAs of the shoreline. Therefore, there would be less shoreline available for boat dock construction, vegetation modification, and other shoreline uses than in the No Action Alternative. All of these activities that would contribute to negative effects to threatened and endangered species would be reduced from the No Action Alternative, as described below.

- **Docks:** For boat docks, this alternative would have a reduction in negative effects from the No Action Alternative on ESA listed salmonids. Continuous negative effects would occur due to predation on juvenile salmonids by other fish that use the docks and the associated support structures as hiding cover. Pile driving during construction would alter sound pressure levels in the water column thus disturbing ESA-listed salmonids. There would still be increased watercraft use and accompanying noise around each dock, but to a lesser degree. The increased number of boats moored on the lake could also have a negative effect on listed fish from the possibility of contaminants in the water. However, the number of potential docks would decrease from 611 to 100. New docks would need to be built according to SMP dock criteria, existing docks and special status docks would need to be upgraded to meet the SMP dock criteria when the adjacent property is transferred or sold. When major components of the dock are replaced, SMP dock criteria components must be used. Existing dock owners may keep their existing docks until the adjacent property is transferred or sold. After the effective date of the SMP, existing dock owners will be issued renewals to their expired permits. Existing docks may be allowed to remain per the conditions of the 2011 dock inspection if the dock is in safe condition and has not been extensively modified without authorization. Existing dock configurations would allow the current conditions at those locations and along the shoreline to continue until the docks are upgraded. The reduced number and design of docks in this alternative drastically reduces the effects from the No Action Alternative. In addition, new docks would require mitigation in the form of riparian planting at a ratio of 5 to 1, based on the square footage of each new dock, further offsetting the effects of new docks on ESA-listed fish species. Because of the low number of bull trout expected to be in the area, bull trout are not likely be affected. There would be no effect on pygmy rabbit, Ute ladies'-tresses or Canada lynx.

- **Vegetation Modification:** In the Vegetation Modification category, this alternative would have limited negative effects to threatened and endangered salmon species and potential habitat for Pygmy rabbits. Modifications to riparian vegetation reduce the amount of shade and insects near the shoreline, both of which are beneficial to salmonids. It is doubtful that Pygmy rabbits, who utilize deep soil sage brush habitat, are still in the area; however they could be adversely affected by human presence and habitat alteration if they are near the modification areas. However, riparian losses would be mitigated at a 2 to 1 ratio, based on the square footage of the disturbance. Bull trout, Ute ladies'-tresses and Canada lynx would not be affected.

- **Other Shoreline Uses:** In this category, this alternative could have minor negative effects to threatened and endangered species. Other shoreline uses such as stairways, steps, footbridges, hard-surfaced walkways, erosion control devices, and private irrigation systems, etc. would be allowed, but only with a real estate license, therefore the Corps could limit these activities if potential environmental effects appear to be negative. Some possible environmental effects are: soil erosion due to ground disturbance, turbidity in the water column from soil erosion and construction activities, construction noise and human presence, riparian habitat destruction, and contaminants in the water or on the shoreline from heavy machinery and equipment. However, mitigation would be required to offset riparian losses at a 2 to 1 ratio, based on the square footage of the disturbance.

3.7.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** This alternative would reduce the LDAs of the shoreline. Therefore, there would be less shoreline available for boat dock construction, vegetation modification, and other shoreline uses than in alternative 1. All of these activities that would contribute to negative impacts to threatened and endangered species would be reduced from alternative 1, as described below.

- **Docks:** In this category, this alternative provides the best benefit to ESA-listed salmonids because it allows for the lowest number of docks. For boat docks, alternative 3 would have a major reduction in negative effects from alternative 1, and moderate reduction in negative effects from alternative 2 on ESA listed salmonids. Continuous negative effects would occur due to predation on juvenile salmonids caused by other fish that use the docks and the associated support structures as hiding cover. Installation of new docks would not occur. The number of potential docks would decrease from 611 in alternative 1 and 100 in alternative 2 to the existing 73 docks already permitted. Existing docks and eventually special status docks would be required to be upgraded to meet the SMP dock criteria. The reduced number and design of docks in alternative 3 drastically reduces the impact from both alternatives 1 and 2. Because of the low number of bull trout that are in the area, bull trout are not likely to be affected. There would be no effect on pygmy rabbit, Ute ladies'-tresses or Canada lynx.

- **Vegetation Modification:** In the Vegetation Modification category, this alternative would have limited negative effects to threatened and endangered salmon species and potential habitat for Pygmy rabbits. Modifications to riparian vegetation reduce the amount of shade and insects near the shoreline, both of which are beneficial to salmonids. It is doubtful that Pygmy rabbits, who utilize deep soil sage brush habitat, are still in the area; however they could be adversely affected by human presence and habitat alteration if they are near the modification areas. However, riparian losses as a result of permit renewal would be mitigated at a 2 to 1 ratio, based on the square footage of the disturbance. Bull trout, Ute ladies'-tresses and Canada lynx would not be affected.

- **Other Shoreline Uses:** For this alternative, negative effects to threatened and endangered species for activities classified as other shoreline uses would be the same as alternative 2.

3.8 Cultural Resources

3.8.1 Affected Environment

The area now known as the Lake Wallula shoreline is an area of rich cultural heritage. People have lived here more than ten thousand years. The confluence of the Columbia River and the Snake River, near the midpoint of the reservoir, was frequented by the Cayuse, Umatilla, Walla Walla and other peoples. The historic era began with the Lewis and Clark Expedition in 1805. Recorded sites of the prehistoric and historic eras are numerous around the reservoir shoreline. The Tri-Cities Archaeological District is listed on the National Register of Historic Places (Register). The McNary Project, including the dam and associated levees, has also been nominated to the Register.

Types of prehistoric and historic cultural sites which might be encountered within the McNary Project are rockshelters, pithouses, fishing stations, fort/trading post remains, townsites, roadways/trails, homesteads and other remains of the long history of human use of the area. Besides remnants of prehistoric and historic daily life, there are areas and specific locations of great traditional significance represented around the Lake Wallula shoreline. All of these cultural resources are protected by federal laws and regulations. The Walla Walla District of the Corps of Engineers has the responsibility of taking into account the effects of their actions, as well as actions permitted within managed lands, on historic properties. All actions under the SMP will require individual cultural resources compliance/approval before such actions are permitted and/or licensed.

3.8.2 Environmental Consequences

3.8.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** This alternative would not reduce the LDAs of the shoreline. Therefore, there would be more shoreline available for boat dock construction, vegetation modification, and other shoreline uses. The Corps would continue to manage cultural resources associated with the lake in accordance with the NHPA, Corps regulations, and other relevant legal frameworks.

- **Docks:** Modification of existing docks and construction of new docks has the potential to affect known historic properties adjacent to the reservoir as well as unidentified submerged historic properties. Construction of new docks also creates potential impacts including cumulative aesthetic impacts to Traditional Cultural Properties (TCPs). Construction of new docks and ground disturbing modification of existing docks would require review for possible effects under the NHPA, Section 106. Individual review of each proposed ground disturbance would be required.

- **Vegetation Modification:** Any permit that included ground disturbance such as trail construction could impact cultural resources. Some of the actions permitted under this type of permit may be of a nature that does not include ground disturbances, and therefore may not impact archaeological sites. However, actions involving modification of vegetation, especially native vegetation, may have the potential to adversely affect TCPs.

- **Other Shoreline Uses:** All activities classified as other shoreline uses, because of the potential for extensive ground disturbing activities, have the potential to adversely impact historic properties. These activities may also create potential aesthetic impacts to TCPs. Under the No Action Alternative, the Corps would continue to manage cultural resources associated with the lake in accordance with the NHPA, Corps regulations, and other relevant legal frameworks. Individual review of each proposed ground disturbance would be required.

3.8.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** Overall, the reduction of LDAs will result in a smaller number of undertakings, and a decrease in cumulative effects to historic properties and TCPs. This alternative also has the potential to assist in the management of historic properties if they are considered during the re-allocation of the shoreline.

- **Docks:** The reduction in the total number of boat docks from 611 to 100 represents a significant decrease in the anticipated cumulative effects caused by increased development along the McNary Shoreline. This is especially important when considering effects to properties such as TCPs and also the NRHP listed Tri-Cities Archaeological District. These properties are more susceptible to impacts caused by increased development and use, which deteriorates land forms, natural view sheds and natural settings; conditions that influence the NRHP eligibility of the property.

- **Vegetation Modification:** Vegetation modification under this alternative would not change the need to review permits identified under the No Action Alternative. However, the requirement for the establishment of riparian habitat offsets does create an additional undertaking that would need to be reviewed under the NHPA. Habitat restoration could be beneficial in restoring natural setting and aesthetic qualities of historic properties, although habitat restoration may also represent direct adverse effects to archaeological resources due to ground disturbing activities.

- **Other Shoreline Uses:** All activities classified as other shoreline uses, because of the potential for extensive ground disturbing activities, have the potential to adversely impact historic properties. These activities may also create potential aesthetic impacts to TCPs. Individual review of each proposed ground disturbance would be required. The reduction in available shoreline could result in fewer negative effects from development of facilities classified as other shoreline uses.

3.8.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** Overall, the reduction of LDAs will result in a smaller number of undertakings, and a decrease in cumulative effects to historic properties and TCPs. This alternative also has the potential to assist in the management of historic properties if they are considered during the re-allocation of the shoreline.

- **Docks:** The proposal to not permit any new docks would result in no new impacts to historic properties for this type of action. Removal of existing docks does not mitigate past impacts, but may ultimately have a net benefit in restoring a more natural setting to the McNary shoreline. This would likely result in a benefit to TCPs. It would also eliminate the need for NHPA review of actions permitted by the Corps.

- **Vegetation Modification:** The elimination of permits for vegetation modification would similarly result in a situation where there were no new impacts to historic properties for this type of action. It would also eliminate the need for NHPA review of individual actions.

- **Other Shoreline Uses:** For this alternative, negative effects to threatened and endangered species for activities classified as other shoreline uses would be the same as alternative 2.

3.9 Recreation

3.9.1 Affected Environment

Residents along Lake Wallula have a long history of recreational use on the Columbia River. Even prior to the construction of McNary Dam and the Tri-Cities levees, public parks and swim beaches gave residents a place to escape high summer temperatures. Public recreation is an authorized purpose of the McNary project, and the Corps and others have provided many areas along the river where members of the public may swim, launch boats, or cool off under shady trees. Table 3-2 lists the public recreation facilities in the area, and those either owned by the Corps or leased by the Corps to public or private entities are shown in shaded areas.

Recreational boating on the Columbia River is a popular activity. In 2009, over 4 million people took advantage of the many recreational opportunities on Lake Wallula (*USACE, NWW Monthly Visitation Summary, FY09*), with the highest visitation in the months of May – August. Popular activities include fishing, water skiing, jet skiing, cruising, and camping. Table 3-3 lists the participation, by activity, documented on Lake Wallula for May-August of 2009.

3.9.2 Environmental Consequences

Impacts to public water-based recreation in the project area, due to the minor differences in alternatives related to public recreation, are difficult to predict because the small number of shoreline dock owners is negligible compared to the overall population of the Tri-Cities region and the current recreational use on and around Lake Wallula. Public recreation on Lake Wallula would continue under all of the alternatives.

3.9.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** Under this alternative, the Corps would not reallocate the shoreline. About 11.26 miles of shoreline would remain as Limited Development Areas and be available for construction of boat docks, vegetation modification, and other shoreline uses. Therefore, there would be no negative effects to recreation on Lake Wallula in this category.

- **Docks:** In the boat dock category, under this alternative, private recreational use of the shoreline would likely increase due to the higher number of private docks that would be constructed. Overall recreation on the lake would likely continue increasing as the population of the area increases.

- **Vegetation Modification:** In this category, this alternative would have a small negative effect on recreation. Some publicly owned areas may appear to be privately owned, limiting some recreational use of the area.

Table 3-2. Recreation Facilities at Lake Wallula

Facility	Major Use
Chiawana Park	Day use and boating
Road 54 Park	Day use and boating
Clover Island Yacht Club	Marina and boating
Columbia Park	Camping, day use, boating, and marina
Columbia Point Marina Park	Day use, boating, and marina
Duportail Primitive Boat Launch	Day use and boating
Hat Rock State Park	Day use and boating
Hood Park	Camping, day use, and boating
Hover Park	Day use and boating
Howard Amon Park	Day use and boating
Leslie R. Grove Park	Day use and boating
Lewis and Clark Commemorative Trail	Day use, hiking, and equestrian trail
Locust Grove/Martindale	Day use
Madame Dorion Memorial Park	Camping, day use, and boating
McNary Beach Park	Day use
McNary National Wildlife Refuge	Day use
McNary Yacht Club	Boating and marina
Oregon Boat Launch	Day use and boating
Pacific Salmon Visitor Information Center	Visitor Center
Pasco Boat Basin	Day use, boating, and marina
Peninsula HMU	Day use
Sacajawea State Park	Day use and boating
Sand Station	Camping and day use
Spillway Park	Day use
Two Rivers HMU	Day use
Two Rivers Park	Day use and boating
Walla Walla Yacht Club	Boating and marina
Wallula HMU	Day use
Warehouse Beach	Day use
Washington Boat Launch	Day use and boating
West Park	Day use
Wye Park	Day use and boating
Yakima River Delta Wildlife Nature Area	Day use

- **Other Shoreline Uses:** Under the No Action Alternative, the Corps would continue to allow activities classified as other shoreline uses, (stairways, steps, footbridges, hard-surface walkways, erosion control devices, private irrigation systems, etc) but only with the issuance of a real estate license. Potential negative effects to the recreating public include: these facilities posing as

Table 3-3. 2009 Lake Wallula Visitation, Number of Visitors by Activity

Month 2009	Camping	Picnic	Boating	Fishing	Hunting	Water Ski	Swimming	Other	Sightseeing
October	1,925	28,284	24,172	27,498	2,043	2,875	2,347	177,979	54,273
November	1,368	18,495	15,168	19,766	1,411	1,837	1,570	111,680	34,057
December	108	4,241	4,511	12,102	1,064	0	38	85,541	22,012
January	141	5,031	5,204	15,029	1,137	0	40	99,890	26,061
February	138	5,784	6,398	15,946	1,167	0	42	118,376	30,398
March	2,283	51,186	13,609	22,554	0	2,291	8,328	106,706	69,132
April	3,805	88,010	22,988	38,280	0	3,988	13,669	180,090	121,727
May	16,222	113,568	79,151	52,173	0	42,090	68,200	318,576	167,331
June	17,950	113,123	129,311	63,359	0	88,785	88,920	321,157	213,943
July	11,643	111,661	54,086	44,998	0	30,357	72,789	265,504	151,780
August	10,897	101,820	49,453	43,152	0	25,827	69,525	263,580	156,287
September	11,375	66,633	42,438	38,908	0	24,287	51,362	154,725	113,714
Total	77,855	707,836	446,489	393,765	6,822	222,337	376,830	2,203,804	1,160,715

obstructions along the shoreline, a less aesthetically pleasing shoreline, perception that public property is privately owned, and restrictions for boat mooring along the shoreline due to riprap or other erosion control devices. This alternative would not require mitigation for construction of facilities termed other shoreline uses.

3.9.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations (Preferred)

- **Shoreline Reallocation:** Implementation of this alternative could produce minor localized negative effects to the recreating public on Lake Wallula. The Corps would revise the SMP and reallocate the shoreline thereby reducing the LDAs. There would be less area available for boat dock construction, vegetation modification and other shoreline uses. However, because new permits and renewals would still be allowed, albeit with mitigation requirements, recreation on Lake Wallula would continue to increase as the population of the area increases.

- **Docks:** In this category, landowners in LDAs adjacent to the shoreline may experience minor negative effects in regard to recreation due to new requirements for SMP dock criteria. Existing docks that do not meet the SMP dock criteria would need to be re-constructed when the adjacent property is transferred or sold with four (4) in water work windows allowed to accomplish the upgrade. Permits for new docks would be issued, however the dock must be constructed to meet SMP dock criteria. This is classified as a negligible negative effect due to the fact that the revised SMP would not prohibit private dock construction in LDAs on Lake Wallula and because there are numerous public marinas and mooring facilities already available on Lake Wallula.

- **Vegetation Modification:** Alternative 2 may have minimal negative recreation effects for the adjacent property owners along the shoreline. Although new permits would be issued and renewals would be allowed, landowners would be required to mitigate at a 2 to 1 ratio, based on the square footage of the disturbance. Some landowners may find this requirement troublesome and therefore choose not to recreate along the shoreline.

- **Other Shoreline Uses:** Under this alternative, activities that fall into this category would require a real estate license and mitigation. This may cause adjacent landowners to re-consider placing structures along the shoreline, thereby limiting their recreating opportunities. However, the recreating public may benefit from fewer structures along the shoreline as they would encounter fewer obstructions and find the shoreline to be more aesthetically pleasing. There would be less perception that public property is privately owned, and fewer restrictions for boat mooring along the shoreline due to riprap or other erosion control devices.

3.9.2.3 Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** Implementation of this alternative could produce minor localized negative effects to the recreating public on Lake Wallula. The Corps would revise the SMP and reallocate the shoreline thereby reducing the LDAs. There would be less area available for boat dock construction, vegetation modification and other shoreline uses. However, because new permits and renewals would still be allowed, albeit with mitigation requirements, recreation on Lake Wallula would continue to increase as the population of the area increases.

- **Docks:** Implementation of this alternative would prohibit permits for new docks, therefore new property owners along the shoreline could find this restriction to be a moderate negative effect. However, they would still have access to public marinas in the vicinity and existing community (or group) docks would be a viable alternative to private docks. Existing docks would qualify for a renewal permit as long as they are upgraded to meet the SMP dock criteria. Overall, this alternative could create a minor negative effect to recreation along the shoreline, but the amount of recreation on the lake would continue to increase as the population of the area increases.

- **Vegetation Modification:** No new vegetation modification permits would be issued should this alternative be selected. It is possible that new property owners could perceive this restriction as a negative impact to recreation, however this alternative could benefit the general recreating public in that some Corps-owned property along the shoreline would no longer be perceived as private property. Existing vegetation modification permits would still be renewed allowing existing adjacent property owners to continue with vegetation modification activities, however they would be required to mitigate for any ground disturbing actions.

- **Other Shoreline Uses:** For this alternative, negative effects to recreation for activities classified as other shoreline uses would be the same as alternative 2.

3.10 Socioeconomics

3.10.1 Affected Environment

The Tri-Cities area (Kennewick, Pasco, Richland, West Richland, WA) is the largest population center affected by the McNary Shoreline Management Plan. Other cities that might be affected by actions proposed in the SMP are Finley, WA (Benton County), Umatilla, OR (Umatilla County), and Burbank, WA (Walla Walla County). The location of the Tri-Cities encompasses the confluences of the Columbia, Snake, and Yakima Rivers.

- **Population**

  The Tri-Cities study area has an estimated combined population of 253,540. The combined Tri-Cities area is the fourth largest metropolitan area in the state of Washington. Spokane is the only city with a larger population in eastern Washington or eastern Oregon. The current population estimate reflects a 22% increase in the population over the 2000 Census figures, and the City of Pasco has had the most significant growth (30%). Education levels of those in the affected area are slightly lower than those statewide, with education levels in the Tri Cities area reflected in Table 3-4.

Table 3-4. Education Levels in the Tri-Cities, Washington, Area

Level of Education	Percent of Population
High School Graduate	31.4
Some College, No Degree	23.2
Associates Degree	10.0
Bachelors Degree	12.5
Graduate Degree	7.1

Source (Demographiscs Now, July 2010 via TriDec Website www.Tridec.org and US Census Bureau http://quickfacts.census.gov)

- **Employment and Income**

  The Tri-Cities area historically had boom and bust periods tied to development at the Hanford Nuclear Reservation just north of Richland. While the area is still dependant on Hanford and other Department of Energy jobs, the economy has diversified. Over twelve employers carry more than 1000 employees. Major employers in the Tri-Cities area include Battelle/Pacific Northwest National Laboratories, CH2M Hill, and ConAgra Foods. The unemployment rate in the Tri-Cities area is 6.2% (June 2010 Employment Data, Washington State Employment Security Department), which is below the state average of 8.7%. The average household income in the greater Tri-Cities area is $64,124.

- **Housing**

  Until relatively recently, little had changed on the shores of Lake Wallula. Development has been slow and incremental. Much of the shoreline is controlled by federal, state or local jurisdictions, and the river shoreline is dotted with public parks, boat launches, and marinas, which have insured sufficient public access. However, growth in the area has resulted in an increase in large home construction along the river on land that was previously agricultural, especially in West Pasco. The increase in the number of homes along the river has put increasing pressure on the Corps to allow additional private dock development along the public shoreline.

3.10.2 Environmental Consequences

Impacts to socioeconomics could occur from expenditures related to construction of new docks, as well as changes in the amount of recreational boating on the lake. If more private docks are allowed on the lake, economic impacts would accrue resulting from the construction of those docks. If fewer docks are allowed on the lake there will likely be increased pressure for additional marina slips, expansion of existing marinas or construction of new marinas. With any of the alternatives the net difference in economic impacts is likely not very large. The greatest socioeconomic impact is from the distribution of benefits. With any of the alternatives, total recreation on Lake Wallula will increase at the same rate. Increasing private docks will likely concentrate a small percentage of overall benefits to private dock owners.

3.10.2.1 Alternative 1: No Action

- **Shoreline Reallocation:** If this alternative was implemented, the Corps would not revise the SMP or reallocate the shoreline. Approximately 11 miles of shoreline would remain as LDAs. The development of these areas would continue and result in short and long term minor beneficial socioeconomic effects.

- **Docks:** Under Alternative 1, approximately 611 new docks could be constructed. This continual development of docks along the shoreline would be expected to result in moderate beneficial socioeconomic effects from the expenditures and employment associated with new dock construction and renovation of existing docks and walkways.

- **Vegetation Modification:** Negative effects to property owners would be negligible in this category under the No Action Alternative. The Corps would continue to issue and renew permits for vegetation modification thus allowing adjacent landowners to perform activities such as minor cutting, light pruning, removal or seeding, clearing a meandering path to the water, and limited mowing. Negligible, beneficial effects may result for the local economy due to the purchase of lawn and garden tools and small machinery.

- **Other Shoreline Uses:** Under the No Action Alternative, the Corps would continue to require a real estate license for activities classified as other shoreline uses. There would only be negligible beneficial and detrimental effects to socioeconomics in this category.

3.10.2.2 Alternative 2: Best Balanced Alternative between Private Use and Environmental Considerations

- **Shoreline Reallocation:** In this category, implementation of this alternative could result in minor negative effects to socioeconomics in the vicinity. The shoreline of Lake Wallula would be reallocated and the LDAs would be reduced from 11 to 3 miles. Because there would be less shoreline available for boat dock construction, vegetation modification, and other shoreline uses, the Tri-Cities area may experience a slight negative effect economically due to reduced construction activities.

- **Docks:** There has been a fair amount of public interest in this proposed action, primarily from existing and potential dock owners. Under this alternative, permits for existing docks would be renewed and new dock permits would still be issued, albeit in a smaller LDA. New docks must be constructed to meet the SMP dock criteria. When the adjacent property is transferred or sold, or when major components are replaced, the existing docks would need to be upgraded to meet the SMP dock criteria within four (4) in-water work windows allowed to accomplish the upgrade. Currently, there are 73 existing private docks on Lake Wallula with a potential maximum under this alternative for an additional 27 docks. With the 2010 U.S. Census population of the Tri-Cities registering at 253,540, implementation of this alternative could have beneficial and/or negative effects to a very small and localized segment of the overall Tri-Cities population.

- **Vegetation Modification:** There may be negligible positive effects in this category if this alternative were implemented. Property owners along the shoreline could still be issued new and renewed vegetation modification permits therefore they may be purchasing more lawn and garden tools, etc.

- **Other Shoreline Uses:** There would be no positive or negative effects to socioeconomics associated with other shoreline uses under this alternative.

3.10.2.3Alternative 3: Maximum Environmental Benefits

- **Shoreline Reallocation:** In this category, implementation of this alternative could result in minor negative impacts to socioeconomics in the vicinity. The shoreline of Lake Wallula would be reallocated and the LDAs would be reduced from 11 to 3 miles. Because there would be less shoreline available for boat dock construction, vegetation modification, and other shoreline uses, the Tri-Cities area may experience a slight negative impact economically due to reduced construction activities.

- **Docks:** Of the three alternatives, this one would have the most negative effects although they would be very minor and insignificant. Because this alternative prohibits the construction of new docks, there would be no economic benefit to contractors in the region. However, there would be short-term benefits from the requirement to upgrade existing docks.

- **Vegetation Modification:** There would be no positive or negative impacts to socioeconomics associated with vegetation modification under this alternative.

- **Other Shoreline Uses:** There would be no positive or negative impacts to socioeconomics associated with other shoreline uses under this alternative.

3.11 Cumulative Impacts

The National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations implementing the Act require federal agencies to consider the cumulative impacts of their actions. Cumulative effects are defined as, “the impact on the environment which results from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR § 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

The scope of this analysis extends beyond the McNary Shoreline area to other areas that sustain the resources of concern. A resource may be differentially impacted in both time and space. The significance of those impacts depends on the characteristics of the resource, the magnitude and scale of the project’s impacts, and the environmental setting (EPA 1999).

3.11.1 Resources of Interest

In accordance with the Council on Environmental Quality's (CEQ) guidance on cumulative effects, this analysis focuses primarily on effects that are "truly meaningful," i.e., important issues of national, regional, or local significance and that scoping should be used to help identify these issues (CEQ 1997). The guidance also states that not all potential issues need to be included in the analysis, just those that are relevant to the decision to be made on the proposed action and alternatives. The Corps reviewed comments received during scoping and during the public review period and input from technical staff to determine which resources should be included in the analysis. With the aid of the public scoping process, the Corps identified three resources of significance for analysis in this section. The Corps determined that threatened and endangered fish species, water quality and recreation are of local and regional significance, and threatened and endangered fish are of national significance. The interest on threatened and endangered fish (especially salmon) is based not only on the economic aspects of commercial and recreational fishing, but on the symbolic role that these fish have for the Pacific Northwest and the role they play in the culture of Native American tribes.

Each resource is discussed in terms of its cumulative effect boundary, the historic condition and impacts to the resource, present condition and impacts to the resource, reasonably foreseeable actions that may affect the resource, and the effects to the resource by the various alternatives when added to other past, present and future actions.

Guidance for setting appropriate boundaries for a cumulative effect analysis is presented by CEQ (1997) and EPA (1999). Generally, the scope of cumulative effects analysis should be broader than the scope of analysis used in assessing direct or indirect effects. "Geographic boundaries and time periods used in cumulative impact analysis should be based on all resources of concern and all of the actions that may contribute, along with the project effects, to cumulative impacts" (EPA 1999). The analysis should delineate appropriate geographic areas including natural ecological boundaries, whenever possible, and should evaluate the time period of the project's effects. The analysis should also include all potentially significant effects on the resources of concern (EPA, 1999).

A temporal or time boundary is the duration that impacts from the proposed project or other actions affecting the resources would last. The boundary can vary per resource. The timeframe used in the threatened and endangered fish discussion is based on the 24-year extinction risk estimates discussed in NOAA Fisheries (2008) Federal Columbia River Power System (FCRPS) Biological Opinion. Timeframe used for water quality was identified to include potential reoccurring effects to the water caused by creation and use of the reservoir (Lake Wallula) and is based on the 60 year history of the McNary Project. The timeframe used in the recreation discussion is based on when Lake Wallula was created and extends approximately 20 years into the future. Twenty years into the future was selected as a reasonable timeframe for which recreation based predictions could be made.

The geographic boundaries are defined and vary per resource. The geographic boundary for threatened and endangered fish includes the Snake and Columbia River watersheds. The geographic boundary for water quality includes the Columbia River watershed. The geographic boundary for recreation focuses on the river based recreation associated with Lake Wallula.

3.11.2 Past, Present, and Future Conditions and Impacts to Resources

The following section discusses resources with respect to their cumulative effect boundaries. The historic conditions and impacts to the resources, the present conditions and impacts to the resources, and reasonably foreseeable actions that may affect the resources are presented.

- **Historic Conditions and Impacts to Resources**

  By the mid 1800s new settlements were being established throughout the region and immigration from the eastern United States increased rapidly (Craig and Hacker, 1940). Prior to the arrival of these new settlers, the human caused impacts to the rivers and streams of the area were limited. Native Americans harvested fish from the rivers, but at much lower numbers than occurred during the late 1800s. Harvest of salmon by Native Americans likely did not exceed a level that would be harmful to subsequent fish runs (Chapman 1986). In contrast commercial harvest of salmon and steelhead in the late 1800s quickly depleted fish populations.

  At about the same time as the anadromous fish populations began to become overexploited, modifications of the rivers for navigation also began. As transportation improved, development of the surrounding land increased (urban, industrial, agriculture, timber harvest, mining). As development increased, the amount of human-caused impact on the rivers and associated resources also increased.

  A part of this development included building numerous dams throughout the watershed. The earliest dams were built on tributary streams for irrigation and logging purposes. In the early 1900s, larger dams on the mainstem Snake River were constructed. The Hells Canyon Dam Complex made up of Hells Canyon, Oxbow, and Brownlee Dams was constructed by the Idaho Power Company on the upper Snake River between the years of 1958 and 1967. On the mid-Columbia River, the Public Utility District constructed Priest Rapids, Wanapum, Rock Island, Rocky Reach, and Wells Dams between the years of 1933 and 1969. The Corps of Engineers and the Bureau of Reclamation now own and operate a system of hydropower dams on the Columbia and Snake rivers (FCRPS). These dams were built in the 1930s to 1970s. Construction of McNary Dam was completed in 1954.

Higher up in the watershed, actions such as road building and logging also affect the various considered resources and can also trigger landslides that can compound the impacts. Loss of riparian areas along streams from logging, agricultural, and urban development; water diversions (including unscreened diversion); impoundment of rivers; increased infrastructure (e.g., roads, facility development, and added areas of impervious surfaces) have changed the original habitat and decreased or eliminated favorable habitat conditions.

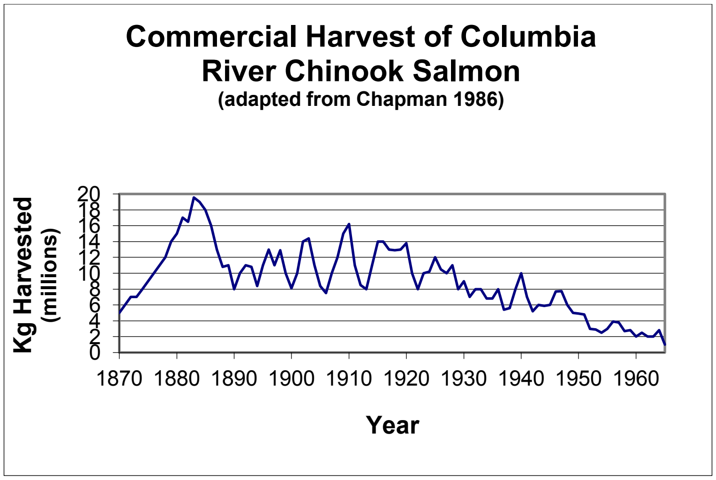
– ***Threatened and Endangered Fish***

Salmon and steelhead adapted to habitat conditions over thousands of years. In many areas of the Columbia and Snake River Basins, these conditions have been significantly changed, or no longer exist. All native salmonid species in the Snake River Basin have decreased from historical levels as a consequence of hydropower development, harvest management, hatchery development, and habitat degradation and loss (the four Hs). Before the mid-1870s, annual runs of salmon and steelhead returning to the Columbia River were roughly estimated to be greater than eight million fish (Chapman, 1986). Since 1938, when Bonneville Dam was constructed, the estimate of minimum total salmon and steelhead returning to the river has ranged from 0.2 to 3.2 million fish. A variety of ocean conditions including currents, pollution, temperatures changes, and nutrient base also affect salmon survival.

Fish harvest has affected anadromous fish in the Columbia River basin for over 150 years. In 1875 the United States Commission of Fish and Fisheries began researching why Columbia River salmon catches were declining (U.S. Commission of Fish and Fisheries, 1878). Their report indicates that 10 to 20 million pounds of canned salmon were taken from the Columbia River annually. Chapman (1986) presents historic harvest rates for the Columbia River. Figure 3-2 depicts just the commercial harvest of Chinook salmon from about 1870 to 1965. Chum salmon, sockeye salmon, coho salmon, and steelhead were also harvested. In addition, other sources of harvest, such as tribal harvest and settler harvest, also occurred.

Dams have inundated large amounts of spawning and rearing habitat. These dams eliminated the primary production areas of some fish species. They have contributed to the reduced distribution and abundance of salmon in the system. Approximately 80% of historical Snake River Chinook salmon spawning habitat was lost with the construction of dams on the mainstem Snake River. The spawning grounds between Huntington, Oregon (RM 328) and Auger Falls in Idaho (RM 607) were

Figure 3-2. Level of Commercial Harvest of Columbia River Chinook Salmon, 1870 to 1965.



historically the most important for this species. Construction of the Hells Canyon Dam complex (1958-1967) cut off anadromous fish access to 211 miles (or 46%) of the remaining historical fall Chinook habitat upstream of RM 247.

Even before mainstem dams were built, habitat was lost or severely damaged in small tributaries by construction and operation of irrigation dams and diversions, inundation of spawning areas by impoundments, and siltation and pollution from sewage, farming, logging, and mining (Fulton 1968).

– ***Water Quality***

State and local governments have been faced with pressures from population growth and movement over the last 200 years in this region. Growth in business has placed increased demands on these governments for buildable land, infrastructure, water, electricity and waste disposal. Such population trends have placed greater overall and localized demands in the action area affecting water quality directly and indirectly and increased the need for transportation and recreation. The effects of private actions are the most uncertain. Private landowners may convert their lands from current uses, or they may intensify or diminish those uses. Activities such as mining, logging and agriculture have introduced large volumes of sediment from early earth moving practices and lack of care in assuring natural character of basin waterways. Mining has contributed extensive chemicals from runoff during the mining operations. Agricultural practices associated with irrigation have adversely affected the aquatic environment. Runoff of irrigation water, polluted with pesticides and fertilizers has contributed excessive nutrients, elevated levels of chemicals and substantial amounts of sediment to natural waterways, further degrading the water quality of the system.

Agricultural practices associated with irrigation have the potential to adversely affect the aquatic environment. Runoff of irrigation water polluted with pesticides and fertilizers can contribute excessive nutrients, elevated levels of chemicals and substantial amounts of sediment to natural waterways further degrading the water quality of the system. Urban and rural land uses for residential, commercial, industrial and recreational activities like boating and golf can contribute pollutants and sediments to surface waters as well. Impacts from contaminant spills could also be significant depending on the nature and quantity of the contaminants involved. Smaller, more frequent spills may add to the degradation of the aquatic environment. These spills may occur at any time throughout the action area with different parties responsible for the contamination.

– ***Recreation***

There are many types of recreation in the Tri-Cities, but the focus of this analysis is on recreation associated with the Columbia and Snake rivers. Prior to the construction of McNary Dam, flows in the Columbia and Snake Rivers near Tri-Cities were unregulated. Recreational activities had to take into account the seasonal variation in flow. Water-borne recreation included fishing, hunting and boating. A few swimming areas and boat moorage areas were likely present. Some private docks likely existed along the shoreline, but they would have been subject to the highly variable flow conditions and river level fluctuations.

Several recreation facilities, authorized by the Flood Control Act of 1944, were constructed as part of the development of McNary Dam. A few years after McNary Dam was completed, new legislation regarding recreation was enacted. The Federal Water Project Recreation Act of 1965 (Public Law 89-72) established certain funding authorities and procedures for public recreational endeavors.

- **Present Conditions and Impacts to Resources**

– ***Threatened and Endangered Fish***

The number of salmon and steelhead in the Columbia River basin has been increasing in the recent past. The latest 10-year average (1998 to 2007) is about 1.8 million salmon and steelhead passing Bonneville Dam per year (Fish Passage Center). This is almost double the 10-year average at

Bonneville Dam from 1968 to 1977, which was 1.1 million (Fish Passage Center). Salmon and steelhead in the Snake River have experienced a similar increase from 1977 when the 10-year average at Ice Harbor Dam was about 185,000 (Fish Passage Center). The latest 10-year average of salmon and steelhead passing Ice Harbor dam (1998 to 2007) was just under 340,000 (Fish Passage Center).

When the Snake River was transformed from a flowing body of water to a series of slow moving reservoirs, much of the historic habitat was inundated and habitat functions were lost. Off-channel habitat, refugia (habitat that protects fish from unfavorable conditions), and large woody debris production has been reduced by inundating off-channel areas and historic riparian zones. Because the flow is highly regulated between dams, hydraulic variation is lacking. Consequently, pools, riffles and other in-stream habitat are greatly reduced or have been eliminated.

Hatchery fish are widespread and stray to spawn naturally throughout the region. In the 1990s, an average of 86% of adult steelhead passing Lower Granite Dam was of hatchery origin. Hatchery contribution to naturally spawning populations varies across the region however. Hatchery fish dominate some stocks, but do not contribute to others. Hatchery-reared fall Chinook salmon have been released into the Snake River Basin since 1981 (Busack 1991). Release of subyearling fish may also help minimize the differences in mortality patterns between hatchery and wild populations that can lead to genetic change (Waples 1999). Harvest continues to contribute significantly to reduced numbers of returning adults for some salmon and steelhead stocks.

Fish predation occurs by species that occupy the highest trophic level of the aquatic food web. The most important piscivorous fish species include smallmouth bass, northern pikeminnow, channel catfish, crappie, and yellow perch. Individuals of these species can forage on a variety of smaller species. Of particular importance, the larger individuals may seasonally forage on juvenile salmonids residing in, or migrating through, the reservoirs. The most significant predator on juvenile salmonids in Lower Snake River reservoirs are smallmouth bass because of their abundance, overlapping rearing habitat preference, and reduced alternative prey diversity and abundance (i.e., crayfish) in the reservoir environment, especially in Lower Granite Reservoir. Salmonids were reported as an important component to the diet of channel catfish (Bennett et al., 1983), but little is known about catfish abundance and the total amount of salmonid predation they may incur. Predation by northern pikeminnow has been reduced substantially in the lower Columbia and Snake Rivers in recent years as the result of high harvest levels supported by the Sport

Reward Program and scientific sampling funded by Bonneville Power Administration (Friesen and Ward, 1999). However, overall predation of salmon in Lower Granite pool and tailrace by northern pikeminnow is low (Naughton, 1998).

– ***Water Quality***

Water resource development has modified natural hydrologic and water temperature regimes throughout the Columbia River basin. Heat exchange characteristics are influenced by water residence times and river channel geometry.

Runoff of urban storm water or irrigation water polluted with pesticides and fertilizers can contribute excessive nutrients, elevated levels of chemicals and substantial amounts of sediment to natural waterways further degrading the water quality of the system. Urban and rural land uses for residential, commercial, industrial and recreational activities like boating and golf contribute pollutants and sediments to surface waters as well. Impacts from contaminant spills are possible and, depending on the nature and quantity of the contaminants involved, could be significant. Even small smaller, more frequent spills may add to the degradation of the aquatic environment. These spills may occur at any time throughout the action area by any number of maritime related activities including recreational boats and boating facilities.

– ***Recreation***

Lake Wallula is the predominant water source in the area. This makes it extremely popular with recreationists. Recreational boating on the Columbia River occurs frequently in the area and includes fishing, water skiing, jet skiing, and cruising. In addition, there are various trails along some of the shoreline for walking, jogging and biking. Recreation use of the lake occurs year-round, but peaks from late spring through early fall; typically from Memorial Day to Labor Day.

All of these activities were done to some extent prior to the construction of McNary Dam in 1954, but at a much lower level. Recreation is one of the authorized purposes of the McNary Dam project. The lake created by McNary Dam provides a large area for water-borne recreation. As part of construction of the project, several parks and river access points were provided to meet recreation needs of the surrounding communities. The present recreation facilities associated with Lake Wallula were presented earlier in table 3.3.

McNary Dam is a "run-of-the-river" impoundment. The lake does not experience the large seasonal fluctuations in pool elevations that characterize storage reservoirs. Most of the water-related recreation facilities on the lake are designed to be usable throughout the normal narrow range of daily, weekly and seasonal fluctuations. As long as pool elevations are held within the normal range, recreation facilities remain fully usable.

- **Reasonably Foreseeable Impacts to Resources**

Future anticipated actions likely to continue having adverse effects on the endangered and threatened species that may occur in or near surface waters in the action area are mostly associated with urban activities in the area. The most notable of these include: industrial activities and other sources; urban stormwater, agricultural runoff, and groundwater contamination of pesticides, herbicides, hydrocarbons, metals, temperature, organics, and nutrients; urban development, timber harvesting, and water withdrawals.

More specifically, urban growth would increase the demand for electricity; water and buildable land in and near the project area would affect water quality and would increase the need for transportation, communication, and other infrastructure. These impacts would likely affect habitat features such as water quality and quantity, which are important for ESA-listed species. There would likely be both beneficial and adverse effects on resources and their habitats due to inconsistency among local governments. Industrial development could potentially result in alteration and loss of riparian areas, increased pollution, and alteration and loss of shallow water habitat. Maintenance of levees for flood control also limits riparian habitat when woody vegetation is removed.

Some future development of port facilities is reasonably foreseeable in the project area. Industrial development could result in additional dredging around dock facilities and additional dredging for access channels to enable ports to be competitive. Continued urban and industrial development also is reasonably foreseeable in response to regional and national economic trends.

The state of Washington has various strategies and programs designed to improve the habitat of listed species and assist in recovery planning. Washington's 1998 Salmon Recovery Planning Act provided the framework for developing watershed restoration projects and established a funding mechanism for local habitat restoration projects. The Watershed Planning Act, also passed in 1998, encourages voluntary planning by local governments, citizens and Tribes for water supply and use, water quality and habitat at the Water Resource Inventory Area or multi- Water Resource Inventory Area level. Washington's Department of Fish and Wildlife and tribal co-managers have been implementing the Wild Stock Recovery Initiative since 1992. The co-managers are completing comprehensive species management plans that examine limiting factors and identify needed habitat activities. Water quality improvements will be proposed through development of Total Maximum Daily Loads (TMDLs). The state of Washington is under a court order to develop TMDL management plans on each of its 303(d) water-quality-listed streams. These efforts could help improve habitat for listed species.

Changes to recreation associated with the river may include additional trails along the shoreline or completion of a loop trail connecting several other trail segments. Additional boat moorage facilities will likely be added as demand dictates. Efforts are underway to integrate multiple recreation sites to improve the recreational experience gained.

3.11.3 Cumulative Impacts Summary and Conclusion

The cumulative effects analysis requires consideration of historic actions, as well as reasonably foreseeable future ones. The resources covered by this analysis have been greatly affected in the past and will continue to change into the future. For example, construction of the FCRPS has modified river flows in a way that affects both fish and recreation in the project area; and many human activities and other factors have resulted in depleted populations of fish species requiring their protection under the ESA. Non-Federal actions are likely to continue affecting listed species. Based on the population and growth trends, cumulative effects are likely to increase.

Economic diversification has contributed to population growth and movement. This trend is likely to continue. Such population trends will result in greater demands for electricity, water and buildable land in the action area and will increase the need for transportation and other infrastructure. The result of these economic and population demands will probably affect habitat features such as water quality and quantity, which are important to the survival and recovery of the listed species. The overall effect will likely be negative, unless avoided or carefully planned for and mitigated.

Implementation of the SMP could add a small amount of negative impact to the threatened and endangered species of the area, but would not add to the overall effects on recreation. Future actions, including this one, are taking place in a dramatically different regulatory and political climate than did the most damaging historic actions. Specifically, future actions are subject to detailed review at the federal, state or local level, or some combination thereof. As appropriate, this review includes the NEPA, the ESA, the Clean Water Act, state wetlands and growth management regulations, and local protections for critical resources. Accordingly, unlike historic actions, future actions will better avoid and minimize detrimental effects to key resources and provide appropriate mitigation for unavoidable losses.

3.12 Climate Change

Evidence for climate change includes increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level. Eleven of the last twelve years (1995 -2006) rank among the 12 warmest years in the instrumental record of global surface temperature (since 1850). The linear warming trend over the last 50 years (0.13 +/- 0.03°C per decade) is nearly twice that for the last 100 years. The total global average temperature increase from 1850 – 1899 to 2001 – 2005 is 0.76 +/- 0.19°C.

Climate records show that the Pacific Northwest has warmed about 1.0°C since 1900, or about 50% more than the global average warming over the same period. The warming rate for the Pacific Northwest over the next century is projected to be in the range of 0.1-0.6˚ C/decade. Projected precipitation changes for the region are relatively modest and unlikely to be distinguishable from natural variability until late in the 21st century. Most models project long-term increases in winter precipitation and decreases in summer precipitation. The changes in temperature and precipitation will alter the snow pack, stream flow, and water quality in the Columbia Basin:

- Warmer temperatures will result in more precipitation falling as rain rather than snow.
- Snow pack will diminish, and stream flow timing will be altered.
- Peak river flows will likely increase.
- Water temperatures will continue to rise.

These changes will have a variety of impacts on aquatic and terrestrial habitats in the Columbia Basin. Warming temperatures will increasingly stress coldwater fish in the warmest parts of the region (which includes the action area) should some level of water warming occur It is unknown what the scale of additive effects to protected species would be should water temperatures increase, but the effect is assumed to be negative.

Implementation of the proposed changes to the SMP would not result in any measurable negative effects to global climate in general. The mitigation planting requirements outlined in Appendix H, designed to help offset negative environmental impacts from boat docks and vegetation modification permits, could also beneficially contribute to carbon dioxide uptake and result in very minor positive effects on local climate conditions.

SECTION 4—COMPLIANCE WITH APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

4.1 National Environmental Policy Act

This environmental assessment was prepared pursuant to regulations implementing the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.). The NEPA provides a commitment that Federal agencies will consider the environmental effects of their actions. Completion of this programmatic environmental assessment and signing of a Finding of No Significant Impact (FONSI), if applicable, fulfills the requirements of the NEPA.

4.2 Clean Water Act

The Federal Water Pollution Control Act (33 U.S.C. §1251 et seq., as amended) is more commonly referred to as the Clean Water Act. This act is the primary legislative vehicle for Federal water pollution control programs and the basic structure for regulating discharges of pollutants into waters of the United States. The act was established to restore and maintain the chemical, physical, and biological integrity of the Nation's waters and sets goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment. The act has been amended numerous times and given a number of titles and codifications.

Activities that include in water construction activities will be reviewed individually to determine any water quality impacts. Any necessary permitting under this act will be conducted.

Section 404 of the Clean Water Act established a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the U. S. regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the U. S., unless the activity is exempt from Section 404 regulation. Many normal farming practices are exempt from Section 404. The definition of "fill material" within section 404 of the Clean Water Act was revised in 2002 (33 CFR Part 323). The term "fill material" means material placed in waters of the U.S. where the material has the effect of: 1) replacing any portion of a water of the U.S. with dry land, or 2) changing the bottom elevation of any portion of a water of the U.S. "Fill material" would not be discharged by activities covered under SMP permits. However, if pilings are used for new construction or retrofitting docks to meet SMP dock criteria, pilings would be considered "fill material" and therefore subject to Section 404.

Section 402 of the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) program, pertains to discharge of pollutants. No pollutants would be discharged into waters of the U.S. by activities covered under SMP permits.

4.3 Endangered Species Act

The Endangered Species Act (ESA) established a national program for the conservation of threatened and endangered fish, wildlife and plants and the habitat upon which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the USFWS and NMFS, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. Section 7(c) of the ESA and the Federal regulations on endangered species coordination (50 CFR §402.12) require that Federal agencies prepare biological assessments of the potential effects of major actions on listed species and critical habitat.

The USFWS and NMFS were consulted regarding fish and wildlife species listed and proposed to be listed under the ESA. A biological assessment was prepared for the preferred alternative and forwarded to the USFWS and NMFS on July 27, 2010 to address species and habitat impacts (see Appendix D). The Corps determined that the preferred alternative may affect and is likely to adversely affect several anadromous salmonid stocks including Upper Columbia River spring Chinook salmon, Upper Columbia River steelhead, Middle Columbia River steelhead, Snake River sockeye salmon, Snake River steelhead, Snake River spring/summer Chinook salmon, and Snake River fall Chinook salmon. The preferred alternative is not likely to adversely affect bull trout.

Any requirements or recommendations from NMFS are provided in the Biological Opinion (Appendix E) and subsequent coordination between the Corps and NMFS concerning changes to the preferred alternative that have resulted from public comments, have been incorporated into this EA and addressed in the FONSI, if appropriate. A Letter of Concurrence dated November 19, 2010 was received from the USFWS and is attached as Appendix F.

Email correspondence between the Corps and NMFS on December 6, 2011 concerning changes to the preferred alternative that have resulted from public comments confirmed that the preferred alternative has been captured in NMFS' Biological Opinion. NMFS considered the changes and concluded that they "would not increase the amount or extent of take of any listed species authorized in our Biological Opinion issued to the Corps of Engineers concerning the Shoreline Management Plan." NMFS also indicated that minor variances within the Shoreline Plan, while ensuring that the Corps meets the intent of the Biological Opinion, would be captured in each Standard Project Information Form (SPIF) submitted to NMFS for approval. In other email communication between the Corps and USFWS on December 8, 2011, USFWS recommended that the Corps revisit the concurrence letter and biological assessment to determine if the changes to the preferred alternative that have resulted from public comments would result in effects to bull trout or bull trout critical habitat that were not previously considered. As the anticipated effects have not changed, then no further action is necessary, as indicated by USFWS.

4.4 National Historic Preservation Act

The NHPA, particularly Section 106, together with its implementing regulations (36 CFR, Part 800), lays out a process for agencies to follow in assessing potential impacts to historic properties that may result from a proposed Federal undertaking. The term, historic property, is used to denote prehistoric and historic properties, as well as Traditional Cultural Properties (TCPs). The process calls for a federal agency to identify if historic properties are present and, if so, to assess their significance and identify and coordinate with interested parties. The significance or non-significance of a historic property is based on a set of defined criteria. If determined significant, the historic property is then eligible for listing in the National Register of Historic Properties (NRHP). It is only listed and eligible historic properties that a federal agency is required to address under the NHPA.

Under Section 106 of the NHPA, it states that a federal agency shall take into account the effect of its undertakings on historic properties included in or eligible for inclusion in the NRHP. It also says that the agency shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on its undertaking. As part of its required Section 106 consultation/coordination process, the Corps also routinely works with the appropriate State Historic Preservation Office (SHPO), Native American Indian tribes and other interested parties in managing historic properties.

The Corps determined that enactment of the SMP does not authorize, require, or result in any ground disturbance or other action that has the potential to affect cultural properties (Appendix C). Future permits for individual actions under the SMP will be reviewed in compliance with the NHPA, Section 106 and its implementing regulations.

4.5 Rivers and Harbors Act, Section 10

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 *et seq.*) requires authorization from the U.S. Army Corps of Engineers for the construction of any structure in or over any navigable water of the U.S., the excavation/dredging or deposition of material in these waters or any obstruction or alteration in a “navigable water”. Structure or work outside the limits defined for navigable waters of the U.S. require a Section 10 permit if the structure or work affects the course, location, condition, or capacity of the water body. Section 10 permits may be required for fixed recreational facilities, therefore, individual reviews of dock permit applications would be conducted on a case by case basis.

SECTION 5—COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

5.1 Agency Coordination

This is a Revised Programmatic Environmental Assessment. Updating of the McNary SMP has been an on-going activity with multiple agency involvement since 2006. The Corps has worked continuously with state and federal agencies on development of dock criteria and vegetation modification to assure consistency throughout the region with this type of development for protection of ESA-listed species while responding to public recreational needs.

The Corps consulted with NMFS on the potential effects to ESA listed anadromous fish species. Formal consultation began with the Corps' submission of a biological assessment (BA) on July 27, 2010. NMFS issued a Biological Opinion on April 14, 2011. Changes to the preferred alternative that resulted from public comments were coordinated with NMFS after the issuance of their Opinion to ensure that the changes were within the scope of the original consultation.

The Corps also initiated consultation with the U.S. Fish and Wildlife Service on the potential effects to bull trout with the submission of a BA on July 27, 2010. The USFWS concurred with the Corps determinations and stated so in a Letter of Concurrence dated November 19, 2010.

The Corps has worked closely with NMFS and the Washington Department of Fish and Wildlife (WDFW) on design criteria for private boat docks. WDFW is the agency responsible for review of Hydraulic Project Approval applications [via the Joint Aquatic Resource Permit Application (JARPA)] for boat docks. In addition, Corps technical staff coordinated with various entities and agencies, including Benton and Franklin Counties, the U.S. Coast Guard, Washington State Department of Ecology and Washington State Department of Natural Resources.

The Corps offered Government to Government consultation with the Umatilla Tribe, Nez Perce Tribe, Colville Tribe, and Wanapum. Tribal technical staffs were offered the opportunity to provide comments on the SMP, and several commented on proposed actions and general development on the McNary shoreline.

5.2 Public Involvement

5.2.1 Scoping

As part of the public involvement process for development of the McNary Shoreline Management Plan and the 2006 EA, a public scoping meeting was held in Pasco, Washington on September 18, 2006. A total of 92 people attended the open house and workshop sessions. Meeting participants represented adjacent land owners;

representatives from the cities of Pasco, Kennewick and Richland; county and port officials; congressional representatives; representatives from Washington Department of Natural Resources; Washington Department of Fish and Wildlife and interested local citizens.

After reviewing comments from the scoping meeting and ongoing discussions with agency representatives, the team formulated a plan that met requirements of shoreline management while responding to public needs and assuring protection of endangered species and critical habitat.

Beginning in March of 2007 and extending through August 2007, progress on the SMP was halted by the Corps of Engineers' Northwestern Division office so that impacts of the FCRPS Biological Opinion remand could be better assessed in regard to future management of the McNary shoreline.

5.2.2 Public Review of the Draft SMP and Environmental Assessment

The draft SMP and the EA were sent out for public review in January 2009. The documents were available on the internet at *http://www.nww.usace.army.mil/McNaryShoreline/*. Hard copies were available upon request.

A public meeting to discuss the draft SMP and EA was held on January 14, 2009 in Pasco, Washington at Columbia Basin College. At that time, the public review period was extended to July 14, 2009. During the six-month review period, the Corps received approximately 116 comment letters and also met with multiple private citizens and fielded many phone calls to answer questions or provide information. Several comments that were received seemed to indicate a general aversion to the Corps' preferred alternative (revising the SMP to require new dock design criteria for new docks). Other comments pertained to an assumption that the Corps was not basing the SMP dock criteria on hard, scientific evidence. In response to such concerns, the Corps ordered a scientific peer review conducted by the U.S. Geological Survey, Biological Resources Division, Western Fisheries Research Center of the SMP dock criteria derived from the Anadromous Fish Evaluation Program Report, titled, "Minimizing Effects of Over-Water Docks on Federally Listed Fish Stocks in McNary Reservoir: A Literature Review for Criteria". In addition, this criterion was compared to criteria used for construction of private docks on the upper and lower Columbia River and found to be consistent with those criteria.

In addition to the public meetings, briefings were held with the Tri-Cities Rivershore Enhancement Committee (TREC) in July 2006 and June 2010, with the Pasco City Council in July 2009, Walla Walla/Tri-Cities Building Association in March 2009, and with the Tri-Cities Realtors Association in December 2006. Additional meetings with interest groups such as the Audubon Society and the Rod and Gun Club were offered, but not accepted. Information regarding the process and progress has been posted to the Walla Walla District website (*www.nww.usace.army.mil/McNaryShoreline/*). Corps staff provided press releases and interviews to the press regarding the McNary Shoreline Management Plan.

In May 2011, the updated SMP and Revised Programmatic EA were completed and made available to the public for review and comment. On May 17, 2011, the Corps had a meeting with the Tri-Cities city and county officials. A public meeting was held in Pasco on June 9, 2011 in which approximately 180 people attended. During the 90-day review period, from May 27 to August 27, 2011 approximately 66 comments were received. In response to those comments and after extensive review, the Corps modified the SMP and accompanying EA. In preparation of release of the modified SMP and Revised EA, the Corps held a series of meetings with current dock owners (grouped together by LDA) during the last week of September and in mid-October 2011. The modified SMP and Revised EA were formally released for a 30 day public review and comment period on October 27, 2011. The Corps also held a public meeting on November 9, 2011, in Pasco, in which interested parties were given the opportunity to comment on the revised documents. As a result of those comments, the Corps modified the shoreline allocations slightly and created a 2,018 foot limited development area on the Snake River in the Burbank Heights area.

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Appendix A:

Columbia River Basin Dock Design Criteria Table

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Piers and Ramps					
To prevent damage to shallow water habitat, piers and or ramps shall extend at least **40 feet** perpendicular from the OHWM	Yes* *The Corps recognizes that in some instances and sites, it may not be practical to extend a ramp 40' from OHWM (for instance, where this could conflict with navigation). The Corps will consider exceptions on a case-by-case basis.	Yes – **20'** perpendicular of OHWM	Yes –**50'** perpendicular of OHWM	Ramps and their attendant docks should not extend out into the stream more than 10% of the width of the stream (measured from OHWM). Docks on the Columbia River may extend out into the river farther (see additional criteria). Docks less than or equal to 6' in width should be located 50 feet from the shoreline and have 20 feet of water depth below the float (both criteria measured at mean low water).	Yes – though no discrete number is used: " New or renovated ramps and launches must be an elevated design of sufficient height off the nearshore to minimize the obstruction of currents, alteration of sediment transport, and eliminate the accumulation of drift logs and debris under the ramps. In instances where the substrate is suitable for forage fish spawning, the structure must also span the spawning areas.
Piers and ramps shall be no more than 4' in width	Yes	Yes		Ramp width should not exceed 5 feet.	Yes – though no discrete number is used. See above
The bottom of the pier or bottom of the landward edge of the ramp shall be elevated at least **2 feet** above the plane of OHWM	Yes	Yes - The bottom of the landward edge of the ramp shall be elevated at least **2'** above the plane of OHWM			Yes – though no discrete number is given. New overwater structures must be located in water sufficiently deep to prevent grounding, keeping the bottom of the structure at least 0.5 meters (1.5 feet) above the level of the substrate
Grating shall cover the entire surface area (100%) of the pier and/or ramp. The open area grating shall be at least **50%** as rated by the manufacturer.	Yes	Yes, though open area of grating is required to be 60%. "The open area of grating shall be at least **60%**. Clear translucent material shall have greater than 90% light transmittance as rated by the manufacturer."	Yes. Requires minimum **40%** light penetration	The ramp out to the dock should be 100% grated to allow light to pass through. Docks in excess of 6 feet in width should have at least 50% of the float surface grated (allowing 60% light transmission) and be located in water that maintains a flow velocity of at least 7 feet per second.	Yes. "The portions of piers, elevated docks that are over the nearshore/littoral area must have unobstructed grating over at least 50% of the surface area. Floating docks 1.5 meters (5 feet) or greater in width, must have unobstructed grating over at least 50% of the surface. Floating docks less than 1.5 meters in width must have unobstructed grating over at least 30% of the surface. All grating material must have at least **60%** functional open space. Grating requirements can also be met if the combination of grated surface area and grating open space are equal or better than the above standards. Gangways must incorporate 100% grating with **60%** functional open space

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Piers and Ramps					
Skirting shall not be placed on piers, ramps, or floats. Protective bumper material will be allowed along the outside edge of the float as long as material does not extend below the bottom edge of the float frame or impede light penetration	Yes	Yes – skirting shall not be placed on piers, ramps and floats			Yes – Skirting is prohibited. Tires are prohibited as part of above and below water structures or where tires contact the water (e.g. floatation, fenders, hinges). Existing tires must be replaced with inert or encapsulated materials such as plastic or enclosed foam, during maintenance or repair of the structure.
Shoreline concrete anchors must be placed at least 10 feet landward from the OHWM and shall be sized no larger than 4' wide by 4' long, unless otherwise approved by NMFS, USACE, and WDFW	Yes* *The intent of this criterion is to limit impacts to riparian vegetation along the shoreline. The Corps may evaluate placement of anchor blocks individually if requested, and allow variance from the 10 foot landward requirement if site conditions warrant that. Exceptions will be considered on a case-by-case basis to accommodate reasonable and safe designs.	No – does not address concrete anchors			No – does not address concrete anchors
Pilings and Float Anchors					
Pilings shall not exceed **5"** in diameter	Yes, although NOAA now allows anchors 8" in diameter	Yes. "Pilings shall not exceed **4"** in diameter. If piling is encased in a sleeve, the piling plus sleeve diameter shall not exceed **5"**."			Piling width not specified
Piling shall be spaced at least 18 feet apart on the same side of any component of the overwater structure. The pier/ramp and float are separate components	Yes	Yes. Piling shall be spaced at least 18 feet apart on the same side of any component of the overwater structure. The pier and floats are separate components. Two joint-use floats linked together constitute one component			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Pilings and Float Anchors					
Each over water structure shall utilize no more than **6 piles** total for the entire project	Yes	Yes. Each overwater structure shall utilize no more than **10 piles**			Number of pilings not restricted
Pilings shall be white in color	No	Yes			
All pilings shall be fitted with devices to prevent perching by piscivourous (fish-eating) birds	Yes	Yes. All piling, mooring buoys and navigation aids shall be fitted with devices to prevent perching by piscivourous (fish eating) birds	Yes	All pilings should be fitted with devices to prevent perching by piscivorus birds	
If a drop or impact hammer is used to install or achieve full embedment of steel piling, one of the following sound attenuation methods shall be employed: a. placement of a 6” thick piece of wood between the hammer and the piling b. Use of a bubble curtain that distributes air bubbles around 100% of the perimeter of the piling over the full depth of the water column. (Bubble curtain design information is available at the Corps website).	No	Yes			
Pilings must be installed using a vibratory hammer. No impact driving allowed			Yes		
Submerged float anchors will be constructed out of concrete and shall be horizontally compressed in form, by a factor of 5 or more, for a minimum profile above the stream bed (the horizontal length and width will be at least 5 times the vertical height).	Yes	No			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Pilings and Float Anchors					
No in-water fill material will be allowed, with the exception of pilings and float anchors (Note: uncured concrete or it's by-products will not be allowed)	Yes	No			
Floats					
Float components shall not exceed the dimensions of 8 – by – 20 feet or an aggregate total of 160 square feet for all float components	Yes	Yes. Floats shall not exceed dimensions of 8' x 20'			
Float materials contacting the water shall be white in color	No	Yes. Float materials contacting the water shall be white in color or translucent			
Floatation materials shall be permanently encapsulated to prevent breakup into small pieces and dispersal in water (e.g. rectangular float tubs)	Yes	Yes – same language		Float materials should be composed of closed cell expanded polystryrene (EPS) materials (which are further enclosed in some protective material for protection from abrasion and rodents). Other types of floats should be reviewed. Open cell EPS, and metal or plastic industrial drums should not be used. Oregon law requires encapsulation of expanded polystyrene foam floatation used in state waters. Encapsulation methods and materials must be approved by the Oregon State Marine Board prior to installation of foam floatation.	

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Floats					
Grating shall cover **100%** of the surface area of the floats. The open area of the grating shall be no less than **50%** as rated by the manufacturer.	Yes	Yes – functional grating or clear translucent material shall cover at least **50%** of the surface area of floats. Submit a framing plan for the proposed floats with calculations showing the % functional grating. The open area of the float grating shall be at least **60%**. Clear translucent material must have greater than 90% light transmittance as rated by the manufacturer	Yes – requires 40% light penetration	Docks in excess of 6 feet in width should have at least 50% of the float surface composed of grating containing at least 60% open space surface.	Yes – see above
Functional grating will cover no less than 50% of the float	Yes	Yes. Functional grating or clear translucent material shall cover at least 50% of the surface area of floats. Submit a framing plan for the proposed floats with calculations showing the % functional grating (see appdx C). The open area of float grating shall be at least 60%. Clear translucent material must have greater than 90% light transmittance as rated by the manufacturer.		See above	Yes. The portion of piers, elevated docks that are over the nearshore/littoral area must have unobstructed grating over at least 50 percent of the surface area. Floating docks 1.5 meters (5 feet) or greater in width, must have unobstructed grating over at least 50% of the surface. Floating docks less than 1.5 meters (5') in width must have unobstructed grating over at least 30% of the surface. All grating material must have at least 60% functional space. Grating requirements can also be met if the combination of grated surface area and grating open space are equal or better than the above standards. Gangways must incorporate 100% grating with 60% functional open space.

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Floats					
Floats shall not be located in shallow water habitat where they could ground or impede the passage or rearing of any life stage of salmonids. Floats shall be in at least **10'** of water at all reservoir pool levels, including Minimum Operating Pool (MOP which is 335 feet above sea level). Depth is measured from the bottom of the landward-most edge of the float	Yes – though moving forward this issue is addressed by shoreline zoning, not as an individual dock criteria	Yes. - Floats shall not be located in shallow water habitat where they could ground or impede salmonid passage - To receive authorization for permanent floats, water depth at the landward edge of the float shall be at least: **14'** for Rock Island and Rocky Reach reservoirs and the Okanogan River. **18'** for Wells reservoir. - To receive authorization for temporary floats, water depth at the landward edge of the floats shall be at least **7'** for Rock Island and Rocky Reach reservoirs and the Okanagon River and **11'** for Wells Reservoir	Yes. Requires docks be located in minimum depth of **20'**	Docks less than or equal to 6 feet in width should be located 50 feet from the shoreline and have **20 feet** of water depth below the float (both criteria measured at mean low water).	Yes. Depth requirement is at least **7'** at the lowest low water, or where it can be shown that prop scour will not adversely impact aquatic vegetation or increase suspended sediment loads.
Nothing shall be placed on the over-water structure that will reduce natural light penetration through the structure	Yes (regulation?)	No comparable criteria		Grated surfaces on the docks should not be used for storage or other purposes that will reduce natural light penetration through the structure.	No comparable criteria

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Floats					
Floats shall be positioned at least 40' horizontally from the OHWM and no more than 100' from the OHWM as measured from the landward-most edge of the float.	Yes* *In some locations this may present issues of safety or be excessive for site conditions. The Corps will work with landowners on an individual basis to adjust this requirement where it makes sense on a case-by-case basis.	No		Docks less than or equal to 6' in width should be located 50' from the shoreline and have 20' of water depth below the float.	
For private use structures a maximum of 1 float shall be installed. A maximum of 2 floats shall be installed for joint-use structures. Joint-use requires at least two contiguous waterfront property owners as applicants for the Corp s permit.	No – current plan does not address joint use (group) structures	Yes		Total area of dock on water should not exceed 144 sq. feet (maximum size should be 6' x 24') and no part should be covered or enclosed. Docks serving two or more adjacent home owners can be 6' x 48' in size.	
Freeboard height on floats shall be at least 10"	No	Yes			
Preservatives					
The dock shall be built with materials that do not leach preservatives or other materials	Yes	Yes – more specific language (see below)	Yes		
No treated wood of any kind shall be used on any overwater structure (float, pier, or ramp)	Yes	Yes & No – more specific language (see below)	Yes	Deck boards, structural members, rub rails, and pilings should not be of treated wood (unless they are completely encapsulated in a non-toxic sealant, prior to being placed in the water).	
No paint, stain or preservative shall be applied to the overwater structure	Yes	Yes – more specific language (see below)	Yes		

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Presevatives					
Treated wood may be used for piling provided the applicant demonstrates that the copper concentration in the water column and sediment will not exceed 7 parts per billion at 55 mg/L hardness and 34 pars per million, respectively, as measured by a prescribed NMFS method (available at the NWS website)	No	Yes		See above	
Piling treated with creosote or pentachlorophenol shall not be used	Yes – more general language (see above)	Yes			
The permittee shall visually inspect and replace any treated wood piling with surface residues and/or bleeding of preservatives	No – preservatives not allowed (may ask for retrofits)	Yes			
Treated wood piling shall incorporate design features (e.g. metal bands) to minimize abrasion of the piling by vessels, floats or other objects	No	Yes			
Treated wood shall not be used for any above-water component (e.g. structurel members, framing, fascia, hand railing, etc) on piers, ramps, and floats	Yes – more general language (see above)	Yes		See above	
Any paint, stain or preservative applied to the overwater structure shall be completely dried or cured prior to installation	Yes – paint etc prohibited	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Preservatives					
Projects that require removal of treated wood will take care to ensure that no treated wood falls into the water. If treated wood debris does fall into the water it shall be removed immediately.	No – current plan does not address retrofits	Yes			
If pilings are removed: a. dislodge piling with a vibratory system. b. After removal, place the piling on a construction barge or other dry storage site c. If a treated wood piling breaks during extraction, the stump must be removed from the water column (by cutting it 3' below the substrate or pushing it to that depth). The buried stump must then be capped with clean native sediment. d. Fill holes left by piling extraction with clean native sediment	No – current plan does not address removal or retrofits	Yes			
All treated wood removed during the project, including treated wood piling, shall be disposed at an upland facility approved for hazardous materials of this classification. Treated wood piling shall not be left in the water or stacked on the streambank.	No – current plan does not address removal or retrofit	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Preconstruction and Construction Activities					
If native vegetation is removed, damaged, or destroyed, it shall be replaced with a functional native species equivalent during site restoration	Yes	Yes. Also asks applicant to indicate on application number and species to be removed and replaced.	Yes – minimize disturbance to riparian vegetation – may require mitigation		
Any large wood, native vegetation, topsoil, and/or native channel material displaced by construction shall be stockpiled for use during site restoration	Yes	Yes, but indicates "weed-free topsoil"			
No existing habitat features (e.g. woody debris, substrate materials) shall be removed from the shore or aquatic environment	Yes	Yes. Adds, "If invasive weeds (e.g. milfoil) are present, removal may occur with authorization from WDFW."			
Construction impacts shall be confined to the minimum area needed to complete the project.	Yes	Yes			
The boundaries of clearing limits associated with site access and construction shall be flagged to prevent ground disturbance of riparian vegetation, wetlands, and other sensitive sites beyond the flagged boundary. This action shall be completed before any significant alteration of the project area.	Yes	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Preconstruction and Construction Activities					
A supply of sediment control materials (e.g. silt fence, straw bales, coconut fiber COIR bales) shall be available onsite. This action shall be completed before significant alteration of the project area.	Yes	Yes. "A supply of sediment control measures (e.g. silt fence, straw bales) shall be available onsite. This action shall be completed before significant alteration of the project area. When available, certified weed-free straw or hay bales shall be used to prevent introduction of noxious weeds			
All temporary erosion controls shall be in place and appropriately installed downslope of project activities within the riparian area until restoration is complete.	Yes	Yes			
Project construction shall cease under high flow conditions that could result in inundation of the project area except for efforts to avoid or minimize resource damage	Yes	Yes			
Pollution and Erosion Control Measures					
A Pollution and Erosion Control Plan (PECP) shall be prepared and carried out to prevent pollution caused by construction operations. The plan shall be available for inspection by the Corps or NMFS. The PECP shall contain the pertinent elements listed below and meet requirements of all applicable laws and regulations	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Pollution and Erosion Control Measures					
The PECP shall list the name and address of the party(s) responsible for implementation of the PECP	No	Yes			
The PECP shall include practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas and roads being decommissioned	No	Yes			
The PECP shall include practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or binding agents, including measures for washout facilities.	No	Yes			
The PECP shall include a description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling and monitoring of the products.	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Pollution and Erosion Control Measures					
The PECP shall include a spill containment and control plan that provides the following information: notification procedures; specific cleanup and disposal instructions for different products; quick-response containment and cleanup measures; proposed methods for disposal of spilled materials; employee training for spill containment. Materials for containment and cleanup shall be available onsite during preconstruction, construction, and restoration phases of the project	No	Yes			
The PECP shall include practices to prevent construction debris from dropping into any stream or waterbody and to remove any material that does drop with minimum disturbance to the streambed and water quality.	No	Yes			
Heavy Equipment Use					
All heavy equipment shall be clean and free of external oil, fuel or other potential pollutants	No	Yes			
All equipment to be used below OHW shall be steam cleaned until all visible external oil, grease, mud and other visible contaminants are removed. This cleaning shall occur before operations begin and as often as is necessary during operation	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Heavy Equipment Use					
When heavy equipment is used, the equipment will have the least adverse effects on the environment (e.g. minimally sized, low ground pressure equipment)	No	Yes			
Only enough supplies and equipment to complete a specific job shall be stored onsite	No	Yes			
Vehicle staging, cleaning, maintenance, refueling and fuel storage shall only occur in a vehicle staging area placed 150' or more from any stream, waterbody or wetland unless otherwise approved in writing by NMFS	No	Yes			
All vehicles operated within 150' of any stream, waterbody, or wetland shall be inspected daily for fuel leaks before leaving the vehicle staging area. Any leaks detected shall be repaired in the vehicle staging area before the vehicle resumes operation. Inspections shall be documented in a record for review on request by the Corps, NMFS, or USFWS	No	Yes			
All stationary power equipment (e.g. generators, cranes, stationary drilling equipment) operated within 150' of any stream, waterbody, or wetland shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering any stream or waterbody	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Heavy Equipment Use					
Heavy equipment shall work from onshore staging areas with the exception of an excavator arm or bucket. Pile drivers may use constructed work platforms (e.g. a barge) to access construction locations.	No	Yes			
General					
No electricity shall be provided to or on the overwater structure	Yes	No			No
No boat lifts or watercraft lifts (e.g. jet ski lifts) of any type will be placed on or in addition to the overwater structure	Yes* *The Corps will assess boat lifts and their impacts, if proposed, if the applicant can demonstrate that the proposed boat lift meets the intent of the criteria to minimize structure, maximize light, and maximize depth. However, these structures must meet the size criteria of the plan (160 square feet).	No			
Shoreline armoring (i.e. bulkheads, rip-rap, and retaining walls) shall not occur in association with installation of the overwater structure	Yes				
Construction of the overwater structure shall be completed during the in-water work window of December 1 to February 28	Yes	Yes – work windows for Chinook, bull trout, and bald eagle			
Vegetation Enhancement					
Riparian vegetation will be planted, maintained, and/or enhanced along the entirety of the Corps waterfront land adjacent to the overwater structure	Yes	Yes – in much greater detail (see below)			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Vegetation Enhancement					
For mitigation planting, the planting shall include native shrubs and trees from the following list. The use of native shrubs and trees not listed here must be approved by the Corps and WDFW. (list provided)	Yes	Yes (list provided)			
Shrubs and trees shall be planted at intervals of 3 and 10 feet, respectively. Trees and shrubs will be planted at a 1 to 10 ration (1 tree for every 10 shrubs)	Yes	Yes, same planting interval, but with different specs. "At least 2 trees and 15 shrubs shall be included in each 10' by 20' plot. For a 10' by 10' plot, at least 1 tree and 8 shrubs shall be included in the plot. The applicant shall submit a mitigation planting plan with the application. The mitigation planting shall be constructed within 12 months of the Corps issuance of a permit for the proposed work and no later than the first April 15th following construction.			
All plants shall be planted between February 15 and June 1 and be completed by June 1 of the same year following the start of construction of the overwater structure.	Yes	Yes (see above)			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Vegetation Enhancement					
Plantings must have 100% survival for the first five years after planting. After the first 5 years, survival must be maintained at 80% for shrubs and 100% for trees. Individual plants that die must be replaced inkind (i.e. replace a tree with a tree) with species from the native list above or other species approved by the Corps and WDFW. All trees and shrubs shall be maintained (watered, beaver protection installed, and replaced) for as long as the overwater structure is present, regardless of ownership of the structure.	Yes	Yes, with different survival requirements. "For mitigation planting, 100% survival of all planted trees and shrubs is required during first and second year after planting. During the third through fifth year after planting, 80% survival is required. The permittee must protect the mitigation from damage (the Corps recommends fencing). Individual plants that die must be replaced in kind.			
Select all of the following descriptions that apply to the proposed project. One mitigation unit is required for each box selected. - New overwater structure - Repair, replacement, or modification of an existing overwater structure and the footprint of the new overwater structure. - Previous Corps-required mitigation has been removed from the site	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Vegetation Enhancement					
Each mitigation category listed below is worth 1 mitigation unit. You must provide justification to the Corps if you cannot provide mitigation from category a. You must also provide a plan view drawing of the proposed mitigation. -Plant overhanging vegetation along the shoreline immediately landward of OHW in a plot at least 20' long by 10' wide -Remove 10 linear feet of hardened shoreline and plant the area (10' by 10') with overhanging vegetation - Remove 100 square feet of existing inwater structure such as a pier, piling, concrete or asphalt debris	No	Yes			
A status report on mitigation construction, including as-built drawings, shall be submitted to the Corps 12 months from the date the Corps issues a permit for the proposed work. Status reports on mitigation construction will be due annually to the Corps until the Corps accepts the as-built drawings. The permittee can meet this requirement by submitting to the Corps a completed Status Report for Mitigation Construction, which is provided in Appdx. F. Annually the Corps will inform USFWS and NMFS of applicant compliance with mitigation construction	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Vegetation Enhancement					
For mitigation planting, monitoring reports shall be due annually for 5 years from the date the Corps accepts the as-built drawings. The monitoring report must include written and photographic documentation on tree and shrub mortality and replanting efforts. The permittee can meet this requirement by submitting to the Corps a completed Mitigation Monitoring Report, which is provided in Appdx. G. Annually the Corps will inform USFWS and NMFS of applicant compliance with mitigation monitoring.	No	Yes			
The mitigation planting shall be preserved for as long as the permitted project remains in place	Yes (see above)	Yes			
Fertilizer, pesticides, and herbicides shall not be applied to mitigation planting areas.	No	Yes			
Site Restoration					
A site restoration plan shall be prepared and carried out as necessary to ensure that all stream banks, soils and vegetation disturbed by the project are cleaned up and restored. A written restoration plan shall be available for inspection on request by the Corps, NMFS, or USFWS	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Site Restoration					
Damaged stream banks shall be restored to a natural slope pattern and profile that is suitable for establishment of permanent woody vegetation unless precluded by pre-project conditions (e.g. a natural rock wall)	No	Yes			
Areas requiring revegetation shall be replanted before the first April 15th following construction. A diverse assemblage of species native to the project area of region, including grasses, forbs, shrubs, and trees shall be used. Noxious or invasive species shall not be used.	Yes. Planting window specified (See above)	Yes			
Fencing shall be installed as necessary to prevent access to revegetated areas by livestock or unauthorized persons.	No (beaver protection specified)	Yes			
When floating or submerged large wood debris must be moved to allow reasonable use of an overwater structure or in-water facility, the wood shall be returned to the water downstream where it will continue to provide aquatic habitat function.	No	Yes			

Measure	Corps of Engineers – NWW - Mid-Columbia	Corps of Engineers – NWS – Upper Columbia (Regulatory)	Lower Columbia – Corps in consultation with NMFS	Columbia - ODFW	Washington State Dept of Natural Resources
Fish Harm and Site Access					
If a sick, injured or dead specimen of upper Columbia River spring Chinook or upper Columbia River steelhead is found, the finder must notify the Northwest Office of the NMFS Law Enforcement. The finder must take care in handling of sick or injured specimens to ensure effective treatment and in handling dead specimens to preserve biological material in the best possible condition for later analysis of the cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to specimen is not disturbed unnecessarily.	No	Yes (same statement for bull trout)			
The permittee shall provide the NMFS, USFWS, and Corps reasonable access to the project authorized under this application	No, but this language exists in the permit application	Yes			

Appendix B: Shoreline Use Allocation Maps

(These maps are current as of December 2011. A pending land transfer to US Fish and Wildlife Service will affect the total amount of shoreline in the vicinity of Wallula.)

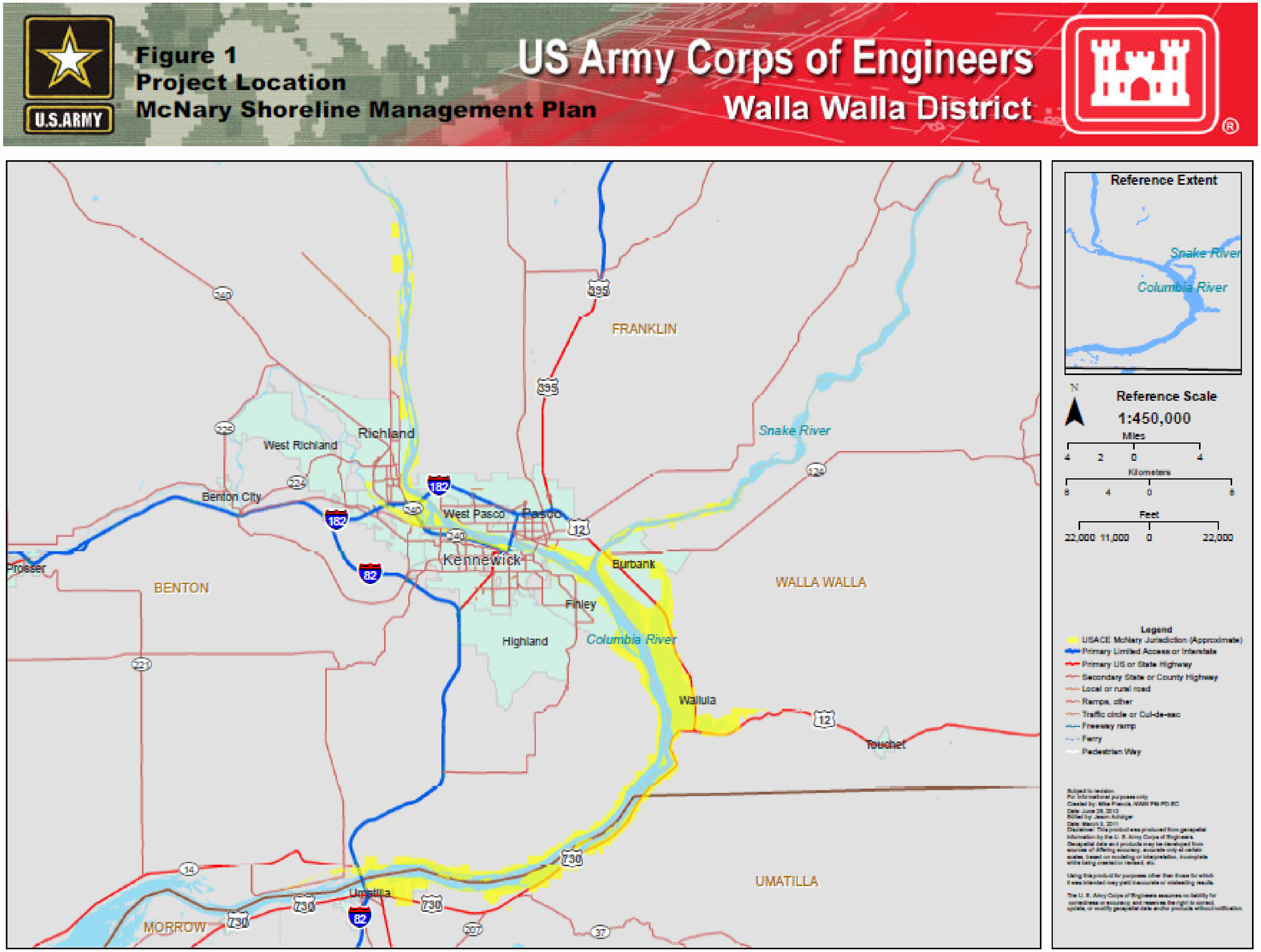
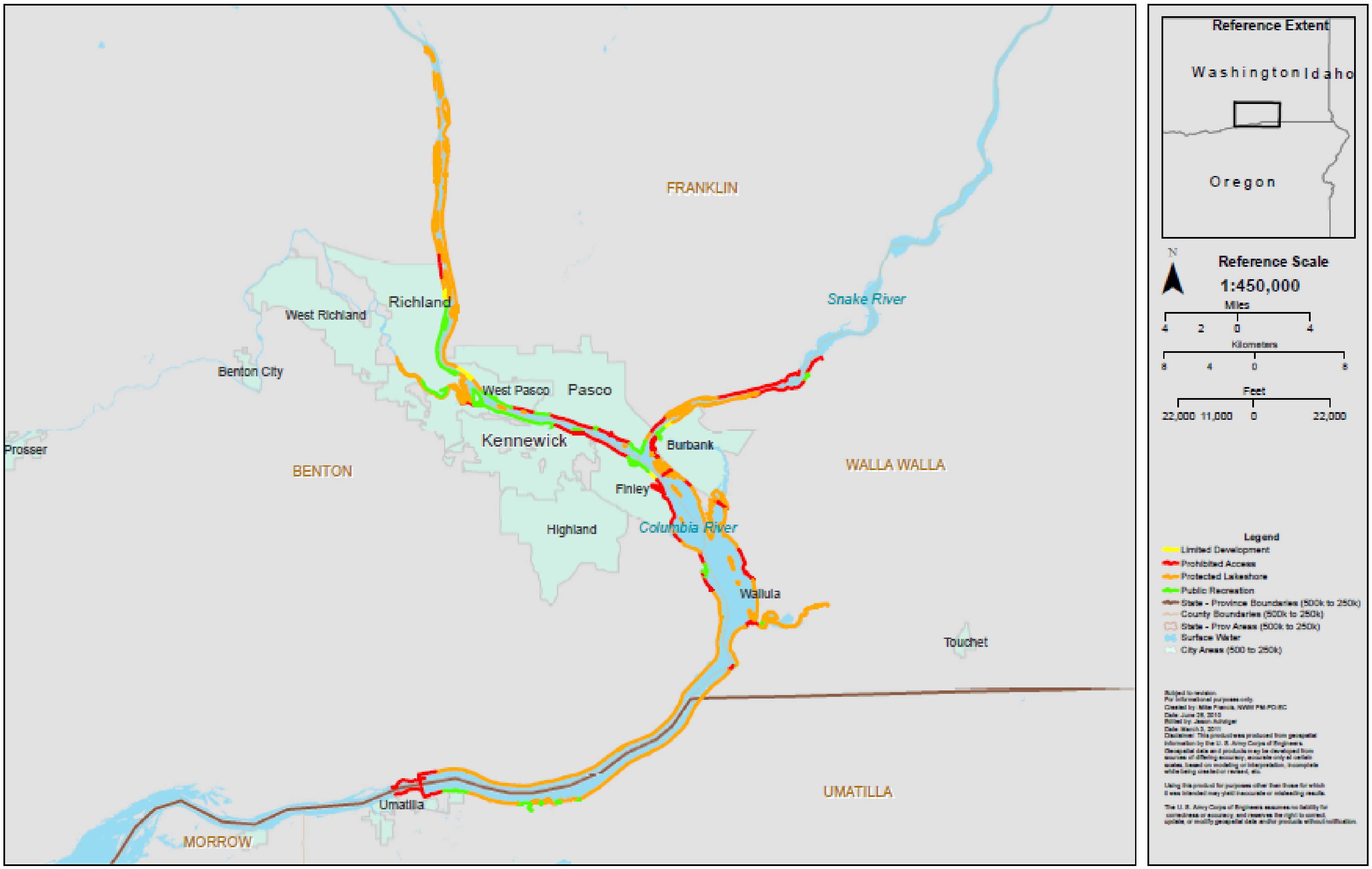

U.S.ARMY
Figure 1
Project Location
McNary Shoreline Management Plan
US Army Corps of Engineers
Walla Walla District
Reference Extent
Snake River
Columbia River
Reference Scale
1:450,000
Miles
4 2 0 4
Kilometers
8 4 0 8
Feet
22,000 11,000 0 22,000
Legend
USACE McNary Jurisdiction (Approximate)
Primary Limited Access or Interstate
Primary US or State Highway
Secondary State or County Highway
Local or rural road
Ramps, other
Traffic circle or Cul-de-sac
Freeway ramp
Ferry
Pedestrian Way
FRANKLIN
BENTON
WALLA WALLA
UMATILLA
MORROW
Richland
West Richland
Benton City
Prosser
West Pasco
Pasco
Kennewick
Burbank
Finley
Highland
Wallula
Touchet
Umatilla
Snake River
Columbia River

Figure 2
Shoreline Allocations
McNary Shoreline Management Plan

US Army Corps of Engineers
Walla Walla District



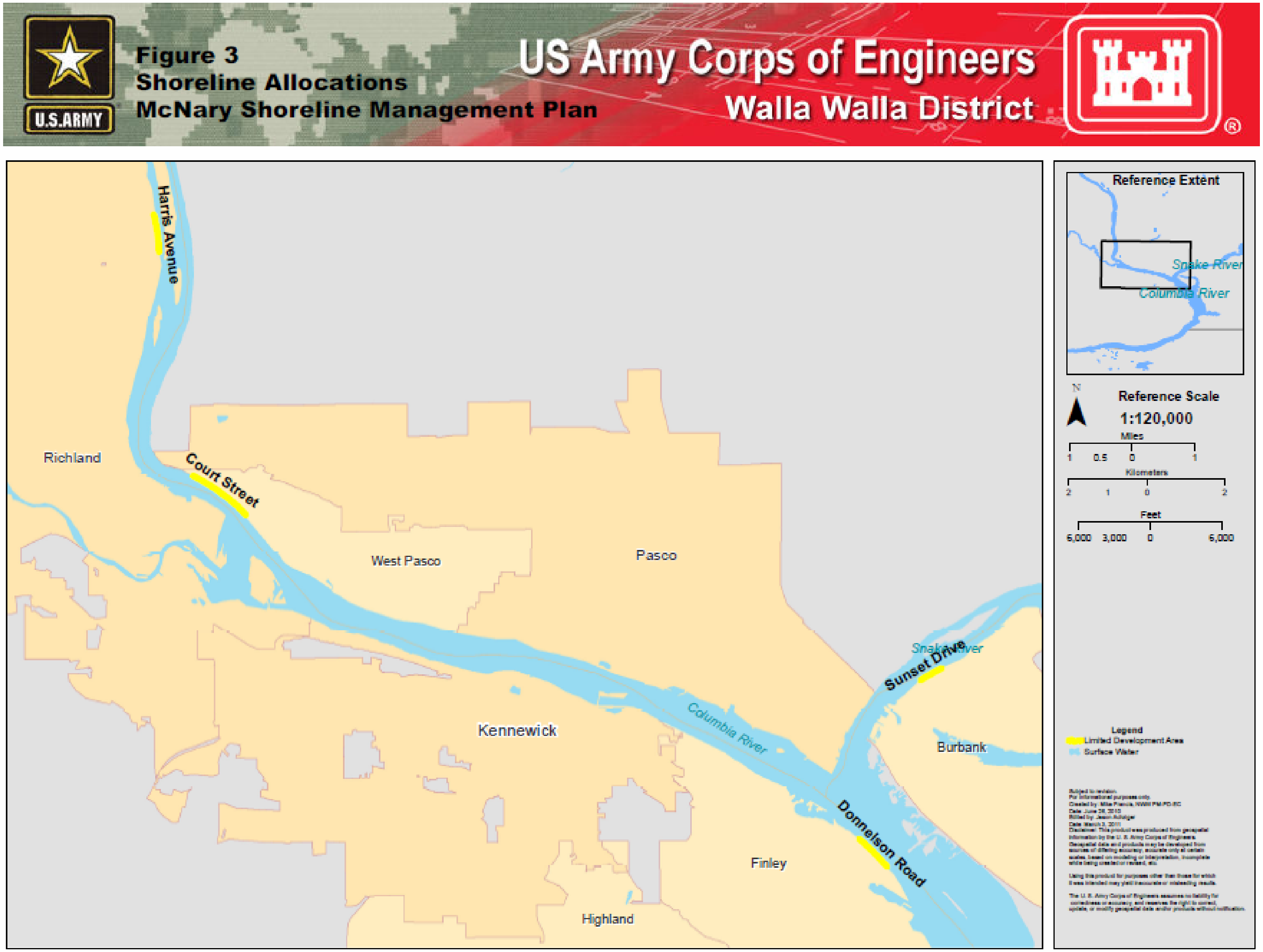


Figure 3
Shoreline Allocations
McNary Shoreline Management Plan
US Army Corps of Engineers
Walla Walla District
U.S.ARMY
Harris Avenue
Richland
Court Street
West Pasco
Pasco
Kennewick
Columbia River
Snake River
Sunset Drive
Burbank
Donnelson Road
Finley
Highland
Reference Extent
Snake River
Columbia River
N
Reference Scale
1:120,000
Miles
1 0.5 0 1
Kilometers
2 1 0 2
Feet
6,000 3,000 0 6,000
Legend
Limited Development Area
Surface Water

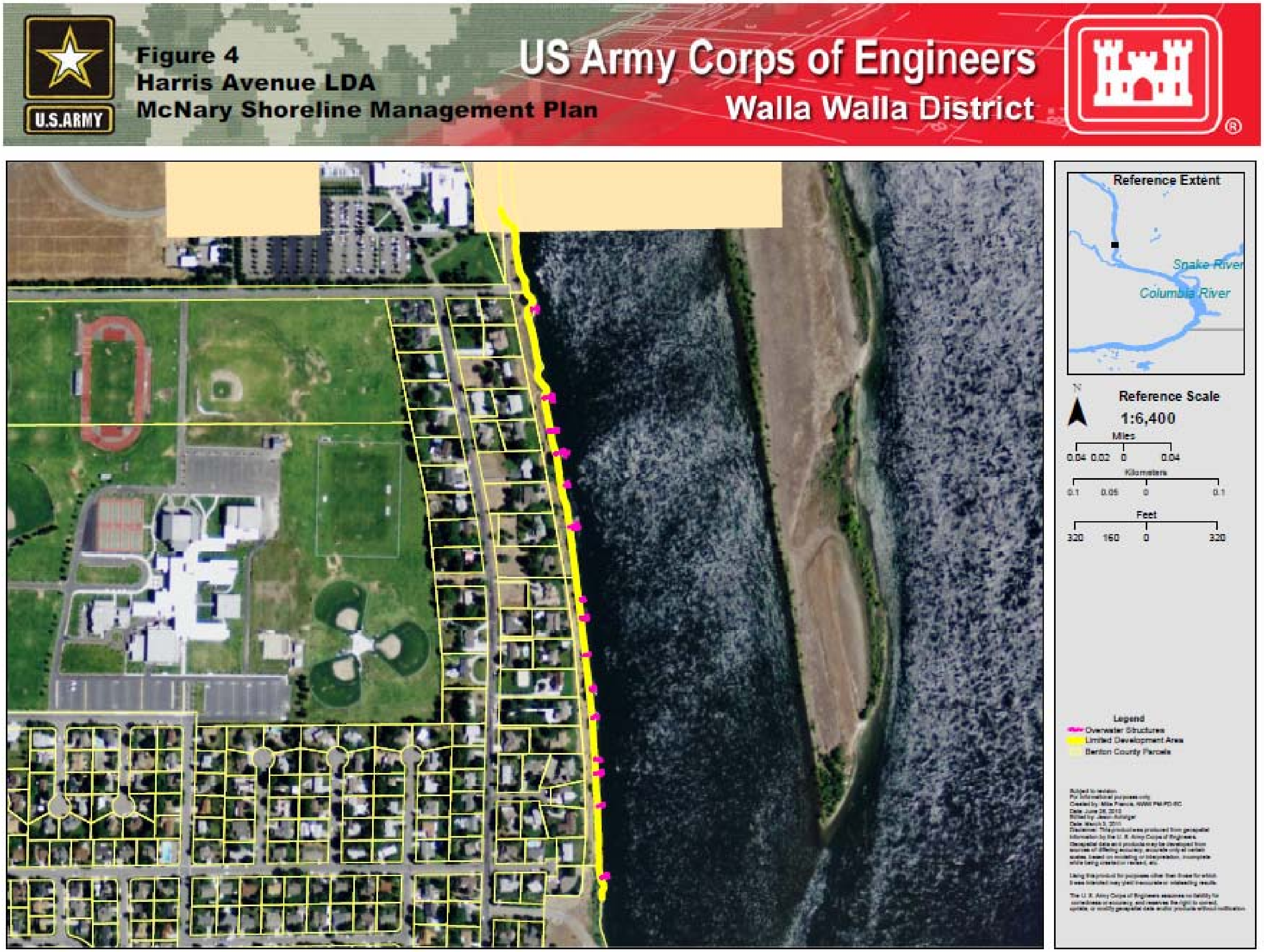

U.S.ARMY
Figure 4
Harris Avenue LDA
McNary Shoreline Management Plan
US Army Corps of Engineers
Walla Walla District
Reference Extent
Snake River
Columbia River
Reference Scale
1:6,400
Miles
0.04 0.02 0 0.04
Kilometers
0.1 0.05 0 0.1
Feet
320 160 0 320
Legend
Overwater Structures
Limited Development Area
Benton County Parcels

Figure 5
Court Street LDA
McNary Shoreline Management Plan

US Army Corps of Engineers
Walla Walla District

Figure 6
Donelson Road LDA
McNary Shoreline Management Plan

US Army Corps of Engineers
Walla Walla District

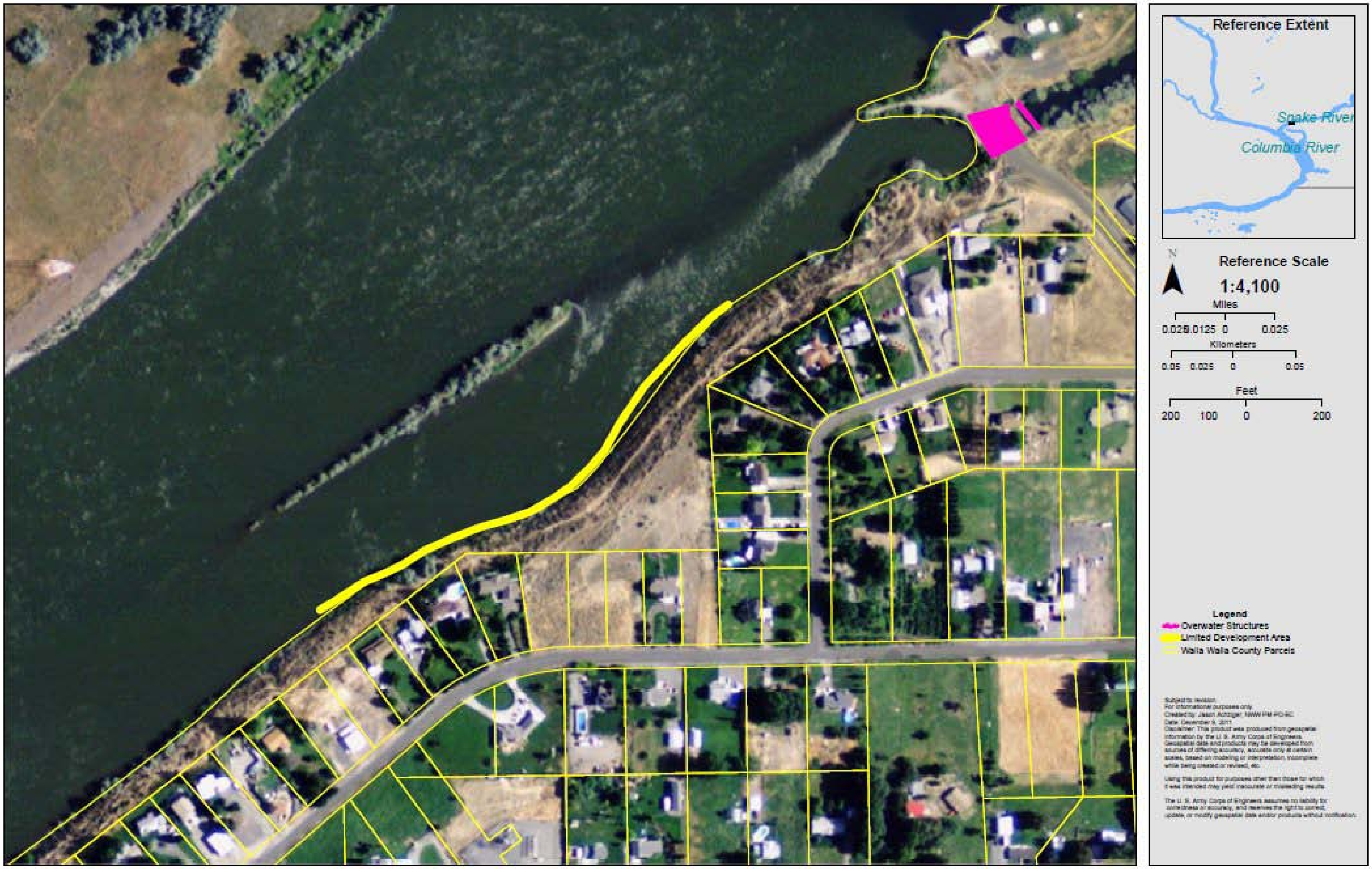
Figure 7
Sunset Drive LDA
McNary Shoreline Management Plan

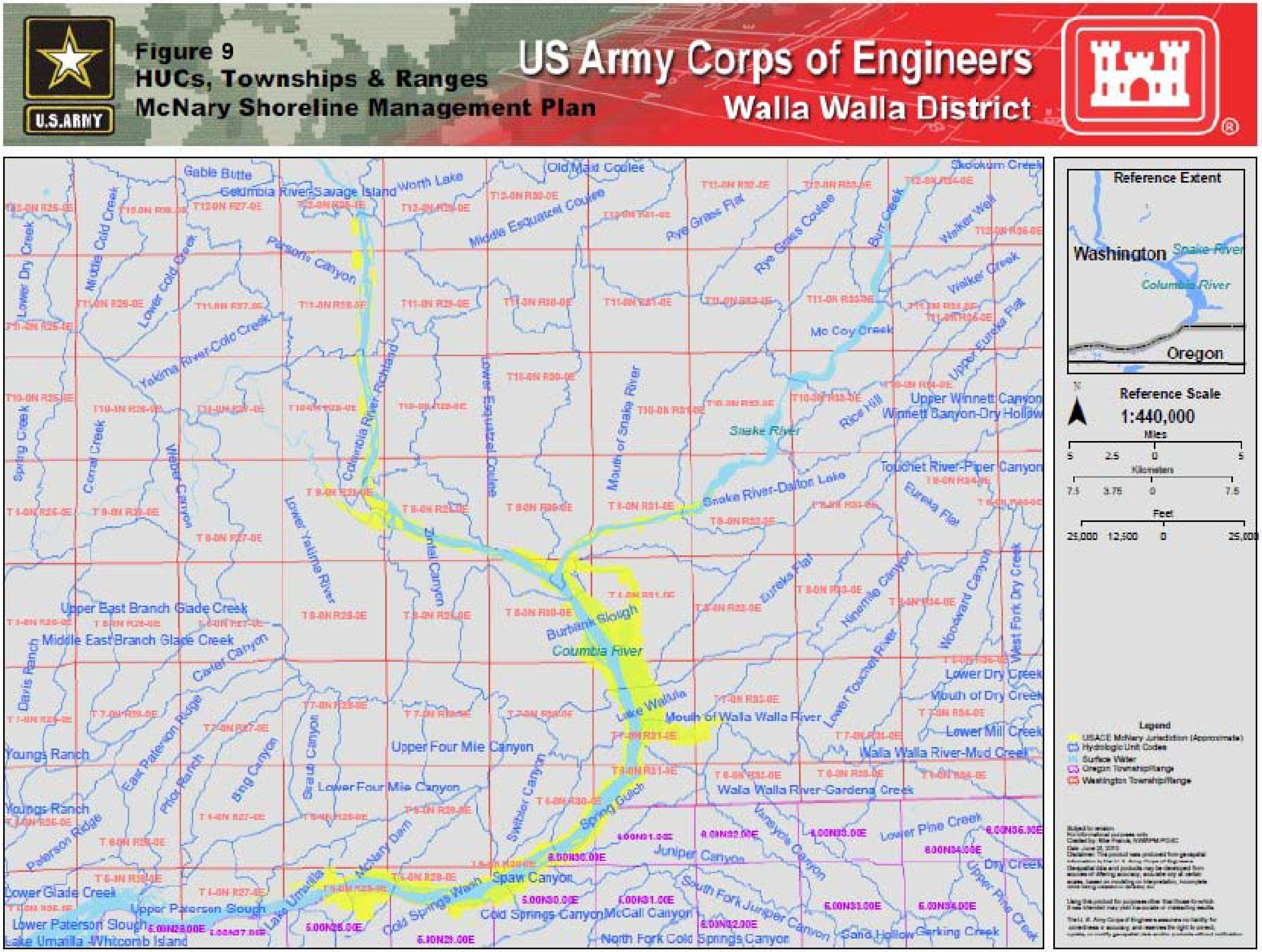
US Army Corps of Engineers
Walla Walla District

U.S. ARMY

Figure 8
Burbank Heights LDA
McNary Shoreline Management Plan

US Army Corps of Engineers
Walla Walla District




U.S.ARMY
Figure 9
HUCs, Townships & Ranges
McNary Shoreline Management Plan
US Army Corps of Engineers
Walla Walla District
Reference Extent
Washington
Snake River
Columbia River
Oregon
Reference Scale
1:440,000
Miles
Kilometers
Feet
Legend
Gable Butte
Columbia River-Savage Island
Worth Lake
Old Maid Coulee
Skookum Creek
Parsons Canyon
Middle Esquatzel Coulee
Rye Grass Flat
Rye Grass Coulee
Burr Creek
Walker Well
Walker Creek
Lower Dry Creek
Middle Cold Creek
Lower Cold Creek
Yakima River-Cold Creek
Mc Coy Creek
Upper Eureka Flat
Columbia River-Richland
Lower Esquatzel Coulee
Mouth of Snake River
Upper Winnett Canyon
Winnett Canyon-Dry Hollow
Snake River
Rice Hill
Spring Creek
Corral Creek
Webber Canyon
Touchet River-Pepper Canyon
Snake River-Dalton Lake
Eureka Flat
Lower Yakima River
Zintel Canyon
Ninemile Canyon
Woodward Canyon
West Fork Dry Creek
Upper East Branch Glade Creek
Middle East Branch Glade Creek
Burbank Slough
Columbia River
Carter Canyon
Davis Ranch
Lower Touchet River
Lower Dry Creek
Mouth of Dry Creek
Lake Wallula
Mouth of Walla Walla River
Lower Mill Creek
Youngs Ranch
East Paterson Ridge
Upper Four Mile Canyon
Walla Walla River-Mud Creek
Phot Ranch
Bing Canyon
Straub Canyon
Lower Four Mile Canyon
Switzler Canyon
Spring Gulch
Walla Walla River-Gardena Creek
Youngs Ranch
Paterson Ridge
McNary Dam
Juniper Canyon
Vansycle Canyon
Lower Pine Creek
Dry Creek
Upper Pine Creek
Lower Glade Creek
Upper Paterson Slough
Lake Umatilla
Spaw Canyon
Cold Springs Wash
Cold Springs Canyon
McCall Canyon
South Fork Juniper Canyon
Lower Paterson Slough
Lake Umatilla-Whitcomb Island
North Fork Cold Springs Canyon
Sand Hollow
Gerking Creek

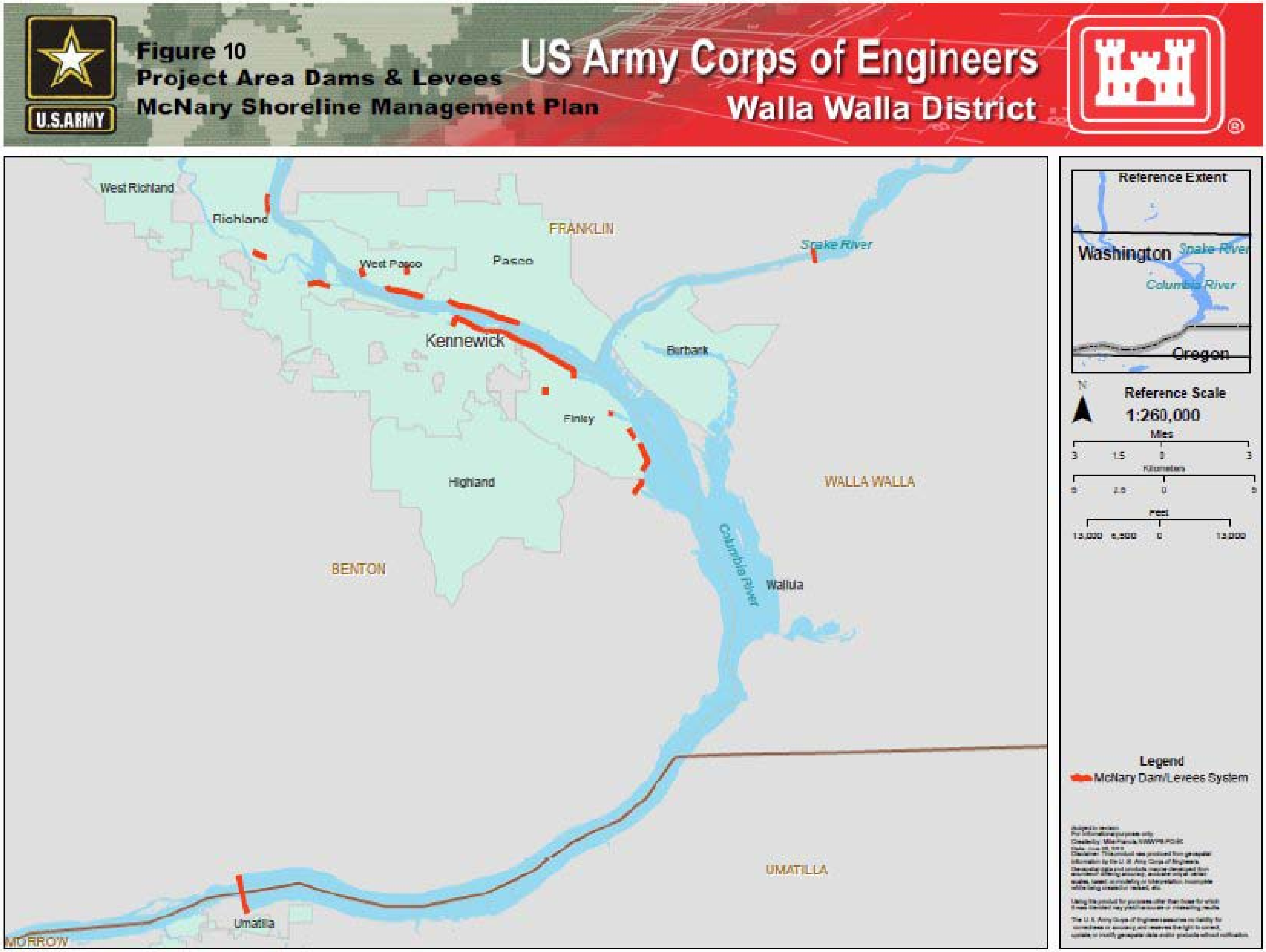


Figure 10
Project Area Dams & Levees
McNary Shoreline Management Plan
US Army Corps of Engineers
Walla Walla District
U.S.ARMY
West Richland
Richland
FRANKLIN
Snake River
West Pasco
Pasco
Kennewick
Burbank
Finley
Highland
WALLA WALLA
BENTON
Columbia River
Wallula
UMATILLA
Umatilla
MORROW
Reference Extent
Washington
Snake River
Columbia River
Oregon
N
Reference Scale
1:260,000
Miles
3 1.5 0 3
Kilometers
5 2.5 0 5
Feet
13,000 6,500 0 13,000
Legend
McNary Dam/Levees System

Appendix C:

National Historic Preservation Act, No Potential Memo

US Army Corps of Engineers
Walla Walla District

National Historic Preservation Act, Section 106

Determination of Effect to Historic Properties

For

Implementation of

The McNary Shoreline Management Plan

(PM-EC-2010-0014)

U.S. Army Corps of Engineers

Walla Walla District

Environmental Compliance Section

May 24, 2011

CENWW-PM-PD-EC May 24, 2011

MEMORANDUM FOR: Record, Environmental Compliance Section, Walla Walla District, U.S. Army Corps of Engineers

SUBJECT: National Register of Historic Places, Section 106 Determination of Effect for the Proposed Implementation of the McNary Shoreline Management Plan (PM-EC-2010-0014).

The U.S. Army Corps of Engineers (Corps) is updating its McNary Lakeshore Management Plan (now called a shoreline management plan [SMP]). This plan addresses private use of federally owned shoreline by nearby landowners with readily available access to the shoreline (Figure 1). Private use consists of individual and community boat docks and vegetation modification to provide access to the shoreline. This plan also addresses other shoreline uses such as stairways and steps, hard-surfaced walkways and erosion control devices. The SMP will be re-evaluated every 5 years. This approach is intended to balance benefits provided to the general public with protection of the natural and cultural resources of Lake Wallula.

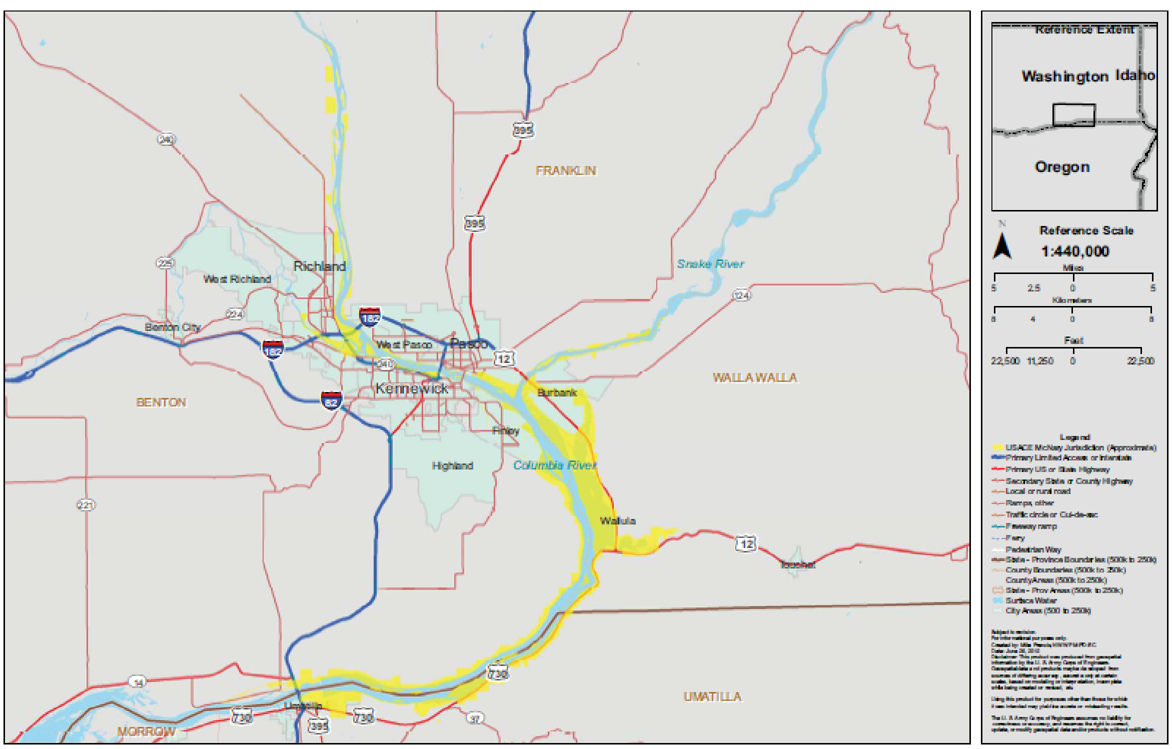


Figure 1. Location map

Lake Wallula is located on the Columbia River in southeastern Washington. The reservoir starts at McNary Dam [River Mile (RM) 292], and extends 61.6 miles upstream to RM 353.6. The reservoir also extends one mile up the Walla Walla River, 9.7 miles up the Snake River to Ice Harbor Dam, and six miles up the Yakima River. At maximum pool, the reservoir has 37,000 surface acres of water and 242 miles of shoreline.

Increased development has occurred along parts of the Lake Wallula shoreline in the Tri-Cities, Washington, area (Richland, Kennewick and Pasco). Residential construction has expanded next to Corps property over the last 25 years and many of these adjacent property owners have the expectation of a private dock on the federally-owned and managed shoreline or reservoir. Prior to the development of the plan, some private boat docks were already present along the shoreline. These existing docks and all docks that had a valid permit by November 17, 1986 were "grandfathered" into the program. There are currently 20 grandfathered docks. These docks are allowed to remain in place as long as they meet the terms of their permits and the grandfathered dock criteria with the following conditions: Upon sale or transfer of a property associated with a grandfathered dock, the new owner, would be required to obtain a real estate license and would be required to upgrade the structure to meet ESA design criteria. A sunset date of ten years after the adoption of the new SMP (anticipated to be 2021) would be applied to all grandfathered docks. Any grandfathered dock not upgraded to current (because criteria could change) ESA design criteria by 2021 would be required to either upgrade or be removed.

2. DETERMINATION: The project subject area lies within the Tri-Cities Archaeological District. Any permit or license issued under the SMP will require review under the NHPA, Section 106. Implementation of the SMP, in itself, does not permit or license any ground disturbance, construction, change in land status, or land use. Any future actions permitted under the SMP will be reviewed individually. The planned update and implementation of the SMP is an undertaking **as** defined in 36 CFR Part 800. However, based on the provisions of the SMP, the CRM Team has determined that the undertaking does not have the potential to affect historic properties and recommends a Federal Finding of Effect for the project of "no potential to cause effects on historic resources".

The Corps acknowledges that the APE is within an area of religious or cultural significance to Indian Tribes. Given information available to the Corps at this time, the Corps anticipates that implementation of the SMP will have no effect on traditional cultural values inherent in the vicinity.

3. ADMINISTRATIVE RECORD: The Walla Walla District has completed the necessary review for this project and has no further obligations under Section 106 of the NHPA and 36 CFR Part 800. A copy of this review is filed at the Walla Walla District.

4. For further information or questions regarding this action, please contact Mr. Ray Tracy, at 509 527-7286 or ray.l.tracy@usace.army.mil.

Ray L. Tracy	Scott M. Hall
Staff Archaeologist	Peer Reviewer

Appendix D:

Biological Assessment

US Army Corps of Engineers
Walla Walla District

MCNARY SHORELINE MANAGEMENT PLAN

SHORELINE ALLOCATIONS, PRIVATE BOAT DOCKS, VEGETATION MODIFICATION AND OTHER USE PERMITS ON FEDERAL PROPERTY

Biological Assessment

for

Threatened and Endangered Species,
Critical Habitat, and Essential Fish Habitat

Under the Jurisdiction of:

National Marine Fisheries Service
and
U.S. Fish and Wildlife Service

U.S. Army Corps of Engineers
Walla Walla District

September 17, 2010

Table of Contents

ACRONYM/ABBREVIATION QUICK REFERENCE iii
I. Introduction, Background and History ..... - 1 -
A. Limited Development Areas ..... - 1 -
B. Public Recreation Areas ..... - 1 -
C. Protected Shoreline Areas ..... - 2 -
D. Prohibited Access Areas ..... - 2 -
E. Current Allocations and Dock Locations ..... - 2 -
F. Federal Action Consultation History ..... - 9 -
II. Affected Area/Action Area ..... - 10 -
A. Affected Area General ..... - 10 -
i. Description of Project Footprint ..... - 10 -
ii. HUC, Watershed, Township, Range, Section ..... - 10 -
i. Quantification of Area Potentially Affected ..... - 12 -
A. Federal Action and Legal Authority / Agency Discretion ..... - 12 -
B. Project Purpose and Objectives ..... - 12 -
C. Project Description ..... - 14 -
i. Shoreline Allocation ..... - 14 -
ii. Other Shoreline Uses ..... - 16 -
iii. Boat Docks ..... - 16 -
iv. Vegetation modification ..... - 17 -
v. Operational Characteristics of the Proposed Project ..... - 18 -
vi. Description of Proposed Conservation Measures ..... - 18 -
vii. Description of Mitigation Required Under Other Permits ..... - 19 -
viii. Discussion of Interdependent and Interrelated Actions ..... - 19 -
B. Known Ongoing and Previous Projects in the Action Area ..... - 19 -
II. Status of Species and Critical Habitat ..... - 20 -
A. Species Lists from the Services ..... - 20 -
B. Endangered Species ..... - 20 -
i. Upper Columbia River Spring Chinook Samon ..... - 20 -
ii. Snake River Sockeye Salmon ..... - 23 -
iii. Pygmy Rabbit ..... - 25 -
iv. Upper Columbia River Steelhead ..... - 25 -
B. Threatened Species ..... - 28 -
i. Middle Columbia River Steelhead ..... - 28 -
ii. Snake River Steelhead ..... - 31 -
iii. Snake River Fall Chinook Salmon ..... - 34 -
iv. Snake River Spring/Summer Chinook Salmon ..... - 37 -
v. Bull Trout ..... - 40 -
vi. Ute Ladies'-tresses ..... - 50 -
vii. Canada Lynx ..... - 51 -
C. Candidate Species ..... - 51 -
i. Columbia spotted frog ..... - 51 -
ii. Greater sage grouse ..... - 51 -
iii. Yellow-billed cuckoo ..... - 52 -

iv. Umtanum desert buckwheat - 52 -
v. Washington ground squirrel - 52 -
vi. White Bluffs bladderpod - 52 -
III. Environmental Baseline - 53 -
A. Description of the Action Area and Project Area - 53 -
B. Description of the Environmental Baseline - 53 -
i. Hydroelectric Facilities - 55 -
ii. Land Use and Shoreline Development - 58 -
IV. Effects Summary - 58 -
V. Cumulative Effects - 60 -
A. Climate Change - 61 -
VI. Essential Fish Habitat Evaluation - 62 -
VII. References - 63 -
ANNEX A - 66 -
ANNEX B - 72 -

ACRONYM/ABBREVIATION QUICK REFERENCE

BA	Biological Assessment
CFR	Code of Federal Regulations
CH	Critical Habitat
Corps	US Army Corps of Engineers
CR	Columbia River
DPS	Distinct Population Segment
ESA	Endangered Species Act of 1973, as amended
ESU	Evolutionarily Significant Unit
FR	Federal Register
HUC	Hydrologic Unit Code
MCR	Middle Columbia River
MOP	Minimum Operating Pool
MSL	Mean Sea Level
MPI	Matrix of Pathways and Indicators
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
OHWM	Ordinary high water mark
PCE	Primary constituent element
RM	River mile
Services	National Marine Fisheries Service and U. S. Fish and Wildlife Service jointly
SMP	Shoreline Management Plan
SR	Snake River
SRB	Snake River basin
UCR	Upper Columbia River
Service	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
WDFW	Washington Department of Fish and Wildlife

I. Introduction, Background and History

This Biological Assessment (BA) is prepared pursuant to Section 7 of the Endangered Species Act of 1973, as amended (ESA).

The U.S. Army Corps of Engineers (Corps) is updating its McNary Lakeshore Management Plan (now called a shoreline management plan [SMP]). This plan addresses private use of federally owned shoreline by nearby landowners with readily available access to the shoreline (Figure 1). Private use consists of individual and community boat docks and vegetation modification to provide access to the shoreline. This plan also addresses other shoreline uses such as stairways and steps, hard-surfaced walkways and erosion control devices. The SMP will be re-evaluated every 5 years.

Development of adjoining private land increases the demand for private floating facilities; therefore, it is readily apparent that implementing an updated plan for managing development of the shoreline is essential. This approach is intended to balance benefits provided to the general public with the protection the McNary Project features, shoreline and fish and wildlife habitat.

An SMP uses 4 shoreline allocations to determine use restrictions of a given reach of shoreline. The allocations are limited development areas, public recreation areas, protected shoreline and prohibited access areas.

A. Limited Development Areas

Limited Development areas are designated where private shoreline use facilities or vegetation management activities may be allowed, when consistent with the SMP and cleared for environmental and cultural resources issues by Corps personnel prior to any development. Both vegetation modification and the construction of private boat docks require issuance of a permit, and must be permitted prior to the onset of construction or modification. Permit applications are considered individually, on their own merits, and utilizing SMP guidelines. Shoreline and water conditions, as well as underwater topography, cultural resources, and other pertinent factors will be carefully evaluated before floating facilities are permitted. Only shoreline areas within the “Limited Development Area” land use classification in the McNary Master Plan shall be considered available for private development.

B. Public Recreation Areas

Public Recreation Areas are set aside to be managed by federal, county, or state governments for public use, or are designated for commercial concessionaire facilities. Except for vegetation modification permits in existence prior to January 1, 2008, no private shoreline use facilities (including floating facilities) or activities will be permitted within or near designated or developed public recreation areas. No modification of landforms or vegetative characteristics is permitted. Public recreation areas do not constitute legal access when applying for shoreline use permits.

C. Protected Shoreline Areas

Protected shoreline areas are those areas set aside to maintain or restore fish and wildlife habitat, cultural, aesthetic, or other environmental values. Shorelines may also be designated as protected to prevent development in areas subject to heavy erosion, excessive siltation, or exposure to high wind, wave, or current action, or in areas where development would interfere with navigation. No private recreation facilities (docks) will be permitted in protected areas. Protected shoreline areas are not eligible for permitting of private facilities.

D. Prohibited Access Areas

Prohibited areas are areas where public access is not allowed or very limited for safety reasons or for the protection of unique resources. Prohibited areas typically include hazardous areas near dams or spillways, critical wildlife habitat, or historic properties. Mooring of private floating facilities or modification of landforms and vegetation are not allowed in areas designated as prohibited.

E. Current Allocations and Dock Locations

The current shoreline allocation (Figure 2) is different from that used previously due to new information regarding water depths, public usage, water management features and adjacent land ownership patterns.

Figure 1. Project Location Map

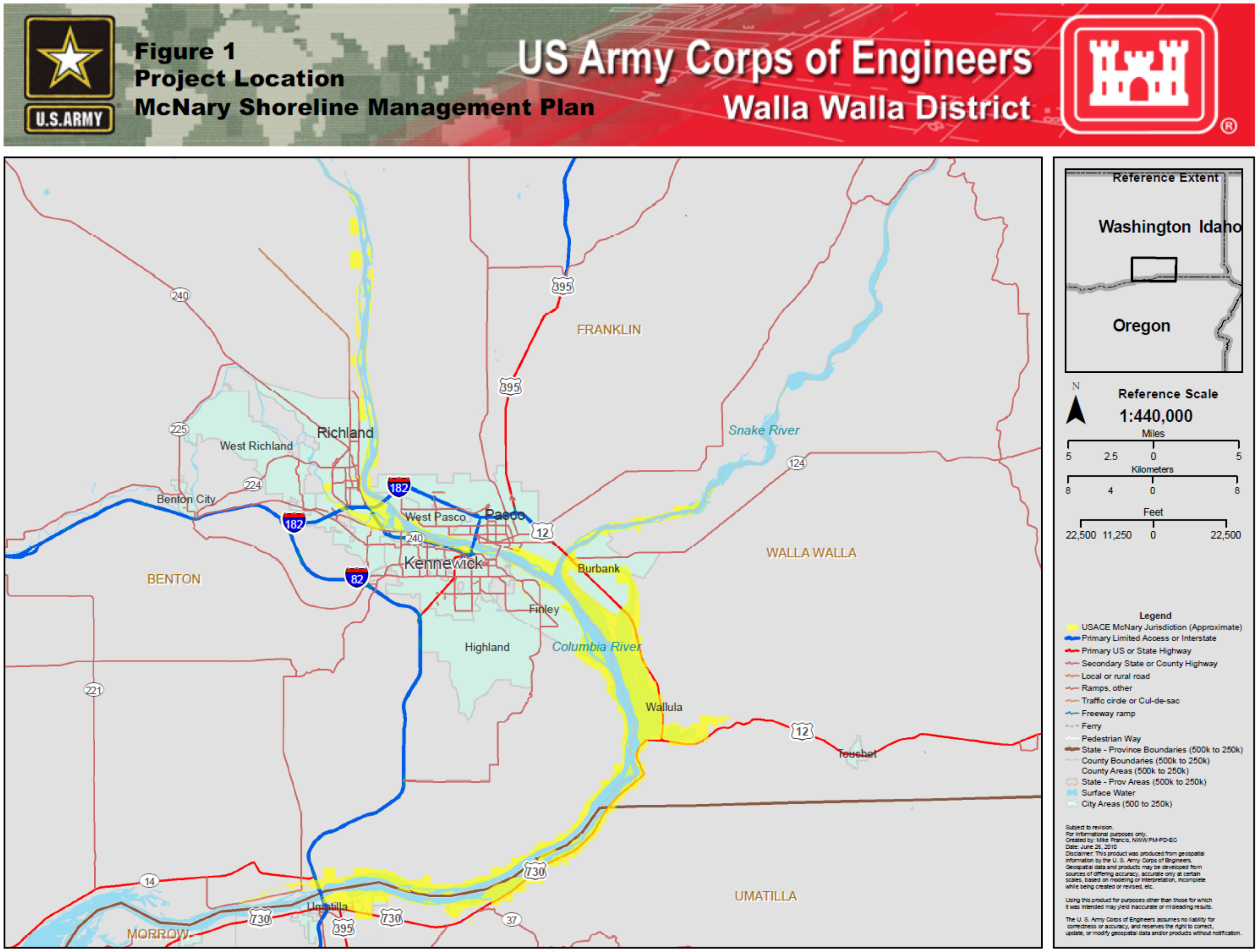
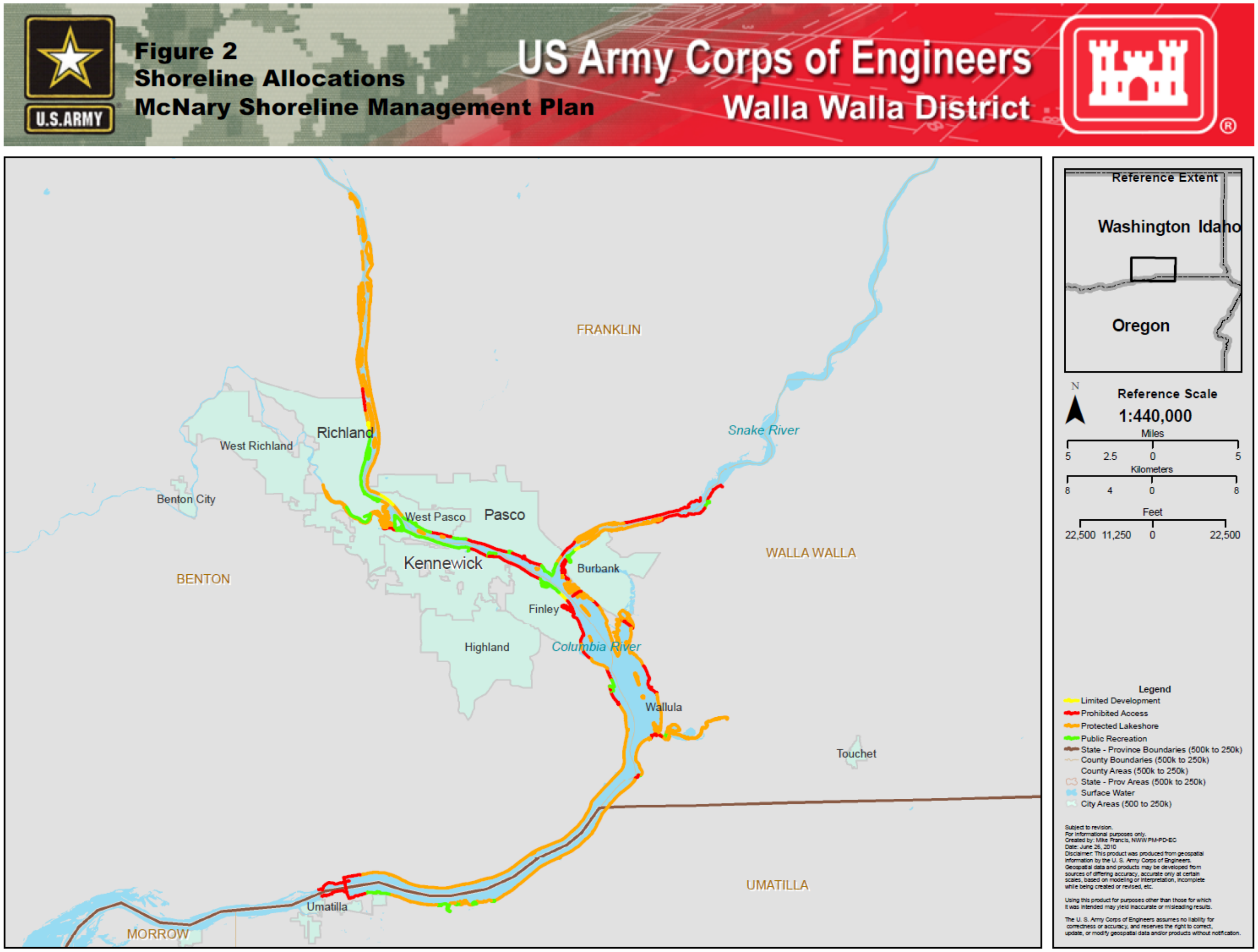


Figure 2. McNary Shoreline Management Plan Shoreline Allocations



Of the 73 existing private docks on Lake Wallula, 24 are ‘grandfathered’ by law to remain in place. Most of the 73 docks are not compliant with dock criteria developed to minimize impacts to ESA-listed fish species (Annex A).

Further, as the shoreline allocations have been updated, some docks are now within broader areas of differing allocation. These docks are now considered to have dock-specific Limited Development Areas (LDAs) within the broader allocation to address the Corps’ pre-existing commitments to those dock owners, thus all existing docks are within an LDA allocation. Removal of a dock with a dock-specific LDA designation for other than normal temporary maintenance will cause the dock-specific allocation to revert to the surrounding allocation.

Table 1, below, gives the number of docks located in each ‘broad allocation’ and describes the number of potential docks in the future.

Table 1. Existing and Potential Private Docks By Allocation

Limited Development Private Dock Totals	**Number**
Existing Docks	39
Grandfathered Docks Included	12
Possible New Docks in Limited Development	54
Recreation Area Private Dock Totals	**Number**
Existing Docks	3
Grandfathered Docks Included	3
Possible New Docks in Recreation Areas	0
Protected Area Private Dock Totals	**Number**
Existing Docks	31
Grandfathered Docks Included	9
Possible New Docks in Protected Areas	0
Total Private Docks	**Number**
Total Existing Private Docks	73
Grandfathered Docks Included	24
Possible New Private Docks Total	**54**

The Corps has prepared a draft environmental assessment (EA) for the development and implementation of the McNary SMP. This ESA consultation is programmatic and covers the Corp’s preferred alternative for each action area considered in the EA. The EA alternatives were separated into three action area categories; Private Floating Recreation Facilities (boat docks), Vegetation Modification and Other Shoreline Uses for ease of analysis.

The shoreline allocation in large part determines what actions what shoreline use is allowed for each action area, and thus the results of an updated allocation analysis based primarily upon suitability for ESA-listed fish habitat (primarily by water depth) and protection of McNary Project facilities is included. The preferred alternative measures and the shoreline allocation identified below are the subject of this consultation.

<u>New Shoreline Allocation for McNary Project Lands</u>
- Increase protection allocation based on best ESA-listed fish suitability.
- Increase prohibited allocation based on McNary Project facilities and National Dam Safety considerations.
- Reduce recreational allocation based on McNary Project facilities and changes in use.
- Reduce limited development allocation based on unsuitable shallow water locations and adjacent land ownership/lease patterns.
- Existing docks now occurring in generally designated protected areas are considered in limited development for the footprint of their specific existing dock location only and those docks must be upgraded to ESA-compliant designs.

<u>Private Floating Recreation Facilities (Docks)</u>
- The Corps will allow new docks via permit in the limited development allocation areas (with ESA-compliant dock design criteria).
- The Corps will allow existing dock permits in limited development areas to be renewed if the docks are upgraded to ESA-compliant design criteria.
- Grandfathered dock permits will be renewed if not substantially altered or if upgraded to ESA-compliant design criteria).
- Docks now located within broader protected shoreline allocations (but in site-specific LDAs) that are removed for other than normal maintenance, will not be re-permitted and the LDA will revert to protected shoreline.

<u>Vegetation Modification</u>
- Allow vegetation modification via permits and renew existing permits in limited development areas but at reduced vegetation modification magnitudes.
- Grandfathered dock location vegetation management permits will follow the same new limitations.
- Vegetation modification permits will have mitigative requirements.

<u>Other Shoreline Uses</u>
Other private uses include stairways, steps, footbridges, hard-surfaced walkways, erosion control, private irrigation systems, etc. Where applicable (very few select instances) other shoreline uses would be allowed within the following parameters:
- These uses may be allowed in limited development areas
- Because these uses involve construction of permanent facilities on federal property, they will require a real estate license, rather than a shoreline permit, and will undergo all associated additional environmental and cultural reviews associated with Real Estate actions

- Due to the aquatic critical habitat designation and the associated riparian habitat, the Corps will limit hardened shoreline development to that only necessary (e.g. a hardscape walkway to facilitate Americans with Disabilities Act access), and using the least environmentally damaging methods practical.

The McNary Lakeshore Management Plan was initially developed in 1980 and was last updated in 1983. Prior to the development of the plan some private boat docks were already present along the shoreline. These existing docks and all docks that had a valid permit by November 17, 1986 were "grandfathered" into the program. There are currently 24 "grandfathered" docks. These docks are allowed to remain in place per section 1134(d) of Public Law 99-662. These “grandfathered” docks may also be transferable to new owners even if they do not and cannot meet the current design criteria per 36CFR327.30. The remaining permits in LDAs are valid for a period of five years and are renewable as long as they still meet requirements of the SMP.

Since 1983 when the plan was last updated, there have been several species that occur in the area listed under the ESA. Some of these listed species could be affected by activities permitted under the Lakeshore Management Plan. If the existing plan were to remain in place and development of the surrounding area continues into the future, there is the potential for over 600 private docks to be developed on Lake Wallula. The potential for adverse effects to ESA-listed species under that scenario would be high. The current plan reduces the potential from 600 total private docks to only 127 (Table 1).

The major component of this consultation is the issuance of permits or real estate licenses for the private use in 4 limited development areas. Most of the shoreline (281 miles of 284 total miles under Corps jurisdiction) is protected from any private development. While docks within broader protected allocations will be required to upgrade their docks to design criteria less impacting to ESA-listed fish as an action under this plan, the installation of completely new docks within LDAs has the most potential to impact fish. Less than 3 miles of shoreline is currently open to limited development (down from approximately 11 miles under previous allocation) and is the primary potential construction considered in this consultation (Figures 3-7).

Figure 3. Tri-Cities Limited Development Areas

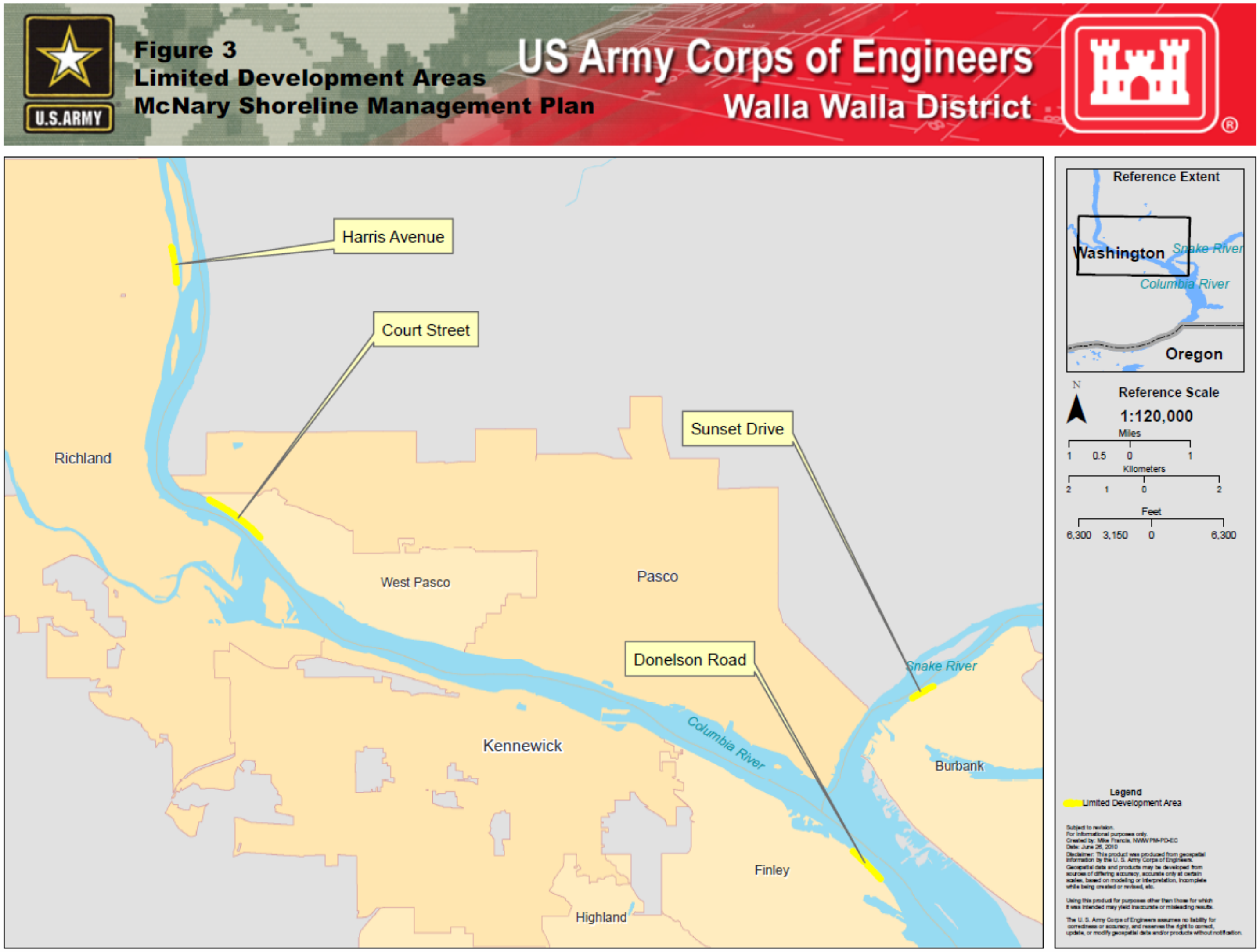


Figure 4. Harris Avenue, Richland, Limited Development Area

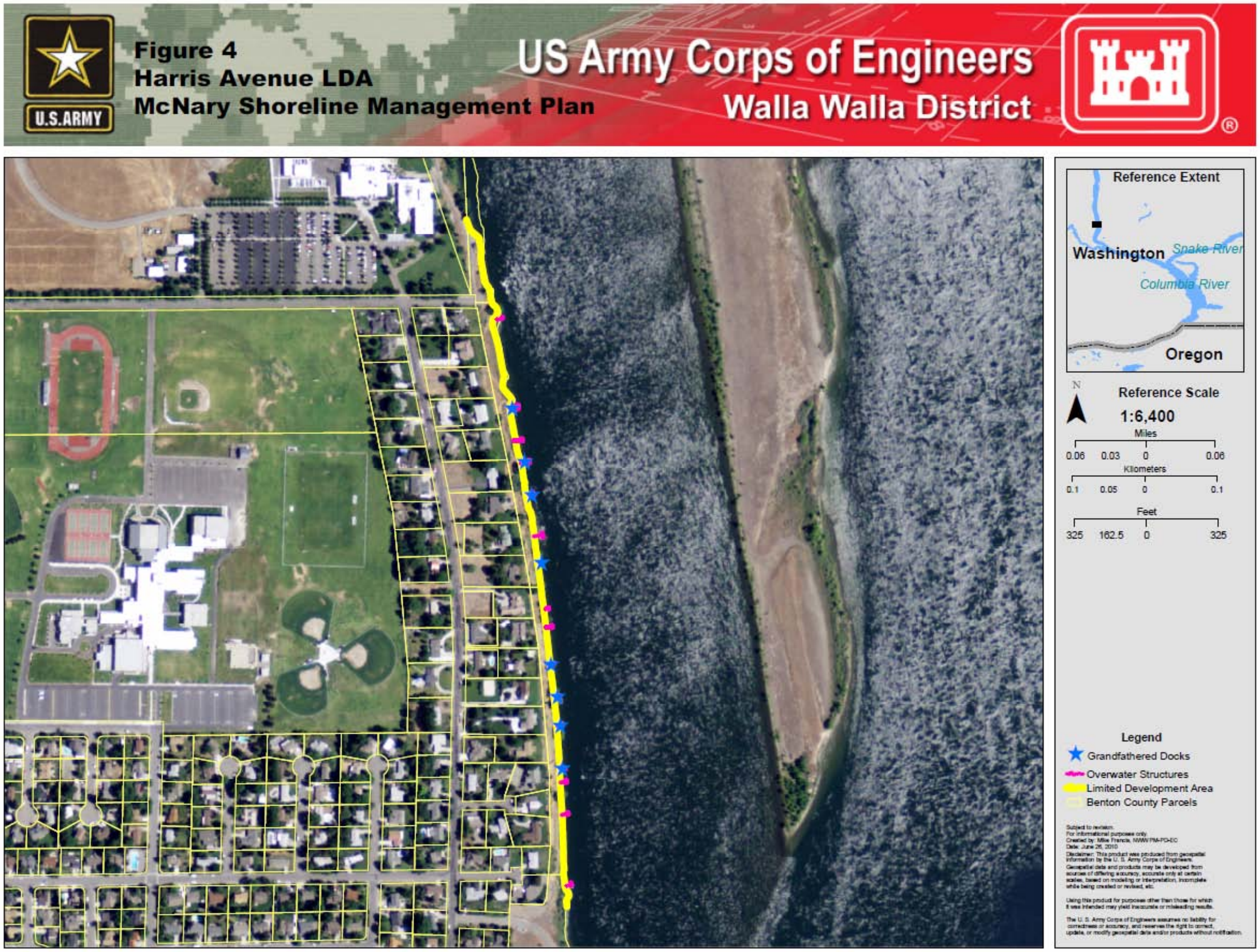


Figure 5. Court Street, West Pasco, Limited Development Area

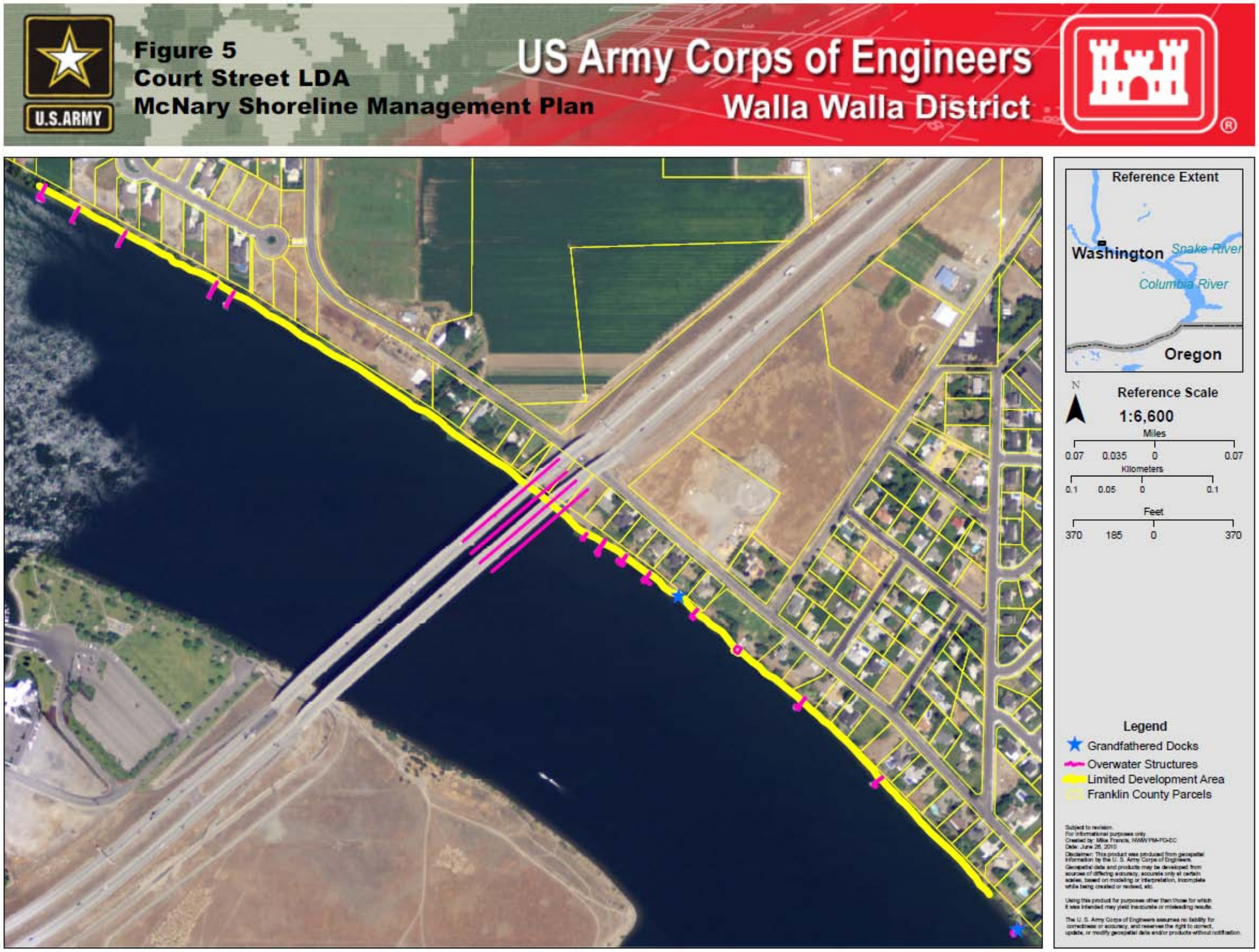


Figure 6. Donelson Road, Finley, Limited Development Area

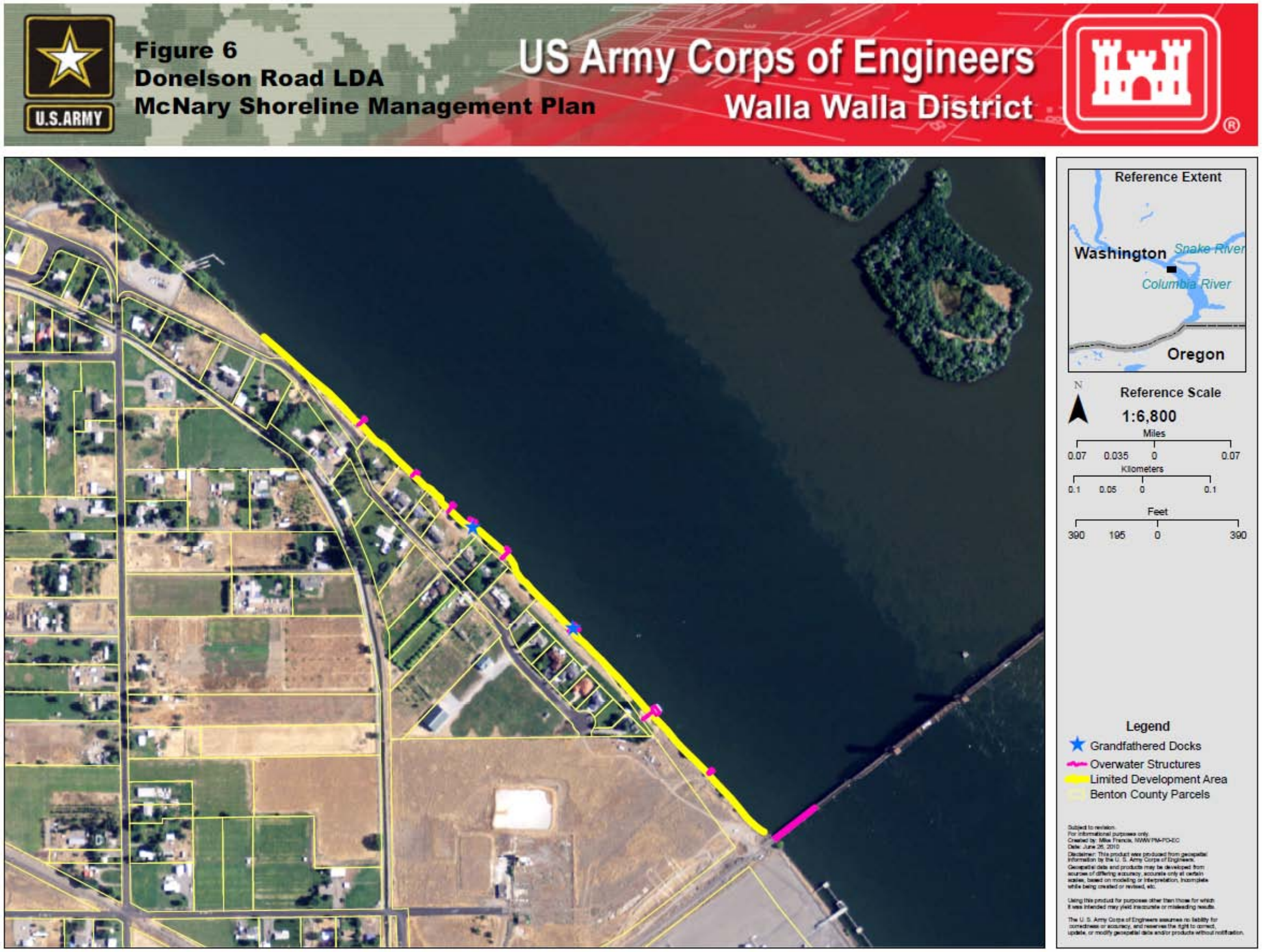
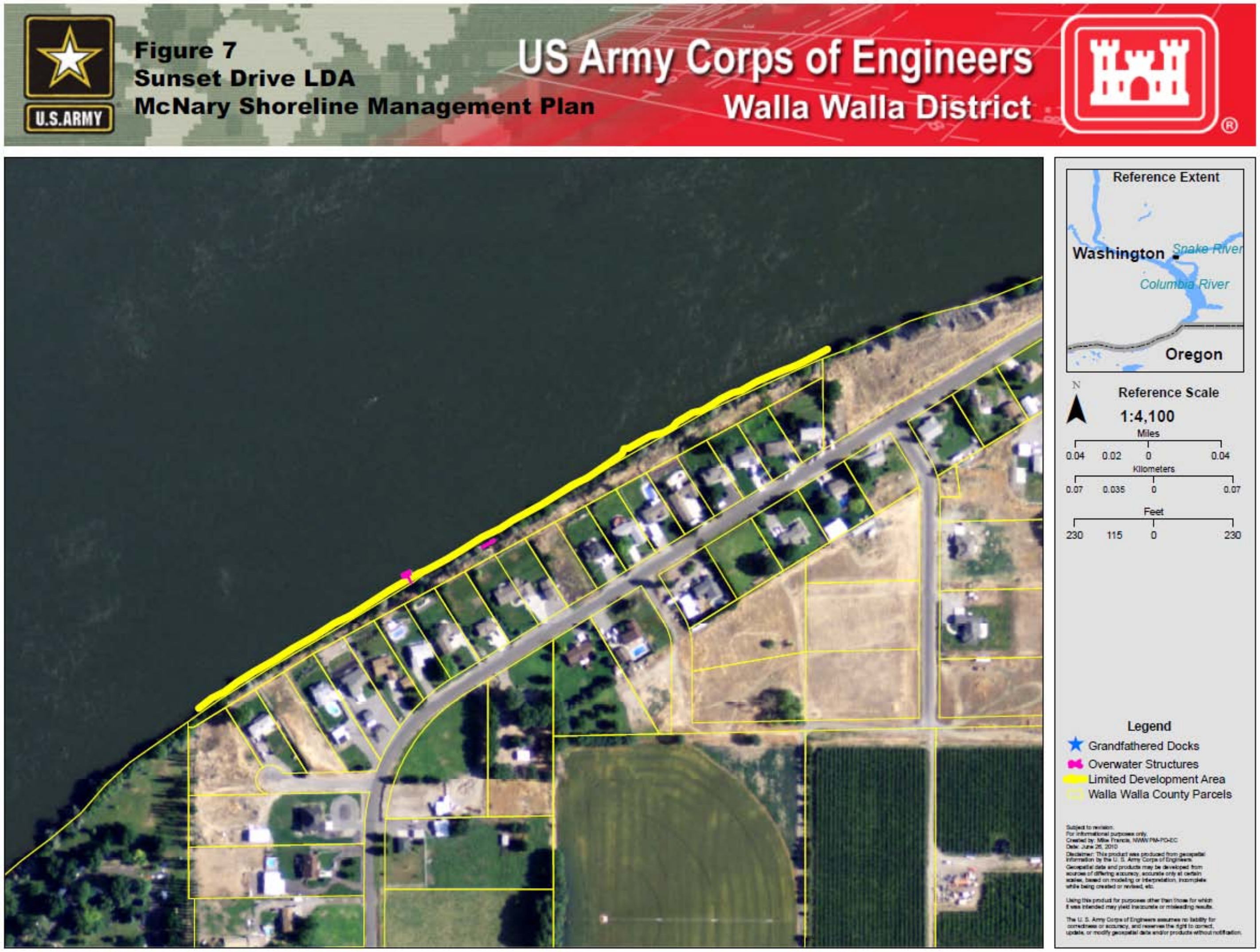


Figure 7. Sunset Drive, Burbank, Limited Development Area



Federal Action Consultation History

Below is a listing of several relevant consultations from the U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS), jointly referred to as the ‘Services’. A previous consultation was initiated with the Services on this action in 2008, and a concurrence letter for the Service was received, dated December 2, 2008. Consultation with NMFS was suspended to allow for additional public comments. Various boat docks and marinas in the area have undergone ESA consultation with NMFS.

- December 2, 2008 – Concurrence letter from Service on McNary Shoreline Management Plan.
- June 13, 2008 – Sent biological assessment (dated May 13, 2008) for formal consultation with NMFS and Service on McNary Shoreline Management Plan, Washington.
- April 24, 2008 – Cascade Marina Expansion Project, Columbia River, Franklin County, Washington
- July 23, 2007 – Concurrence letter from NMFS on a public boat dock at Chiawana Park.
- July 3, 2007 – Concurrence letter from USFWS on a public boat dock at Chiawana Park. FWS Ref. 1-9-07-1-0126.
- June 2006 – Concurrence letter from NMFS on Installation of Four Residential Docks Under Lakeshore Management Plan at Pasco, Washington, McNary Reservoir.
- April 17, 2006 – Dock Replacement Pasco Boat Basin, Cascade Marina. (NMFS Tracking No. 2005/06498)
- December 6, 2005 – Columbia Point Marina Expansion Project in Benton County, Washington. (NMFS Tracking No.:2005/00348)
- November 3, 2005 – Port of Kennewick Marina Expansion Project in Benton County, Washington. (NMFS Tracking No.:2005/00010)
- April 22, 2005 – Richland Yacht Club Dock Expansion Project in Benton, County Washington. (NMFS Tracking No.:2004/01831)

II. Affected Area/Action Area

A. Affected Area General

The *"Affected Area"* as defined in the CAR as the entire area that may be affected directly or indirectly with the implementation of the Corps' four action alternatives considered, not merely the immediate area (i.e., construction footprint) involved in the action. The *"Affected Area"* would be defined similarly under the no action alternative. This is similar to the usage of the term *"Action Area"* in section 7 Endangered Species Act consultations. Furthermore, under section 7,*"direct effects"* are those which are caused by the action and occur at the same time and place, while *"indirect effects"* are those which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable (40CFR §1508.8(a&b) and 50 CFR § 402.02).

i. Description of Project Footprint

The action area includes all of Lake Wallula (McNary Reservoir) and its immediate shoreline within the jurisdiction of the Corps (see Figure 1).

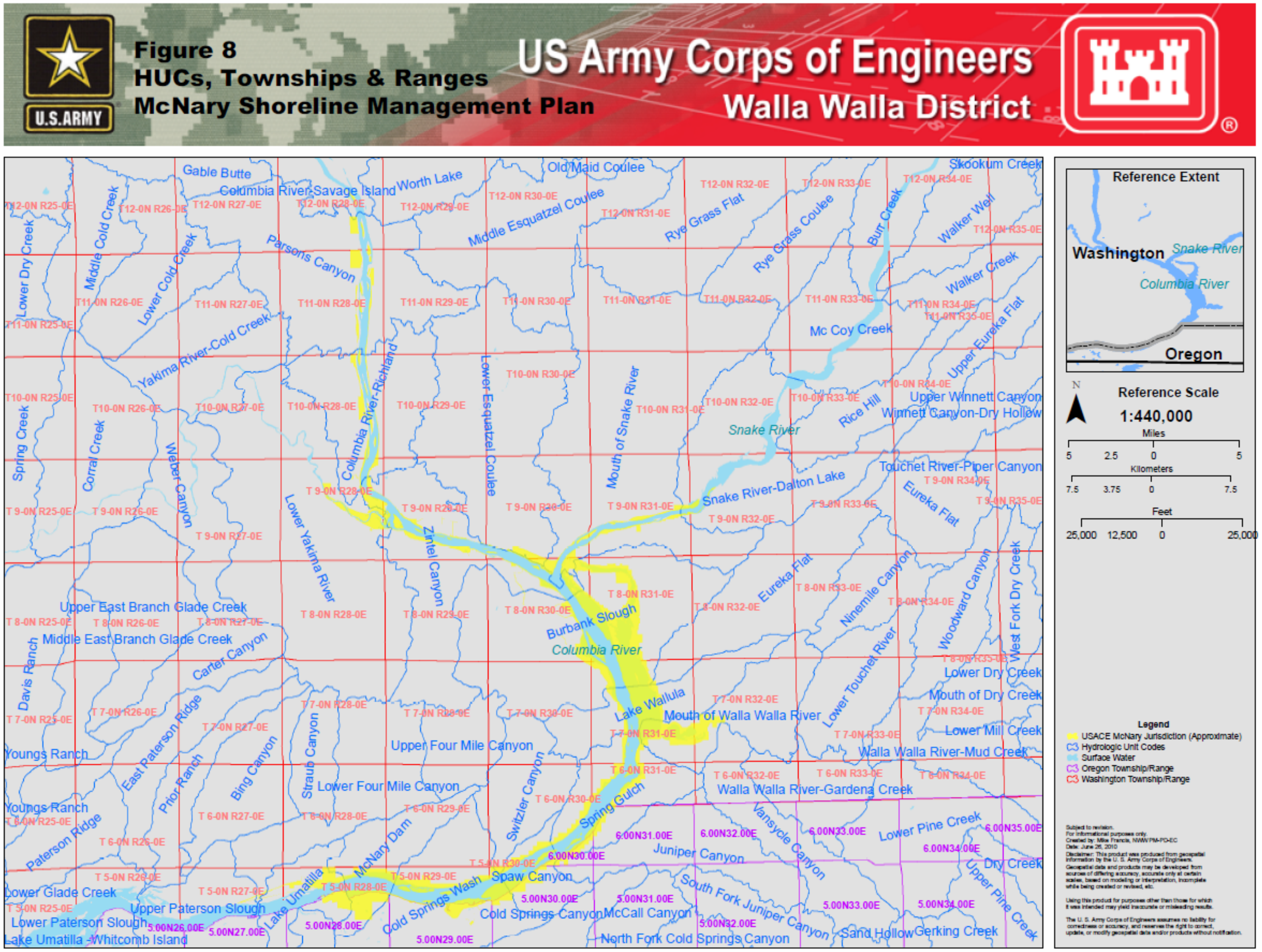
ii. HUC, Watershed, Township, Range, Section

This project includes portions of the Middle Columbia, Upper Columbia, Yakima and Lower Snake River basins. The 16 accounting unit Hydrologic Unit Codes (HUCs) for the affected area are:

- 170200160603, Zintel Canyon
- 170200160504, Columbia River-Savage Island
- 170200160601, Parsons Canyon
- 170200160602, Columbia River-Richland
- 170300030709, Lower Yakima River
- 170601100401, Mouth of Snake River
- 170601100303, Snake River-Dalton Lake
- 170701010101, Burbank Slough
- 170701010103, Lake Wallula
- 170701010201, Spring Gulch
- 170701010204, Spaw Canyon
- 170200160207, Lower Esquatzel Coulee
- 170701010206, Cold Springs Wash
- 170701010207, McNary Dam
- 170701010601, Lake Umatilla
- 170701010602, Upper Peterson Slough
- 170701010205, Switzler Canyon
- 170701010203, Juniper Canyon

The project lands are in numerous sections within Townships 5, 6, 7, 8, 9, 10, 11 and 12 North, Ranges 28, 29, 30, 31 and 32 East (Figure 8).

Figure 8. HUCs, Townships and Ranges of Affected Area



i. Quantification of Area Potentially Affected

The Potentially Affected Area includes all of Lake Wallula, Columbia River in the States of Washington (Benton, Franklin and Walla Walla Counties) and Oregon (Umatilla County) and Corps owned property and easements along Lake Wallula.

Lake Wallula is located in the Columbia Basin in Oregon and Washington on the main stem of the Columbia River. The reservoir extends nine miles up the Walla Walla River, 9.7 miles up the Snake River (to Ice Harbor Dam) and six miles up the Yakima River. At full pool elevation of 340 MSL (mean sea level), Lake Wallula covers 44,266 acres, has a shoreline of 242 miles, and a lake length of 64 miles. Topographically, the lake shoreline lies in two distinctly different types of terrain. The shoreline in the lower 30 miles of the reservoir has little or no river bottomlands and is closely flanked by rugged basalt ledges rising 500 to 1,000 feet above the lake. Upstream the shoreline lands have a more gradual contour. This is particularly so on the east bank around the Burbank Slough area and in the lower reaches of the Walla Walla River. In addition, there are 17 miles of levees at Pasco, Kennewick and Richland (Tri-Cities), which have altered much of the shoreline in the Tri-Cities area (Figure 9).

A. Federal Action and Legal Authority / Agency Discretion

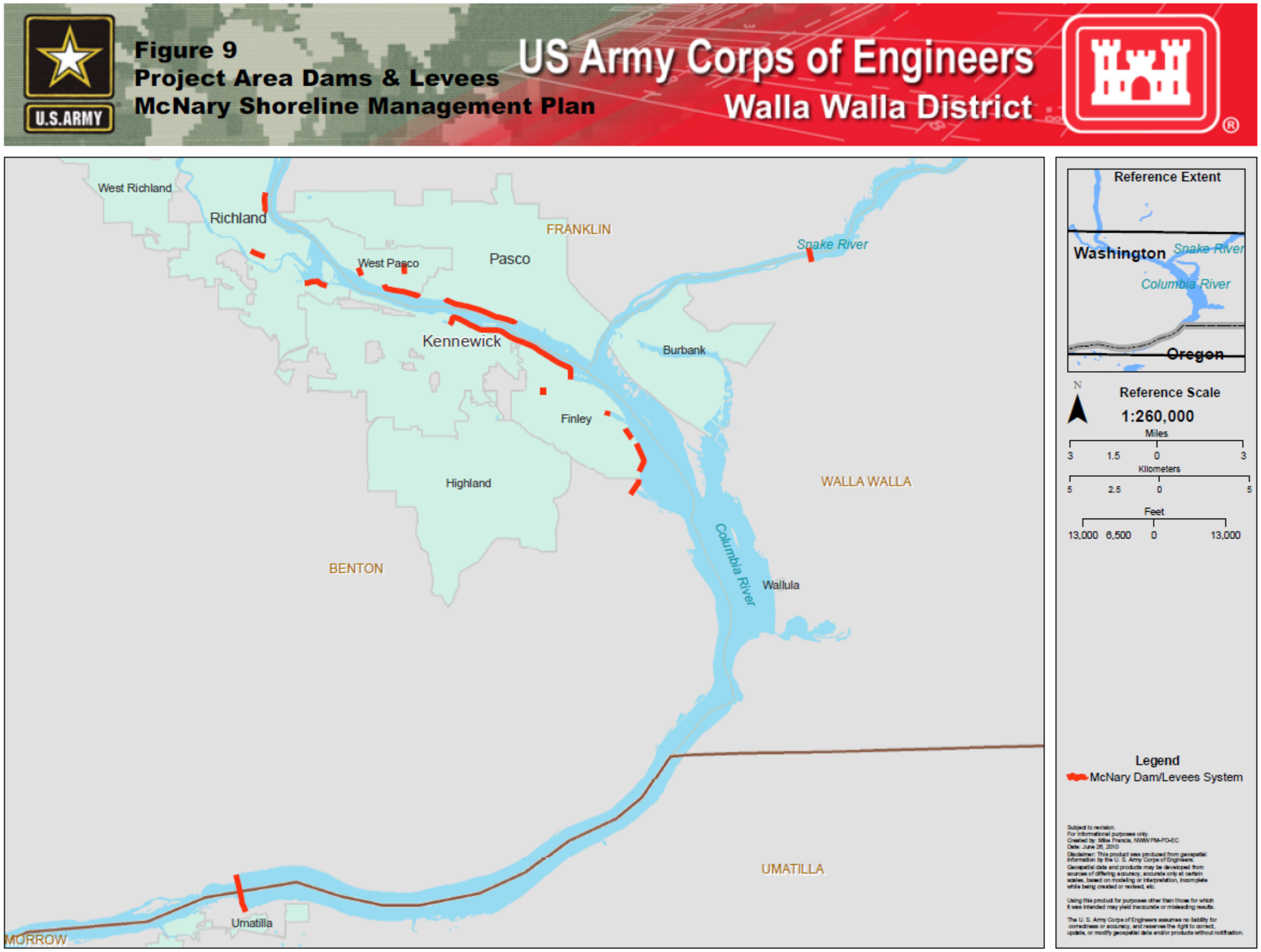
Authority for administering the Shoreline Management Plan is granted under Public Laws 86-717 and 87-874 charging the Chief of Engineers with the duty to exercise good conservation practices which promote recreation and to operate and maintain water resource projects in the public interest, respectively. The plan applies to all Corps owned lands associated with McNary Lock and Dam, however, only a portion of these lands (less than 3 miles of shoreline) have been designated as suitable for limited development (See Figures above).

B. Project Purpose and Objectives

The Corps' main objective is to achieve a balance between permitted private uses and natural resource protection (specifically supporting ESA-listed fish) for general public benefit. The secondary objective is to limit impacts to current permit holders, if at all possible. The underlying action being considered is the updating of the McNary Reservoir SMP. This plan is being updated to account for regulatory changes that have taken place since the last update in 1983. The intent of the updated SMP is to:

- Define the procedures and conditions for private boat docks, vegetation modification and other shoreline uses on property under Corps' jurisdiction on Lake Wallula.
- Reduce potential environmental impacts caused by the presence and use of private boat docks, vegetation modification permits and permits for other shoreline uses.

Figure 9. Tri-Cities Levees



C. Project Description

The general underlying activities of the SMP included in this consultation are:

- Re-allocation of shoreline uses of McNary Reservoir under Corps jurisdiction,
- Implement ESA-compliant dock criteria for McNary Reservoir,
- The permitting of docks on McNary Reservoir,
- The management of vegetation associated with dock construction and use and
- Very limited other shoreline uses for unique access and maintenance needs.

The activities included in this consultation specifically include the following preferred alternative as defined by the EA:

- Regarding new docks in the newly defined limited development allocation, new individual docks will be permitted if they meet the new ESA-supporting dock criteria.
- Regarding the renewal of already existing docks in the newly defined limited development allocation, individual dock permits or real estate licenses will be renewed once the dock is retrofitted or rebuilt to meet the ESA-supporting dock criteria (with 2 in-water work windows allowed to accomplish the retrofit).
- Regarding the renewal of already existing docks in the newly defined protected shoreline allocation, dock permits or real estate licenses will be renewed once the dock is retrofitted or rebuilt to meet the ESA-supporting dock criteria and will remain in their specific locations as small LDAs within the larger protected area. Should any of these docks ever be removed for other than short-term normal maintenance, the dock-specific LDA will revert to protected allocation.
- Regarding the renewal and issuance of vegetation modification permits, such permits will be renewed and will follow the vegetation modification limitations and mitigative measures described in a later section. Such vegetation modification will be limited to LDAs only.

i. Shoreline Allocation

The shoreline re-allocation was accomplished in June of 2010 and is based upon actual depth and location survey data gathered in May of 2010. The change in allocation according to the current SMP has resulted in a significant increase in protected shoreline (Figures 10 and 2, Table 2), particularly in those areas most suitable for protection of ESA-listed fish and critical habitat.

Figure 10. Change in Total Shoreline Allocation at McNary Reservoir

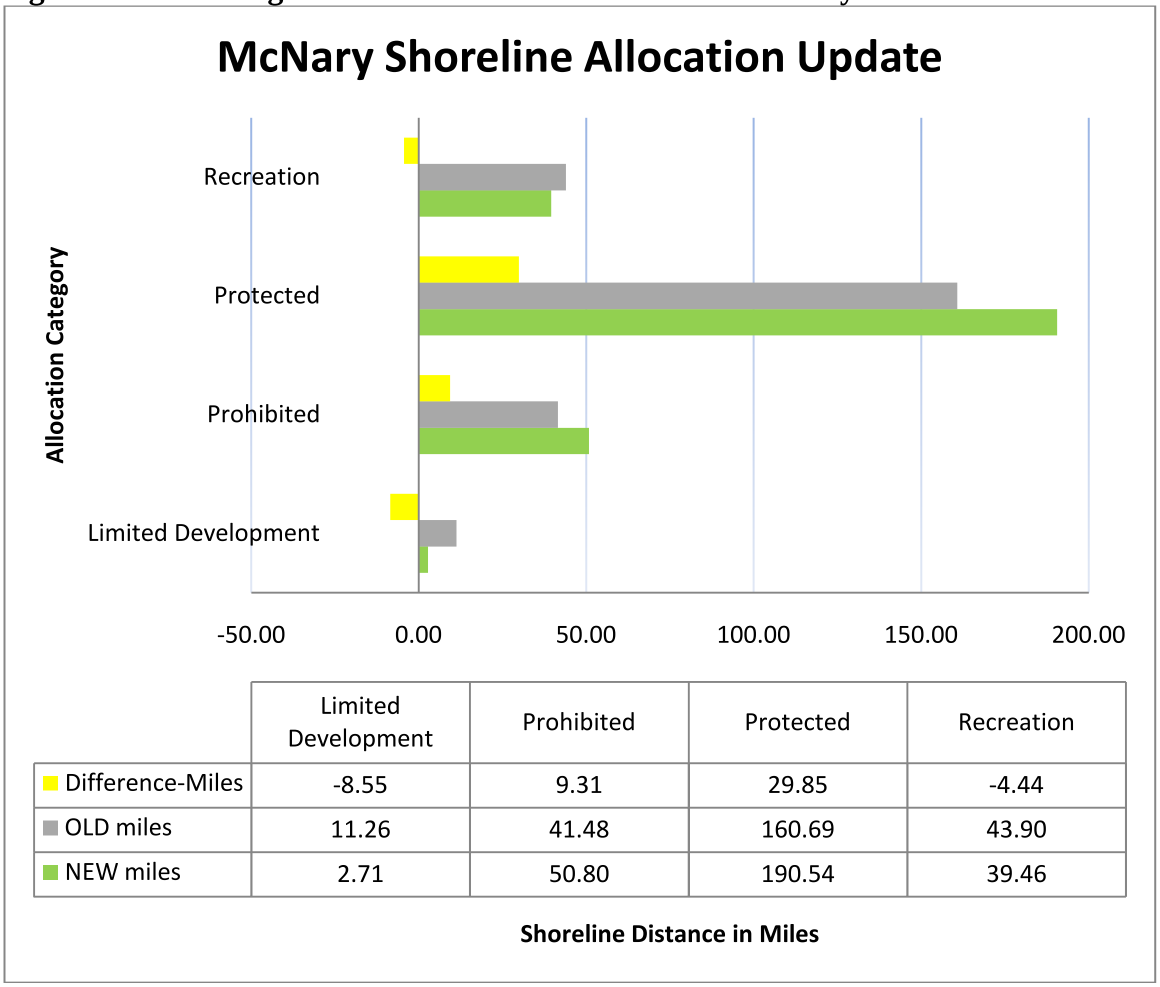


Table 2. Shoreline Allocation Percentages

Allocation	Percent of Total
Limited Development	1.0%
Prohibited	17.9%
Protected	67.2%
Recreation	13.9%

a. Limited Development Areas

LDA total allocation has been reduced in this plan from 11.26 miles to 2.71 miles (see Figures 4-7) and now includes only 1.0% of the total project shoreline. The issuance of either shoreline use facilities or vegetation modification permits does not preclude or restrict public use of the limited development shoreline area. Permit holders who attempt to deny pedestrian traffic and/or general public use of the shoreline are in violation of permit conditions and are subject to enforcement action, including permit revocation and the required removal of all previously authorized facilities.

Permittees may restrict public access to authorized private facilities, which are considered the permittee's personal property. The Corps does not have authority to address unauthorized intrusion or trespass on private floating facilities.

b. Public Recreation Areas

Public recreation area total allocation has also been reduced in this plan, from 43.9 miles to 39.46 miles and now includes only 13.9% of the total project shoreline.

c. Protected Shoreline Areas

Protected shoreline area total allocation has been increased in this plan, from 160.69 miles to 190.54 miles and now includes 67.2% of the total project shoreline.

d. Prohibited Access Areas

Prohibited shoreline area total allocation has also been increased in this plan, from 41.48 miles to 50.8 miles and now includes 17.9% of the total project shoreline.

ii. Other Shoreline Uses

The SMP governs activities allowed on the public shoreline. Besides docks and vegetation permits, very limited other private uses (i.e., stairways, steps, footbridges, hard-surfaced walkways, erosion control, private irrigation systems, etc.) require a real estate license and are issued to address special site conditions. Where applicable (very few select instances) Other Shoreline Uses would be allowed within the following parameters:

- These uses may be allowed in limited development areas
- Because these uses involve construction of permanent facilities on federal property, they will require a real estate license, rather than a shoreline permit, and will undergo all associated additional environmental and cultural reviews associated with Real Estate actions
- Due to the aquatic critical habitat designation and the associated riparian habitat, the Corps will limit hardened shoreline development to that only necessary (e.g. a hardscape walkway to facilitate Americans with Disabilities Act access), and using the least environmentally damaging methods practical.

iii. Boat Docks

e. Permitting and construction of new private boat docks

Under our proposed action, an estimated 54 new docks could be permitted and constructed in the future beyond the current number of private docks (Table 1). These docks would be required to meet residential overwater structure design criteria current at the time the application was received (Annex A). Owners of these new docks would be required to pay the associated administrative fees to obtain a real estate license from the Corps.

f. Renewing existing private boat dock permits

Existing dock permits would be renewed as long as the docks are upgraded to ESA-compliant designs and maintained in a usable and safe condition and they meet the terms of their existing or most recent permit (many are currently expired). The license or permit would require the dock be modified to meet the current design criteria. Up to 24 of the docks (the grandfathered docks) may remain on the lake indefinitely, regardless of ownership (as per 36 CFR 327.30).

g. Removal of private boat docks

Eventually the total number of docks may decrease from the estimated peak number of docks (127, based on current adjacent private ownership), to an estimated potential low of 95 docks. This number is dependent upon potential removals of site specific LDAs now contained within protected areas that will not be renewed if removed for other than temporary maintenance purposes. Grandfathered docks would not be required to be modified or removed.

iv. Vegetation modification

a. Vegetation modification permits

Vegetation modification permits that do not in any way involve a disruption of or a change to land form and are no wider than necessary to safely access the dock (4' width perpendicular to the flow of the river) may be permitted in LDAs (note that this includes areas now surrounded by protected areas). Most of these permits would be in limited development areas, but some may also be in public recreation areas where extensive vegetation modifications by adjacent landowners currently occur.

The following activities would be allowed in limited development areas under specific vegetation modification permit(s):

- The planting and maintenance of areas of lawn grass including associated underground irrigation systems (if pre-existing).
- Mowing to reduce fire danger.
- Maintenance activities to enhance shoreline aesthetics.
- Unsurfaced access trails to the shoreline. These trails must not be more than 4 feet in width and must follow a meandering route to prevent erosion and avoid the removal of trees and shrubs. These walkways will be designated to provide a common pathway to serve as many individual interests in the immediate vicinity as possible and may be covered with crushed stone, wood chips, stepping stones or other readily removable material.

- Burning of vegetative debris originating on Corps land. Burning must be performed in accordance with local burning regulations in such a manner as to not endanger any other project lands, features or vegetation. The specific locations of any burning must be approved in advance by the resource manager on each occasion of burning.

b. Vegetation modification prohibitions

Prohibited vegetation modification activities include:

- Planting and maintenance of gardens.
- Burning of standing live vegetation.
- Disposal or storage of debris, refuse or any other material.
- Application of pesticides.
- Modification of existing land contours.
- Placement of any lawn or beach equipment or other personal property.
- Construction of any structures.
- Activities that might affect the environmental and physical characteristics of the shoreline.

c. Renewing existing vegetation modification permits

There are 51 existing vegetation modification permits. We would continue to renew these permits as long as the permittee was in compliance with the permit conditions. Some of these permits were issued to cure landscaping encroachments. Renewals for permits that do not meet the criteria above can be issued if replanting of native species (tree, shrub and ground cover strata) is accomplished as a mitigative measure.

Mitigation planting will follow the vegetation enhancement guidelines provided in Appendix E of the McNary SMP (attached hereto as Annex B). Vegetation modification permits in recreation areas will expire in the coming year and the Corps may seek other pathways to deal with these encroachments in the future.

v. Operational Characteristics of the Proposed Project

Operation of the SMP permit program involves an annual inspection of permitted facilities and activities and follow-up with the permittee if necessary due to permit violations. Specific use of the private boat docks varies between owners. Some owners use their docks frequently, all months of the year, others seldom use their docks. Generally the majority of the docks are used during the summer months.

vi. Description of Proposed Conservation Measures

The Lake Wallula shoreline was evaluated to determine areas where the lowest level of environmental impact would occur if limited development (boat docks and vegetation modification) were to take place. Less than 3 miles of the 284 miles of shoreline is allocated for limited development. The expansion of both protected and prohibited shoreline will support ESA-listed fish.

New docks and renewals will be required to comply to the maximum extent possible with the current residential dock design criteria (July 2010) included as Annex A. The criteria do not include water depth at this time, as depth became criteria for determining primary shoreline allocation (shallow water = protected shoreline, with the exception of existing docks in place at the time of implementing this plan).

Vegetation modification activities are limited to maintaining previously permitted areas and the permitted activities listed above. These activities are intended to be minor in nature, causing very little environmental disturbance. Mitigative plantings may be required in some areas as described under "Renewing existing vegetation modification permits" above.

vii. Description of Mitigation Required Under Other Permits

New docks will require Hydraulic Project Approval permits from the Washington Department of Fish and Wildlife (WDFW). It is unknown if additional mitigation would be required by WDFW. Mitigative planting may be required to correct vegetative management permits exceedence.

viii. Discussion of Interdependent and Interrelated Actions

Interdependent and interrelated actions include an increase in recreational activity along some of the shoreline as the local population grows. This includes activities such as boating, fishing and swimming. Boating in shallow water areas can stir up bottom sediments. Mooring boats in shallow areas can create cover for predatory fish species and increase the chance of releasing contaminated bilge water to the lake. Recreational fishing can negatively affect some ESA listed species through incidental bycatch. Swimming and other recreation along the shoreline contributes to shoreline erosion in some areas. Private and commercial boat traffic is also known to promote the distribution of invasive non-native aquatic species that could affect fish habitats.

B. Known Ongoing and Previous Projects in the Action Area

There have been several actions in the past that have affected Lake Wallula; the largest being construction and operation of the Federal Columbia River Power System. Direct effects to Lake Wallula come from operation of McNary, Priest Rapids, and Ice Harbor dams. Other projects include irrigation withdrawals, marina expansions, and public and private boat dock operations.

II. Status of Species and Critical Habitat

A. Species Lists from the Services

NOAA Fisheries and USFWS Species Lists are included at the end of this BA. A comprehensive list of the ESA listed species follows, summarizing the lists from Franklin, Benton and Walla Walla Counties, Washington, and Umatilla County, Oregon.

Endangered

- Upper Columbia River spring Chinook salmon (*Oncorhynchus tshawytscha*)
- Snake River sockeye salmon (O. *nerka*)
- Pygmy rabbit (*Brachylagus idahoensis*) Columbia Basin distinct population segment
- Upper Columbia River steelhead (*O. mykiss*)

Threatened

- Middle Columbia River steelhead (*O. mykiss*)
- Snake River steelhead (*O. mykiss*)
- Snake River fall Chinook salmon (*O. tshawytscha*)
- Snake River spring/summer Chinook salmon (*O. tshawytscha*)
- Bull trout (*Salvelinus confluentus*) Columbia River distinct population segment
- Ute ladies'-tresses (*Spiranthes diluvialis*)
- Canada lynx (*Lynx canadensis*)

Candidate

- Columbia spotted frog (*Rana luteiventris*)
- Greater sage grouse (*Centrocercus urophasianus*) Columbia Basin Distinct Population Segment
- Yellow-billed cuckoo (*Coccyzus americanus*)
- Umtanum desert buckwheat (*Eriogonum codium*), plant
- Washington ground squirrel (*Urocitellus [=Spermophilus] washingtoni*)
- White Bluffs bladderpod (*Physaria tuplashensis*), plant

B. Endangered Species

i. Upper Columbia River Spring Chinook Samon

Several different strains of Chinook salmon can be found in Lake Wallula during part of the year. Unlisted upper Columbia River (UCR) fall Chinook salmon are the most common. However, UCR spring Chinook, Snake River (SR) spring/summer Chinook salmon, and SR fall Chinook salmon are also present. Migration timing and life stage development can be different between the strains as they migrate through and use the lake.

The UCR spring Chinook salmon were listed as an endangered species on March 24, 1999 and their endangered status was reaffirmed on June 28, 2005. This stock includes all natural-origin, stream-type Chinook salmon from river reaches above Rock Island Dam and downstream of Chief Joseph Dam, including the Wenatchee, Entiat and Methow River basins. Adult and juvenile UCR spring Chinook salmon migrate through the action area.

a. Biological Requirements

UCR spring Chinook salmon biological requirements include food; high quality, flowing water; clean spawning substrate, resting habitat and unimpeded migratory access to and from spawning and rearing areas.

b. Factors of Decline

i. Historical Pressures on the Species

Historic fishing pressure initiated the decline of salmon populations over 100 years ago. Construction of dams, roads, railroads and levees/shoreline protection, as well as irrigation withdrawals has altered the rearing habitat of juvenile salmon and the migratory habitat of juveniles and adults. Increased predation on juvenile salmonids due to the habitat changes is also a contributor to the declining salmonid population. Prior to the construction of McNary Dam, a large percentage of the shoreline consisted of shallow water with a small particle size substrate. Today, much of the shoreline consists of deeper water bordered by riprap. This change in habitat type is likely a factor in the decline of the Columbia Basin salmonid populations.

ii.Current Pressures on the Species

Current pressures on UCR spring Chinook include loss of quality habitat, predation, poor ocean conditions and limited fishing pressure.

iii. Limiting Factors for Recovery

The limited amount of suitable habitat available, caused by habitat degradation and passage barriers is the main factor limiting recovery.

c. Local Empirical Information

Most juvenile UCR spring Chinook migrate downstream through Lake Wallula from late April through early June. Most adults migrate upstream through Lake Wallula during the same timeframe and generally take four to seven days to get through the lake.

Three important spawning populations have been identified within this Evolutionarily Significant Unit (ESU): the Wenatchee, Entiat and Methow populations (Interior TRT

2003). The spring components of the following hatchery stocks are also listed: the Chiwawa, Methow, Twisp, Chewuch and White rivers and Nason Creek.

i. Current Local Population Information

Since 1960 the number of adult and jack UCR spring Chinook counted at Priest Rapids Dam has ranged from a high of 51,366 in 2001 to a low of 1,208 in 1995. In 2009, 13,469 were counted. The latest 10-year average (2000-2009) is 19,133. The previous 10-year average (1990-2000) was 9,247.

ii. Ongoing Monitoring Programs

There are numerous monitoring programs associated with salmon that pass through Lake Wallula. Adult salmon are counted at Priest Rapids and McNary Dams. Sample counts of juveniles are also taken to estimate the number of juveniles passing through the lake.

d. Population Trend of the Species

The UCR spring Chinook salmon ESU continues to have habitat problems. In general, tributary habitat problems affecting this ESU include increasing urbanization on the lower reaches, irrigation and flow diversion in upriver sections of the major drainages, and impacts of grazing on middle reaches. The latest 10-year average is higher than the previous 10-year average.

e. Critical Habitat Designation

Critical habitat for UCR spring Chinook salmon was designated in 2000, but vacated in 2002 due to legal implications. Critical habitat was re-designated on January 2, 2006 (Figure 12). Critical habitat includes the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Specific areas outside the geographical area occupied by the species that are determined to be essential for the conservation of the species are also included.

f. Effects From the Proposed Action

Construction of new docks could cause some temporary disturbance to juvenile Chinook. These impacts would be limited because the docks would be designed and constructed as per the most recent overwater structure design criteria. Some docks could be removed in the future. Impacts would likely be minor as the work would be allowed during the winter, when few salmon would be present. Up to 73 existing docks would remain in place and several more could be put in place, up to 127 total docks based on adjacent landownership patterns in LDAs. Permit renewals and new permits in LDAs would be contingent upon compliance with current dock criteria to minimize impacts on fish. The 24 grandfathered docks (included in the numbers above) could remain on the lake indefinitely. These docks may provide cover for predatory fish species which prey on juvenile salmonids, including UCR spring Chinook salmon. All of the boat docks contribute to increased recreational use of shoreline areas, which can also have a negative effect on fish. Only minor vegetation modification actions are permitted, so effects to fish would be minimal.

While the amount of shoreline in LDAs is greatly reduced and the amount of protected shoreline is greatly increased under this SMP, due to the potential adverse effects from leaving existing docks in place and permitting new docks, we conclude that the proposed project "may affect, and is likely to adversely affect" UCR spring Chinook salmon. The project would adversely modify UCR spring Chinook salmon critical habitat by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for 'ESA-compliant' docks for all non-grandfathered docks.

ii. Snake River Sockeye Salmon

Snake River sockeye were listed as endangered on November 20, 1991. Critical habitat was designated in 1993.

a. Biological Requirements

Sockeye salmon spawn in or near lakes, where the juveniles rear for 1 to 3 years prior to migrating to the ocean. Most sockeye salmon stay at sea for two years, returning to spawn in their fourth year, but some may be five or six years old when they spawn. Sockeye, unlike the other species of Pacific salmon, feed almost exclusively on plankton. They are able to do this as a result of their many gill rakers, which strain plankton from the water. Sockeye salmon biological requirements include food; high quality, flowing water; clean spawning substrate, resting habitat and unimpeded migratory access to and from spawning and rearing areas.

b. Biological Factors of Decline

i. Historical Pressures on the Species

Snake River (SR) sockeye salmon have been impacted by a wide range of factors in the past. At one time, SR sockeye salmon were subject to eradication programs as a means to replace them with a more desirable rainbow trout fishery. Construction of dams, roads, railroads and levees/shoreline protection, as well as irrigation withdrawals has altered the migratory habitat of juveniles and adults. Increased predation on juvenile salmonids due to the habitat changes is also a contributor to the declining salmonid population.

ii. Current Pressures on the Species

Current pressures on Snake River sockeye include partial passage barriers, degraded habitat and a very low population.

iii. Limiting Factors for Recovery

The extremely low population and limited amount of suitable habitat combine to limit the potential for recovery of SR sockeye salmon.

c. Local Empirical Information

SR sockeye adults and juveniles could be found in Lake Wallula within the Snake River and in the Columbia River downstream of the Snake River. Juveniles typically migrate through the lake from early May through early June. Adults generally migrate through the reservoir in June and July.

i. Current Local Population Information

The SR Sockeye salmon ESU currently consists of Redfish Lake stock in the captive broodstock program at Eagle and Beef Creek hatcheries, and the hatchery fish released from this program into Redfish Lake, Pettit Lake, Pettit Creek and Redfish Lake Creek; wild residual sockeye in Redfish Lake and their out-migrating progeny; any naturally-spawned progeny of broodstock adults released into Redfish Lake; and any adults returning to Redfish or Pettit Lake.

The population of SR sockeye salmon is extremely low but has shown substantial increase recently. Since 1962, the highest count of adults at Ice Harbor dam was 1,276 in 1964. Zero adults were counted at Ice Harbor dam in 1994 (this may be somewhat misleading since in 1994, six were counted at Lower Monumental, 44 at Little Goose and 5 at Lower Granite). The latest 10-year average (2000-2009) is 196. The previous 10-year (1990-1999) average was 10. In 2009, 867 sockeye salmon were counted and by July 14, 2010, 1050 have been counted.

ii. Ongoing Monitoring Programs

Snake River sockeye salmon are counted at the Corps' Snake River dams. Adults are counted as they move up through the ladders. Juveniles are sampled from the juvenile bypass systems and abundance estimates are made. Additional monitoring takes place in and near the lakes where sockeye spawn and rear.

d. Population Trend of the Species

Snake River sockeye salmon are at critically low levels, but on an increasing trend. Fish management actions (hatchery production and the captive brood program) seem to be resulting in increased adult returns.

e. Critical Habitat Designation

Critical habitat for Snake River sockeye was designated in 1993. Critical habitat includes river reaches of the Columbia, Snake and Salmon Rivers, Alturas Lake Creek, Valley Creek and Stanley, Redfish, Yellow Belly, Pettit and Alturas Lakes. Habitat components include spawning and juvenile rearing areas, juvenile migration corridors, areas for growth and development to adulthood and adult migration corridors. Lake Wallula makes up part of the adult and juvenile migration corridor. Essential features of this habitat include substrate, water quality, water quantity, water temperature, water velocity, cover and shelter, food, riparian vegetation, space and safe passage conditions. For adult migration critical habitat, the essential features are the same, with the exception that food is not required.

f. Effects from the Proposed Action

There is currently only one private dock permitted on the Snake River, in the Sunset Drive LDA (Figure 7). This dock is grandfathered and would be permitted to remain in place. New docks would be permitted in this area if they meet the new design criteria and be restricted to the LDA. The remainder of the shoreline would be in protected or prohibited status. Vegetation modification actions in this LDA would have minimal impact on the river environment and are not likely to affect fish.

While the amount of shoreline in LDAs is greatly reduced and the amount of protected shoreline is greatly increased under this SMP, due to the potential adverse effects from leaving an existing dock in place and permitting new docks, we conclude that the proposed project "may affect, and is likely to adversely affect" Snake River sockeye. The project would adversely modify sockeye critical habitat by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for 'ESA-compliant' docks for all non-grandfathered docks.

iii. Pygmy Rabbit

Pygmy rabbits were listed under the Endangered Species Act as endangered in 2003 after originally being listed under an emergency action in 2001. Their historic range may have included northern Benton County, Washington, but they are no longer found there. The pygmy rabbit is a member of the family Leporidae, which includes hares and rabbits. They are a small rabbit, usually weighing less than a pound. The pygmy rabbit is distinguishable from other rabbits by its small size, short ears, gray color, small hind legs and lack of white on the tail. Pygmy rabbits are not found near the Snake or Columbia rivers. The proposed project would have no effect on pygmy rabbits.

iv. Upper Columbia River Steelhead

UCR steelhead were listed as endangered in August 1997 and then changed to threatened in January 2006, then changed back to endangered by court decision in June 2007. This stock includes all naturally spawned populations of steelhead in streams in the Columbia River Basin upstream from the Yakima River to the U.S.-Canada border. Six artificial propagation programs are included in the listing: the Wenatchee River, Wells Hatchery (in the Methow and Okanogan Rivers), Winthrop National Fish Hatchery, Omak Creek and the Ringold steelhead hatchery program. Adult and juvenile UCR steelhead migrate through the action area. Some adult steelhead overwinter in the Columbia and Snake rivers.

a. Biological Requirements

Range-wide UCR steelhead biological requirements include food, flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), clean spawning substrate and unimpeded migratory access (with resting areas) to and from spawning and rearing areas. Steelhead use Lake Wallula mainly as a migration corridor. Habitat use in the mainstem Columbia River by steelhead is not well known. Unlike other salmonids, which tend to use a smaller portion of the available habitat at a higher density, steelhead tend to disperse widely throughout the available habitat.

b. Factors of Decline

i. Historical Pressures on the Species

Historic fishing pressure began the decline of salmon populations over 100 years ago. Construction of dams, roads, railroads and levees/shoreline protection, as well as irrigation withdrawals has altered the rearing habitat of juvenile salmon and the migratory habitat of juveniles and adults. Increased predation on juvenile salmonids due to the habitat changes is also a contributor to the declining salmonid population. Prior to the construction of McNary Dam, a large percentage of the shoreline consisted of shallow water with a small particle size substrate. Today, much of the shoreline consists of deeper water bordered by riprap. This change in habitat type is likely a factor in the decline of the Columbia Basin salmonid populations.

ii. Current Pressures on the Species

Current pressures on UCR steelhead include loss of quality habitat, predation, poor ocean conditions and limited fishing pressure.

iii. Limiting Factors for Recovery

The limited amount of suitable habitat available, caused by habitat degradation and passage barriers is the main factor limiting recovery.

c. Local Empirical Information

Based on limited data, steelhead from the Wenatchee and Entiat rivers return to freshwater after one year in salt water, whereas Methow River steelhead primarily return after two years in salt water. Similar to other inland Columbia River basin steelhead, adults typically return to the Columbia River between May and October and are considered summer steelhead. Adults may remain in fresh water up to a year before spawning. Most UCR steelhead migrate relatively quickly up the mainstem to their natal tributaries. A portion of the returning run overwinter in the mainstem reservoirs, passing over the upper mid-Columbia dams in April and May of the following year. Unlike Chinook salmon or sockeye salmon, some steelhead adults attempt to migrate back to the ocean. These fish are known as kelts, and those that survive may migrate from the ocean to spawn again.

i. Current Local Population Information

Returns of both hatchery- and naturally produced steelhead to the upper Columbia River have increased in recent years. Priest Rapids Dam is below Upper Columbia River steelhead ESU production areas.

ii. Ongoing Monitoring Programs

Estimates of annual adult returns are based on dam counts.

d. Population Trend of the Species

Steelhead numbers passing Priest Rapids Dam have ranged from a high of 40,093 in 2009 to a low of 4,357 in 1995. The most recent 10-year average (2000 – 2009) is 18,701. The previous 10-year average (1990 – 1999) was 8,358.

e. Critical Habitat Designation

Critical habitat for UCR steelhead was designated in 2000, but vacated in 2002. Critical habitat was re-designated on January 2, 2006. Critical habitat includes the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Specific areas outside the geographical area occupied by the species that are determined to be essential for the conservation of the species are also included.

f. Effects from the Proposed Action

Construction of new docks could cause some temporary disturbance to juvenile steelhead. These impacts would be limited because the docks would be designed and constructed as per the most recent overwater structure design criteria. Some docks could be removed in the future. Impacts would likely be minor as the work would be allowed during either August, or during the winter, when few salmon would be present. Up to 73 existing docks would remain in place and several more could be put in place, up to 127 total docks based on adjacent landownership patterns in LDAs. Permit renewals and new permits in LDAs would be contingent upon compliance with current dock criteria to minimize impacts on fish. The 24 grandfathered docks (included in the numbers above) could remain on the lake indefinitely. These docks may provide cover for predatory fish species which prey on juvenile salmonids, including UCR steelhead. All of the boat docks contribute to increased recreational use of shoreline areas, which can also have a negative effect on fish. Only minor vegetation modification actions are permitted, so effects to fish would be minimal.

While the amount of shoreline in LDAs is greatly reduced and the amount of protected shoreline is greatly increased under this SMP, due to the potential adverse effects from leaving existing docks in place and permitting new docks, we conclude that the proposed project “may affect, and is likely to adversely affect” UCR steelhead. The project would adversely modify steelhead critical habitat by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for ‘ESA-compliant’ docks for all non-grandfathered docks.

B. Threatened Species

i. Middle Columbia River Steelhead

Middle Columbia River (MCR) steelhead were listed as threatened on March 25, 1999 and their threatened status was reaffirmed on June 28, 2005. This stock includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin. Seven artificial propagation programs are considered part of the listing: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River and Upper Yakima River), Umatilla River and the Deschutes River steelhead hatchery programs. Major watersheds within this ESU include the Klickitat, Fifteen Mile, Deschutes, John Day, Umatilla, Yakima and Walla Walla River Basins. The MCR steelhead use the action area for migration and staging prior to entering their tributary rivers. Habitat use in the mainstem Columbia River by steelhead is not well known. Unlike other salmonids, which tend to use a smaller portion of the available habitat at a higher density, steelhead tend to disperse widely throughout the available habitat.

a. Biological Requirements

Range-wide MCR steelhead biological requirements include food, flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), clean spawning substrate and unimpeded migratory access (and resting areas) to and from spawning and rearing areas.

b. Factors of Decline

i. Historical Pressures on the Species

Historic fishing pressure began the decline of salmon populations over 100 years ago. Construction of dams, roads, railroads and levees/shoreline protection, as well as irrigation withdrawals has altered the rearing habitat of juvenile salmon and the migratory habitat of juveniles and adults. Increased predation on juvenile salmonids due to the habitat changes is also a contributor to the declining salmonid population. Prior to the construction of McNary Dam, a large percentage of the shoreline consisted of shallow water with a small particle size substrate. Today, much of the shoreline consists of deeper water bordered by riprap. This change in habitat type is likely a factor in the decline of the Columbia Basin salmonid populations.

ii. Current Pressures on the Species

Numerous factors that led to the listing of MCR steelhead continue to exert substantial influence on anadromous fish production. These factors include declines in abundance of naturally produced fish, heavy harvest pressures, significant habitat loss, losses associated with mainstem Columbia River hydropower projects, grazing, irrigation diversions and pervasive hatchery impacts that affect the viability of steelhead populations.

iii. Limiting Factors for Recovery

The reduced amount of suitable habitat may be the main factor limiting steelhead recovery.

c. Local Empirical Information

Very little information is documented on nearshore habitat use by juvenile steelhead in the mainstem Columbia River. Juvenile steelhead are thought to utilize the deeper, higher velocity areas away from the shoreline to migrate through the reach. They could potentially use the backwater area near the proposed project location during the winter and spring for rearing.

i. Current Local Population Information

From the analysis of adult fish counts presented in the following section it is difficult to determine the current population of MCR steelhead.

ii. Ongoing Monitoring Programs

Both adult and juvenile steelhead are counted as they pass the mainstem dams. Theoretically the number of adults counted at Ice Harbor Dam (presumably Snake River steelhead) and Priest Rapids Dam (presumably upper Columbia steelhead) in a given season could be subtracted from the number counted passing McNary Dam. However, doing this sometimes results in negative numbers. At Priest Rapids Dam wild (adipose fin present) fish are not differentiated. When the number counted at Priest Rapids Dam is added to the number of wild fish counted at Ice Harbor Dam, then subtracted from the number of wild fish counted at McNary Dam, the results since 1993 show a high of 18,164 in 2001 and a low of -4,082 in 1999. When the number counted at Priest Rapids Dam is added to the total number of steelhead at Ice Harbor Dam, then subtracted from the total number counted at McNary, since 1993 the high has been 113,101 in 2001 and the low was -5,856 in 1999.

d. Population Trend of the Species

The abundance of a few natural populations of MCR steelhead has increased in the recent past, however, the population has declined from its high count in 2001. NMFS has identified 19 spawning populations that primarily utilize 12 major production areas in the Klickitat, Yakima, Deschutes, John Day, Umatilla, Yakima and Fifteenmile Creek Basins. Long-term trends for eleven of the twelve major production areas in the Distinct Population Segment (DPS) were negative, although NMFS observes that these downward trends were driven, at least in part, by a peak in returns in the middle to late 1980s followed by relatively low escapement levels in the early 1990s.

e. Critical Habitat Designation

Critical habitat for MCR steelhead was designated in 2000, but vacated in 2002 due to legal implications. Critical habitat was re-designated on January 2, 2006. Critical habitat includes the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Specific areas outside the geographical area occupied by the species that are determined to be essential for the conservation of the species are also included.

f. Effects from the Proposed Action

Construction of new docks could cause some temporary disturbance to juvenile steelhead. These impacts would be limited because the docks would be designed and constructed as per the most recent overwater structure design criteria. Some docks may also be removed in the future. Removal activities could also cause temporary disturbance to steelhead. Impacts would likely be minor as the work would be allowed during either August, or during the winter, when few salmon would be present. Up to 73 existing docks would remain in place and several more could be put in place, up to 127 total docks based on adjacent landownership patterns in LDAs. Permit renewals and new permits in LDAs would be contingent upon compliance with current dock criteria to minimize impacts on fish. The 24 grandfathered docks (included in the numbers above) could remain on the lake indefinitely. These docks may provide cover for predatory fish species which prey on juvenile salmonids, including MCR steelhead. All of the boat docks contribute to increased recreational use of shoreline areas, which can also have a negative effect on fish. Only minor vegetation modification actions are permitted, so effects to fish would be minimal.

While the amount of shoreline in LDAs is greatly reduced and the amount of protected shoreline is greatly increased under this SMP, due to the potential adverse effects from leaving existing docks in place and permitting new docks, we conclude that the proposed project "may affect, and is likely to adversely affect" MCR steelhead. The project would adversely modify steelhead critical habitat by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for 'ESA-compliant' docks for all non-grandfathered docks.

ii. Snake River Steelhead

Snake River (SR) steelhead were listed as threatened on August 18, 1997. This stock includes all natural-origin populations of steelhead in the Snake River Basin of southeast Washington, northeast Oregon and Idaho. None of the hatchery stocks in the Snake River Basin are listed.

Steelhead spawning habitat in the Snake River Basin is distinctive in having large areas of open, low-relief streams at high elevations. In many Snake River tributaries, spawning occurs at a higher elevation (up to 2,000 meters) than for steelhead in any other geographic region. SR steelhead also migrate farther from the ocean than most (up to 1,500 kilometers). Steelhead are not known to spawn or rear in the impounded reaches of the Snake River. However, adult steelhead are known to hold in the mainstem Snake River for extended periods (months) prior to spawning, and thus some are likely to be in the Action Area for most of the year.

a. Biological Requirements

Range-wide SR steelhead biological requirements include food, flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), clean spawning substrate and unimpeded migratory access (with resting areas) to and from spawning and rearing areas.

b. Factors of Decline

i. Historical Pressures on the Species

Historic fishing pressure began the decline of salmon populations over 100 years ago. Construction of dams, roads, railroads, and levees/shoreline protection, as well as irrigation withdrawals has altered the rearing habitat of juvenile salmon and the migratory habitat of juveniles and adults. Increased predation on juvenile salmonids due to the habitat changes is also a contributor to the declining salmonid population. Prior to the construction of McNary Dam, a large percentage of the shoreline consisted of shallow water with a small particle size substrate. Today, much of the shoreline consists of deeper water bordered by riprap. This change in habitat type is likely a factor in the decline of the Columbia Basin salmonid populations.

ii. Current Pressures on the Species

Hydrosystem projects create substantial habitat blockages in this ESU; the major ones are the Hells Canyon Dam complex (mainstem Snake River) and Dworshak Dam (North Fork Clearwater River). Minor blockages are common throughout the region. Habitat in the Snake River Basin is warmer and drier and often more eroded than elsewhere in the Columbia River Basin or in coastal areas.

iii. Limiting Factors for Recovery

The reduced amount of suitable habitat may be the main factor limiting steelhead recovery.

c. Local Empirical Information

Very little information is documented on nearshore habitat use by juvenile steelhead in the mainstem Columbia and Snake Rivers. Juvenile steelhead are thought to utilize the deeper, higher velocity areas away from the shoreline to migrate. They could potentially use the shoreline area during the winter and spring for rearing.

i. Current Local Population Information

Most wild adult steelhead typically migrate through the reach between June and August for the A-run and between late August and November for the B-run. Adults from this stock may be migrating in deeper water or individuals may be holding in mid-channel areas prior to moving upriver into tributaries for spawning in early spring.

Wild juvenile SR steelhead generally migrate downstream through the lower Snake River, mainly between late March and the end of August. Some rearing or overwintering may occur in the reservoirs.

ii. Ongoing Monitoring Programs

Passage of adult and juvenile steelhead is monitored at the Snake River dams. There are also several other monitoring programs by other Federal, state and tribal organizations throughout the watershed.

d. Population Trend of the Species

Since 1962 adult fish counts at Ice Harbor Dam show that steelhead (hatchery and wild) reached a high of 328,105 in 2009 and a low of 12,528 in 1974. Wild (adipose fin not removed) fish began to be differentiated in the counts in 1993. Since that time a high of

76,434 was reached in 2009. A low of 8,265 was counted in 1994. The 76,434 wild steelhead counted in 2009 were 23% of the total return.

For SR steelhead, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.91 to 0.70, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (McClure *et al*. 2000). NOAA Fisheries has also estimated the risk of absolute extinction for the A- and B-runs, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (*i.e.*, hatchery effectiveness = 0), the risk of absolute extinction within 100 years is 0.01 for A-run steelhead and 0.93 for B-run fish (McClure *et al*. 2000). At the high end, assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100 percent), the risk of absolute extinction within 100 years is 1.00 for both runs (McClure *et al*. 2000).

e. Critical Habitat Designation

Critical habitat for SR steelhead was designated in 2000, but vacated in 2002. Critical habitat was re-designated on January 2, 2006. The lower Snake River corridor is primarily critical habitat for migration passage of wild SR steelhead. However, habitats suitable for rearing or overwintering are likely present in the lower Snake River. Critical habitat includes the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Specific areas outside the geographical area occupied by the species that are determined to be essential for the conservation of the species are also included.

f. Effects from the Proposed Action

There is currently only one private dock permitted on the Snake River, in the Sunset Drive LDA (Figure 7). This dock is grandfathered and would be permitted to remain in place. New docks would be permitted in this area if they meet the new design criteria and be restricted to the LDA. The remainder of the shoreline would be in protected or prohibited status. Vegetation modification actions in this LDA would have minimal impact on the river environment and are not likely to affect fish.

While the amount of shoreline in LDAs is greatly reduced and the amount of protected shoreline is greatly increased under this SMP, due to the potential adverse effects from leaving an existing dock in place and permitting new docks, we conclude that the proposed project “may affect, and is likely to adversely affect” SR steelhead. The project would adversely modify steelhead critical habitat by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for ‘ESA-compliant’ docks for all non-grandfathered docks.

iii. Snake River Fall Chinook Salmon

Snake River (SR) fall Chinook salmon were listed as threatened on April 22, 1992. This population includes all natural-origin populations of fall Chinook salmon in the mainstem Snake River and its tributaries. Fall Chinook from the Lyons Ferry hatchery are not listed. Critical Habitat for SR fall Chinook salmon was designated on December 28, 1993.

a. Biological Requirements

Adult fall Chinook salmon return from the ocean to the Snake River at ages 2 through 5. Spawning, which takes place in late fall, occurs in the mainstem and in the lower parts of major tributaries. Juvenile fall Chinook salmon generally move seaward slowly as subyearlings. Juvenile SR fall Chinook salmon use shallow, open water, sand substrate in backwater-type and opposing bar habitat areas for rearing periods during their outmigration. The majority of juveniles tend to outmigrate as subyearlings over a period of weeks or months during their year of emergence, feeding and growing as they progress downriver (Bennett et al. 1997).

More recently, results from analyzing scales of adult fall Chinook salmon passing Lower Granite Dam indicated that 40-50% of the adult return may have come from fish that entered the ocean as yearling fish. This suggests that many of the fish either held up in the estuary to overwinter, juveniles migrated during the winter and were not collected or transported.

b. Factors of Decline

i. Historical Pressures on the Species

SR fall Chinook salmon are believed to have once lived and spawned in the mainstem Snake River from its confluence with the Columbia River upstream to Shoshone Falls (RM 615). The spawning grounds between Huntington, Oregon (RM 328) and Auger Falls in Idaho (RM 607) were historically the most important for this species; and only limited spawning activity occurred downstream of RM 273 (Waples et al. 1991), about one mile below Oxbow Dam. However, development of irrigation and hydropower projects on the mainstem Snake River have inundated or blocked access to most of this area in the past century.

Construction of Swan Falls Dam (RM 458) in 1901 eliminated access to many miles (about 25 percent) of potential habitat, leaving only 458 miles of useable habitat. Construction of the Hells Canyon Dam complex (from 1958-1967) cut off anadromous fish access to 211 miles (or 46 percent) of the remaining historical fall Chinook salmon habitat upstream of RM 247. The lower Snake River Dams allow access to upriver areas, but have further changed the character of the remaining habitat.

ii. Current Pressures on the Species

SR fall Chinook salmon now have access to approximately 100 miles of mainstem Snake River habitat, which is roughly 22 percent of the 458 miles of historic habitat available prior to completion of the Hells Canyon Complex and the four lower Snake River dams. The limited amount of habitat limits the salmon population. These fish are also affected by passage through dams, high water temperatures, predation and poor estuary conditions.

The Snake River system has contained hatchery-reared fall Chinook salmon since 1981 (Busack 1991). The hatchery contribution to Snake River Basin escapement has been estimated at greater than 47% (Myers *et al.* 1998). Artificial propagation is relatively recent, so cumulative genetic changes associated with it may be limited. Wild fish are incorporated into the brood stock each year, which should reduce divergence from the wild population. Release of subyearling fish may also help minimize the differences in mortality patterns between hatchery and wild populations that can lead to genetic change.

c. Limiting Factors for Recovery of the Species

Approximately 80 percent of historical spawning habitat was lost with the construction of a series of dams on the mainstem Snake River. The loss of spawning habitat restricted the ESU to a single naturally spawning population and increased its vulnerability to environmental variability and catastrophic events. The diversity associated with populations that once resided above the Snake River dams has been lost and the impact of hatchery fish and fish from other areas straying to the spawning grounds has the potential to further compromise the genetic diversity of the ESU. Although recent improvements in the marking of hatchery fish and their removal at Lower Granite Dam have reduced the impact of many of these strays, introgression below Lower Granite Dam remains a concern. The Biological Review Team found moderately high risk for all viable salmon population categories and therefore felt that this ESU was at some level of risk despite the recent positive signs.

d. Local Empirical Information

i. Current Local Population Information

Wild juvenile fall Chinook salmon typically pass through the Lower Snake River from mid-June through September, with double peaks in mid-July and some lingering portion of the annual migration lasting until December. Many of the juvenile fall Chinook salmon outmigrating from the Clearwater and Snake Rivers spend time in shoreline areas (less than 9.8 feet [3 meters] in depth) in the Lower Granite reservoir and less time in downriver reservoirs, where they prefer sand-substrate areas (Bennett et al. 1997). When water temperatures reach about 70°F (21.1°C), these fish appear to have achieved adequate growth and fitness due to the warming conditions of these shallow-water habitat areas. They leave the shoreline areas to either continue rearing or begin their migration in the cooler pelagic zone of the reservoirs (Bennett et al. 1997).

Though most juvenile Chinook salmon migrate to the ocean as sub-yearlings, passive integrated transponder (PIT) tag detections from 1993 to 1995 brood year juvenile fall Chinook salmon from the Clearwater River were recorded in the spring of 1994 to 1996 at some lower Snake River dams. It is unknown whether these fish overwintered in one or more of the lower Snake River reservoirs. More PIT-tagged fall Chinook salmon outmigrants were detected in the spring of 1994 and 1995 than in the previous year, while the trend was reversed with the 1995 brood year. It is apparent from these detections that some Clearwater River fall Chinook salmon migrate to the ocean as yearlings, rather than as subyearlings.

Cold-water releases from Dworshak Dam, aimed at augmenting flows for adult migration, may cause stunted growth rates in juveniles in the late summer and early fall, causing these fish to overwinter. Overwintering and early rearing of fall Chinook salmon in Lake Wallula backwater areas has been documented and it would be logical to assume that the potential for overwintering and rearing exists in the lower Snake River as well.

The low velocity and relatively fine substrate along a high percentage of the reservoir shorelines of the Lower Snake River reservoirs preclude spawning in these areas. The limited spawning that does occur is in the tailrace areas below all of the lower Snake River dams, where water velocity is high and substrate size is relatively large. Surveys conducted in the tailraces of Lower Granite and Lower Monumental dams in December of 2002 and 2003 revealed no redds in the navigation channels or in areas where redds were found in the mid- to late-1990s. No redds have been located in other regions of the reservoirs, including shoreline areas that could be potentially affected by site development.

ii. Ongoing Monitoring Programs

Passage of adult and juvenile Chinook salmon is monitored at the Snake River dams. There are also several other monitoring programs by other federal, state and tribal organizations throughout the watershed.

iii. Population Trend of the Species

For the SR fall Chinook salmon ESU as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.94 to 0.86, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (McClure *et al.* 2000). NOAA Fisheries has also estimated the risk of absolute extinction for the aggregate fall Chinook salmon population, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (*i.e.*, hatchery effectiveness = 0), the risk of absolute extinction within 100 years is 0.40 (McClure *et al*. 2000). At the high end, assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100 percent), the risk of absolute extinction within 100 years is 1.00 (McClure *et al*. 2000).

The 2000-2009 average count of SR fall Chinook salmon at Ice Harbor Dam was 16,242 (38,818 including jacks). The previous 10 year (1990-1999) average was 3,759 (5,536 including jacks)

e. Critical Habitat Designation

Critical Habitat for SR fall Chinook salmon was designated on December 28, 1993. Critical habitat includes reaches of the Columbia, Snake, and Salmon Rivers and all tributaries of the Snake and Salmon rivers presently or historically accessible to Snake River Fall Chinook salmon (except reaches above impassible natural falls and Dworshak and Hells Canyon dams).

f. Effects From the Proposed Action

There is currently only one private dock permitted on the Snake River, in the Sunset Drive LDA (Figure 7). This dock is grandfathered and would be permitted to remain in place. New docks would be permitted in this area if they meet the new design criteria and be restricted to the LDA. The remainder of the shoreline would be in protected or prohibited status. Vegetation modification actions in this LDA would have minimal impact on the river environment and are not likely to affect fish.

While the amount of shoreline in LDAs is greatly reduced and the amount of protected shoreline is greatly increased under this SMP, due to the potential adverse effects from leaving an existing dock in place and permitting new docks, we conclude that the proposed project “may affect, and is likely to adversely affect” SR fall Chinook salmon. The project would adversely modify Chinook salmon critical habitat by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for ‘ESA-compliant’ docks for all non-grandfathered docks.

iv. Snake River Spring/Summer Chinook Salmon

SR spring/summer Chinook salmon were listed as threatened on April 22, 1992. Spring/summer Chinook are found in several subbasins of the Snake River. Some or all of the fish returning to several of the hatchery programs are also listed including those returning to the Tucannon River, Imnaha and Grande Ronde hatcheries and to the Sawtooth, Pahsimeroi and McCall hatcheries on the Salmon River.

Historically, spring/summer Chinook salmon spawned in virtually all accessible and suitable habitat in the Snake River system. During the late 1800s, the Snake River produced a substantial fraction of all Columbia River Basin spring and summer Chinook salmon, with total production probably exceeding 1.5 million in some years.

a. Biological Requirements

In the Snake River, spring and summer Chinook salmon share key life history traits. Both are stream-type fish, with juveniles that migrate swiftly to sea as yearlings.

Depending primarily on location within the basin (and not on run type), adults tend to return after either two or three years in the ocean. Both spawn and rear in small, high-elevation streams, although where the two forms coexist, spring Chinook salmon spawn earlier and at higher elevations than summer Chinook salmon. Spring/summer Chinook salmon are not thought to rear in the impounded portions of the Snake River. They do, however, pass through the lower portion of the Action Area on their adult and smolt migrations.

b. Factors of Decline

i. Historical Pressures on the Species

Even before mainstem Snake River dams were built, habitat was lost or severely damaged in small tributaries by construction and operation of irrigation dams and diversions, inundation of spawning areas by impoundments and siltation and pollution from sewage, farming, logging and mining.

In 1927 major subbasins in the Clearwater River Basin were blocked to Chinook salmon by the construction of Lewiston Dam, which has now been removed. Tributary streams upstream of the Salmon River were completely blocked by the 1960's by construction of the Hells Canyon Complex. The lower Snake River dams have also impacted a portion of the remaining population. By the mid-1900s, the abundance of adult spring and summer Chinook salmon had greatly declined. As evidenced by adult counts at dams, however, spring and summer Chinook salmon have declined considerably since the 1960s.

ii. Current Pressures on the Species

Factors such as injury while passing through dams, predation and high water temperatures continue to impact SR Chinook salmon. During the 2004 Status Review, NOAA Fisheries evaluated whether conservation efforts (e.g., the extensive artificial propagation program) reduced or eliminated the risk to SR spring/summer Chinook salmon. They concluded that the artificial propagation programs did provide benefits in terms of abundance, spatial structure and diversity, but that the programs had neutral or uncertain effects in terms of overall productivity. As a result, NOAA Fisheries did not believe that the artificial propagation programs were sufficient to substantially reduce the long-term extinction risk. Actions under the Federal Columbia River Power System Biological Opinion and improvements in hatchery practices are addressing some factors for decline for this ESU.

iii. Limiting Factors for Recovery of the Species

The limited amount of high quality habitat available is likely the main factor limiting recovery of Snake River spring/summer Chinook salmon.

c. Local Empirical Information

i. Current Local Population Information

Juvenile spring Chinook salmon have been documented as using the backwater areas of Lake Wallula for rearing. Although sampling has not occurred during the cooler water months in the lower Snake River, it is reasonable to assume that individuals of SR spring/summer Chinook salmon could use the backwater areas of lower Snake River reservoirs for periods of rearing or overwintering between July and March. Because this ESU is an upriver stock, no spawning habitat is present in the lower Snake River.

A few juvenile SR spring/summer Chinook salmon generally migrate through the Snake River during March through July. Most adult SR spring/summer Chinook salmon migrate through the lower Snake River between April and mid-August.

ii. Ongoing Monitoring Programs

Passage of adult and juvenile Chinook salmon is monitored at the Snake River dams. There are also several other monitoring programs by other Federal, state and tribal organizations throughout the watershed.

d. Population Trend of the Species

For the SR spring/summer Chinook salmon population as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.96 to 0.80, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to the effectiveness of fish of wild origin (McClure *et al*. 2000). NOAA Fisheries has also estimated median population growth rates and the risk of absolute extinction for the seven spring/summer Chinook salmon index stocks, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (*i.e.*, hatchery effectiveness = 0), the risk of absolute extinction within 100 years for the wild component ranges from zero for Johnson Creek to 0.78 for the Imnaha River (McClure *et al*. 2000). At the high end, assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100 percent), the risk of absolute extinction within 100 years ranges from zero for Johnson Creek to 1.00 for the wild component in the Imnaha River (McClure *et al*. 2000).

The most recent SR spring/summer Chinook salmon 10 year (2000-2009) average count was 79,323. The 2009 count was 116,914 SR spring/summer Chinook salmon.

e. Critical Habitat Designation

Critical Habitat was designated for SR Chinook salmon on December 28, 1993 and was revised on October 25, 1999. Critical habitat for SR spring/summer Chinook salmon consists of river reaches of the Columbia, Snake and Salmon Rivers, and all tributaries of the Snake and Salmon Rivers (except the Clearwater River) presently or historically accessible to spring/summer Chinook (except reaches above impassible natural falls and Hells Canyon Dam). Juvenile and adult migration occurs between mid-March and late August. No spawning habitat for wild Snake River spring/summer Chinook salmon is present in the lower Snake River.

f. Effects From the Proposed Action

There is currently only one private dock permitted on the Snake River, in the Sunset Drive LDA (Figure 7). This dock is grandfathered and would be permitted to remain in place. New docks would be permitted in this area if they meet the new design criteria and be restricted to the LDA. The remainder of the shoreline would be in protected or prohibited status. Vegetation modification actions in this LDA would have minimal impact on the river environment and are not likely to affect fish.

While the amount of shoreline in LDAs is greatly reduced and the amount of protected shoreline is greatly increased under this SMP, due to the potential adverse effects from leaving an existing dock in place and permitting new docks, we conclude that the proposed project “may affect, and is likely to adversely affect” Snake River spring/summer Chinook. The project would adversely modify Chinook critical habitat by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for ‘ESA-compliant’ docks for all non-grandfathered docks.

v. Bull Trout

Bull trout were listed as threatened in 1998. Bull trout belong to the Salmonidae family and are native to the Pacific Northwest and western Canada. Critical habitat was designated in 2004. On January 13, 2010, the U.S. Fish and Wildlife Service proposed to revise its 2005 designation of critical habitat for the bull trout to include the mainstem Columbia and Snake Rivers.

a. Biological Requirements

Individual bull trout may exhibit resident or migratory life history strategies. Resident bull trout carry out their entire life cycle in the stream in which they spawn and rear. Migratory bull trout spawn in tributary streams, but eventually travel to larger streams (or lakes) where they mature. Habitat components that appear to influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrates and migratory corridors (with resting habitat). All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders and deep pools.

Bull trout normally reach maturity in four to seven years and may live as long as twelve years. They generally spawn from August to November during periods of decreasing water temperatures. Migratory bull trout may travel over one hundred miles to their spawning grounds. Egg incubation is normally 100 to 145 days and fry remain in the substrate for several months.

Bull trout are opportunistic feeders. Their diet requirements vary depending on their size and life history strategy. Resident and juvenile bull trout prey on insects, zooplankton and small fish. Adult migratory bull trout mainly eat other fish.

b. Factors of Decline

i. Historical Pressures on the Species

Bull trout are estimated to have occupied about 60 percent of the Columbia Basin and presently occur in only about 45 percent of their historic range. The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices and the introduction of non-native species. Declining salmon and steelhead populations could also negatively impact bull trout populations by reducing the number of juvenile salmon and steelhead that bull trout might prey on.

ii. Current Pressures on the Species

Bull trout habitat is sensitive to stream channel changes. Altered flow regimes, sedimentation rates, bank erosion and reduced channel complexity all reduce the quality of bull trout habitat.

iii. Limiting Factors for Recovery of the Species

Barriers between isolated populations are a limiting factor for most of the bull trout subpopulations in the Columbia Basin.

c. Local Empirical Information

i. Current Local Population Information

The few remaining bull trout strongholds in the Columbia River Basin tend to be found in large areas of contiguous habitats in the Snake River basin of the central Idaho mountains, upper Clark Fork and Flathead Rivers in Montana, and several streams in the Blue Mountains in Washington and Oregon. Populations also exist in the Yakima River watershed. Recent studies have shown some migration to, from, and through Lake Wallula, but very little is known about the number of bull trout within Lake Wallula. The number is presumed, and likely to be very low. Bull trout using Lake Wallula would be using it solely for migration or overwintering.

ii. Ongoing Monitoring Programs

Fish passage at McNary and Ice Harbor Dams is monitored. Any bull trout observations are recorded, though only a few, if any, are generally seen in any year.

Anglin et al. (2010) estimated a total of 192 bull trout emigrated from the Walla Walla Basin to the Columbia River from November 2007 through December 2009. They estimated that 36 PIT tagged bull trout entered the Columbia from the Walla Walla in 2009. However, over the duration of their 2009 study, only one bull trout was detected, in June, returning to the Walla Walla River from the Columbia River. Four Walla Walla Basin bull trout were detected at mainstem Columbia River dams over the duration of the study. Detections at the juvenile facilities at John Day and McNary dams indicated two of these bull trout were moving downstream. Detections in the adult ladders at McNary and Priest Rapids dams indicated two of these bull trout were moving upstream (Anglin et al. 2010).

Anglin et al. (2010) also indicate that bull trout dispersed into the mainstem Columbia River from the Walla Walla Basin, and at times, this dispersal included a relatively long migration. One bull trout moved 130 river kilometers (rkm) upstream and was detected at Priest Rapids Dam, and another moved 162 rkm downstream to John Day Dam (Anglin et al. 2010).

Two additional bull trout were detected returning to the Walla Walla from the Columbia River in mid-April 2010.

The timing of migratory bull trout movement from the Walla Walla River to the Columbia River varies from year to year, but generally occurs between October and May, peaking between December and February (Anglin et al. 2010). Adult bull trout migrating from the Columbia River might initiate upstream movement in April (R. Koch, personal communication, August 30, 2010).

Faler et al. (2008) report that bull trout in the Tucannon River (tributary to the Snake River), upstream of Lower Monumental Dam, migrated upstream in spring and early summer to the spawning areas in upper portions of the Tucannon River watershed. The fish in their study quickly moved off the spawning areas in the fall, and either held or continued a slower migration downstream until March or April. By the June 1, most bull trout had ascended the Tucannon River. During late fall and winter, bull trout were distributed in the lower half of the Tucannon River basin, down to and including the mainstem Snake River below Little Goose Dam.

They observed bull trout migrations into the Lower Monumental reservoir area influenced by the lower Tucannon River and/or the Snake River for 6 individuals. Two of the fish never returned to the Tucannon River. One individual made multiple movements to and from the reservoir near the mouth of the Tucannon, but it spent much of the winter within the reservoir influence area of the Tucannon River (Faler 2008).

Two Tucannon PIT tags have also been detected outside of the reservoir. One by NMFS personnel conducting Avian Predation Study efforts on a Columbia River island in 2002, and the other in the Catherine Creek (tributary to the Grande Ronde River) acclimation pond in 2003 (Faler 2008).

Based on the Anglin et al. studies (ongoing), and the Faler et al. studies, it is clear that some individual bull trout migrate out of their natal streams and into the mainstem Columbia and Snake Rivers. Clearly actual abundance and amount of usage by bull trout during migration and overwintering is not yet known in Lake Wallula, but given the evidence, the number of migratory bull trout using the action area is extremely low.

d. Population Trend of the Species

The U.S. Fish and Wildlife Service conducted a 5-year review of the current status of bull trout. Conservation Status Assessment Map A[1] illustrates rank by core area, but shows no presence in the action area upstream of McNary Dam until the mouth of the Yakima River. Other Conservation Status Assessment maps also show the same information. The action area does not contain a core area, so an assessment was not done. Any potential individuals that may be in the action area are likely migrants from outside the area, and were not considered in the assessments. Migrating individuals may use the action area for overwintering, but distinguishing between fish for different core areas for the purposes of the proposed action to discuss trends of any core area populations is not practical.

e. Critical Habitat Designation

Critical habitat for Columbia Basin bull trout was designated in 2004. Critical habitat includes the stream channels within the designated stream reaches and includes a lateral extent from the bankfull elevation on one bank to the bankfull elevation on the opposite bank. On January 13, 2010, the U.S. Fish and Wildlife Service proposed to revise its 2005 designation of critical habitat for the bull trout to include the mainstem Columbia and Snake Rivers. Although bull trout critical habitat has not been finalized for the action area, the following discussion of proposed critical habitat is discussed as if it has been designated for the purposes of ESA section 7 consultation with the Service.

Primary Constituent Elements for Bull trout based on the needs identified in 75 CFR 2270 and the current knowledge of the life-history, biology, and ecology of the species and the characteristics of the habitat necessary to sustain the essential life history functions of the species, the USFWS has identified the following 9 PCEs for bull trout critical habitat. The nine PCEs relate to (1) water quality; (2) migration corridors; (3) food availability; (4) instream habitat; (5) water temperature; (6) substrate characteristics; (7) stream flow; (8) water quantity; and (9) nonnative species. Following each PCE is a brief description of current conditions in the action area, as well as a discussion of potential effects from the proposed action.

[1] http://www.fws.gov/pacific/bulltrout/Maps/Statusmaps.html

1. *Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia*:

Flow and temperature regimes have been altered from historic levels since completion of the McNary project. Cool water refugium is formed by hyporheic upwelling, and is a normal feature in flowing systems as a result of pool formation. Formation of such features is reduced in a slow-moving, deeper-water reservoir. However, the reservoir provides deeper, cooler water than would be found in a smaller stream or river during periods of high temperatures. Construction of s reduces floodplain connectivity, and may partially block exchange with subsurface water. The action area contains an extensive levee network (approximately 17 miles of levees) that was built as part of the McNary project.

When instream work commences on pile installation, a turbidity plume will be created in the immediate vicinity of the pile driving, and may extend downstream from each site for a few hours. Hyporheic exchange is not likely to be affected due to the size of the piles, and intermittent dispersal of the piles. They will not have the ability to block hyporheic flow, except for in the immediate vicinity of the (up to 160 ft residential or 320 ft^2 community) dock, which has a maximum of 6 8 inch pilings (see Annex A) driven approximately 2.67 feet (dock criteria states 1/3 above and 2/3 below ground, or 2.67 ft) into the substrate. The pilings have the potential to occupy 1.8 ft^2 of substrate for each pile, or up to10.6 ft^2 if all 6 piles are used on a dock, and have the potential to occupy a volume in the substrate of up to approximately 4.7 ft^3 per piling, or a total of up to approximately 28.3 ft^3 for all 6 pilings.

Given the size of the action area (44,266 acres), the size of the rivers in the action area (approximately 3, 000 ft wide at the confluence of the Snake and Columbia Rivers, approximately 3,300 ft wide at the Cable and Blue bridges between Kennewick and Pasco, and approximately 9,600 ft wide and 75 ft deep at McNary) and the current degraded and generally poor ESA-listed fish related conditions in the action area, it is reasonable to assume that the effects on this PCE will be insignificant or discountable.

No measurable effect on thermal refugia will result from the proposed action.

The proposed action will have no effect on short-term and long-term water quantity.

2. *Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers*:

McNary and Ice Harbor Dams are within the action area. Both have juvenile bypass facilities, and adult fish ladders. The action area is not used by bull trout for spawning. It may be used by some individuals for rearing and overwintering, but summer water temperatures exclude them from the action area.

Migration is not likely to be significantly altered because of the very small number of migrating individuals that use the area, and the lack of migration occurring during the work in the area, the intermittent short-term nature of the potential hydroacoustic and turbidity effects, and the short duration of the instream work during pile driving.

3. *An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish*:

Increased development along the Columbia River, construction of the dams, and construction of the levee system have altered the action area from historic conditions, reducing riparian vegetation, and likely aquatic organisms. The action area is typically used by salmonids as a migration corridor solely, and may be used by bull trout for overwintering. The action area is not well suited to the unique habitat requirements of bull trout because of limited cover, altered flows, altered temperatures, etc. It is likely that the action area was never well suited for bull trout, simply because of elevation, geography, and water temperatures in the summer.

A minor decrease in the abundance of macroinvertebrates may occur in the immediate vicinity of, and immediately downstream of instream work sites for a period of a few days or a few weeks as a result of turbidity from pile driving, or vegetation modifications. However, given that mitigation is proposed as part of the proposed action (Annex B), the effects will be short-term in nature, and natural function should resume upon establishment of mitigative plantings. Plantings will also have 100% survivability for the first 5 years post-construction. Therefore, it is reasonable to assume that the effects on this PCE will be insignificant or discountable.

4. *Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure*:

The urban expansion of the Tri-Cities, as well as the construction of McNary, Ice Harbor, and Priest Rapids Dams, and subsequent inundation, in and near the action area fundamentally altered the riverine system in the action area. The Columbia River was slowed, side channels were reduced, levees were built, undercut banks were replaced in many areas with rip-rap, water depth became relatively homogeneous, fines increased in the substrate in the action area as a result of the slow-moving water, and large wood recruitment decreased.

Some vegetation providing shade may be removed during construction and vegetation modifications. However, only minor vegetation modification actions are permitted, so effects to fish would be minimal. Given that mitigation is proposed as part of the proposed action (Annex B), the effects will be short-term in nature, and natural function should resume upon establishment of mitigative plantings. Plantings will also have 100%

survivability for the first 5 years post-construction. Therefore, it is reasonable to assume that the effects on this PCE will be insignificant or discountable.

Construction of new docks could cause some temporary disturbance to individuals that may be in the area. These impacts would be limited because the docks would be designed and constructed as per the most recent overwater structure design criteria. Some docks may also be removed in the future. Removal activities could also cause temporary disturbance to bull trout. Impacts would likely be minor as the work would be allowed during either August, when few bull trout are likely to be present. However, work may occur during the winter when individual bull trout may be using Lake Wallula for overwintering.

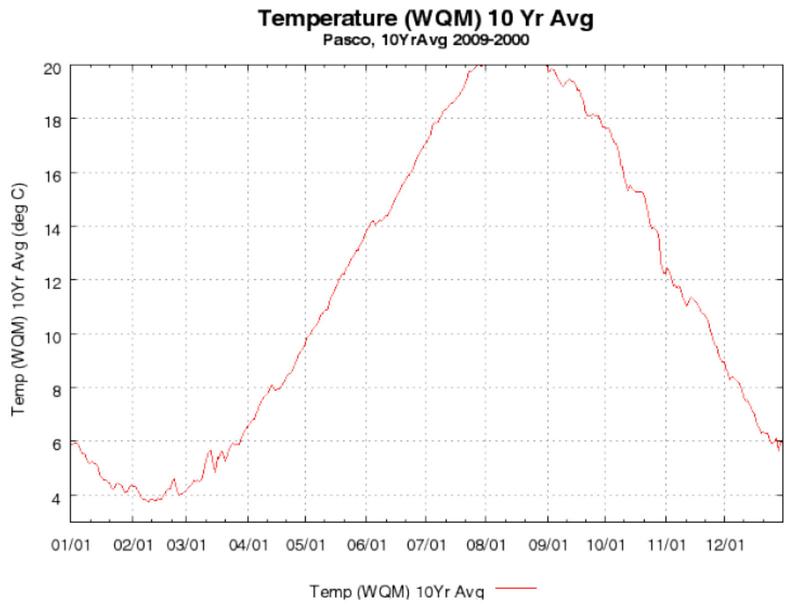
Up to 73 existing docks would remain in place and several more could be put in place, up to 127 total docks based on adjacent landownership patterns in LDAs. Permit renewals and new permits in LDAs would be contingent upon compliance with current dock criteria to minimize impacts on fish. The 24 grandfathered docks (included in the numbers above) could remain on the lake indefinitely. These docks may provide cover for predatory fish species. All of the boat docks contribute to increased recreational use of shoreline areas, which can also have a negative effect on fish.

The proposed project will also have a beneficial effect by upgrading docks to new dock design criteria (Annex A) for those docks identified in sections I and II of this document. The upgrade will negatively impact fish species that use the docks as cover, and reduce their habitat value to predatory fish. In addition, only 24 of the 73 existing docks are grandfathered in, and, as they are already part of the baseline, there will be no change in condition as a result of those docks remaining in place. Therefore, it is reasonable to assume that the effects on this PCE will be insignificant or discountable.

5. *Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence*:

Water temperatures at Pasco from May to August are typically increasing. In 2009, the temperature at Pasco on May 1 was approximately 7-8°C. The temperature water quality monitor (WQM) 10 year average on May 1 is just below 10°C. The water temperatures level out during August. In 2009, between August 1 and September 1, the temperature varied between approximately 19°C and 22°C. The WQM 10 year average between August 1 and September 1 is between 20°C and approximately 21°C (Figure 11) (DART 2010).

Figure 11. 10 year average water temperature in Pasco, WA (DART 2010).



Based on the DART (2010) information, temperatures in the Columbia River near Pasco between mid-June and mid-October of a typical year would be too high for any bull trout presence.

No measurable increases in water temperature will result from the proposed action.

6. *Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 %) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions*:

Bull trout spawn in upper tributaries with cooler waters, and would not use the action area for spawning. The proposed action will, therefore, have no measurable effect.

7. *A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph*:

The proposed action will have no measurable effect.

8. *Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited*:

The proposed project will have no measurable effect.

9. *Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present*:

Non-native piscivorous fish species, including percids and centrarchids, have become established in the Columbia River (Wydoski and Whitney 2003) and are present in the action area. These predators may feed directly on salmonids or compete for other food or habitat resources. Other native predators including the Northern pikeminnow (*Ptychocheilus oregonensis*) have exploited the impounded environment created by dams. The USGS Nonindigenous Aquatic Species (NAS) database contains 25 records for the Upper Columbia-Priest Rapids subbasin (HUC17020016). Some of which are native transplants, and some exotic. Species include smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), grass carp (*Ctenopharyngodon idella*), common carp (*Cyprinus carpio*), purple loosestrife (*Lythrum salicaria*), and Eurasian water-milfoil (*Myriophyllum spicatum*) (USGS 2009).

The proposed project will have a beneficial effect by upgrading docks to new dock design criteria (Annex A) for those docks identified in sections I and II of this document. Piers and ramps will extend at least 40 ft perpendicular from the OHWM to prevent damage to shallow-water habitat. Residential docs will be no larger than 160 ft^2, and community docks will not exceed 320 ft^2. Grating, covering 100% of the surface area, will allow at least 50% open area to allow for light penetration.

Although the docks will still provide some cover, the upgrade will negatively impact fish species that use the docks as cover, and reduce their habitat value to predatory fish. It should also be noted that the individual bull trout that use the action area for overwintering are typically larger fish. Faler et al. (2008) reported 6 radio-tagged bull trout from the Tucannon that entered the Snake River. The average fork length of the 6 individuals was 406.3 mm. Unlike juvenile salmonids susceptible to predation by piscivorous fish using the docks for cover, bull trout are large enough that predation on them by predatory fish may be reduced, and individual bull trout may be able to take advantage of the cover that is provided by docks. In addition, only 24 of the 73 existing docks are grandfathered in, and, as they are already part of the baseline, there will be no change in condition as a result of those docks remaining in place. The effects on this PCE would not be easily quantified, should be beneficial overall, and will likely be insignificant or discountable.

f. Effects From the Proposed Action

Few bull trout are found in the mainstem Columbia and Snake Rivers. The few that are found there are typically larger fish. Effects from private boat dock development and use and associated vegetation modifications would be minimal, but would include hydroacoustic effects and effects from turbidity generated during pile driving.

Hydroacoustic effects. Pile driving creates biological effects on fish resulting from high sound pressures when piles are driven by impact hammers. However, the proposed action will not use impact hammers. Vibratory hammers will be used, and are not known to reach levels of concern even when piles are many times larger (up to 72 inches in diameter) than proposed for this project are driven (Caltrans 2007).

Table 3. Summary of near-source (33 ft) unattenuated sound pressures for in-water pile installation using a vibratory driver/extractor (CALTRANS 2007).

Pile Type and Approximate Size	Relative Water Depth	Average Sound Pressure (dB)		
		Peak	RMS*	SEL**
12" steel H-type	<16 ft	165	150	150
12" steel pipe pile	<16 ft	171	155	155

* Impulse level (35 millisecond average)
**SEL-Sound Exposure Level: for 1 second of continuous driving

The Fisheries Hydroacoustic Working Group's Interim Criteria for Injury to Fish from Pile Driving Activities (FHWG 2008) is shown below in Table 4.

Table 4. Fish thresholds for marine construction activity (adapted from FHWG 2008).

Functional Hearing Group	Airborne Noise Thresholds	Underwater Noise Thresholds		
	In air Sound Pressure Level (RMS)	Vibratory Pile Driving Disturbance Threshold	Impact Pile Driving Disturbance Threshold	Injury Threshold
Fish ≥ 2 grams	NA	Behavior effects threshold 150 dB RMS*		187 dB CumulativeSEL
Fish < 2 grams	NA			183 dB CumulativeSEL
Fish all sizes	NA			Peak 206 dB

* RMS-Root-mean-square: for pile driving, this is the square root of the mean square of a single pile driving impulse pressure event.

FHWG shows that the behavioral effects threshold is at 150 dB RMS. That is the level that would be expected for using unattenuated vibratory hammer for 12 inch piles. However, the piles that will be driven as part of the proposed action are 8 inches (Annex A), and the piles will only be driven approximately 2.67 ft into the substrate, reducing the exposure of any sound pressures generated that may reach individual bull trout. Additionally, the Washington State Department of Transportation (WDOT) has shown noise reductions by using bubble curtains[2], and bubble curtains are a standard mitigative practice for reducing hydroacoustic effects as a result of pile driving on ESA-listed fish in the Columbia and Snake Rivers. Wood cushion blocks can also attenuate noise generated from pile driving.

The above measures, combined with the size of the pile, and the depth to which the pile would be driven would reduce the exposure of bull trout to below the behavioral effects

[2] http://www.wsdot.wa.gov/NR/rdonlyres/9586F526-79F1-4FA9-A2D3-F56228907DA5/0/NoiseRFP.pdf

threshold. This, combined with the extremely low numbers of individual bull trout that may be in the action area during any pile driving make it reasonably certain that there will be no adverse effects on bull trout as a result of pile driving.

Turbidity. The project will cause discrete releases of sediment, including suspended sediment that will be limited due to the nature of the work. Effects of increased sedimentation have been extensively studied, and are widely known. There is no bull trout spawning in the action area, so no redds will be affected. The likelihood of gill irritation is reduced by the highly localized nature of any pulses of turbidity and the extremely low number of individual bull trout that may be in the action area during any pile driving Therefore, it is reasonably certain that there will be no adverse effects on bull trout as a result of pile driving.

Any effects resulting from dock construction as part of the proposed action would be short-term in nature, and would be localized to the immediate vicinity of the construction. The short-term nature of the effects, the use of "ESA-compliant" dock design criteria to include the use of vibratory hammers for driving piles with a maximum diameter of 8 inches (Annex A), proposed vegetation mitigation (Annex B), combined with the extremely low number of individual bull trout that may be in the action area during construction, leads us to believe that the effects would be insignificant or discountable.

The project would adversely modify critical habitat for ESA-listed fish species by permitting dock construction in critical habitat, although this would be mitigated to a great degree by following the criteria for 'ESA-compliant' docks for all non-grandfathered docks. However, the proposed action will have a minimal impact to bull trout critical habitat, as described in the PCEs above, and it has been demonstrated that very few individual bull trout use the action area. No bull trout spawn in the action area. Those few individuals that may migrate from core areas outside of the action area would likely use the action area for overwintering. There will not be a significant modification to the current condition of PCEs for this life history usage.

There is also the potential for effects from reductions in vegetation associated with dock installation, removal, or vegetation modification permits. However, those effects would be short-term in nature, given that mitigation is being proposed that would attenuate those effects. It has also been demonstrated that a few individuals may enter the action area during periods of migration or for overwintering. However, the evidence shows that there are an extremely small number of individuals that may do so, and that number varies between years and streamflow patterns. Based on these facts, the proposed action is, therefore is not reasonably certain to affect bull trout, or appreciably diminish the value of critical habitat for bull trout. We conclude that the proposed activities may affect, but are not likely to adversely affect bull trout.

vi. Ute Ladies'-tresses

Ute ladies'-tresses was listed as threatened in 1992. This plant is a perennial orchid with stems that are eight to 20 inches tall arising from thick roots. Its narrow leaves are about

11 inches long at the base of the stem and decrease in size going up the stem. The flowers consist of three to 15 small, white or ivory colored flowers clustered into a spike arrangement at the top of the stem. There are no known records of occurrence of this species near this area. We have determined that the proposed project would have no effect on Ute ladies'-tresses.

vii. Canada Lynx

Canada lynx was listed as threatened in April 2000. They are listed throughout most of the Pacific Northwest. Critical habitat for Canada lynx was designated in November 2006. The Columbia and Snake River corridors are not included in the designation.

Lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short, black-tipped tail. The lynx's long legs and large paws make it well adapted for living in areas that receive deep snow. The home range of a lynx may extend over a few hundred square miles. Young lynx may disperse great distances from their birthplace. There are no known records of occurrence of this species near Lake Wallula. We have determined that the proposed project would have no effect on Canada lynx or its designated critical habitat.

C. Candidate Species

i. Columbia spotted frog

Over their wide range, Columbia spotted frogs are found diverse habitats, usually in places with strong sun exposure near water with floating vegetation, including beaver ponds, mountaintop wetlands, small lakes, boreal ponds, wet springs, and slow-moving stream edges. Exposed basking sites are preferred. The habitat surrounding these riparian areas vary from mixed coniferous and subalpine montane forests, to arid desert and arid grass and brushlands. From near sea level to 10,000 ft. (3,000 m.) This frog is highly aquatic, usually found close to a source of water. Adults overwinter in ponds, seeps, rivers and streams, preferring areas where the water does not freeze, but they also overwinter under ice. Overwintering frogs may be active all winter, even under ice. Adults emerge from winter hibernation somewhere from late February to early July, depending on location. After breeding, adults often disperse into habitats adjacent to the breeding waters. The implementation of the SMP, allowing dock construction and nearshore vegetation modification, may affect spotted frogs.

ii. Greater sage grouse

Greater Sage-Grouse are found in shrub-steppe and meadow-steppe habitats. They are typically found in areas with low, rolling hills adjacent to valleys. They prefer medium-density sagebrush mixed with a variety of other plants for cover and food. The birds are found at elevations ranging from 4,000 to over 9,000 feet. The implementation of the SMP will not affect the species as the area of affect does not include suitable habitat.

iii. Yellow-billed cuckoo

Yellow-billed cuckoos prefer open woodlands with clearings and a dense shrub layer. They are often found in woodlands near streams, rivers or lakes. In North America, their preferred habitats include abandoned farmland, old fruit orchards, successional shrubland and dense thickets. In winter, yellow-billed cuckoos can be found in tropical habitats with similar structure, such as scrub forest and mangroves. Construction and subsequent use of dock facilities will not affect the yellow-billed cuckoo. Vegetation management actions under the SMP will not affect the species as limited development areas do not have stands of dense riparian vegetation suitable for use and riparian vegetation mitigation would be required.

iv. Umtanum desert buckwheat

The Umtanum desert buckwheat is endemic to a very narrow range in Benton County in south-central Washington. The only known population of this species occurs at elevations ranging between 1,100 to 1,320 feet on flat to gently sloping microsites near the top of the steep, north-facing basalt cliffs overlooking the Columbia River. It is apparently restricted to the exposed top of one particular basalt flow (the Lolo Flow).The species is designated Endangered by the State of Washington. The implementation of the SMP is not likely to adversely affect (likely to benefit) the species as the area of affect includes greater shoreline and nearshore protection than previous management plans.

v. Washington ground squirrel

Although Washington ground squirrels are associated with sagebrush-grasslands of the Columbia Plateau, recent studies indicate that silty loam soils, especially those classified as Warden soils, are of particular importance. Washington ground squirrels occupy areas with a greater grass and forb cover than adjacent unoccupied areas, but soil type may be the most important habitat feature. Warden soils not only have a high silt content, they are very deep, allowing for deeper burrows that maintain their structure compared to sandy or shallow soils. Warden soils occur east and south of the Columbia River. The Washington ground squirrel is listed as Endangered under the Oregon Endangered Species Act. The implementation of the SMP will not affect the species as the area of affect does not include suitable habitat.

vi. White Bluffs bladderpod

The White Bluffs bladderpod is only found in a very small area in Franklin County, Washington adjacent to the Columbia River. The species is restricted to dry, barren, nearly vertical exposures of calcium carbonate paleosol. The species is considered Threatened in Washington. The implementation of the SMP is not likely to adversely affect (likely to benefit) the species as the area of affect includes greater shoreline and nearshore protection than previous management plans.

III. Environmental Baseline

This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem within the action area. The environmental baseline is a "snapshot" of a species' health at a specified point in time. It does not include the effects of the action under review in the consultation.

The baseline includes State, tribal, local and private actions already affecting the species or that will occur contemporaneously with the consultation in progress. Unrelated Federal actions affecting the same species or critical habitat that have completed formal or informal consultation are also part of the environmental baseline, as are Federal and other actions within the action area that may benefit listed species or critical habitat.

A. Description of the Action Area and Project Area

Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For purposes of this consultation, the action area includes the project footprint, the riverbed, riverbank, and riparian areas immediately adjacent to the site. Furthermore, based on the potential sound pressure waves and turbidity generated by the proposed action, the action area includes the entire water column of Lake Wallula. Lake Wallula has a water surface area of 37,000 acres, a pool length of approximately 62 miles, a maximum width of nearly 2½ miles, and a shoreline length of more than 242 miles (with McNary Project lands including a total of 284 miles of shoreline). The 0- to 10-foot deep areas amount to approximately 22.3 percent of the total innundated area.

The action area is used by Chinook salmon, sockeye salmon, and steelhead and is designated as critical habitat for these species. This area serves as a migration corridor and a staging and holding area. The action area is also designated as essential fish habitat (EFH) for Chinook and coho salmon (Pacific Fishery Management Council 1999) and is in an area where environmental effects of the proposed project may adversely affect EFH for those species.

B. Description of the Environmental Baseline

Generally, the environment for listed species in the Columbia River Basin, including those species that migrate through the action area, has been dramatically affected by the development and operation of the Federal Columbia River Power System (FCRPS). Hydroelectric dams have dramatically reduced mainstem spawning and rearing habitat and have altered the natural flow regime of the Columbia River, decreasing spring and summer flows, increasing fall and winter flows and altering natural thermal patterns. Power operations cause fluctuation in flow levels and river elevations, affecting fish movement through reservoirs, disturbing riparian areas and possibly stranding fish in shallow areas as flows recede. The dam (McNary Dam) nearest the action area yields similar effects as other dams in the migration corridor of the Columbia River, killing or injuring a portion of the smolts passing through the area. Above, below, and within the action area, the low velocity movement of water through the reservoir behind McNary Dam slows the smolts journey to the ocean and enhances the survival of predatory fish (Independent Scientific Group 1996, National Research Council 1996). Similarly, within and outside of the action area, formerly complex mainstem habitats in the Columbia River have been reduced, for the most part, to single channels, with floodplains reduced in size, and off-channel habitats eliminated or disconnected from the main channel (Sedell and Froggatt 1984; Independent Scientific Group 1996; and Coutant 1999). Dams also decrease the amount of large woody debris in the Columbia River, reducing habitat complexity and altering the river's food webs (Maser and Sedell 1994).

Since 2002, the number of boat docks have increased by more than 30% in the McNary Reservoir upriver of the Snake River confluence at four marinas, predominantly in excavated backwater habitats greater than 20 feet deep. An additional 4 boat launch ramps and piers of various sizes in shallow water shoreline habitats have been consulted on with NMFS by either the Corps-Walla Walla or the Corps-Seattle Regulatory. These commercial or public recreational facilities amount to approximately a total of 220,924 square feet of over-water structure with about ⅓ to ½ covering shallow water rearing habitat and the remaining ⅔ to ½ covering habitat deeper than 20 feet. Currently, 2 more marinas are proposing expansions to their marina facilities (not included in this consultation action). The proposed action includes 73 existing docks that cover approximately 30,000 square feet with 54 potential new docks that could add about 22,000 square feet of new over-water structures in the action area (totaling a maximum of roughly 52,000 square feet). The total surface area of Lake Wallula is over 1.5 billion square feet. Approximately 22.3% of the McNary Project associated water surface area is shallow water habitat less than 10 feet deep, equaling roughly 10,000 surface acres of water along the McNary Project shoreline.

The environmental baseline includes impacts that resulted from previous actions. The "Matrix Pathway for Documenting Environmental Baseline and Effects of Proposed Action on Relevant Anadromous Salmonid Habitat Indicators (MPI)" summarizes the environmental baseline relative to anadromous salmonids and is presented below in Table 5. The Corps believes that the MPI also generally summarizes the baseline conditions for bull trout, as well as the anadromous species for which it was designed. It summarizes the current conditions, and illustrates that the action, as proposed, will not significantly alter baseline conditions for bull trout. A baseline description of bull trout PCEs can be found in the *Bull Trout* section (II.B.v.) of this document.

Table 5. Matrix Pathway for Documenting Environmental Baseline and Effects on Relevant MPI

Diagnostic/Pathway Indicators	**Baseline Environmental Conditions**			**Effects of Project Actions on Environmental Conditions**		
	Properly Functioning	At Risk	**Not Properly Functioning**	**Improved**	**Maintained**	**Degraded**
Water Quality						
Temperature			X		X	
Sediment			X		X	
Chemical Contamination/Nutrients			X		X	
Habitat Access						
Physical Barriers		X			X	
Habitat Elements						
Substrate Embeddedness			X		X	
Large Woody Debris			X		X	
Pool Frequency			X		X	
Pool Quality			X		X	
Off-Channel Habitat			X		X	
Refugia			X		X	
Channel Conditions and Dynamics						
Width/Depth Ratio			**X**		**X**	
Streambank Condition			**X**			**X**
Floodplain Connectivity			**X**		**X**	
Flow/Hydrology						
Change in Peak/Base Flow			**X**		**X**	
Drainage Network Increase			**X**		**X**	
Watershed Conditions						
Road Density and Location			X		**X**	
Disturbance History			**X**		**X**	
Riparian Reserves			**X**		**X**	

i. Hydroelectric Facilities

Hydropower development in the Columbia and Snake rivers has altered the riverscape of the action area. Dams and similar structures have caused a broad range of habitat degradation and altered the structure and function of the lower and middle Columbia River by converting a riverine environment to a series of reservoirs. Consequently, a host of indicators within numerous pathways of the MPI have been affected. Specifically, hydroelectric facility operations and maintenance have altered natural flow regimes, produced broad diel flow fluctuations, altered temperature profiles, inundated spawning habitat, created passage barriers, diminished sediment transport, eliminated lotic channel characteristics, altered riparian habitat and expanded suitable habitat for piscivorous species (both native and non-native) that prey on or compete with salmonids.

a. Flow/Hydrology.

Streamflow in the Columbia River within the action area was historically driven by natural watershed processes, but is presently more significantly controlled by the operation of mainstem dams. In an unregulated condition, the Columbia River in the action area would exhibit the hydrograph of a snowmelt-dominated system where discharge peaked in the spring concurrent with melting snow and reached baseflow during the mid- to late-summer.

Presently reservoir operations within the action area have attenuated and truncated the natural runoff regime and produced a river system that is substantially out of phase with its unregulated, natural hydrograph. Further, hydropower peaking operations often cause broad daily flow fluctuations below dam facilities. Flow regimes that deviate from the natural condition can produce a diverse array of negative ecological consequences. The hydrograph of the rivers within the action area is temporally and spatially discordant with its supporting watershed and, accordingly, the aquatic and riparian biota of the system have suffered. In the MPI analysis, streamflow falls under the Flow/Hydrology pathway, and Change in Peak/Base flow indicator. Presently this indicator is *not properly functioning*. In this instance, *not properly functioning* is defined as pronounced changes in peak flow, base flow or flow timing relative to an undisturbed watershed of similar size, geology and geography.

b. Water Quality.

Water quality within the action area has been degraded by hydroelectric dams that contribute to high instream temperatures, high concentrations of dissolved atmospheric gases and high concentrations of nutrients and pollutants bound to fine sediments that settle out in reservoir pools (Spence *et al.* 1996; NMFS 2000). Portions of the action area have been placed on the Washington State 303(d) list (Clean Water Act) for degraded temperature, total dissolved gas, and dissolved oxygen parameters. Relevant water quality indicators (Temperature, Sediment/Turbidity, and Chemical Contamination/Nutrients) and thus the Water Quality pathway of the MPI are *not properly functioning*.

c. Habitat Access.

Hydroelectric dams control river stage and flow within the action area and can inhibit safe passage of listed salmonids by creating conditions where listed salmonids may be killed or injured by mechanical impingement or high dissolved gas levels (Spence *et al.* 1996; NMFS 2000). Additionally, the dams create false attraction to impassable areas, habitat for predators and otherwise delay the progress of some migrants. Therefore, based on the direct presence of hydroelectric dams and the secondary passage problems they cause, the Habitat Access pathway (Physical Barriers indicator) of the MPI is *at risk* within the action area because manmade barriers can delay upstream or downstream fish passage at a range of flows.

d. Habitat Elements.

Yet another consequence of reservoir impoundment for hydropower development is expressed as general habitat degradation within the action area. Habitat is a collective term that encompasses various physical, biological and chemical interactions within a river and its watershed that produce the spatial and temporal environs in which riverine species exist. Numerous instream and floodplain elements of habitat (*e.g.*, substrate, large woody debris [LWD], pool frequency and quality, off-channel areas and refugia) are vital to the production and maintenance of native fish assemblages (Bjornn and Reiser 1991; Spence *et al.* 1996; NRCC 1996).

When the Columbia River was transformed into a series of slow moving reservoirs, much of the historic habitat was inundated and most habitat functions were lost. Sediment transport has been restricted to the extent that fine materials (silt and sand) settle out of the water column in the reservoirs instead of being flushed downstream (causing sedimentation). In addition, low water velocity, the physical presence of the dams (both upstream and in the action area) and a management approach that maintains comparatively static reservoir pools act to trap spawning substrates, preventing downstream recruitment. Off-channel habitat, refugia and LWD production areas have been reduced or entirely eliminated by reservoir inundation. Streamflow in the action area is highly regulated between dams and channel-forming materials and processes are greatly diminished. This wholesale simplification of habitat has reduced or eliminated pools, riffles and other instream habitat features that are vital to the foodweb and listed salmonids. These factors have impaired every indicator (*e.g.*, Substrate, LWD, Pool Frequency and Quality, Off-channel Habitat and Refugia) of the Habitat Elements pathway such that all are *not properly functioning* within the action area.

e. Channel Condition and Dynamics.

Large reservoirs are often the defining hydrologic feature in arid environments such as the action area and their operational regimes often alter mainstem rivers both upstream and downstream of dam structures as well as streams tributary to a reservoir pool. Gravels trapped behind a dam are no longer available to downstream reaches for bank and bed formation/maintenance and can limit substratum for spawning salmonids and other members of the riverine food web. The availability and cycling of sediment along the river has a controlling influence on channel morphology, floodplain and channel complexity and riparian species assemblages. In addition, altered flow regimes (from an unregulated condition) can impact hydraulic parameters with associated biologic components (*i.e.*, sediment transport, gravel recruitment and bank stability) that are important to riverine aquatic species. Finally, periodic flooding redeposits silts, provides passage for biota to and from floodplain habitats, leads to extensive nutrient transformations, promotes channel maintenance, facilitates floodplain storage and enhances floodplain biodiversity and production.

The Columbia River throughout the action area presently bears little resemblance to the riverine environment that existed previous to hydrosystem development. The floodplain and mainstem channel of the Snake River is buried under many feet of reservoir water and tributary junctions are affected by inundation and pool fluctuation as well. Thus, riverine processes and their ecological linkages important to listed salmonids and the aquatic environment such as those described in the preceding paragraph are greatly diminished if not totally absent. Consequently, all requisite indicators of the Channel Condition and Dynamics pathway (*e.g.*, Width/Depth Ratio, Streambank Condition, and Floodplain Connectivity) are *not properly functioning* in the action area; the historic channel of the Columbia River no longer exists except for short tailwater reaches below the dams.

ii. Land Use and Shoreline Development

In the action area of this project, numerous anthropogenic features or activities (*e.g.*, dams, marinas, docks, roads, railroads, rip-rap and landscaping) have become permanent fixtures on the landscape and have displaced and altered native riparian habitat to some degree. Consequently, the potential for normal riparian processes (*e.g*., shading, bank stabilization and LWD recruitment) to occur is diminished and aquatic habitat has become simplified.

Shoreline development has reduced the quality of nearshore salmonid habitat by eliminating native riparian vegetation, displacing shallow water habitat with fill materials and by further disconnecting the Columbia River from historic floodplain areas. Further, riparian species that evolved under the environmental gradients of riverine ecosystems are not well suited to the present hydraulic setting of the action area (*i.e.*, static, slackwater pools), and are thus often replaced by nonnative species. Therefore, the Watershed Conditions pathway and Riparian Reserves indicator *is not properly functioning* in the action area because <u>the riparian reserve system is fragmented, poorly connected and provides inadequate protection of habitats and refugia for sensitive aquatic species</u> (less than 70% intact).

IV. Effects Summary

Negative effects from the proposed action could occur to the listed fish stocks that occur above the Snake River confluence with the Columbia River. The most probable effects would be on juveniles due to increased predation around the docks. Snake River stocks would experience little if any affect due to the low number of private docks (2, 1 in place and one recently damaged) on the Snake River and downstream. There could be a total of 20 private docks in the Snake River (of the possible 127) within the Corps' jurisdiction. Our effect determinations are included in the following table (Table 6). Most effects would be small, and the general effects of future dock development on listed fish would be reduced as a result of this plan being implemented with new and renewed docks meeting the NMFS approved criteria and the severe curtailment of potential new docks by the significant reduction of LDAs.

Table 6. Effects Determination Summary

Species and Status	Critical Habitat Effect	Species Effect (or Effect if listed)
Endangered Species		
Upper Columbia River spring Chinook	Likely to adversely modify	May affect, likely to adversely affect
Snake River sockeye	Likely to adversely modify	May affect, likely to adversely affect
Pygmy rabbit, Columbia Basin DPS	None designated	No effect
Upper Columbia River steelhead	Likely to adversely modify	May affect, likely to adversely affect
Threatened Species		
Middle Columbia River steelhead	Likely to adversely modify	May affect, likely to adversely affect
Snake River steelhead	Likely to adversely modify	May affect, likely to adversely affect
Snake River fall Chinook salmon	Likely to adversely modify	May affect, likely to adversely affect
Snake River spring/summer Chinook salmon	Likely to adversely modify	May affect, likely to adversely affect
Bull trout, Columbia River DPS	Not likely to destroy or adversely modify	May affect, not likely to adversely affect
Ute ladies'-tresses	None designated	No effect
Canada lynx	Not likely to destroy or adversely modify	No effect
Candidate Species		
Columbia spotted frog	None designated	(May affect, not likely to adversely affect)
Greater sage grouse, Columbia Basin DPS	None designated	(No effect)
Yellow-billed cuckoo	None designated	(No effect)
Umtanum desert buckwheat	None designated	(May affect, not likely to adversely affect - beneficial)
Washington ground squirrel	None designated	(No effect)
White Bluffs bladderpod	None designated	(May affect, not likely to adversely affect - beneficial)

V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation. Non-Federal actions are likely to continue affecting listed species. Based on the population and growth trends, cumulative effects are likely to increase.

State and local governments may be faced with pressures from population growth and movement. Growth in business will place increased demands on these governments for buildable land, infrastructure, water, electricity and waste disposal. Such population trends will place greater overall and localized demands in the action area affecting water quality directly and indirectly and increase the need for transportation and recreation. The effects of private actions are the most uncertain. Private landowners may convert their lands from current uses, or they may intensify or diminish those uses.

Impacts to the aquatic environment that may contribute specifically to the cumulative effects include: water flow fluctuation, degraded water quality, migration barriers, habitat degradation, resource competition and introduction of nonnative species. Because of the aquatic nature of the action area, water quality is of primary concern when evaluating potential effects to listed species. Elevated levels of contaminants in the waterways can adversely affect aquatic species through direct, lethal or sublethal toxicity, through indirect effects on their food supply or through interactions with compounds present in the water.

Agricultural practices associated with irrigation have the potential to adversely affect the aquatic environment. Runoff of irrigation water polluted with pesticides and fertilizers can contribute excessive nutrients, elevated levels of chemicals and substantial amounts of sediment to natural waterways further degrading the water quality of the system. Urban and rural land uses for residential, commercial, industrial and recreational activities like boating and golf can contribute pollutants and sediments to surface waters as well. Impacts from contaminant spills could also be significant depending on the nature and quantity of the contaminants involved. Smaller, more frequent spills may add to the degradation of the aquatic environment. These spills may occur at any time throughout the action area with different parties responsible for the contamination.

Economic diversification has contributed to population growth and movement. This trend is likely to continue. Such population trends will result in greater demands for electricity, water and buildable land in the action area and will increase the need for transportation and other infrastructure. The result of these economic and population demands will probably affect habitat features such as water quality and quantity, which are important to the survival and recovery of the listed species. The overall effect will likely be negative, unless avoided or carefully planned for and mitigated.

The state of Washington has various strategies and programs designed to improve the habitat of listed species and assist in recovery planning. Washington's 1998 Salmon

Recovery Planning Act provided the framework for developing watershed restoration projects and established a funding mechanism for local habitat restoration projects. The Watershed Planning Act, also passed in 1998, encourages voluntary planning by local governments, citizens and Tribes for water supply and use, water quality and habitat at the Water Resource Inventory Area or multi- Water Resource Inventory Area level. Washington's Department of Fish and Wildlife and tribal co-managers have been implementing the Wild Stock Recovery Initiative since 1992. The co-managers are completing comprehensive species management plans that examine limiting factors and identify needed habitat activities. Water quality improvements will be proposed through development of Total Maximum Daily Loads (TMDLs). The state of Washington is under a court order to develop TMDL management plans on each of its 303(d) water-quality-listed streams. These efforts could help improve habitat for listed species.

A. Climate Change

Evidence for climate change includes increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level. Eleven of the last twelve years (1995 -2006) rank among the 12 warmest years in the instrumental record of global surface temperature (since 1850). The linear warming trend over the last 50 years (0.13 +/- 0.03°C per decade) is nearly twice that for the last 100 years. The total global average temperature increase from 1850 – 1899 to 2001 – 2005 is 0.76 +/- 0.19°C.

Climate records show that the Pacific Northwest has warmed about 1.0°C since 1900, or about 50% more than the global average warming over the same period. The warming rate for the Pacific Northwest over the next century is projected to be in the range of 0.1-0.6˚ C/decade. Projected precipitation changes for the region are relatively modest and unlikely to be distinguishable from natural variability until late in the 21st century. Most models project long-term increases in winter precipitation and decreases in summer precipitation. The changes in temperature and precipitation will alter the snow pack, stream flow, and water quality in the Columbia Basin:

- Warmer temperatures will result in more precipitation falling as rain rather than snow.
- Snow pack will diminish, and stream flow timing will be altered.
- Peak river flows will likely increase.
- Water temperatures will continue to rise.

These changes will have a variety of impacts on aquatic and terrestrial habitats in the Columbia Basin. Warming temperatures will increasingly stress coldwater fish in the warmest parts of the region (which includes the action area) should some level of water warming occur. It is unknown what the scale of additive effects to protected species would be should water temperatures increase, but the effect is assumed be negative.

VI. Essential Fish Habitat Evaluation

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended, established procedures designed to identify, conserve and enhance Essential Fish Habitat (EFH) for fisheries regulated under a Federal fisheries management plan. Federal agencies must consult with NOAA Fisheries on all proposed actions authorized, funded or carried out by the agency that may adversely affect EFH. "Adversely affect" means impacting EFH in a way that reduces the habitat's quality or quantity, including direct, indirect, cumulative, site-specific or habitat-wide impacts.

Species in the area covered by the MSA include Chinook and coho salmon. EFH is defined as the waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. Coho salmon use the proposed project area in a similar manner to steelhead and Chinook, which are discussed earlier in this assessment. Potential impacts to coho would be similar to the potential impacts to Chinook and steelhead. These impacts include the following:

- Short-term degradation of water quality because of an increase in turbidity during in-water construction.
- Degradation of water quality due to an increase in the number of boats moored on the lake. These additional boats would also be distributed over a larger, unconfined area.
- Degradation of habitat along the shoreline.
- Continued predation of juvenile salmonids along the shoreline.

We conclude that the proposed action may adversely affect EFH.

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ANNEX A

DRAFT Dock Design Criteria
Lake Wallula/ McNary Pool residential overwater structure design criteria
July 1, 2010

1. Objectives

- Overwater structure design, construction, and use shall minimize degradation of aquatic, near-shore, and shoreline habitats.
- Overwater structures shall not impede any juvenile or adult salmonid life stage, including migration, rearing, and spawning.
- Overwater structures shall not enhance habitats used by potential salmonid predators (especially fishes and birds).

2. Overwater Structure Definitions

- A residential overwater structure typically consists of a shoreline anchor, ramp, and float (the dock platform). The structure may also include piles, and/or float anchors.
- Functional grating is the area not covered or blocked by any objects (i.e. framing wood, floatation tubs, etc.) The percent of functional grating is in relation to the surface area of the float.

3. Piers and Ramps

- To prevent damage to shallow – water habitat, piers and/or ramps shall extend at least 40 feet perpendicular from the ordinary high water mark (OHWM). Ramps should extend as far as possible to insure float is in deepest water possible for the location.
- Piers and ramps shall be no more than 4 feet in width.
- The bottom of either the pier or landward edge of the ramp shall be elevated at least two feet above the plane of OHWM.
- Grating shall cover the entire surface area (100%) of the pier and/or ramp. The open area of grating shall be at least 50%, as rated by the manufacturer.
- Skirting shall not be placed on piers, ramps, or floats. Protective bumper material will be allowed along the outside edge of the float as long as the material does not extend below the bottom edge of the float frame or impede light penetration.
- Shoreline concrete anchors must be placed at least 10 feet landward from the OHWM, and shall be sized no larger than 4 feet wide by 4 feet long, unless otherwise approved by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), the

US Army Corps of Engineers (Corps), and Washington Department of Fish and Wildlife (WDFW). The maximum anchor height shall be only what is necessary to elevate the bottom of either the pier or landward edge of the ramp at least 2 feet above the plane of OHWM.

4. Piling and Float Anchors

- Piling shall not exceed *8 inches* in diameter. *If piling is encased in a sleeve, the piling plus sleeve diameter shall not exceed 8 inches.*
- Pilings shall be spaced at least 18 feet apart on the same side of any component of the overwater structure. The pier/ramp and float are separate components.
- Each overwater structure shall utilize no more than 6 piles total for the entire project.
- All pilings shall be fitted with devices to prevent perching by piscivourous (fish-eating) birds.
- *Pilings must be installed using a vibratory hammer. No impact driving will be allowed.*
- *Piling treated with creosote or pentachlorophenol shall not be used.*
- *If pilings are removed:*

a. *Dislodge piling with a vibratory system*

b. *After removal, place the piling on a construction barge or other dry storage site*

c. *If a treated wood piling breaks during extraction, the stump must be removed from the water column (by cutting it 3' below the substrate or pushing it to that depth). The buried stump must then be capped with clean native sediment).*

d. *Fill holes left by piling extraction with clean native sediment*

- *All treated wood removed during the project, including treated wood piling, shall be disposed at an upland facility approved for hazardous materials of this classification. Treated wood piling shall not be left in the water or stacked on the stream bank.*
- Submerged float anchors will be constructed from concrete; and shall be horizontally compressed in form, by a factor of 5 or more, for a minimum profile above the stream bed (the horizontal length and width will be at least 5 times the vertical height
- No in-water fill material will be allowed, with the exception of pilings and float anchors. (Note: uncured concrete or its by-products shall not be allowed).

5. Floats

- Float components shall not exceed the dimensions of 8- by 20 feet, or an aggregate total of 160 square feet, for all float components
- Float materials in contact with the water shall be white in color
- Floatation materials shall be permanently encapsulated to prevent breakup into small pieces and dispersal in water (e.g. rectangular float tubs).
- Grating shall cover 100% of the surface area of the floats. The open area of the grating shall be no less than 50%, as rated by the manufacturer.
- Functional grating will cover no less than 50% of the float.
- Nothing shall be placed on the overwater structure that will reduce natural light penetration through the structure.
- Floats shall be positioned at least 40 feet horizontally from the OHWM and no more than 100 feet from the OHWM, as measured from the landward – most edge of the float.
- *Tires shall not be used as floats.*

6. General

- No electricity shall be provided to, or on, the overwater structure.
- No boat lifts or watercraft lifts (e.g. jet ski lifts) of any type will be placed on, or in addition to, the overwater structure.
- Shoreline armoring (i.e. bulkheads, rip-rap, and retaining walls) shall not occur in association with installation of the overwater structure.
- Construction of the overwater structure shall be completed during the in-water work window (December 15 to March 1).

7. Preservatives

- The dock shall be built with materials that do not leach preservatives or other materials.
- No treated wood of any kind shall be used on any overwater structure (float, pier, or ramp).
- No paint, stain, or preservative shall be applied to the overwater structure.

8. Preconstruction and Construction Activities

- If native vegetation is moved, damaged, or destroyed, it shall be replaced with a functional native species equivalent during site restoration according to Annex B. All ground disturbed will be seeded with native groundcover and maintained.
- Any large wood, native vegetation, topsoil, and/or native channel material displaced by construction shall be stockpiled for use during site restoration.

- No existing habitat features (i.e. woody debris, substrate materials) shall be removed from the shore or aquatic environment
- Construction impacts shall be confined to the minimum area needed to complete the project
- The boundaries of clearing limits associated with site access and construction shall be flagged to prevent ground disturbance of riparian vegetation, wetlands, and other sensitive sites beyond the flagged boundary. This action shall be completed before any significant alteration of the project area.
- A supply of sediment control materials [i.e. silt fence, straw bales, coconut fiber (coir) bales] shall be available onsite. This action shall be completed prior to significant alteration of the project area.
- All temporary erosion controls shall be in place and appropriately installed downslope of project activities within the riparian area until site restoration is complete.
- Project construction shall cease under high flow conditions that could result in inundation of the project area except for efforts to avoid or minimize resource damage.

9. Pollution and Erosion Control Measures

- A Pollution and Erosion Control Plan (PECP) shall be prepared and carried out to prevent pollution caused by construction operations. The plan shall be available for inspection by the Corps or NMFS. The PECP shall contain the pertinent elements listed below and meet requirements of all applicable laws and regulations.
- The PECP shall list the name and address of the party(s) responsible for implementation of the PECP.
- The PECP shall include practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.
- The PECP shall include practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.
- The PECP shall include a description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling and monitoring of the products.
- The PECP shall include a spill containment and control plan that provides the following information: notification procedures; specific cleanup and

disposal instructions for different products; quick-response containment and cleanup measures; proposed methods for disposal of spilled materials; employee training for spill containment. Materials for containment and cleanup shall be available onsite during preconstruction, construction and restoration phases of the project.

- The PECP shall include practices to prevent construction debris from dropping into any stream or water body and to remove any material that does drop with minimum disturbance to the steam bed and water quality.

10. Heavy Equipment Use

- All heavy equipment shall be clean and free of external oil, fuel or other potential pollutants
- All equipment to be used below OHW shall be steam cleaned until all visible external oil, grease, mud and other visible contaminants are removed. This cleaning shall occur before operations begin and as often as is necessary during operation.
- When heavy equipment is used, the equipment will have the least adverse effects on the environment (e.g. minimally sized, low ground pressure equipment)
- Only enough supplies and equipment to complete a specific job shall be stored onsite
- Vehicle staging, cleaning maintenance, refueling and fuel storage shall only occur in a vehicle staging area placed 150’ or more from any stream, waterbody, or wetland unless otherwise approved in writing by NMFS.
- All vehicles operated within 150’ of any stream, waterbody, or wetland shall be inspected daily for fuel leaks before leaving the vehicle staging area. Any leaks detected shall be repaired in the vehicle staging area before the vehicle resumes operation. Inspections shall be documented in a record for review on request by the Corps, NMFS, or WDFW.
- All stationary power equipment (e.g. generators, cranes, stationary drilling equipment) operated within 150’ of any stream, waterbody, or wetland shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.
- Heavy equipment shall work from onshore staging areas with the exception fo an excavator arm or bucket. Pile drivers may use constructed work platforms (e.g., a barge) to access construction locations

11. References

To be determined.

ANNEX B

Approved Mitigative Planting List and Maintenance

(Excerpted from Appendix E of the Draft McNary Shoreline Management Plan)

a. Riparian vegetation will be planted, maintained, and/or enhanced along the entirety of the US Army Corps of Engineers (Corps) waterfront land adjacent to the overwater structure.
b. For mitigation planting, the planting shall include native shrubs and trees from the following list. The use of native shrubs and trees not listed here must be approved by the Corps and Washington Department of Fish and Wildlife (WDFW).
    i. Shrubs:
        - Sitka Willow, *Salix sitchensis*
        - Scouler's Willow, *Sailxscouleriana*
        - Coyote Willow, *Salix exigua*
        - MacKenzie’s Willow, *Salix prolixa*
        - Pacific Willow, *Salix lasiandra*
        - Red-Osier Dogwood, *Cornus stolonifera*
        - Common Juniper, *Juniperus communis*
    ii. Trees:
        - Black Cottonwood, *Populus trichocarpa*
        - Red Alder, *Alnus rubra*
        - Ponderosa Pine, *Pinus ponderosa*
        - Douglas-Fir, *Pseudotsuga menzeisii*
c. Shrubs and trees shall be planted at intervals of 3 and 10 feet, respectively. Trees and shrubs will be planted at a 1-to-1 0 ratio (1 tree for every 10 shrubs planted)
d. All plants shall be planted between February 15 and June 1. Plantings must be completed by June 1 of the same year following the start of construction of the overwater structure.
e. Plantings must have 100% survival for the first 5 years following planting. After the first 5 years, survival must be maintained at 80% for shrubs and 100% for trees. Individual plants that die must be replaced in kind (i.e., replace a tree with a tree), with species from the native list above or other species approved by the Corps and WDFW. All trees and shrubs shall be maintained (watered, beaver protection installed, and replaced) for as long as the overwater structure is present, regardless of ownership of the structure.

Appendix E:

National Marine Fisheries Service Biological Opinion

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

NMFS Tracking Number.:
2010/03597

April 14, 2011

Peter F. Poolman
Chief, Environmental Compliance Section
Department of the Army
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, Washington, 99362-1876

Re: Endangered Species Act Section 7 formal consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the McNary Shoreline Management Plan, Benton, Franklin, and Walla Walla Counties, Washington and Umatilla County, Oregon.

Dear Mr. Poolman:

The enclosed document contains a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects the McNary Shoreline Management Plan. In this Opinion, NMFS concludes that the proposed action, as proposed, is not likely to jeopardize the continued existence of ESA-listed Upper Columbia River (UCR) Spring-run Chinook salmon (*Oncorhynchus tshawytscha*), UCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead (*O. mykiss*), Snake River Basin (SRB) steelhead (*Oncorhynchus mykiss*), Snake River Spring/Summer-run (SRSS) Chinook salmon (*O. tshawytscha*), Snake River sockeye (*O. nerka*), Snake River Fall-run (SRF) Chinook salmon, or any of their designated critical habitat.

As required by Section 7 of the ESA, NMFS provided an incidental take statement with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal agency and any person who performs the action must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects to EFH. These conservation recommendations are a non-identical set of the ESA Terms and Conditions. Section

305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, the Walla Walla District of the Corps of Engineers must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

If you have any questions, please contact Justin Yeager of the Washington State Habitat Office at (509) 925-2618 or electronic mail at justin.yeager@noaa.gov.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

McNary Shoreline Management Plan
Columbia River and Snake River

Fifth Field Hydrologic Unit Codes: Esquatzel Coulee, 1702001602; Columbia River – Zintel Canyon, 1702001606; Yakima River – Cold Creek, 1703000307; Snake River – McCoy Creek, 1706011003; Mouth of Snake River, 1706011004; Upper Lake Wallula, 1707010101; Lower Lake Wallula, 1707010102; Four Mile Canyon, 1707010103; Upper Lake Umatilla, 1707010106

Benton, Franklin, and Walla Walla, Counties, Washington and Umatilla County, Oregon

NMFS Consultation Number: 2010/03597

Action Agency: U.S. Army Corps of Engineers, Walla Walla District

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely to Jeopardize the Species?	Is Action Likely to Destroy or Adversely Modify Critical Habitat?
Upper Columbia River spring-run Chinook salmon	Endangered	Yes	No	No
Upper Columbia River Steelhead	Threatened	Yes	No	No
Middle Columbia River Steelhead	Threatened	Yes	No	No
Snake River fall-run Chinook salmon	Threatened	Yes	No	No
Snake River summer/spring Chinook salmon	Threatened	Yes	No	No
Snake River Basin Steelhead	Threatened	Yes	No	No
Snake River Sockeye salmon	Endangered	Yes	No	No

Fishery Management Plan that Describes EFH in the Project Area	Does action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Issued by:

William W. Stelle, Jr.
for
Regional Administrator

Date: April 14, 2011

TABLE OF CONTENTS

Acronym Glossary

1.0 INTRODUCTION 1
1.1 Background 1
1.2 Consultation History 1
1.3 Proposed Action 2
1.4 Action Area 6
2.0 ENDANGERED SPECIES ACT: BIOLOGICAL OPINION 7
2.1 Introduction 7
2.2 Rangewide Status of the Species and Critical Habitat 8
2.2.1 Status of the Species 9
2.2.2 Status of Critical Habitat 25
2.3 Environmental Baseline 29
2.4 Effects of the Action 30
2.4.1 Effects on Species 32
2.4.2 Effects on Critical Habitat 41
2.5 Cumulative Effects 43
2.6 Integration and Synthesis 43
2.7 Conclusion 45
2.8 Incidental Take Statement 46
2.8.1 Amount or Extent of Take 46
2.8.2 Reasonable and Prudent Measures and Terms and Conditions 48
2.9 Conservation Measures 50
2.10 Reinitiation of Consultation 50
3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT 51
3.1 Essential Fish Habitat Affected by the Project 51
3.2 Adverse Effects to Essential Fish Habitat 51
3.3 Essential Fish Habitat Conservation Recommendations 52
3.4 Statutory Response Requirement 52
3.5 Supplemental Consultation 52
4.0 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW 53
4.1 Utility 53
4.2 Integrity 53
4.3 Objectivity 53
5.0 Literature Cited 55

ACRONYM GLOSSARY

BA	Biological Assessment
CFR	Code of Federal Regulations
CHART	Critical Habitat Analytical Review Team
Corps	U.S. Army Corps of Engineers
dB	Decibel
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
FR	Federal Register
hp	Horsepower
HUC	Hydrologic Unit Code
ICTRT	Interior Columbia Basin Technical Recovery Team
IDFG	Idaho Department of Fish and Game
ITS	Incidental Take Statement
LDA	Limited Development Area
LWD	Large Woody Debris
MCR	Middle Columbia River
MPG	Major Population Group
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	Mean Sea Level
NFH	National Fish Hatchery
NMFS	National Marine Fisheries Service
OHWM	Ordinary High Water Mark
Opinion	Biological Opinion
PAH	Polycyclic Aromatic Hydrocarbons
PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
SEL	Sound Exposure Level
SMP	Shoreline Management Plan
SPIF	Specific Project Information Form
SPL	Sound Pressure Level
UCR	Upper Columbia River
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VSP	Viable Salmonid Population

1.0 INTRODUCTION

The document contains a biological opinion (opinion) and incidental take statement prepared in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, et seq.), and implementing regulations at 50 CFR 402. The National Marine Fisheries Service (NMFS) also completed an essential fish habitat (EFH) consultation prepared in accordance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR 600. The opinion and EFH conservation recommendations are both in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Data Quality Act) (44 U.S.C. 3504 (d)(1) and 3516), and underwent pre-dissemination review. The administrative record for this consultation is on file at the Eastern Washington Field Office in Ellensburg, Washington.

1.1 Background

On July 29, 2010, NMFS received a biological assessment (BA) and request for ESA and MSA consultation from the U.S. Army Corps of Engineers (Corps) to update the McNary Shoreline Management Plan (SMP). Authority for administering the Shoreline Management Plan is granted under Public Laws 86-717 and 87-874 charging the Chief of Engineers with the duty to exercise good conservation practices which promote recreation and to operate and maintain water resource projects in the public interest, respectively. The Corps' main objective is to achieve a balance between permitted private uses and natural resource protection for general public benefit.

The Corps has determined the proposed action is likely to adversely affect Upper Columbia spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Upper Columbia River steelhead (*O. mykiss*), Snake River fall-run Chinook salmon (*O. tshawytscha*), Snake River spring/summer-run Chinook salmon (*O. tshawytscha*), Snake River Basin steelhead (*O. mykiss*), Snake River sockeye salmon (*O. nerka*), Middle Columbia River steelhead (*O. mykiss*), and critical habitat for all seven species. The Corps also found the proposed action would adversely affect designated EFH for Chinook salmon and coho salmon.

1.2 Consultation History

The following chronology documents key points of the consultation process that culminated in this biological opinion for NMFS-listed species.

1. NMFS received a Biological Assessment on May 15, 2008 for the McNary Shoreline Management Plan, NMFS # 2008/03014.
2. January 14, 2009 McNary Shoreline Management Plan public meeting.
3. January 8, 2010 NMFS and the Corps placed the consultation on hold pending additional information and a revised biological assessment.
4. July 29, 2010 NMFS received a request for ESA and MSA consultation for the McNary Shoreline Plan.

5. On September 2, 2010, NMFS requested more information.
6. During September, NMFS had discussions with the USFWS and Corps concerning details in the Plan.
7. On September 17 and October 25, 2010, NMFS received additional information from the Corps.
8. NMFS and the Corps corresponded via phone and email numerous times in December 2010 through February 2011.
9. NMFS received a final update to the proposed action on February 15, 2011.

1.3 Proposed Action

The Corps is updating their McNary Lakeshore Management Plan with the main objective to achieve a balance between permitted private uses and natural resource protection for general public benefit. The underlying action being considered is the updating of the McNary Reservoir Shoreline Management Plan. This plan is being updated to account for regulatory changes that have taken place since the last update in 1983. The intent of the updated SMP is to; 1) define the procedures and conditions for private boat docks, vegetation modification and other shoreline uses on property under Corps' jurisdiction on Lake Wallula, 2) reduce potential environmental impacts caused by the presence and use of private boat docks, vegetation modification permits, and permits for other shoreline uses. The SMP will be re-evaluated every 5 years by NMFS and the Corps. The Corps and NMFS will resume ESA consultation thereafter as warranted.

The general underlying activities of the McNary SMP included in this consultation are:
1. Re-allocation of shoreline uses of McNary Reservoir under Corps' jurisdiction
2. Implementation of ESA-compliant dock criteria and permitting a limited number of new docks on the McNary Reservoir
3. Vegetation management
4. Other shoreline uses for unique access and maintenance needs
5. Monitoring and inspections

Shoreline Allocation
The shoreline re-allocation was accomplished in June 2010 and is based upon actual depth and location survey data gathered in May 2010. The change in allocation according to the current SMP has resulted in a significant increase in protected shoreline particularly in those areas most suitable for protection of ESA-listed fish and critical habitat.

- Limited Development Areas (LDA)
    - LDA are areas where private shoreline use facilities and vegetation management can occur consistent with other cultural and natural resource objectives. The total shoreline classified as a LDA has been reduced from 11.26 miles to 2.71 miles, roughly 1.0 percent of the total project shoreline. The issuance of either shoreline use facilities or vegetation modification permits does not preclude or restrict public use of the limited development shoreline area. Permit holders who attempt to deny pedestrian traffic and/or general public use of the shoreline are in violation of permit conditions and are subject to enforcement action, including permit revocation and the

required removal of all previously authorized facilities. Permittees may restrict public access to authorized private facilities, which are considered the permittee's personal property. The Corps does not have authority to address unauthorized intrusion or trespass on private floating facilities.

- Public Recreation Areas
  - These are areas reserved to be managed for either strictly public use or commercial concessionaire facilities. Public recreation area total allocation has also been reduced from 43.9 miles to 39.46 miles and now includes 13.9 percent of the total project shoreline.

- Protected Shoreline Areas
  - These are areas reserved to maintain or restore fish and wildlife habitats, aesthetic and environmental values, or protect cultural resources. Protected shoreline area total allocation has been increased from 160.69 miles to 190.54 miles and now includes 67.2 percent of the total project shoreline.

- Prohibited Access Areas
  - These are areas where public access is curtailed either to protect highly sensitive resources or for human safety. Prohibited shoreline area total allocation has also been increased from 41.48 miles to 50.8 miles and now includes 17.9 percent of the total project shoreline.

Table 1. Shoreline Allocation Percentages under McNary Shoreline Management Plan

Allocation	Percent of Total
Limited Development	1.0%
Prohibited	17.9%
Protection	67.2%
Recreation	13.9%

Boat Docks

Permitting and construction of new private boat docks

Under the proposed action, 27 new docks could be permitted and constructed (see Table 2). These docks would be required to meet the most current residential overwater structure design criteria at the time the application is received.

Renewing existing private boat dock permits

Existing dock permits (73) could be renewed as long as the docks are upgraded to residential overwater structure design criteria and maintained in a usable and safe condition. All docks must meet the terms of their existing or most recent permit (many are currently expired, however all docks are re-permitted every five years). The license or permit would require the dock be modified to meet the current overwater structure design criteria. Twenty-four of the docks (the grandfathered docks) may remain on the lake indefinitely, regardless of ownership (as per 36 CFR 327.30) however, the docks will be upgraded to the current overwater structure design criteria or removed by 2021.

Removal of private boat docks
Eventually the total number of docks may decrease from the estimated peak number of docks (100, based on current adjacent private ownership). This number is dependent upon potential removals of site-specific LDAs now contained within protected areas that will not be renewed if removed for other than temporary maintenance purposes. A dock will be considered removed for other than temporary reasons if removed for more than 30 consecutive days, or more than twice during a calendar year. However, the Corps may authorize removal for seasonal storage if requested in writing by the permittee.

Table 2. Total number of docks by allocation allowed under the McNary Shoreline Management Plan.

Limited Development Private Dock Totals	**Number**
Existing Docks	39
Grandfathered Docks Included	12
Possible New Docks in Limited Development	27
Recreation Area Private Dock Totals	**Number**
Existing Docks	3
Grandfathered Docks Included	3
Possible New Docks in Recreation Areas	0
Protected Area Private Dock Totals	**Number**
Existing Docks	31
Grandfathered Docks Included	9
Possible New Docks in Protected Areas	0
Total Private Docks	**Number**
Total Existing Private Docks	73
Grandfathered Docks Included	24
Possible New Private Docks Total	**27**

Vegetation Management
Vegetation modification permits
Vegetation modification permits that do not in any way involve a disruption of or a change to land form and are no wider than necessary to safely access the dock (4-foot width perpendicular to the flow of the river) may be permitted in LDAs (this includes areas now surrounded by protected areas). Most of these permits would be in limited development areas, but some may also be in public recreation areas where extensive vegetation modifications by adjacent landowners have occurred.
The following activities would be allowed in limited development areas under specific vegetation modification permit(s):

- The planting and maintenance of areas of lawn including associated underground irrigation systems (if pre-existing).

- Mowing to reduce fire danger.
- Maintenance activities to enhance shoreline aesthetics.
- Unsurfaced access trails to the shoreline. These trails must not be more than 4 feet wide and must follow a meandering route to prevent erosion and avoid the removal of trees and shrubs. These walkways will be designated to provide a common pathway to serve as many individual interests in the immediate vicinity as possible and may be covered with crushed stone, wood chips, stepping-stones or other readily removable material.

Vegetation modification prohibitions
Prohibited vegetation modification activities include:
- Planting and maintenance of gardens.
- Burning of standing live vegetation.
- Disposal or storage of debris, refuse or any other material.
- Application of pesticides.
- Modification of existing land contours.
- Placement of any lawn or beach equipment or other personal property.
- Construction of any structures.
- Activities that might affect the environmental and physical characteristics of the shoreline.

Renewing existing vegetation modification permits
There are 51 existing vegetation modification permits. The Corps would continue to renew these permits as long as the permittee complies with the permit conditions. Some of these permits were issued to cure landscaping encroachments. Renewals for permits that do not meet the criteria above can be issued if replanting of native species is accomplished as a mitigative measure. Mitigation planting at a 2 to 1 ratio will follow the vegetation enhancement guidelines provided in the McNary SMP.

Other Shoreline Uses
The McNary SMP governs activities allowed on the public shoreline. Besides docks and vegetation permits, very limited other private uses (i.e., stairways, steps, footbridges, hard-surfaced walkways, erosion control, private irrigation systems, etc.) require a real estate license and are issued to address special site conditions. Where applicable (very few select instances) Other Shoreline Uses would be allowed within the following parameters:
- They are only allowed in limited development areas
- They will require a real estate license, rather than a shoreline permit, and will undergo all associated additional environmental and cultural reviews associated with Real Estate actions
- The Corps will limit hardened shoreline development to that only necessary (e.g. a hardscape walkway to facilitate Americans with Disabilities Act access), and using the least environmentally damaging methods practical.

Monitoring and inspections
Operation of the McNary SMP permit program involves an annual inspection of permitted facilities and activities and follow-up with the permittee if necessary.

Corps and NMFS Review Procedures
Each applicant for a new dock or upgraded structure will be required to submit a Specific Project Information form (SPIF) and drawings to the Corps in order for the Corps to confirm that the project meets the McNary SMP overwater structure design criteria. After review and acceptance of the SPIF by the Corps, the SPIF will be electronically mailed to NMFS for review. NMFS will respond within 10 business days whether the SPIF meets the intent of the overwater structure design criteria.

1.4 Action Area

Action area means all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For purposes of this consultation, the action area includes all of Lake Wallula (McNary Reservoir) and its immediate shoreline within the jurisdiction of the Corps. The action area also includes all bordering riparian habitat within the construction area and all sites affected by the project including any staging zones and roadways.

Seven ESA-listed species and designated critical habitats for each occur in the action area and were considered in this opinion (Table 3). For all of the listed salmon and steelhead considered in this opinion, the action area is a migration corridor for adults and juveniles, and is designated as critical habitat. The action area is also designated as EFH for Chinook salmon and coho salmon (Pacific Fishery Management Council 1999).

Table 3. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation. Listing status: T means listed as threatened under the ESA; E means listed as endangered.

Species	**Listing Status**	**Critical Habitat**	**Protective Regulations**
Chinook salmon (*Oncorhynchus tshawytscha*)			
Upper Columbia River spring-run	E 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	ESA section 9 applies
Snake River spring/summer	6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Snake River fall-run	T 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Sockeye salmon (*O. nerka*)			
Snake River	E 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	ESA section 9 applies
Steelhead (*O. mykiss*)			
Middle Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	2/01/06; 71 FR 5178
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

2.0 ENDANGERED SPECIES ACT: BIOLOGICAL OPINION

Section 7(a)(2) of the ESA requires Federal agencies to consult with the NMFS to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. 'To jeopardize the continued existence of a listed species' means to engage in an action that would be expected, directly or indirectly, to reduce appreciable the likelihood of both the survival and recovery of a listed species in the wild be reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). This biological opinion does not rely on the regulatory definition of 'destruction or adverse modification' of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat[1].

The biological opinion included below records the results of the consultation. Section 7(b)(4) required the provisions of an incidental take statement (ITS) that species the impacts of any incidental taking and includes reasonable and prudent measures to minimize such impacts. The ITS follows the opinion in this document.

2.1 Analytical Approach of the Biological Opinion

This opinion presents the results of NMFS' consultation with the Corps regarding whether the proposed action will jeopardize listed species or adversely modify or destroy their designated critical habitat. For the jeopardy analysis, NMFS reviews the status of each listed species of Pacific salmon and steelhead[2] considered in this consultation, the environmental baseline in the action area, the effects of the action, and cumulative effects (50 CFR 402.14(g)). From this assessment, NMFS discerns whether effects on individual animals in the action area are meaningful enough, in view of existing risks, to appreciably reduce the likelihood of both the survival and recovery of the affected species.

For the critical habitat adverse modification analysis, NMFS considers the status of critical habitat, the functional condition of critical habitat in the action area (environmental baseline), the likely effects of the action on that level of function, and the cumulative effects. From this assessment, NMFS discerns whether any predicted change in the function of the primary constituent elements (PCEs) of critical habitat in the action area would be enough, in view of existing risks, to appreciably reduce the conservation value of critical habitat at the designation scale. This analysis does not employ the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02. Instead, this analysis relies on statutory provisions of the ESA, including those in section 3 that define "critical habitat" and "conservation," in section 4 that describe the designation process, and in section 7 that set forth the substantive protections and

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1 Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resource, NMFS (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act) (November 7, 2005).
2 An "evolutionary significant unit" ESU of Pacific salmon (Waples 1991) and a "distinct population segment" (DPS) of steelhead (71 FR 834; January 5, 2006) are both "species" as defined in Section 3 of the ESA.

procedural aspects of consultation, and on agency guidance for application of "destruction or adverse modification" standard (Hogarth 2005).

2.2 Rangewide Status of the Species and Critical Habitat

Climate change affects salmon and their habitat throughout Washington. Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the state (Battin et al. 2007; Independent Scientific Advisory Board 2007). While the intensity of effects will vary by region (Independent Scientific Advisory Board 2007), climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature). As climate change alters the structure and distribution of rainfall, snowpack, and glaciations, each factor will in turn alter riverine hydrographs. Given the increasing certainty that climate change is occurring and is accelerating (Battin et al. 2007), NMFS anticipates salmonid habitats will be affected. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote and Salathé 2009) – changes that will shrink the extent of the snowmelt-dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories.

In Washington State, most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation. Average temperatures in Washington State are likely to increase 0.1-0.6ºC per decade (Mote and Salathé 2009). Warmer air temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing stream flow timing and increasing peak river flows, which may limit salmon survival (Mantua et al. 2009). The largest driver of climate-induced decline in salmon populations is projected to be the impact of increased winter peak flows, which scour the streambed and destroy salmon eggs (Battin et al. 2007).

Higher water temperatures and lower spawning flows, together with increased magnitude of winter peak flows are all likely to increase salmon mortality. Higher ambient air temperatures will likely cause water temperatures to rise (Independent Scientific Advisory Board 2007). Salmon and steelhead require cold water for spawning and incubation. As climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations. Thermal refugia are important for providing salmon and steelhead with patches of suitable habitat while allowing them to undertake migrations through or to make foraging forays into areas with greater than optimal temperatures. To avoid waters above summer maximum temperatures, juvenile rearing may be increasingly found only in the confluence of colder tributaries or other areas of cold water refugia (Mantua et al. 2009).

Climate change is expected to make recovery targets for these salmon populations more difficult to achieve. Habitat action can address the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters, protecting and restoring riparian vegetation to ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; Independent Scientific Advisory Board 2007).

2.2.1 Status of the Species

This section describes the status of each species considered in this consultation. The NMFS describes the level of risk of the listed species affected by the proposed action using criteria for a 'viable salmonid population' (VSP) (McElhany et al. 2000). Attributes associated with a VSP include abundance, productivity, spatial structure, and genetic diversity at levels that maintain its capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. These attributes are influenced by survival, behavior, and experiences throughout the entire life cycle, characteristics that are influenced, in turn, by habitat and other environmental conditions. For the status of critical habitat designated for the listed species considered in this consultation, NMFS reviews the condition of the essential physical or biological features throughout the designated area, and the conservation values of the various watersheds in the designated area.

Status of Upper Columbia River Spring-run Chinook Salmon

On March 24, 1999, NMFS listed UCR spring-run Chinook salmon as an endangered species (64 FR 14308) and their endangered status was reaffirmed on June 28, 2005 (70 FR 37160). This ESU includes all naturally spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington (excluding the Okanogan River). The ESU also includes six artificial propagation programs: the Twisp River, Chewuch River, Methow Composite, Winthrop National Fish Hatchery (NFH), Chiwawa River, and White River spring-run Chinook salmon hatchery programs. The Interior Columbia Basin Technical Recovery Team (ICTRT) has identified three populations in one major population group (Eastern Cascades) for this species. A historic population in the Okanogan River has been extirpated (ICTRT 2005b).

Life History. Upper Columbia River spring-run Chinook salmon exhibit classic stream-type life history strategies: emigrating from freshwater as yearling smolts in the spring and undertaking extensive offshore ocean migrations. Most of these fish mature at four years of age and return to the Columbia River from March through mid-May. Spawning occurs in tributaries in August through September.

Limiting Factors. The UCR spring-run Chinook salmon ESU continues to experience many problems. The key limiting factors for UCR spring-run Chinook salmon include: (1) Mainstem Columbia River hydropower system mortality, (2) tributary riparian degradation and loss of in-river wood, (3) altered tributary floodplain and channel morphology, (4) reduced tributary stream flow and impaired passage, and (5) harvest impacts (NMFS 2005). In general, tributary habitat problems affecting this ESU include increasing urbanization on the lower reaches, irrigation and flow diversion in upriver sections of the major drainages, and impacts of grazing on middle reaches (Good et al. 2005).

Abundance. There are no estimates of historical abundance specific to the UCR spring-run Chinook salmon ESU prior to the 1930s. All populations are at high risk of extinction due to low abundance and have not improved over the past 10 years (Table 4).

Table 4. Abundance and Abundance Thresholds for UCR spring-run Chinook salmon populations.

Population	10-year Geomean Abundance[1]	Abundance Threshold[2]	Extinction Risk for Abundance and Productivity [3]	Abundance Trend Category[1]
Wenatchee	415	2000	High	No trend
Methow	270	2000	High	No trend
Entiat	111	500	High	No trend

1 1999-2008. Natural-origin spawners. Salmon Population Trend Summary for Upper Columbia River Steelhead. 2010. http://www.nwfsc.noaa.gov/trt/pubs_esu_trend.cfm
2 Abundance threshold for viability based on historic intrinsic potential (Upper Columbia Salmon Recovery Board 2007).
3 ICTRT (2005a). Projected probability of extinction over a 100-year period. "High" risk is greater than 25% probability of extinction. "Moderate" risk is 5-25% probability of extinction.

Productivity. On average over the last 20 full brood year returns (1979 to 1998 brood years, including adult returns through 2003), UCR spring-run Chinook salmon populations have not replaced themselves. For every population, productivity is insufficient to meet recovery needs (ICTRT 2007a). Estimates of required productivity increases required to reach a low risk of extinction depend on assumptions regarding future hydropower operations and ocean conditions.

Improving hydropower survival levels anticipated by 2014 in the 2004 FCRPS Biological Opinion will improve productivity (ICTRT 2007a), but will not be sufficient by itself to meet productivity viability criteria. Productivity estimates associated with the 2004 FCRPS Biological Opinion are useful because the most recent FCRPS Biological Opinion is expected to have similar effects as the 2004 version (Table 5).

Table 5. Productivity increases needed for viability (ICTRT 2007a).

Population	Productivity increase needed to achieve 5% risk of extinction under relatively good (historical) ocean conditions[1]	Productivity increase needed to achieve 5% risk of extinction under poor ocean conditions[1]
Wenatchee	None	39%
Methow	9%	62%
Entiat	32%	95%

1 Assumes that hydropower system and survival improvements anticipated by 2014 in the 2004 FCRPS Biological Opinion will be achieved.

Under even the most optimistic assumptions regarding proposed hydropower operations and ocean conditions, additional productivity increases are needed for the Methow and Entiat populations to reach a low extinction risk. Under poor future ocean conditions, significant productivity improvements are needed in all three populations. The harvest rate on the ESU has been approximately 8 percent in recent years (ICTRT 2007a), meaning that potential harvest reductions would be insufficient to make up all of the needed productivity. Therefore, the only feasible options for productivity increases sufficient to reach a low or very low extinction risk are habitat restoration, reduced predation risks, and/or hydrosystem improvements beyond those assumed in the current FCRPS Biological Opinion.

Spatial Structure and Diversity The spatial structure of the Upper Columbia River spring-run Chinook salmon ESU was severely curtailed by the construction of Grand Coulee and Chief Joseph dams, which is thought to have resulted in the extinction of two Major Population Groups. Within the remaining Major Population Group, the Okanogan population is functionally extinct. The Methow and Wenatchee populations have adequate spatial structure. The Entiat is considered to be at moderate risk of extinction from poor spatial structure (ICTRT 2005a). All three remaining populations in the ESU face a high extinction risk due to low diversity. Due to hatchery practices, there is a high degree of homogenization and resultant loss of phenotypic and genotypic variability.

Summary. The UCR spring-run Chinook salmon ESU is at high risk of extinction. The population cannot achieve viability and the associated low risk of extinction without significant improvements in abundance, productivity, and diversity in every population and improvement in spatial structure in the Entiat population.

Status of Upper Columbia River Steelhead

The UCR steelhead DPS was listed as endangered on August 18, 1997 (62 FR 43937) and their status was upgraded to threatened on January 5, 2006 (71 FR 834). This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border, and six artificial propagation programs: the Wenatchee River, Wells Hatchery (in the Methow and Okanogan Rivers), Winthrop NFH, Omak Creek, and the Ringold steelhead hatchery programs. The ICTRT has identified five populations within this DPS: the Wenatchee River, Entiat River, Methow River, Okanogan Basin, and Crab Creek (ICTRT 2005b). The Crab Creek anadromous component is functionally extirpated (ICTRT 2007b).

Life History. Life history characteristics for UCR steelhead are similar to those of other inland steelhead DPSs. However, smolt age is dominated by two- and three-year-olds and some of the oldest smolt ages for steelhead, up to seven years, are reported from this DPS. Based on limited data, steelhead from the Wenatchee and Entiat rivers return to freshwater after one year in salt water, whereas Methow River steelhead primarily return after two years in salt water. Similar to other inland Columbia River basin steelhead DPSs, adults typically return to the Columbia River between May and October and are considered summer-run steelhead. Adults may remain in freshwater up to a year before spawning. Most UCR steelhead migrate relatively quickly up the mainstem to their natal tributaries. A portion of the returning run overwinters in the mainstem reservoirs, passing over the upper Mid-Columbia River dams in April and May of the following year. Unlike Chinook salmon or sockeye salmon, steelhead adults attempt to migrate back to the ocean after spawning. These fish are known as kelts, and those that survive will return from the ocean to spawn again.

Limiting Factors. The UCR steelhead DPS continues to have problems including genetic homogenization from hatchery supplementation (reducing genetic variations from levels that support viability), and the degradation of freshwater habitats within the region (negatively affecting spatial structure and productivity), especially the effects of grazing, irrigation diversions, and hydroelectric dams (Good et al. 2005). Limiting factors identified for UCR steelhead include: (1) Mainstem Columbia River hydropower system mortality, (2) reduced tributary streamflow, (3) tributary riparian degradation and loss of in-river wood, (4) altered tributary floodplain and channel morphology, and (5) excessive fine sediment and degraded tributary water quality (NMFS 2005).

Abundance. For all populations, average abundance over the recent 10-year period is well below the abundance that the ICTRT has identified as necessary for viability. All populations are at high risk of extinction due to low abundance and have not improved over the past 10 years (Table 6).

Table 6. Abundance and Abundance Thresholds for UCR steelhead populations.

Population	10-year Geomean Abundance[1]	Abundance Threshold[2]	Extinction Risk for Abundance and Productivity[3]	Abundance Trend Category[1]
Wenatchee	795	1000	High	No trend
Entiat	112	500	High	No trend
Methow	468	1000	High	No trend
Okanogan	147	500[4]	High	No trend

1 2000-2009. Natural-origin spawners. Salmon Population Trend Summary for Upper Columbia River Steelhead. 2010. http://www.nwfsc.noaa.gov/trt/pubs_esu_trend.cfm
2 Abundance threshold for viability based on historic intrinsic potential (Upper Columbia Salmon Recovery Board 2007).
3 ICTRT (2005a). Projected probability of extinction over a 100-year period. "High" risk is greater than 25% probability of extinction. "Moderate" risk is 5-25% probability of extinction.
4 Within the U.S. portion of the Okanogan subbasin. If the Canadian portion of the Okanogan subbasin is included, the minimum abundance recovery criteria would be 1,000 naturally produced steelhead adults.

Productivity. On average over the last 20 full brood year returns (1980-1981 through 1999-2000 brood years, including adult returns through 2004-2005), UCR steelhead populations have not replaced themselves. For every population, productivity is insufficient to meet recovery needs (ICTRT 2007a). Estimates of required productivity increases required to reach a low risk of extinction depend on assumptions regarding future hydropower operations, ocean conditions, and the relative effectiveness of hatchery and natural origin fish.

Improving hydropower survival levels anticipated by 2014 in the 2004 FCRPS Biological Opinion will improve productivity (ICTRT 2007a), but will not be sufficient by itself to meet productivity viability criteria. Productivity estimates associated with the 2004 FCRPS Biological

Opinion are useful because the most recent FCRPS Biological Opinion is expected to have similar effects as the 2004 version (Table 7).

Table 7. Productivity increases needed for viability (ICTRT 2007a).

Population	Productivity increase needed to achieve 5% risk of extinction under relatively good (historical) ocean conditions[1]		Productivity increase needed to achieve 5% risk of extinction under poor ocean conditions[1]	
	Hatchery Effectiveness 1.0	Hatchery Effectiveness 0.3	Hatchery Effectiveness 1.0	Hatchery Effectiveness 0.3
Wenatchee	12%	3%	31%	21%
Entiat	101%	--	135%	--
Methow	213%	101%	267%	135%
Okanogan	603%	--	725%	--

1 Assumes that hydropower system and survival improvements anticipated by 2014 in the 2004 FCRPS Biological Opinion will be achieved.

Under even the most optimistic assumptions regarding proposed hydropower operations and ocean conditions, enormous productivity increases are needed for three of the four populations to reach a low extinction risk. The harvest rate on the DPS has been approximately 8-10 percent in recent years (ICTRT 2007a), meaning that potential harvest reductions would be insufficient to make up all of the needed productivity. Therefore, the only feasible options for productivity increases sufficient to reach a low or very low extinction risk are habitat restoration, reduced predation risks, and/or hydrosystem improvements beyond those assumed in the current FCRPS Biological Opinion.

Spatial Structure and Diversity. The spatial structure of Upper Columbia River steelhead was severely curtailed by the construction of Grand Coulee and Chief Joseph dams, which is thought to have resulted in the extinction of two Major Population Groups. Within the remaining Major Population Group, the Crab Creek population is believed to be functionally extinct. The Methow and Wenatchee populations have adequate spatial structure. The Entiat population is considered to be at moderate risk of extinction from poor spatial structure (ICTRT 2005a). The Okanogan population has a high risk of extinction because neither of its two major spawning areas in the U.S. are considered occupied. **.** All remaining populations in the DPS face a high extinction risk due to low diversity. Due to hatchery practices, there is a high degree of homogenization and resultant loss of genotypic variability.

Summary. The UCR steelhead DPS is at high risk of extinction. The DPS cannot achieve viability and the associated low risk of extinction without significant improvements in abundance, productivity, and diversity. Improved spatial structure is also needed in the Entiat and Okanogan populations to reduce extinction risk.

Status of Middle Columbia River Steelhead

The MCR steelhead DPS was listed as threatened on March 25, 1999 (64 FR 14517) and its threatened status was reaffirmed on June 28, 2005 (70 FR 37160). The DPS is comprised of 20 independent populations within four Major Population Groups (MPGs) in Washington and Oregon. This DPS includes all naturally spawned populations of steelhead (and their progeny) in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin. Seven artificial propagation programs are considered part of the DPS: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs. Major watersheds within this DPS include the Klickitat, Fifteen Mile, Deschutes, John Day, Umatilla, Yakima, and Walla Walla River Basins. The ICTRT (2007b) identified 20 populations in four major population groups (Eastern Cascades, John Day River, the Umatilla Rivers/Walla Walla, and the Yakima River). There are three extinct populations, the White Salmon and Crooked River populations in the Eastern Cascades MPG, and the Willow Creek population in the Umatilla Rivers/Walla Walla MPG.

The action area of the proposed action overlaps the range of steelhead in two of the marjot population groups the Umatilla/Walla Walla (3 populations) and the Yakima (4 populations). Therefore, the discussion regarding VSP criteria highlights these seven populations in the larger context of the DPS.

Life History. Life history characteristics for MCR steelhead are similar to those of other inland steelhead DPSs. Most fish smolt at two years and spend one to two years in salt water before re-entering freshwater, where they may remain up to a year before spawning (Howell et al. 1985). All steelhead upstream of The Dalles Dam are summer-run (Reisenbichler et al. 1992) fish that enter the Columbia River from June to August. Adult steelhead ascend mainstem rivers and their tributaries throughout the winter, spawning in the late winter and early spring. Fry emergence typically occurs between May and the end of June.

Limiting Factors. The major factors limiting recovery of the MCR steelhead DPS include: (1) Mainstem Columbia River hydropower system mortality, (2) reduced streamflow in tributaries, (3) impaired passage in tributaries, (4) excessive sediment, (5) degraded water quality, and (6) altered channel morphology (NMFS 2005).

Abundance. Abundance estimates have been recently made for 14 of the 20 MCR steelhead populations. Three of the 14 populations are currently above the average abundance thresholds that the ICTRT identifies as a minimum for low risk. The remaining 11 populations are at moderate or high risk of extinction due to low abundance.

The MCR Steelhead Recovery Plan (Yakima Basin Fish & Wildlife Recovery Board 2009) characterized five MCR steelhead populations as being at high risk of extinction in terms of abundance. Two of those high risk populations, the Naches and Upper Yakima, are in the

Yakima MPG. Only one of the seven populations are abundant enough to be considered viable (Table 8).

Table 8. Abundance and Abundance Thresholds for Umatilla/Walla Walla and Yakima River MPG populations of Middle Columbia River Steelhead.

Population	10-year Geomean Abundance[1]	Abundance Threshold[2]	Extinction Risk for Abundance and Productivity [3]	Abundance Trend Category[1]
Upper Yakima River	93	1500	High	Increasing
Naches River	502	1500	High	Increasing
Toppenish Creek	356	500	Moderate	Increasing
Satus Creek	388	1000	Moderate	Increasing
Umatilla River	1579	1500	Moderate	Increasing
Walla Walla River	650	1000	Moderate	No Trend
Touchet River	Not available	1000	Not available	Not available

1 1996-2005. Natural-origin spawners. Salmon Population Trend Summary for Middle Columbia River Steelhead. 2010. http://www.nwfsc.noaa.gov/trt/pubs_esu_trend.cfm
2 Abundance threshold for viability based on historic intrinsic potential. Middle Columbia River Steelhead DPS Recovery Plan (Yakima Basin Fish & Wildlife Recovery Board 2009).
3 ICTRT (2005a). Projected probability of extinction over a 100-year period. "High" risk is greater than 25% probability of extinction. "Moderate" risk is 5-25% probability of extinction.

For the most recent 10-year period (1996-2005) for which trends in abundance could be estimated, they were positive for six of the populations in the DPS and there was no trend for eight populations, with no estimate available for three populations. For the DPS overall, no trend in abundance was observed (ICTRT 2010). Two of the Umatilla/Walla Walla populations have increased in abundance over the most recent 10-year period, however, the Touchet River data is not available yet. All four Yakima MPG populations have increased in abundance over the most recent 10-year period, although abundance still falls short of abundance thresholds for each population.

Productivity. Over the last 20 full brood-year returns of MCR steelhead populations for which estimates are available, most have replaced themselves and a few have not, when only natural production is considered. Relative population status varies widely across the DPS. For most populations, productivity is insufficient to meet recovery needs (ICTRT 2007a). Estimates of required productivity increases required to reach a low risk of extinction depend on assumptions regarding future hydropower operations and ocean conditions. In general, populations in the Umatilla/Walla Walla have moderate productivity deficits (gaps) in the DPS relative to ICTRT viability criteria while the populations in the Yakima MPG have the largest productivity deficits

Improving hydropower survival levels anticipated by 2014 in the 2004 FCRPS Biological Opinion will improve productivity (ICTRT 2007a), but will not be sufficient by itself to meet viability criteria for some MCR steelhead populations, including one of the Umatilla/Walla

Walla populations and all four Yakima MPG populations. Productivity estimates associated with the 2004 FCRPS Biological Opinion are useful because the most recent FCRPS Biological Opinion is expected to have similar effects as the 2004 version (Table 9).

Table 9. Productivity increases needed for viability (ICTRT 2007a) for Yakima River MPG populations of Middle Columbia River Steelhead.

Population	Productivity increase needed to achieve 5% risk of extinction under relatively good (historical) ocean conditions[1]	Productivity increase needed to achieve 5% risk of extinction under poor ocean conditions[1]
Upper Yakima River	77%	101%
Naches River	68%	90%
Toppenish River	24%	40%
Satus Creek	106%	133%
Umatilla River	0%	4%
Walla Walla River	10%	25%
Touchet River	Not available	Not available

[1] Assumes that hydropower system and survival improvements anticipated by 2014 in the 2004 FCRPS Biological Opinion will be achieved.

Under even the most optimistic assumptions regarding proposed hydropower operations and ocean conditions, significant increases are needed in one of the Umatilla/Walla Walla populations and all four Yakima MPG populations to reach a low extinction risk. The harvest rate on the DPS has been approximately 5 percent in recent years. Options for productivity increases sufficient to reach a low or very low extinction risk are habitat restoration, reduced predation risks, and/or hydrosystem improvements beyond those assumed in the current FCRPS Biological Opinion.

Spatial Structure and Diversity. This DPS includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon, upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin. Seven artificial propagation programs are considered part of the DPS: The Touchet River Endemic, Yakima River Kelt Reconditioning Program, Umatilla River, and the Deschutes River steelhead hatchery programs. Major watersheds within this DPS include the Klickitat, Fifteenmile, Deschutes, John Day, Umatilla, Yakima, and Walla Walla basins. The ICTRT characterizes the spatial structure risk to MCR steelhead populations as “very low” to “moderate” for all populations except the Upper Yakima population. The Upper Yakima population has “high” spatial structure risk because 7 of 10 historical major spawning areas are not occupied and significant gaps exist between spawning areas (ICBTRT 2005a).

The ICTRT (2007b) identified 20 existing populations in four MPGs: (Eastern Cascades, John Day River, the Umatilla/Walla Walla, and the Yakima River). Three populations are extinct: the White Salmon and Crooked River populations in the Eastern Cascades MPG, and the Willow Creek population in the Umatilla Rivers/Walla Walla MPG. The Yakima River MPG consists of the Satus Creek, Toppenish, Naches, and Upper Yakima populations. The ICTRT characterizes the Upper Yakima population as having high diversity risk because of introgression with resident *O. mykiss,* loss of presmolt migration pathways within and between tributaries, and hampering of mainstem rearing strategies (ICBTRT 2005a). The other Umatilla/Walla Walla and Yakima River populations have a moderate risk of extinction for diversity.

Summary. The MCR steelhead DPS is at high risk of extinction. The DPS cannot achieve viability and the associated low risk of extinction without significant improvements in abundance, productivity, and diversity. Improved spatial structure is also needed in some populations, most notably the Upper Yakima, to reduce extinction risk.

Status of Snake River fall-run Chinook salmon

The NMFS listed Snake River fall-run Chinook salmon as threatened on April 22, 1992 (57 FR 14653) and their threatened status was reaffirmed on June 28, 2005 (70 FR 37160). The ESU includes all naturally spawned populations of fall-run Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River, as well as four artificial propagation programs: the Lyons Ferry Hatchery, fall Chinook salmon Acclimation Ponds Program, Nez Perce Tribal Hatchery, and Oxbow Hatchery fall-run Chinook salmon hatchery programs. The ICTRT has defined one extant population for the Snake River fall-run Chinook salmon, the lower Snake River mainstem population, and two extirpated populations (Marsing Reach and Salmon falls). This population occupies the Snake River from its confluence with the Columbia River to Hells Canyon Dam, and the lower reaches of the Clearwater, Imnaha, Grande Ronde, Salmon, and Tucannon Rivers (ICTRT 2005b).

Life History. Fall-run Chinook salmon in this ESU are ocean-type. Adults return to the Snake River at ages 2 through 5, with age 4 most common at spawning (Waples et al. 1991). Spawning, which takes place in October and November, occurs in the mainstem and in the lower parts of major tributaries. Juveniles emerge from the gravels in March and April of the following year, moving downstream from natal spawning and early rearing areas from June through early fall. Juvenile fall-run Chinook salmon move seaward slowly as subyearlings, typically within several weeks of emergence (Waples et al. 1991).

Limiting Factors and Abundance Thresholds. The ICTRT completed a status review of Snake River fall-run Chinook salmon and concluded that the species is “likely to become endangered” (Good et al. 2005), and thus it remains listed as a threatened species. The ICTRT found moderate risk to the species for productivity and moderately high risks for abundance, spatial structure, and diversity. The ICTRT concluded that, although Snake River fall Chinook salmon numbers have been increasing in recent years, there remains a moderately high risk of extinction due to insufficient abundance (Good et al. 2005). Sustained abundance of natural origin fish at current levels or higher will decrease long-term risks to the species. Limiting factors identified for Snake River fall-run Chinook salmon include: (1) Mainstem lower Snake and Columbia hydrosystem mortality, (2) degraded water quality, (3) reduced spawning and rearing habitat due to mainstem lower Snake River hydropower system, and (4) harvest impacts (NMFS 2005).

In March 2007, the ICTRT proposed minimum abundance thresholds for Snake River fall-run Chinook salmon populations. They recommend a minimum long-term average spawning abundance threshold of 3,000 natural origin spawners. With no fewer than 2,500 of those natural origin spawners distributed in the mainstem Snake River habitat (ICTRT 2007b).

Abundance. The 10-year geometric mean (1998-2007) of Snake River fall-run Chinook salmon over the most recent 10-year period was 1,869 spawners, which is below the 3,000 natural spawner average abundance thresholds that the ICTRT identifies as a minimum for low risk. The percent of natural spawners is only 62 percent of the minimum abundance threshold required for the population to be considered viable. The population is at high risk of extinction based on low abundance and productivity.

Productivity. On average over the last 20 full brood year returns (1985-2004 brood years), Snake River fall-run Chinook salmon populations have just replaced themselves. For the Snake River population during the period from 1985 to 2004, returns per spawner were 1.07 (ranging from 0.93 to 1.75) (ICTRT 2010).

The Snake River fall-run Chinook salmon population is at moderately high risk of extinction associated with low abundance and productivity (NMFS 2008b). Under even the most optimistic future ocean and Columbia River and Snake River hydropower system operations scenarios modeled by the ICTRT, the Snake River fall-run population would require increased productivity to be viable (ICTRT 2007a). Depending on future ocean conditions and hydropower system operations, the fall-run Chinook salmon population requires a 27 percent increase over observed productivity to be considered viable (ICTRT 2007a). The harvest rate on the population is approximately 31 percent (ICTRT 2007a).

Spatial Structure and Diversity. The ICTRT has identified five major spawning areas (Upper Mainstem Snake River, Lower Mainstem Snake River, Grande Ronde River, Clearwater River, and Tucannon River). Four of the five of the major spawning areas are currently occupied and no major life history strategies have been lost so they are at a low risk of extinction for spatial structure factors alone.

However, the ICTRT determined that Snake River fall-run Chinook salmon are at moderate risk for genetic variation. There is some concern that Snake River fish may become an introgressed population of Upper Columbia River and Snake River gene pools. However, sampling results indicate that naturally produced Snake River fall-run Chinook salmon are differentiating relative to the contributing hatchery programs at this time. In addition, there is a high average proportion of out-of ESU strays (2% to 45%) that contribute to the population (ICTRT 2005a). There is also a high proportion of hatchery spawners (<50%) in natural spawning areas. Overall, the there is a moderate risk of extinction due to spatial structure and diversity considerations.

Summary. The Snake River fall-run Chinook salmon ESU is at moderate risk of extinction. The population cannot achieve viability and the associated low risk of extinction without significant improvements in abundance, productivity, and diversity.

Snake River spring/summer-run Chinook Salmon

The NMFS listed Snake River spring/summer-run Chinook salmon as threatened, and protective regulations were issued under section 4(d) of the ESA, on April 22, 1992 (57 FR 14653). Their threatened status was reaffirmed on June 28, 2005 (70 FR 37160). The ESU includes all naturally spawned populations of spring/summer-run Chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins, as well as fifteen artificial propagation programs: the Tucannon River conventional Hatchery, Tucannon River Captive Broodstock Program, Lostine River, Catherine Creek, Lookingglass Hatchery, Upper Grande Ronde, Imnaha River, Big Sheep Creek, McCall Hatchery, Johnson Creek Artificial Propagation Enhancement, Lemhi River Captive Rearing Experiment, Pahsimeroi Hatchery, East Fork Captive Rearing Experiment, West Fork Yankee Fork Captive Rearing Experiment, and the Sawtooth Hatchery spring/summer-run Chinook hatchery programs. The ICTRT has identified 27 extant populations and four extirpated populations in five major population groups (Upper Salmon River, South Fork Salmon River, Middle Fork Salmon River, Grande Ronde/Imnaha, Lower Snake Mainstem Tributaries) for this species. Historic populations above Hells Canyon Dam are considered extinct (ICTRT 2005b).

Life History. Snake River spring/summer-run Chinook salmon exhibit a stream-type life history. Juvenile fish mature in fresh water for one year before they migrate to the ocean in the spring of their second year. Adults re-enter the Columbia River in late February and early March after two or three years in the ocean. In high elevation areas, mature fish hold in cool, deep pools until late summer and early fall, when they return to their native streams to begin spawning. Eggs incubate through the fall and winter and emergence begins in the late winter and early spring. Juveniles migrate through the action area starting in early May through the middle of June.

Limiting Factors and Abundance Thresholds. The 1991 ESA status review (Matthews and Waples 1991) of the Snake River spring/summer-run Chinook salmon ESU concluded that the ESU was at risk. Aggregate abundance of naturally produced Snake River spring/summer-run Chinook salmon runs had dropped to a small fraction of historical levels. Short-term projections (including jack counts and habitat/flow conditions in the broodyears producing the next generation of returns) were for a continued downward trend in abundance. Risk modeling indicated that if the historical trend in abundance continued, the ESU as a whole was at risk of extinction within 100 years. The review identified related concerns at the population level within the ESU. Given the large number of potential production areas in the Snake River Basin and the low levels of annual abundance, risks to individual subpopulations may be greater than the extinction risk for the ESU as a whole. The 1998 Chinook salmon status review (Myers et al. 1998) summarized and updated these concerns. Both short- and long-term abundance trends had continued downward. The report identified continuing disruption due to the impact of mainstem hydroelectric development, including altered flow regimes and impacts on estuarine habitats. The 1998 review also identified regional habitat degradation and risks associated with the use of outside hatchery stocks in particular areas specifically including major sections of the Grande Ronde River basin (Good et al. 2005). Limiting factors identified for this species include: (1) Mainstem lower Snake and Columbia River hydrosystem mortality, (2) reduced tributary stream flow, (3) altered tributary channel morphology, (4) excessive fine sediment in tributaries, (5) degraded tributary water quality (NMFS 2005).

In March 2007, the ICTRT proposed minimum abundance thresholds for Snake River spring/summer-run Chinook salmon. They represent the numbers that, taken together, may be needed for the population to be self-sustaining, or recovered, in its natural ecosystem. For Snake River spring/summer Chinook salmon, the minimum abundance thresholds are 2,000 spawners each in the Lemhi and Lower Mainstem Snake River, 1,000 spawners in the Lostine/Wallowa River, Upper Grande Ronde River, Catherine Creek, South Fork Mainstem, East Fork/Johnson Creek, Big Creek, Pahsimeroi, Upper Salmon East Fork, and Upper Salmon Mainstem. Seven hundred and fifty in the Imnaha River Mainstem, Minam River, Wenaha, River, Secesh River, Bear Valley, Upper Mainstem North Fork, and Chamberlain Creek. Five hundred in Camas Creek, Loon Creek, Marsh Creek, Lower Mainstem Middle Fork, Sulphur Creek, Valley Creek, Yankee Fork, and North Fork Salmon River (ICBTRT 2007b).

Abundance. Abundance estimates have been recently made for 24 of the 27 spring/summer Chinook salmon populations. One of the 27 populations is currently above the average abundance thresholds that the ICTRT identifies as a minimum for low risk. The remaining 26 populations are at high risk of extinction due to low abundance. Abundance for most populations declined to very low levels in the mid-1990s, and increased to levels similar to the late 1980s during the early 2000s.

For the most recent 10-year period (1999-2008) for which trends in abundance could be estimated, there was no trend for 12 populations and no estimate available for 15 populations. For the DPS overall, no trend in abundance was observed (ICTRT 2010). However, most of the populations showed increased abundance over the most recent 10-year period, although abundance still falls short of abundance thresholds for each population.

Productivity. On average over the last 20 full brood year returns (1980-1999 brood years including adult returns through 2004), approximately two-thirds of Snake River spring/summer-run Chinook salmon populations have not replaced themselves.

The Snake River summer/spring Chinook population is at high risk of extinction associated with low abundance and productivity (NMFS 2008b). Under even the most optimistic future ocean and Columbia River and Snake River hydropower system operations scenarios modeled by the ICTRT, the Snake River summer/spring Chinook population would require increased productivity to be viable (ICTRT 2007a). Depending on future ocean conditions and hydropower system operations, the various populations in the spring-summer Chinook salmon require a 0 to 153 percent increase over observed productivity to be considered viable (ICTRT 2007a), within only three populations needing no increase to meet criteria. The harvest rate on the population is approximately 8 percent (ICTRT 2007a), meaning that harvest reductions would be insufficient to make up all of the needed productivity for nearly all populations. Therefore, the only feasible options for productivity increases sufficient to reach a low or very low extinction risk are restoration of freshwater habitat, reduced predation risks, and hydrosystem improvements beyond those assumed in the current FCRPS Biological Opinion.

Spatial Structure and Diversity. The ICTRT characterizes the spatial structure risk to nearly all Snake River spring/summer-run Chinook salmon populations as "low" or "moderate". "High" risk exceptions are the Upper Grande Ronde and Lemhi populations, which are a result of accessible but currently unoccupied historically significant spawning areas. The ICTRT characterizes the diversity risk to nearly all Snake River spring/summer-run Chinook salmon populations as "low" or "moderate". "High" risk exceptions are found in the Upper Salmon MPG. Factors indicating high risk include loss of the summer-run life history characteristic for the Lemhi population. Ten of the fourteen hatchery programs use fish included in the ESU and are thought to have preserved some of the remaining diversity in this ESU, particularly when individual populations declined to very low numbers in 1994 and 1995.

Summary. This ESU remains at high risk across all major population groups, with all, populations below minimum natural origin abundance thresholds

Status of Snake River Basin Steelhead

The NMFS listed Snake River Basin steelhead as a threatened species on August 18, 1997 (62 FR 43937) and protective regulations were issued under section 4(d) of the ESA on July 10, 2000 (65 FR 42422). Their threatened status was reaffirmed on 28, 2005 (70 FR 37160). The DPS includes all naturally spawned anadromous *O. mykiss* (steelhead) populations below natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, as well six artificial propagation programs: the Tucannon River, Dworshak NFH, Lolo Creek, North Fork Clearwater, East Fork Salmon River, and the Little Sheep Creek/Imnaha River Hatchery steelhead hatchery programs. The ICTRT (2007b) identified 26 populations in the following six MPGs for this species: Clearwater River, Grande Ronde River, Hells Canyon, Imnaha River, Lower Snake River, and Salmon River. The North Fork population in the Clearwater River is extirpated. The ICTRT noted that Snake River Basin steelhead remain spatially well distributed in each of the six major geographic areas in the Snake River Basin (Good et al. 2005). Environmental conditions are generally drier and warmer in these areas than in areas occupied by other steelhead species in the Pacific Northwest. Snake River Basin steelhead were blocked from portions of the upper Snake River beginning in the late 1800s and culminating with the construction of Hells Canyon Dam in the 1960s.

Life History. Sexually immature adult Snake River Basin steelhead return to the Columbia River between late June and October. They are considered a summer run and are known as a stream-maturing type. Snake River Basin steelhead returns consist of A-run fish that spend one year in the ocean, and larger B-run fish that spend two years at sea. Adults typically migrate upriver until they reach tributaries from 1,000 to 2,000 meters above sea level where, now sexually mature, they spawn between March and May of the following year. Unlike other anadromous members of the *Oncorhynchus* genus, some adult steelhead survive spawning, return to the sea, and later return to spawn a second time. After hatching, juvenile Snake River Basin steelhead typically spend two to three years in fresh water before they smolt and migrate to the ocean. The Snake River Basin steelhead B-run population levels remain particularly depressed.

Limiting Factors and Abundance Thresholds. The primary concern regarding Snake River steelhead identified in the 1998 status review was a sharp decline in natural stock returns beginning in the mid-1980s. Of 13 trend indicators at that time, nine were in decline and 4 were increasing. In addition, Idaho Department of Fish and Game (IDFG) parr survey data indicated declines for both A-run and B-run steelhead in wild and natural stock areas. The high proportion of hatchery fish in the run was also identified as a concern, particularly because of the lack of information on the actual contribution of hatchery fish to natural spawning. The review recognized that some wild spawning areas have relatively little hatchery spawning influence (Selway, lower Clearwater, Middle and South Fork Salmon, and lower Salmon rivers). In other areas, such as the upper Salmon River, there is likely little or no natural production of locally native steelhead. The review identified threats to genetic integrity from past and present hatchery practices as a concern. A concern for the North Fork Clearwater stock was also identified: the stock is currently maintained through the Dworshak Hatchery program but cut off from access to its native tributary by Dworshak Dam. The 1998 review also highlighted concerns for widespread habitat degradation and flow impairment throughout the Snake River Basin and for substantial modification of the seaward migration corridor by hydroelectric power development on the Snake and mainstem Columbia rivers (Good et al. 2005). Limiting factors identified for the Snake River Basin steelhead include: (1) Mainstem lower Snake and Columbia River hydrosystem mortality, (2) reduced tributary streamflow, (3) altered tributary channel morphology, (4) excessive fine sediment in tributaries, (5) degraded tributary water quality, (6) harvest and hatchery related adverse effects (NMFS 2005).

In March 2007, the ICTRT proposed minimum abundance thresholds for Snake River Basin steelhead populations. They represent the numbers that, taken together, may be needed for the population to be self-sustaining, or recovered, in its natural ecosystem. For Snake River Basin steelhead, the minimum abundance thresholds are 1,500 spawners each in the Upper Grande Ronde River and Lower Mainstem Snake River. One thousand spawners in Tucannon River, Wallowa River, Lower Grande Ronde River, Imnaha River, Selway River, South Fork, Lochsa River, Lemhi, Upper Salmon East Fork, Upper Salmon Mainstem, Upper Middle Fork, Lower Middle Fork, Pahsimeroi River, Little Salmon River, and South Fork. Five hundred spawners in Asotin River, Joseph Creek, Lolo Creek, Chamberlain Creek, Panther Creek, Secesh River, and North Fork (ICBTRT 2007b).

Abundance. Abundance estimates have been recently made for 2 of the 26 Snake River Basin Steelhead populations. One of the 26 populations is currently above the average abundance thresholds that the ICTRT identifies as a minimum for low risk. The other 25 populations are either unknown or are at high risk of extinction due to low abundance. Abundance for most populations declined to very low levels in the mid-1990s, and increased to levels similar to the late 1980s during the early 2000s (figure 4).

For the most recent 10-year period (1997-2006) for which trends in abundance could be estimated, there was no trend for 2 populations and no estimate available for 24 populations. For the DPS overall, no trend in abundance was observed (ICTRT 2010). However, most of the populations showed increased abundance over the most recent 10-year period, although abundance still falls short of abundance thresholds for each population.

Productivity. On average over the last 20 full brood year returns (1980-1999 brood years, including adult returns through 2004), A-run Snake River steelhead populations replaced themselves, while B-run steelhead did not. In general, productivity was relatively high during the early 1980s, low during the late 1980s and 1990s, and high again in the most recent brood years (NMFS 2008b).

Many populations in the Snake River Basin steelhead DPS are at high risk of extinction associated with low abundance and productivity (NMFS 2008b). Under even the most optimistic future ocean and Columbia River and Snake River hydropower system operations scenarios modeled by the ICTRT, the Snake River Basin steelhead populations would require increased productivity to be viable (ICTRT 2007a). Depending on future ocean conditions and hydropower system operations, the various populations in the Snake River Basin steelhead require a 60 to 105 percent increase over observed productivity to be considered viable (ICTRT 2007a). The harvest rate on the population is approximately 5 percent on the A-run and 13 to 20 percent on the B-run (ICTRT 2007a).

Spatial Structure and Diversity. The ICTRT characterizes the spatial structure risk of nearly all Snake River steelhead populations as “very low” or “low”. Panther Creek is an exception with “high” risk because only 30 percent of the historical range is occupied and there is a significant geographical distance between the single major spawning area for this population and the location of the next population. This is largely a result of past mining operations, which are being addressed through other processes, including the EPA Blackbird Mine Superfund Site clean-up. The ICTRT characterizes the diversity risk of all Snake River steelhead populations as “low” or “moderate”

Summary. There is a high level of uncertainty in the Snake River steelhead DPS the two populations that NMFS has data for are split, one is considered at high risk and the other is maintaining its abundance. NMFS believes that most populations are well below viability criteria as outlined by the ICTRT.

Snake River Sockeye Salmon

The NMFS listed Snake River sockeye salmon as an endangered species on November 20, 1991 (56 FR 58619) and their endangered status was reaffirmed on June 28, 2005 (70 FR 37160). The ESU includes all anadromous and residual sockeye salmon from the Snake River Basin, Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake captive propagation program.

Life History. Snake River sockeye salmon adults enter the Columbia River primarily during June and July. Arrival at Redfish Lake, which now supports the only remaining run of Snake River sockeye salmon, usually occurs in August, and spawning occurs primarily in October (Bjornn et al. 1968). Eggs hatch in the spring between 80 and 140 days after spawning. Fry remain in the gravel for 3 to 5 weeks, emerge in April through May, and move immediately into the lake. Once there, juveniles feed on plankton for 1 to 3 years before they migrate to the ocean. Migrants leave Redfish Lake during late April through May (Bjornn et al. 1968) and travel almost 900 miles to the Pacific Ocean. Smolts reaching the ocean remain inshore or within the influence of the Columbia River plume during the early summer months. Snake River sockeye salmon usually spend 2 to 3 years in the Pacific Ocean and return in their fourth or fifth year of life.

Limiting Factors and Abundance Thresholds. This species has a very high risk of extinction. Between 1991 and 1998, all 16 of the natural origin adult sockeye salmon that returned to the weir at Redfish Lake were incorporated into the captive broodstock program. By the time Snake River Sockeye were listed in 1991, the species had declined to the point that there was no longer a self-sustaining, naturally-spawning anadromous sockeye population. This has been the largest factor limiting the recovery of this ESU, important in terms of both risks due to catastrophic loss and potentially to genetic diversity. Other limiting factors identified for Snake River sockeye include: (1) Reduced tributary stream flow, (2) impaired tributary passage and blocks to migration, and (3) mainstem lower Columbia hydropower system mortality (NMFS 2005).

The NMFS proposed an interim recovery level of 2,000 adult Snake River sockeye salmon in Redfish Lake (1,000) and two other lakes (500 in each) in the Snake River basin (ICTRT 2007b).

Productivity and Abundance. The 10-year geometric mean (1999-2008) of Snake River sockeye salmon over the most recent 10-year period was 52 spawners in Redfish Lake which is below the 1,000 natural spawner average abundance thresholds that the ICTRT identifies as a minimum for low risk (ICTRT 2010). The percent of natural spawners is only 5 percent of the minimum abundance threshold required for the population to be considered viable. The population is at high risk of extinction based on low abundance and productivity.

Snake River sockeye salmon are unique. Anadromous sockeye salmon returning to Redfish Lake in Idaho's Stanley Basin travel a greater distance from the sea (approximately 900 miles) to a higher elevation (6,500 feet) than any other sockeye salmon population and are the southern-most population of sockeye salmon in the world (Bjornn et al. 1968). Stanley Basin sockeye salmon are separated by 700 or more river miles from two other extant upper Columbia River populations in the Wenatchee River and Okanogan River drainages. These latter populations return to lakes at substantially lower elevations (Wenatchee at 1870 feet, Okanogan at 912 feet) and occupy different ecoregions (Chapman and Witty 1993). In 1985, 1986 and 1987, 11, 29, and 16 sockeye, respectively, were counted at the Redfish Lake weir (Good et al. 2005).

Recent annual abundances of natural origin sockeye salmon in the Stanley Basin have been extremely low. No natural origin anadromous adults have returned since 1998 and the abundance of residual sockeye salmon in Redfish Lake is unknown. This species is entirely supported by adults produced through the captive propagation program at the present time. Current smolt-to-adult survival of sockeye originating from the Stanley Basin lakes is rarely greater than 0.3 percent. The current average productivity is substantially less than the productivity required for any population to be at a low extinction risk.

Spatial Structure and Diversity. Five lakes in the Stanley Basin historically contained sockeye salmon: Alturas, Pettit, Redfish, Stanley and Yellowbelly (Bjornn et al. 1968). It is generally believed that adults were prevented from returning to the Sawtooth Valley from 1910 to 1934 by Sunbeam Dam. Sunbeam Dam was constructed on the Salmon River approximately 20 miles downstream of Redfish Lake. Whether or not Sunbeam Dam was a complete barrier to adult migration remains unknown. It has been hypothesized that some passage occurred while the dam was in place, allowing the Stanley Basin population or populations to persist (Bjornn et al. 1968; Waples 1991). Adult returns to Redfish Lake during the period 1954 through 1966 ranged from 11 to 4,361 fish (Bjornn et al. 1968). Sockeye salmon in Alturas Lake were extirpated in the early 1900s as a result of irrigation diversions, although residual sockeye may still exist in the lake (Chapman and Witty 1993). From 1955-1965, the Idaho Department of Fish and Game eradicated sockeye salmon from Pettit, Stanley, and Yellowbelly lakes, and built permanent structures on each of the lake outlets that prevented re-entry of anadromous sockeye salmon

Summary. The ICTRT determined that the Snake River sockeye salmon remains in danger of extinction (Good et al. 2005).

<u>2.2.2 Status of Critical Habitat</u>

For the status of critical habitat designated for the listed species considered in this consultation, NMFS reviews the condition of the essential physical or biological features throughout the designated area, and the conservation values of the various watersheds in the designated area.

In 1993, NMFS determined that the critical habitat designations for Snake River Sockeye, Snake River spring/summer Chinook salmon, and Snake River fall-run Chinook salmon would focus on the physical and biological features of the habitat that are essential to the conservation of the species. In 2005, in designating critical habitat for Snake River Basin Steelhead, UCR spring-run Chinook salmon UCR steelhead, and MCR steelhead NMFS focused on certain habitat features called "primary constituent elements" (PCEs) that are essential to support one or more of the life stages of salmon and steelhead. The 2005 designations also analyzed areas that will provide the greatest biological benefits for listed salmon and balance the economic and other costs for areas considered for designation.

Unlike the 1993 designations, which relied on the U.S. Geological Survey's (USGS) maps of sub-basins and included "all accessible river reaches within the current range of the listed species," the 2005 designations used a much finer, more specific scale in designating critical habitat for salmon and steelhead. The 2005 designations identify stream and near-shore habitat areas where listed salmon and steelhead have actually been observed, or where biologist with local area expertise presume them to occur. These habitat areas are found within more than 800 watersheds in the Northwest and California.

The species addressed in this opinion occupy the same geographic areas and have similar life history characteristics and, therefore, require many of the same habitat functions provided by critical habitat. The 1993 critical habitat designation lists these critical functions as essential physical and biological features and the 2005 critical habitat designation lists these as PCEs, however they function the same for all listed species. Both the essential physical and biological features and the PCEs are identified in the documents designating critical habitat and listed below in Tables 10 and 11.

Table 10. PCEs of critical habitats designated for ESA-listed salmon and steelhead species considered in the opinion (except Snake River spring/summer run Chinook salmon, Snake River fall-run Chinook salmon, Snake River sockeye salmon), and corresponding species life history events.

Primary Constituent Elements		**Species Life history Event**
Site Type	**Site Attribute**	
Freshwater Spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development
Freshwater Rearing	Floodplain connectivity Forage Natural cover Water quality Water quantity	Fry emergence from gravel Fry/parr/smolt growth and development
Freshwater Migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Estuarine Areas	Forage Free of artificial obstruction Natural cover Salinity Water quality Water quantity	Adult sexual maturation and "reverse smoltification" Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Nearshore marine areas	Forage Free of artificial obstruction Natural cover Water quantity Water quality	Adult growth and sexual maturation Adult spawning migration Nearshore juvenile rearing
Offshore marine areas	Forage Water quality	Adult growth and sexual maturation Adult spawning migration Subadult rearing

Table 11. PCEs of critical habitats designated for Snake River spring/summer run Chinook salmon, Snake River fall-run Chinook salmon, and Snake River sockeye salmon, and corresponding species life history events.

Primary Constituent Elements		**Event Species Life History**
Site	**Site Attribute**	
Spawning and juvenile rearing areas	Access (sockeye) Cover/shelter Food (juvenile rearing) Riparian vegetation Space (Chinook, coho) Spawning gravel Water quality Water temp (sockeye) Water quantity	Adult spawning Embryo incubation Alevin growth and development Fry emergence from gravel Fry/parr/smolt growth and development
Adult and juvenile migration corridors	Cover/shelter Food (juvenile) Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Areas for growth and development to adulthood	Ocean areas – not identified Nearshore juvenile rearing	Subadult rearing Adult growth and sexual maturation Adult spawning migration

Tables 10 and 11 provide a list of the physical and biological features identified as essential for adult and juvenile spawning, rearing, and migration. At the time that each habitat area was designated as critical habitat, that area contained one or more PCEs within the acceptable range of values required to support the biological processes for which the species use that habitat.

Freshwater migration PCEs throughout the Columbia River and Snake River basins have been dramatically affected by the development and operation of hydroelectric dams. Snake River salmon and steelhead species must pass up to eight mainstem dams and reservoirs during upstream and downstream migrations. There are currently four hydroelectric dams in the lower Columbia River migration corridor with another four hydroelectric dams in the lower Snake River migration corridor. Although major efforts have been made to reduce juvenile mortality, the safe passage essential element of the migration PCE is severely impaired as significant numbers of smolts are killed or injured by every hydroelectric dam they must pass along this critical migration corridor. These dams also pose significant migration challenges to returning adults.

Anadromous access to vast areas of historically available habitat that served multiple lifestages has been completely eliminated by several dams that obstruct migration by lack of fish passage structures. Fish passage to areas in the Upper Snake River sub-basin was eliminated altogether with the construction of Hells Canyon Dam

Migration corridors serve as conduits to other habitat sites that are also PCEs. Hydroelectric development that created impassible migration barriers has eliminated vast amounts of spawning and rearing habitat access. The Hells Canyon Dam cut off access to 211 miles of the most productive spawning habitat for Snake River fall-run Chinook salmon; the upper reaches of the Snake River were the primary areas used spawning, with only limited spawning occurring downstream from Hells Canyon Dam. Hells Canyon Dam and Dworshak Dam block access to significant amounts of historically productive habitat for Snake River Basin steelhead, and minor blockages occur throughout their range. Where habitat is accessible, freshwater rearing and spawning PCEs have also been impaired, as impounded water behind hydroelectric dams has reduced formerly complex mainstem habitats to mostly single channels with little or no off-channel habitat. Hydroelectric development has also impaired the water volume (which is an element of each - spawning, rearing, and migration) by altering natural flow regime of the Columbia and Snake rivers (decreasing spring and summer flow while increasing fall and winter flow). Both rearing and migration are impacted as fluctuations in river elevation and flow velocity due to power operations slow juvenile migration through reservoirs, disturb riparian areas, and strand fish in shallow areas as levels recede. Similarly, hydro development has also degraded the water temperature essential elements through altered natural thermal patterns, again affecting spawning, rearing, and migration habitats.

The water quality element of the freshwater spawning, rearing, and migration PCEs are also impaired by agricultural and urban development throughout the range of critical habitat. Urban and agricultural runoff, irrigation return flows, as well as municipal and industrial wastewater outflows have increased water temperatures and introduced high levels of sediment and other pollutants into this migration corridor. Even before mainstem dams were constructed, habitat was lost or severely damaged in tributary streams by construction and operation of irrigation dams, channelization of streams, removal of riparian vegetation, and other activities generally associated with farming, grazing, logging, and development.

Despite these degraded habitat conditions, the HUCs that have been identified as critical habitat for these species are largely ranked as having high conservation value3. The Lower Snake River corridor and Columbia River corridor, within which the action area, are ranked as high conservation value. The Critical Habitat Analytical Review Team (CHART) noted that this corridor connects every watershed and population for all listed ESUs/DPSs with the ocean, and is used by rearing and migrating juveniles, and migrating adults.

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3 The conservation value of a site as depends on "(1) the importance of the populations associated with a site to the ESU conservation, and (2) the contribution of that site to the conservation of the population either through demonstrated or potential productivity of the area …The consideration involves population characteristics and is relevant because some populations have a higher conservation value to the ESU than others. Thus a HUC5 that received a medium score might nevertheless be rated high if it supports a unique or significant population within the ESU." (NMFS Fisheries 2005).

2.3 Environmental Baseline

The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

Lake Wallula is located in the Columbia Basin in Oregon and Washington on the mainstem of the Columbia River. The reservoir extends nine miles up the Walla Walla River, 9.7 miles up the Snake River (to Ice Harbor Dam), and six miles up the Yakima River. At full pool elevation of 340 MSL (mean sea level), Lake Wallula covers 44,266 acres, has a shoreline of 242 miles, and a lake length of 64 miles. The lake shoreline lies in two distinctly different types of terrain. The shoreline in the lower 30 miles of the reservoir has little or no river bottomlands and is closely flanked by rugged basalt ledges rising 500 to 1,000 feet above the lake. Upstream the shoreline lands have a more gradual contour. This is particularly so on the east bank around the Burbank Slough area and in the lower reaches of the Walla Walla River. In addition, there are 17 miles of levees at Pasco, Kennewick and Richland, which have altered much of the shoreline in the Tri-Cities area.

In the action area of this project, numerous anthropogenic features or activities (e.g., dam, marinas, docks, roads, railroads, rip-rap and landscaping) have become permanent fixtures on the landscape and have displaced and altered native riparian habitat. Consequently, the potential for normal riparian processes (e.g., shading, bank stabilization and large woody debris (LWD) recruitment) to occur is diminished and aquatic habitat has become simplified.

Shoreline development has reduced the quality of nearshore salmonid habitat by eliminating native riparian vegetation, displacing shallow water habitat with fill materials and by further disconnecting the Columbia River from historic floodplain areas. Furthermore, riparian species that evolved under the environmental gradients of riverine ecosystems are not well suited to the present hydraulic setting of the action area (i.e., slackwater pools that fluctuate by several vertical feet multiple times each day.), and are thus often replaced by non-native species. The riparian system is fragmented, poorly connected and provides inadequate protection of habitats and refugia for sensitive aquatic species (less than 70 percent intact). Approximately 156 kilometers (34 percent) of the shoreline along the four lowest reservoirs on the Snake River is armored with riprap (COE 2002).

Since 2002, the number of boat moorage has increased by more than 30 percent in the McNary Reservoir upriver of the Snake River confluence at four marinas, predominantly in excavated backwater habitats greater than 20 feet deep. An additional four boat launch ramps and piers of various sizes in shallow water shoreline habitats have been consulted on with NMFS by either the Corps-Walla Walla or the Corps-Seattle Regulatory. These commercial or public recreational facilities amount to approximately a total of 220,924 square feet of over-water structure with about one-third to one-half covering shallow water rearing habitat and the remaining two-thirds to one-half covering habitat deeper than 20 feet. The proposed action includes 73 existing docks in varying condition that shade approximately 30,000 square feet of water. The total surface area of Lake

Wallula is over 1.5 billion square feet. Approximately 22.3 percent of the McNary Project associated water surface area is shallow water habitat less than 10 feet deep, equaling roughly 10,000 surface acres of water along the McNary Project shoreline.

The action area for the proposed project consists of sixteen fifth-field HUCs in the Columbia River, Snake River, and Walla Walla River, and Yakima River. In the past ten years, numerous projects have been consulted on by NMFS in the action area including multiple marinas, docks, bank hardening projects, road and bridge construction projects, as well, as a multitude of other projects including numerous implementation projects. In all, NMFS has consulted on approximately 74 projects in the nine fifth field HUCs that compose the action area.

Data suggest that the cumulative loss of habitat from shading of multiple structures can affect fish abundance and species richness (Carrasquero 2001; Kahler et al. 2000). Overwater structures can also reduce the overall coverage and density of freshwater aquatic plants (Radomski and Geoman 2001) which could be significant to the ecological functions of aquatic systems where human development occurs. Multiple activities within a watershed can have a cumulative impact on riparian and shoreline vegetation, including the increased likelihood that the impacts will be measureable, and thus are more likely to have an adverse impact on aquatic species and habitat.

Dams and their associated reservoirs influence rearing and migrating salmon and steelhead. The altered habitats in Lake Wallula reduce smolt migration rates and create more favorable habitat conditions for fish predators, including native northern pikeminnow, nonnative walleye, and smallmouth bass. In the Columbia and Snake rivers, dams have changed food web interaction both directly and indirectly. Impoundments have directly increased predation risk for anadromous salmon smolts by delaying downstream migration, thereby prolonging their exposure to piscivorous birds and fishes. Impoundments have also changes trophic interaction indirectly by creating extensive new habitat that favors some native piscivorous fishes like northern pikeminnow, and providing new opportunities for non-native piscivores like walleye and centrarchids (Independent Scientific Advisory Board 2011). In addition, novel and poorly understood food webs have developed in run-of-the-river reservoirs, and they may not support the energetic needs of spring-migrating salmon or other native organisms. Moreover, future changes in run-of-the-river food webs can be expected as new non-native species become established, and these additions also may have unanticipated effects on the nutritional condition and fitness of migrating juvenile salmon (Independent Scientific Advisory Board 2011).

A substantial fraction of the mortality experienced by juvenile outmigrants through the portion of the migratory corridor affected by the Federal Columbia River Power System occurs in the reservoirs. This includes about half of the mortality of in-river migrating juvenile spring-run Chinook salmon and steelhead (NMFS 2008b).

2.4 Effects of the Action

Effects of the action means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. No interrelated or interdependent actions were identified by the action agency or by NMFS during this consultation.

The analysis below looks at the likelihood of salmon and steelhead being present within the action area, and thus subjected to the effects of project activities. It identifies the lifestages that will encounter these effects, because lifestage is a determinant in the range of response to various effect exposures. The anticipated project effects include changes in sound pressure levels (pile driving and watercraft use), water quality effects (turbidity and pollutants), and effects to physical habitat (substrate, forage, predation, and riparian vegetation). Additional effects include increased boat traffic in the Snake and Columbia rivers. All effects anticipated from the action are habitat-modifying effects, and are likely to cause injury or death of individual fish indirectly, (as a consequence of behavioral modification). Estimating the specific number of animals injured or killed by habitat modifying activities is difficult if not impossible, despite the use of the best available scientific and commercial data, because of the range of responses that individual fish will have to changed habitat, and the fluctuating abundance of fish presence over time.

Species in the Action Area

Different size groups and age classes of salmon and steelhead use mainstem habitat in the McNary Reservoir. Some juvenile steelhead and Chinook salmon overwinter in the McNary Reservoir. Juvenile ocean-type salmon are observed migrating over Ice Harbor Dam and Priest Rapids Dam year round. In general, Juvenile salmon of different sizes often have different behavior, disposition to migrate, and distribution in reservoirs (Peven 1987), which will influence the degree to which effects of the project are experienced by individual fish

Ocean-type salmon migrate downstream through the action area as subyearling juvenile fish, generally leaving the spawning area where they hatched within days to months following their emergence from the gravel. Subyearling Chinook salmon express two peak movements downriver, the first in March through June, and the second mid-October through November. There is considerable variability in the freshwater migration timing of salmon and steelhead. Progeny of upper river tributaries, such as Snake River fall-run Chinook salmon, typically enter the Columbia River at a later date, rearing for weeks to months after arrival. Some remain in freshwater for extended periods until reaching a larger size (more than 75 millimeters) (Levings et al. 1986; Levy and Northcote 1982; MacDonald et al. 1988). Although peak movement of stream-type and ocean-type salmon does not substantively overlap with construction timing, all individuals will be exposed to the long-term year-around effects of in and overwater structure.

Subyearling Chinook generally remain close to the water surface, favoring water column habitat less than 6 feet deep and areas where currents do not exceed 0.1 feet per second. They seek lower energy areas where waves and currents do not require them to expend considerable energy to remain in position while they consume invertebrates that live on or near the substrate. These areas are typically characterized as having fine-grained substrates, which support benthic prey production.

Older juvenile salmon and steelhead (+1 age class) use similar near-shore, off-channel, midchannel, and deeper water habitats, but are more commonly found in deep water habitat ranging from 1 to 33 feet, while favoring the upper 20 to 25 feet. The majority of juvenile stream-type salmon are typically smolt condition and are not substantively feeding or rearing along mainstem river margins; rather they typically use deeper portions of the river channel, with fast moving currents. However, some studies indicate that approximately half (~50%) of the fish caught in beach seines are actually spring-run Chinook salmon (Marshall et al. 2000). Therefore, NMFS believes it is reasonable to expect some subyearling spring-run Chinook salmon to use nearshore areas in mainstem habitats intermixed with fall Chinook salmon.

Based on the above described life history behaviors of the listed species, NMFS anticipates the proposed action will affect all seven NMFS-listed species in the action area by causing physical and biological changes to the environmental baseline, including direct effects on all species. Detailed description of effects at the scale of individual fish appears below.

2.4.1 Effects on Species

Sound Pressure Levels and Noise

The proposed action will alter sound pressure levels from pile driving and increase watercraft use and accompanying noise around each dock.

The project entails the construction of up to 27 new docks with a maximum of six 8-inch piles each and the modification of up to 73 existing docks. Very few, if any of the existing docks are currently supported by piles. Therefore if complete build out occurs and all docks are retrofitted with the maximum number of piles, the total number of new piles could be up to 600, accounting for six new piles for each of the 100 docks. However, the actual number will likely be far less. All pile installation will be completed with a vibratory pile driver during the inwater work window between November 1 and February 28.

The proposed pile driving will create loud underwater sounds. When a vibratory hammer is used, an oscillating sound is created and is conducted through the length of the pile into the surrounding air, water, and substrate. Sound waves in the substrate are transmitted varying distances from the pile and can have localized effects, making it possible that received levels of sound could be less in areas farther from the pile than areas closer to the pile.

Vibratory hammers have a rapid repetition rate and produce sounds of lower intensity than impact hammers, and are not likely to create injury or death of juvenile listed fish. Limiting work to between November 1 and February 28 dramatically reduces the number of listed fish that will be present during pile driving, and exposed to the oscillating sound pressure waves created by the vibratory pile driving. Adult steelhead and fall-run Chinook salmon will be present in the Columbia River and Snake River at this time, but first year juvenile steelhead generally spend the winter either in natal tributaries or in the Columbia River or Snake River near the mouths of tributaries. However, it is likely that a small number of juveniles from each of these two species will be overwintering in the Columbia River or Snake River mainstem, and some of these will likely be near the proposed pile driving and therefore they will be affected by the action. NMFS does anticipate some adverse behavioral disruption of fish within 73 feet of each pile driven when pile driving is expected to exceed 150 dB rms, but does not expect any of the other subject species to experience effects of pile driving noise.

A multi-agency work group determined that to protect listed species, sound pressure waves should be within a single strike threshold of 206 decibels (dB), and for cumulative strikes either 187 dB sound exposure level (SEL) (referenced to 1 micro Pascal [1 µPa]) where fish are larger than 2 grams or 183 dB SEL where fish are smaller than 2 grams (National Marine Fisheries Service 2008a). In addition, any salmon or steelhead within a certain distance of the source (i.e. the radius where the root mean square (rms) sound pressure level will exceed 150 dB re: 1 µPa2) will be exposed to levels that cause changed behavior or physical injury. The result of exposure could be a temporary threshold shift in hearing due to a temporary fatiguing of the auditory system that can reduce the survival, growth, and reproduction of the affected fish by increasing the risk of predation and reducing foraging or spawning success (Stadler and Woodbury 2009).

For this project, NMFS estimated sound pressure levels using a 12-inch pile as a surrogate for 8-inch piles to be used in the project. The pile driving sound data was derived from Reyff 2007 Compendium of Pile Driving Sound Data from table 1.2-2. NMFS estimated the sound pressure level to be 171 dB peak SPL, 150 dB sound exposure level (SEL), and 150 dB rms. NMFS does not expect 206 dB peak SPLs, (at a reference pressure of one micro Pascal (re: 1 µPa)) to be reached as a result of vibratory pile driving. In addition, 187 dB accumulated SEL (re: 1 µPa2•sec) will not be exceeded nor will 183 dB accumulated SEL.

The proposed action is not expected to generate SPLs capable of killing ESA-listed fish (206 dB peak and greater). However, NMFS determined that pile driving could cause some cumulative and behavioral effects to listed salmon and steelhead in the Columbia River and Snake River within a 73-foot radius from each pile being driving. NMFS believes that juvenile fall-run Chinook salmon and juvenile and adult steelhead will be the only species exposed to the behavior disrupting effects of pile driving. It is likely that individuals will move into deeper water away from pile driving activities. Fish exposed to these SPLs might alter feeding while they seek suitable habitat.

The NMFS has determined that SPLs from vibratory pile driving could have behavioral effects on listed fish (150 dB rms and greater) and will extend approximately 73 feet into the river in all directions from the pile driver, spanning a small percent of the wetted width of the Columbia River and Snake River. NMFS also calculated the volume of water in cubic feet using the volume of a cylinder $V= \pi r^2 h$ with the depth of water varying between 10-15 feet at the location of each pile, so NMFS estimated an average of 12 feet (h=12). NMFS determined the total volume of the area affected by pile driving to be at a maximum of 200,796 cubic feet (5,686 cubic meters) of inwater habitat per pile.

For the purposes of this consultation, NMFS will analyze the maximum volume of habitat affected by each pile being driven, even though it is likely to be smaller with most piles located within 40 feet of the shoreline. NMFS estimated the number of juvenile fall Chinook salmon and steelhead that may be affected from the proposed pile driving activity. NMFS used DART dam count data over Lower Monumental dam to calculate the 5-year (2006-2010) averages of outmigrating Snake River fall Chinook salmon. On average 408,077 fish passed the dam each year. NMFS also calculated juvenile and adult steelhead using a 5-year average over McNary dam calculating 527,691 juvenile steelhead and 263,933 adult steelhead on average each year. However, for adult steelhead NMFS subtracted steelhead passing over Ice Harbor Dam and Priest Rapids from the total number of steelhead that are likely to be holding in the McNary Reservoir over the winter. NMFS concluded that no more than 44,206 adult steelhead on average will be in the McNary Reservoir and are likely to be affected by pile driving activities from the proposed action, experiencing noise, disturbance, and behavioral disruption.

A study by Connor et. al. (2005) determined that between 41-51 percent of fall Chinook salmon are reservoir type, meaning they overwinter in Snake or Columbia River reservoirs. However, the study did not detail the specific reservoirs these fish overwintered in or if they travelled downstream during the winter. For this project, NMFS will conservatively assume that 50 percent of the fall Chinook salmon passing over Lower Monumental Dam will overwinter in the McNary Reservoir. NMFS will assume that the fish are evenly distributed throughout the reservoir which has approximately 1.642 billion cubic meters (1,350,000 acre feet) of water. For fall Chinook salmon NMFS assumes they will be distributed only below the confluence of the Snake River, so only the bottom 2/3 of the McNary Reservoir which holds approximately 1.076 billion cubic meters of water.

For fall-run Chinook salmon dividing the overwintering fish (half the fish passing Lower Monumental) 204,038 divided by 1.076 billion cubic meters gives us a fish density of 0.0001896 fish per cubic meter. Take that number and multiply it by the number of piles in the area affected (which is only about half of the proposed projects) by pile driving (1,705,800) to get the number of fall-run Chinook salmon affected by pile driving activities, 323 juvenile fall-run Chinook salmon over the next five years. Doing similar calculations for juvenile steelhead and adult steelhead, once again assuming 50 percent of the adults hold in the river and 50 percent of the juvenile steelhead overwinter, and these fish will be in proximity to pile driving and therefore affected by the proposed pile driving activities. As many as 546 juveniles and 70 adults will be affected by the pile driving activities over the next five years. This is a conservative estimate and NMFS believes that the actual number of fish affected by pile driving will be less than the calculated number. In addition, NMFS anticipates only adverse behavioral disruption with none of these fish killed by pile driving activities.

In addition to effects of pile driving, the presence and use of the dock have separate effects to which exposed fish could adversely respond. These include engine noise, prop movement, and the physical presence of boat hulls and human presence, including fishing activities. All of these can disturb fish and/or cause them to leave an area (Mueller 1980). It would be very difficult to measure the incremental increase in these effects attributable to this action, in part because it is difficult, if not impossible to predict how much additional use actually results from the proposed dock.

The populations in Benton, Franklin, Walla Walla, and Umatilla Counties have increased by 18.1 percent, 56.8 percent, 7.0 percent, and 4.0 percent, respectively[4] from 2000 to 2009 and the demand for new docks strongly suggests that boating activity is increasing at least as fast as human population. New docks will increase boat use in this area of the Columbia and Snake River. NMFS believes that increasing watercraft capacity and activity in the nearshore areas of the Columbia River and Snake River is likely to reduce the suitability of this nearshore habitat adjacent to each dock for rearing and migrating salmonids. An increase in watercraft use at the proposed dock and surrounding area is reasonably certain to occur. Graham and Cooke (2008) studied the effects of three boat noise disturbances (canoe paddling, trolling motor, and combustion engine (9.9 hp)) on the cardiac physiology of largemouth bass (*Micropterus salmoides*). They found that exposure to each of the treatments resulted in an increase in cardiac output in all fish, associated with a dramatic increase in heart rate and a slight decrease in stroke volume, with the most extreme response being to that of the combustion engine treatment. Recovery times were the least with canoe paddling (15 minutes) and the longest with the power engine (40 minutes). They postulate that this demonstrates that fish experienced sublethal physiological disturbances in response to the noise propagated from recreational boating activities.

The NMFS believes that increased boat noise and use of the nearshore area from the proposed action is reasonably certain to alter salmon rearing and migration behavior. This apparent stress-response of salmonids to noise and disturbance caused by boating activity is likely to be experienced by multiple individual fish of all age-classes of listed salmonids at each instance of boating activity, which will occur at unknown intervals for the foreseeable future. The noise and disturbance of driving additional pile has limited duration, and timing restrictions that minimize the amount of fish that will be exposed. Watercraft related noise effects to listed fish from this project would occur at unregulated intervals and frequency. The effects of noise and disturbance from both sources will be limited to behavioral changes only.

Water Quality

The proposed action will reduce water quality during activities that disturb the streambed or introduce contaminants into the Columbia River or Snake River. NMFS expects suspension and transport of sediments as a direct result of project activities that include pile driving and watercraft activity. The increase in turbidity from pile driving will be localized and short-term, and should be dissipated upon completion of each pile being driven. However, the timing and number of piles to be driven (600) will be spread out over the next 20 years as docks are built.

Juvenile salmon and steelhead are likely to be disturbed by increases in turbidity at each episode of pile driving implementation. Turbidity will be greatest during pile driving, while the remaining activities will result in slight, localized increases in turbidity. Increased fine sediment

4 U.S. Census Bureau, State and County Quickfacts. Available at http://quickfacts.census.gov/qfd

can be detrimental to juvenile salmon and steelhead by increasing turbidity that interferes with feeding and territorial behavior (Berg and Northcote 1985). The work window of November 1 to February 28 further minimizes the overlap between when fish and in-water work occur. NMFS does not expect injurious levels of turbidity to be exceed outside of a 10-meter radius around each pile being driven.

Effects of long-term use of new docks will also include turbidity produced from watercraft activity. However, multiple variables determine the amount of turbidity that watercraft produce, including water depth, time of year, substrate, and type of watercraft. The location and shallow depth of many of the existing docks will continue to allow watercraft to disturb nearshore areas, ground out, and alter streambed substrates. However, through implementation of the McNary SMP and improvements in location of many of these docks, the proposed action is expected to reduce turbidity at these locations over time as these docks are placed into deeper water.

Additional impairment of water quality will result from accidental releases of fuel, oil, and other contaminants that can injure or kill aquatic organisms. Such releases, while rare, are reasonably likely to occur over the lifetime of the permitted docks. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can kill salmon at high levels of exposure, and can cause sublethal, adverse effects at lower concentrations. When spills occur, NMFS expects the spills to be small (several ounces). A spill prevention plan and appropriate spill materials will be kept on site during construction. NMFS anticipates PAHs releases of only very small quantities (ounces) are likely with each accidental release or spill, and therefore effects among fish are likely to be at the sublethal level. Spills or releases larger than a few ounces are not reasonably certain to occur and are therefore not covered under this opinion.

Changes to Physical Features of Habitat

The Columbia and Snake Rivers provide foraging and rearing habitat for all listed species covered in this opinion. The nearshore shallow water component provides important overwintering habitat, as well as, spring and summer foraging habitat for salmon and steelhead during their outmigration. This is especially important rearing habitat for fall-run Chinook salmon.

Healthy riparian habitat provides forage, cover, and, refugia, all which considered to be "not functioning properly" in the action area. The addition of in- and overwater structures, increased boating activity, and riparian vegetation changes can alter a variety of physical processes controlling the development and distribution of nearshore habitats, which in turn affect fish behavior and fish condition. Changes to the ambient light regime and riparian and benthic habitat caused by project actions will affect fish behaviors.

As part of this project, the Corps re-allocated their shoreline areas. They decreased the allocation of "limited development areas" (LDAs) from 11.26 miles to 2.71 miles. Although this restriction in developable shoreline area will limit or prevent the degradation of 8.55 miles of this habitat in the future, it will not improve or restore the existing degraded condition of this habitat as it exists under baseline conditions. By re-allocating limited development areas, the Corps concentrated and isolated the build out of private docks and vegetation modifications to 1 percent of their shoreline, meaning in this one percent there will be further degradation of these shorelines. The only exception are the 24 docks located in site specific LDAs that will also continue to degrade nearshore habitat conditions for up to 10 years. In addition to re-allocating the shoreline, the Corps is also now requiring all existing docks, that do not meet the current fish compliant dock criteria, to be upgraded to fish friendly dock criteria as their permits are renewed, and the 24 "grandfathered" docks will be upgraded over the next 10 years. In addition, each new dock built will require the planting of riparian vegetation at a 5:1 ratio.

The proposed action will add new in and overwater structure, as well as maintain existing overwater structure in the McNary Reservoir. After full build out (limited to 100 docks within the reservoir), the total overwater structure footprint will be approximately 36,640 square feet, of which up to 12,960 will be from new over-water structure added to the reservoir. In addition, up to 600 new 8-inch piles can be added as part of the proposed action. As more development occurs along the Columbia River and Snake River, fish habitat will be further degraded and foraging and rearing habitat will become scarcer. Most alterations of littoral zone habitat in North America are incremental and cumulative, occurring primarily at the spatial scale of individual properties (Jennings et al. 1999). Despite the addition of new in-and over-water structure, the proposed action improves conditions in the action area. The improvement of existing docks (e.g, by replacement of decking with grated materials) will improve existing conditions in the action area. The requirement of fish-friendly dock design for future structures will minimize the negative effects of these structures on listed salmonids in the nearshore environment. These features will help avoid and reduce the negative effects of shade from overwater structures on aquatic vegetation and reduce suitability of shaded areas as predator habitat.

One of the key aspects of the action is the replacement of older docks that are located in the nearshore environment, NMFS anticipates, over the 20-year life of the program, that there will be a gradual improvement in rearing and foraging conditions as the result of upgrading and improving exiting docks. An important element in this 20-year program, is the timing of habitat changes; design improvements to benefit fish are anticipated to begin accruing in the action area no later than five years from the date of this consultation, and all structural improvements should be realized within 10 years. The time-frame for the construction of the 27 new docks within the LDA is uncertain, and depends upon the receipt of permit applications from landowners as they come forward with the request for dock construction – this means that the effects of dock construction will occur over the 20 year period, but the full suite of impacts are not likely to precede the full suite of improvements. The timing-balance of beneficial effects and negative effects is expected to be fairly even.

Ambient Light

The reduction of ambient light (e.g., light attenuation and shading) is one of the primary mechanisms by which docks, floats, pilings, boatlifts, and moored vessels adversely affect salmon and steelhead. Light levels are a determining factor that can impair fitness and survival in juvenile salmonids by altering certain behaviors, such as migration, feeding success, and predator avoidance (Nightingale and Simenstad 2001; Rondorf et al. 2010). Overwater structures, such as piers, docks, boatlifts, and marinas, as well as the presence of moored boats, can substantially reduce light levels necessary for these behaviors. The McNary Reservoir already has 73 residential docks, numerous community docks, and at least four marinas.

Ambient light reduction alters fish migration patterns. A variety of studies have shown that salmon fry migrate along the edges of shadows rather than through them (Carrasquero 2001; Washington State Department of Fish and Wildlife 2006). It has also been shown that the majority of migrating juvenile fall-run Chinook salmon strongly avoid overhead cover (Kemp et al. 2005) and select alternative routes of passage if they are available; spring-run Chinook salmon and steelhead likely exhibit a similar response. Timing of migration and reproduction, temperature regimes, and the metabolic cost of feeding and predator avoidance affect energy reserves which, in turn, affect subsequent performance and survival (Independent Scientific Advisory Board 2011). Structures that provide artificial cover probably impede migration and may lead to increased energetic and predatory costs to fish (Kemp et al. 2005).

Ambient light reduction also decreases feeding opportunities and success. Prey abundance and capture rate decline under piers as compared with open-water areas for some fish species. In general, juvenile salmon avoid light/dark interfaces that overwater structures and moored boats present and will most likely swim into deeper water during their outmigration or rearing. This is especially true of fall-run Chinook salmon and likely steelhead, which will avoid this altered nearshore area and will not benefit from any foraging and/or rearing opportunities this area would have otherwise provided.

Reduced ambient light enhances habitat that favors fish preying on young salmon and steelhead. Northern pike-minnow (*Ptychocheilus oregonensis*), smallmouth bass (*Micropterus dolomieu*), and largemouth bass (*Micropterus salmoides*) are also predators that consume juvenile salmon and occupy the river-channel. Predation has been identified as one of the limiting factors for all salmonid species in the Columbia River basin (NMFS 2008c). In-river predation is a significant source of mortality for Columbia River and Snake River salmonids and increases in predator populations would affect all species covered in this opinion. This is especially true above the Yakima River in the mainstem Columbia River where 54 percent of resident fish are piscivorous, and 59 percent are non-native species. Of these northern pikeminnow, smallmouth bass, and walleye and the greatest potential for significantly affecting salmonids (Independent Scientific Advisory Board 2011). In addition, all species have an affinity for inwater structure such as multiple pile structures. In- and overwater structures can increase the exposure of juvenile salmon to predators by providing predator habitat, reducing refugia, and diverting juveniles into deeper waters. These effects would be experienced by all salmonids and steelhead using the nearshore areas where docks are located, but the majority of the effects will be manifested on fall-run Chinook salmon.

Moreover, the proposed action is likely to increase the amount of spawning and rearing habitat for predatory fish, which could lead to an overall increase in the predator population in the action area. Specifically, the placement of 600 new piles and 12,960 square feet of overwater structure will create physical features that are beneficial to salmonid predators. Piles can provide velocity shadows that provide ambush habitat for salmonid predators, including pikeminnow and smallmouth bass. The placement of 600 piles will increase this type of habitat in the reservoir and will in turn increase predation on juvenile salmon and steelhead. NMFS carefully weighed increased predation with the effects of maintaining and building overwater structures in the nearshore environment. NMFS believes the presence of overwater structures in the nearshore (closer than 40 feet from the OHWM) causes a greater level of energy consumption and predation effects to listed fish than will result from the proposed action. The proposed action minimizes the pile size to reduce velocity shadows, placing the overwater structures at least 40 feet from the OHWM, and upgrading older docks to more fish-friendly designs should enable increased use of this nearshore habitat by ESA- listed fish and unlisted Upper Columbia River summer/fall-run Chinook salmon over the course of 20 years.

Even with the induction of more fish-friendly dock designs, the addition of these structures in the action area will adversely affect, even injure juvenile steelhead and Chinook salmon by causing changes in their normal rearing and migratory behavior. Changed behavior could include delayed migration, alteration of schooling behavior, and death of juvenile salmon from increased predation. The extent of these effects on fish is difficult if not impossible to quantify in terms of the number of affected fish.

Riparian and Benthic Habitat

The Columbia and Snake Rivers in the project area both upstream and downstream of the project area provides foraging, rearing, and migration habitat for all listed species, and important rearing habitat for fall-run Chinook salmon. These shallow shoreline habitats with low velocities and slopes offer juvenile salmon refugia from predatory fish that may be too large to enter shallow water (Rondorf et al. 2010). In addition to refuge, shallow water habitat provides a high abundance of terrestrial insects which are a preferred food for subyearling Chinook salmon in the McNary Reservoir (Rondorf et al. 1990). Developed shorelines limit the available suitable habitat for juvenile salmonids, while at the same time providing better habitat conditions for predators of juvenile salmonids ((Rondorf et al. 2010). Riparian degradation, loss of in-river wood, and water quality are currently limiting factors for most Columbia and Snake River salmon and steelhead species (NMFS 2005). The proposed action will have additional detrimental habitat effects that will be experienced by adults and juveniles of all species that rely on the action area.

The proposed action will allow the continued degradation, and additional habitat degradation, through new development on 2.71 miles of riverine habitat in the McNary Reservoir. Although the Corps has made efforts to minimize the effects of the action to nearshore habitats by incorporating joint use docks and dock design criteria, the addition of new in- and over-water structures will still affect listed fish. New dock construction will result in removal of a minimum of 2,160 square feet of riparian vegetation to be removed by the proposed action, from the clearing of paths to docks. That is likely to be the minimum amount of removal that will occur, as encroachments on public land in the McNary Reservoir have occurred in the past. To help minimize unanticipated vegetation removal the Corps will take a more proactive role in the education and enforcement of the SMP in regards to riparian vegetation removal and modifications. Through the proposed action, the Corps is taking a proactive approach in limiting the amount of development that will occur in the reservoir (by limiting new docks to 1 percent of the shoreline). This approach will help reduce the pattern of long-term degradation of the nearshore and riparian environment in the future.

Relevance of Effects on Individual Fish to Salmonid Population Viability

The NMFS assesses the importance of habitat effects in the action area (on individual fish) to their ESUs or DPSs by examining the relevance of those effects to the characteristics of VSPs. The characteristics of VSPs are abundance, population growth rate (productivity), spatial structure, and diversity. While these characteristics are described as unique components of population dynamics, each characteristic exerts significant influence on the others. For example, declining abundance can reduce spatial structure of a population; and when habitats are less varied, then diversity among the population declines. Even with the anticipated pattern of habitat improvement, the effects of dock building and use in the action area will occur episodically over a 20 year period or longer. While the direct effect of these behavioral changes are all sublethal, each of the effects increases the risk of mortality through predation, reduced foraging success, altered migration patterns, and increased stress responses. Moreover, sublethal health effects accrue among fish exposed to water quality degradation from boating activities. NMFS examines the collective effect of these individual responses on the following population viability parameters:

Abundance. Individual fish from each of the populations considered in this consultation will experience these altered habitat conditions for as long as these docks persists. Most of the effects on individual listed fish will be concentrated on juvenile fish that migrate or rear in the nearshore area. These changes will incrementally increase individual stress, reduce foraging success, alter migration patterns, and impair predator avoidance, which is likely to lead behavioral changes and reduced fitness of individual fish. The permanence of the habitat alterations exposes all future generations of fish, of each affected population, to an incremental increase in degraded habitat conditions and corollary negative individual responses, creating negative pressure on population abundance by fractionally increasing the persistent rate of mortality. At the same time, fish friendly redesign of the existing docks will reduce the level of effects caused by shade and nearshore habitat disruption, which is likely to allow a greater rate of survival among juveniles dependent on nearshore habitats during rearing and migration.

When decreases in abundance occur, small populations are at a greater risk of extinction than larger populations because of several processes that affect population dynamics. For this reason, it is important to look at how this project will affect salmonid abundance, and what size the affected populations are. The proposed action will have long-term effects on shallow water habitat, fish movement, migration timing to juvenile steelhead and Chinook salmon, and increased predation on all species. One hundred percent of adults and juveniles of all cohorts of all species covered in this opinion (except MCR steelhead) will be subjected to boat noise-related stress. The effects on individual listed fish will be most concentrated among juvenile fish that migrate or rear in the nearshore area. These changes will incrementally increase stress, reduce foraging success, alter migration patterns, and impair predator avoidance, which is likely slightly increase the level of death or injury of juvenile Chinook salmon and steelhead in each cohort over the lifetime of the boat docks. This means, that all other conditions of the baseline remaining equal, there will be a slight decrease in abundance among all populations of the listed salmonids reviewed in this opinion.

The NMFS recognizes that the Corps is requiring all existing docks to be upgraded to more fish friendly dock criteria over the 20 year effective period of this consultation, and expects some degree of habitat will recover or be restored to a functional condition for salmon and steelhead. The gains in nearshore juvenile survival are likely to ameliorate adverse pressure on population abundance. This balance of habitat effects, when considered together with the COE's cap on the number of docks in the reservoir at 100 total, leads NMFS to the position that the COE's program will not create an appreciable decrease in abundance.

Productivity. The neutral effect on abundance from the project, the long-term nature of the effect to new boat docks, when factored with the currently low population growth-rates, indicates that the ability to achieve the productivity targets of the recovery plan will be unaltered by the project.

Spatial Structure. NMFS does not expect the proposed project to affect the spatial structure of either species. The action area does not include spawning areas or tributary habitat. In addition, the project should not prevent adult salmon or steelhead from returning to their natal streams. However, as productivity and abundance decrease, the diminishment of spatial structure increases, because of fewer fish to maintain sufficiently populated spawning sites.

Diversity. Salmon have complex life histories and changes in the nearshore environment will have a greater effect on specific life history traits that utilize this habitat type. This project will concentrate the effects on certain life histories that are more dependent on nearshore habitats, specifically, nearshore migrating juvenile salmon and steelhead. Over time, selective pressure on one component of a life-history strategy tends to eliminate that divergent element from the population, reducing diversity in successive generations.

2.4.2 Effects on Critical Habitat

Implementation of the proposed action is likely to affect freshwater rearing and freshwater migration for four salmonid ESUs and three steelhead DPSs. Degraded water quality has been identified as one of the limiting factors for all species covered in this opinion, and the proposed action will degrade water quality temporarily. Construction activities will affect water quality throughout the action area by increasing turbidity during and following construction as fine sediment becomes suspended and is redistributed downstream. Construction activities will occur between November 1 and February 28.

Substrate. The proposed action will affect the substrate attribute in several ways. A maximum of 600 new 8-inch piles may be driven to upgrade existing docks and build new docks. In addition, 12,960 square feet of new overwater structure will be built that will enable boats to moor to them. This action will produce localized boat scour in some situations, increase turbidity, and reduce general habitability of substrate. This is likely to be a persistent problem occurring at intervals and at multiple locations, for the forseeable future.

Water Quality. The proposed action will have a temporary negative effect on water quality by increasing turbidity during construction and for a short period during and after construction activities. In addition, water quality will be by affected from watercraft use at the dock through increases in turbidity and re-suspension of sediments on multiple occasions in multiple locations throughout the action area, for the forseeable future.

Water Quantity. The proposed action will have no effect on water quantity.

Floodplain Connectivity. The proposed action will have no effect on floodplain connectivity.

Forage. Primary and secondary productivity will be persistently lower in areas shaded by overwater structures than in unshaded areas. The proposed project will increase shading by 12,960 square feet and boat moorage associated with the overwater structure will also increase shading, especially in areas where very few docks currently exist. There will also be a reduction in 2,160 square feet of riparian vegetation from the proposed action. Salmonids feed during their juvenile outmigration and use nearshore habitats to forage. Boating activity and overwater structures reduce the benefit of the nearshore area to rearing juvenile salmonids by reducing their access and use. Some salmonids will avoid shaded areas projected by the overwater structures or moored boats, therefore reducing the foraging area available. Salmonids are also known to startle when boats are nearby, therefore changing their behavior and reducing foraging efficiency. Compared to having no docks in the reservoir, reduced forage is likely to persist in all dock locations within the action area for the forseeable future. However, real reduction in forage is likely only in the locations where new docks are installed. Where exisiting docks are improved to fish friendly design criteria, some minor degree of improvement in forage is likely as light penetration improves, dock size reduces, and dock locations are moved to deeper water. On the whole, NMFS sees a neutral level of effect on this PCE.

Natural Cover. The proposed action will alter the nearshore area, including 2,160 square feet of vegetation during dock construction and for access to docks. In addition, the proposed action allows vegetation modifications on Corps land that will reduce the recruitment of large wood, insects, and vegetative cover. The mitigation components will at some future date help increase natural cover in the reservoir, but this improvement will be realized10 to 20 years into the future.

Safe Passage. The proposed action allows the construction of 27 new docks in the McNary Reservoir. These docks will alter outmigration routes of juvenile salmon to some degree, especially for juvenile ocean-type Chinook salmon migrating down the Columbia River. They will increase predation on salmon by increasing rearing and spawning areas for bass and other piscivours. Some of the areas affected by the project have very few existing docks and building 10 new docks in one section of shoreline may compound the outmigration and predator effects on juvenile salmonids. In the short-term, construction activities will occur when adult steelhead are migrating upstream to spawning areas. However, as activities will not occur round-the-clock, upstream passage will not be significantly affected during construction activities. Overall, safe passage will be degraded in areas where new docks are built and slightly improved where old docks are being upgraded to newer dock criteria. Therefore, on balance the project does not change the function of the safe passage element of the migration PCE in the action area.

Relevance of Effects on Primary Constituent Elements to Conservation Value

As described above, the proposed action will have some short-term and long-term negative effects on substrate, water quality, forage, natural cover, and safe passage. The addition of in- and overwater structures will burden the function of the rearing and migration PCEs in the action area. The extent of the burden is largely ameliorated by the beneficial aspects of the overwater structures in this action.

2.5 Cumulative Effects

Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Cumulative effects, when combined with baseline effects and effects of the action, may increase the likelihood that the proposed action will result in jeopardy to a listed species, or in destruction or adverse modification of a designated critical habitat.

During this consultation NMFS searches for information on future State, tribal, local, or private actions that were reasonably certain to occur in the action area. Most of the action area includes federal land owned by the Walla Walla Corps, including the majority of the shoreline in the McNary Reservoir, which would preclude the possibility of future state, tribal, or local action that would not require some form of federal funding or authorization.

2.6 Integration and Synthesis

This section is a presentation of the aggregation of the effects of the action (Section 2.4), the environmental baseline (Section 2.3), and the cumulative effects (Section 2.5). This aggregation, made in full consideration of the status of the species and critical habitat (Section 2.2), enables the ultimate determination on the risk posed by the proposed action on the species habitat it affects. From this assessment, the agency can discern whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species.

The ICTRT (2005) noted a high viability risk for all UCR spring-run Chinook salmon and UCR steelhead populations. The three populations of UCR spring-run Chinook salmon (Wenatchee, Entiat and Methow) that use the action area as adults and/or as juvenile outmigrants are each at high risk in all four VSP categories. The 10-year geometric mean from 1994 to 2003 for UCR spring-run Chinook salmon abundance in the Wenatchee, Entiat, and Methow populations is 222, 59, and 180 spawners respectively (NMFS 2008) meaning that none of the Chinook salmon populations affected by the project reaches abundance threshold for viability.

There are four populations (Wenatchee, Entiat, Methow and Okanogan) of UCR steelhead that pass or may use the action area as adults and/or as juvenile outmigrants The 10-year geometric mean from 1997 to 2006 for UCR steelhead abundance in the Wenatchee, Entiat, Methow, and Okanogan is 900, 94, 281, and 104 spawners respectively (NMFS 2008), meaning that none of the steelhead populations affected by the project reaches the threshold for viability.

There are seven populations (Upper Yakima, Naches, Toppenish, Satus, Umatilla River, Walla Walla River, and Touchet River) of MCR steelhead that pass or may use the action area as adults and/or as juvenile outmigrants. The 10-year geometric mean from 1995 to 2004 for MCR steelhead abundance for these seven populations are all below the abundance thresholds proposed by the ICTRT, except the Umatilla River (ICTRT 2010). In addition, the ICTRT (2005) noted a moderate risk for five or the seven populations (Naches, Toppenish, Satus, Umatilla, and Walla Walla) and high risk for the Upper Yakima population in all four VSP categories, for the Yakima basin MCR steelhead populations. There was no data for the Touchet River population.

There is a single population of Snake River fall-run Chinook salmon in one major population group that spawns and rears in the mainstem Snake River and its tributaries below Hells Canyon Dam. The 10-year geometric mean from 1995-2004 for Snake River fall-run Chinook salmon abundance is 1,273 spawners (NMFS 2008b) short of the 3,000 recommended by the ICTRT.

There is one population of Snake River Sockeye salmon includes all anadromous and residual sockeye salmon from the Snake River Basin, Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake captive propagation program. The 10-year geometric mean (1999-2008) of Snake River sockeye salmon over the most recent 10-year period was 52 spawners in Redfish Lake, which is below the 1,000 natural spawner average abundance thresholds recommended by the ICTRT.

There are 27 populations of Snake River spring/summer Chinook in five major population groups that rear in the Columbia River and Snake River (Upper Salmon River, South Fork Salmon River, Middle Fork Salmon River, Grande Ronde/Imnaha, Lower Snake Mainstem Tributaries). Only one of the 27 populations is currently above the average abundance thresholds that the ICTRT identifies as a minimum for low risk. The remaining 26 populations are at high risk of extinction due to low abundance.

The Snake River steelhead DPS includes 24 populations in five major population groups that spawn and rear in the mainstem Snake River and its tributaries between Ice Harbor Dam and the Hells Canyon hydro complex. Only one of the 26 populations is currently above the average abundance thresholds that the ICTRT identifies as a minimum for low risk. The other 25 populations are either unknown or are at high risk of extinction due to low abundance.

The cumulative effects of non-federal activities in the action area will be modest. The Federal government manages most of the environmentally important actions in the action area. These include the reservoir's water levels and sediments, water withdrawals, and shoreline modifications. Accordingly, the effects of these activities are not considered in cumulative effects. The non-federal activities (with the exception of recreation and boating activities unassociated with the docks considered in this opinion, and with water quality impacts generated from upstream land uses) are unlikely to bear on three of the four VSP parameters.

Any land or water management action that changes habitat conditions beyond the tolerance of the species results in lower life-stage survival and abundance of the species. In some cases, the range of tolerance for some species is quite narrow and relatively small changes in habitat can have large effects on species survival (Upper Columbia Salmon Recovery Board 2007). Thus, continued shoreline development in the migration corridor of species already facing high levels of risk for multiple viability parameters will further increase the level of risk of all listed salmonids and steelhead. This is particularly true when abundance is already a critical risk factor, the population sizes are very low, and the proposed action will add incremental pressure on the ability of the populations to maintain even current low levels of abundance.

The action's negative effects consist of both short-term and long-term effects that will have a sustained and additive detrimental effects on habitat condition in the mainstem Columbia River and Snake River. However, the improvement of 49 existing docks in the McNary Reservoir to a more fish friendly design should have a habitat benefit compared to the existing structures, and these benefits should occur over the next 5 to 10 years. NMFS has determined that the addition of 27 new docks to the baseline will alter the shoreline over baseline conditions leading to a further decline in physical habitat conditions and increase predation on juvenile salmonids in the nearshore areas of the McNary Reservoir. However, the improvement of design of 73 docks to benefit fish habitat, together with limiting total build-out to 100 docks in the reservoir, and the requirement that the 27 new docks will have fish friendly dock design will minimize the addition of habitat detriments, and prevent the overall effects to these populations.

2.7 Conclusion

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of UCR spring-run Chinook salmon, UCR steelhead, MCR steelhead, Snake River Basin steelhead, Snake River fall-run Chinook salmon, Snake River spring/summer-run Chinook salmon, and Snake River sockeye salmon or to destroy or adversely modify its designated critical habitat.

During consultation, NMFS reviewed the status of UCR spring-run Chinook salmon, UCR steelhead, MCR steelhead, Snake River Basin steelhead, Snake River fall-run Chinook salmon, Snake River spring/summer-run Chinook salmon, and Snake River sockeye salmon, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects. Based on the consultation, NMFS concludes that the effects of the proposed action will not influence population viability characteristics for affected populations of Snake River Basin steelhead and Snake River fall-run Chinook salmon, causing no appreciable change in the extant risks facing them. Therefore, the action will not jeopardize their continued existence.

During consultation, NMFS reviewed the status of critical habitat designated for UCR spring-run Chinook salmon, UCR steelhead, MCR steelhead, Snake River Basin steelhead, Snake River fall-run Chinook salmon, Snake River spring/summer-run Chinook salmon, and Snake River sockeye salmon, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects. Based on the consultation, NMFS concludes that the effects of the proposed action will not influence the function of the affected PCEs in a manner discernible beyond the action area. Because the proposed action's effects on individual PCEs will not influence the conservation value of range-wide critical habitat the action will not therefore destroy or adversely modify designated critical habitat.

2.8 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. For purposes of this consultation, we interpret "harass" to mean an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point where such behaviors are abandoned or significantly altered. Section 7(b)(4) and Section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of this incidental take statement.

2.8.1 Amount or Extent of Take

Effects of the action will coincide with the presence of all salmon and steelhead covered in this opinion such that incidental take in the form of harm is reasonably certain to occur. All species use portions of the action area for juvenile rearing, and adult and juvenile migrations. NMFS expects juvenile and adult steelhead to be present in the project vicinity during the work window exposing them to construction effects. All species considered in this document, will be exposed to the long-term post-construction effects. In addition, the persistence of the overwater structures ensures that at least a portion of the outmigrating smolts from each species will experience habitat effects for as long as the structures remain.

Harm of juvenile salmon and steelhead of the species considered in this opinion as a result of increased predation resulting from the advantages conveyed by overwater structure to predators of juvenile salmon and steelhead. In addition, noise generated during pile installation and increased boating activity are likely to adversely modify the behaviors of steelhead that experience these sources of disturbance, construed as harm when the response is severe enough to alter the fitness of the affected individual for the present and/or subsequent life stages.

Estimating the specific number of animals injured or killed by habitat modifying activities is difficult if not impossible, despite the use of the best available scientific and commercial data, because of the range of responses that individual fish will have to changed habitat. While this uncertainty makes it impossible to quantify take in terms of numbers of animals injured or killed, the extent of habitat change to which present and future generations of fish will be exposed is readily discernable and presents a reliable measure of the extent of take that can be monitored and tracked. Therefore, when the specific number of individuals "harmed" cannot be predicted, NMFS quantifies the extent of take based on the extent of habitat modified (June 3, 1986, 51 FR 19926 at 19954).

Take of juvenile and adult steelhead and a percentage of overwintering Snake River fall-run Chinook salmon from pile driving activities will occur within the area of the river affected by increased sound pressure levels (SPLs) where SPLs exceed 150 dB rms due to pile driving. Such SPLs will alter normal fish rearing and migrating behaviors. NMFS does not expect any take of UCR spring-run Chinook salmon, Snake River sockeye salmon, or Snake River spring/summer Chinook salmon from pile driving activities. This area is defined by a radial space up to 73 feet into the Columbia River and Snake River in all directions from the pile driver that consists of a cylinder around each pile of 200,796 cubic feet. NMFS estimated the number of fish expected to be effected by pile driving and concluded that 323 juvenile fall-run Chinook salmon, 546 juvenile steelhead, and 70 adult steelhead will be exposed over the next five years. NMFS anticipates only adverse behavioral disruption with none of these fish killed by pile driving activities.

Take from increased predation within a specific space of modified habitat wherein the new conditions favor predation opportunity. The extent of modified habitat is equivalent to the area of shadow cast on aquatic habitat covered by new overwater structures (12,960 square feet) and 600 new piles.

The estimated extent of habitat affected by construction activities represents the extent of take exempted in this ITS. These extents are readily observable and therefore suffice to trigger reinitiation of consultation, if exceeded during the course of the proposed action (see H.R. Rep. No 97-567, 97th Cong., 2d Sess. 27 (1982)). Specifically, adding 12,960 square feet of overwater coverage and 600 new piles is reasonably certain to take listed fish via (1) increased predation rates on juveniles of all species, (2) reductions in primary production (preybase) for steelhead and Chinook salmon, and (3) reductions in riparian and benthic vegetation (natural cover) thus affecting habitat for juvenile steelhead and Chinook salmon.

2.8.2 Effect of Take

The extent of take from the proposed action does not burden the abundance or productivity of any of the affected populations of listed species considered in this consultation to an extent that bears on the risk of extinction of the affected species. The project does not jeopardize any of the seven listed species that will experience effects of the project. If anything, the effects of the anticipated extent of take among all foreseeable cohorts of juvenile rearing and out-migrant fish will be to hold the level of productivity static at its current level. Because the level of abundance is low among most of the populations of these listed species, stasis in the level of productivity leaves these populations at their current levels of risk for both productivity and abundance.

2.8.3 Reasonable and Prudent Measures and Terms and Conditions

Reasonable and prudent measures are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02). Terms and conditions implement the reasonable and prudent measures (50 CFR 402.14). These must be carried out for the exemption in section 7(o)(2) to apply.

The NMFS believes that full application of conservation measures included as part of the proposed action, together with use of the reasonable and prudent measures and terms and conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of listed species due to completion of the proposed action.

The Corps shall:

1. Minimize the effects of construction activities,
2. Minimize the number of piles,
3. Minimize the effects of the overwater structures and vegetation modifications through design criteria and review,
4. Track and monitor projects to ensure that the conservation measures are meeting the objective of minimizing take.

To be exempt from the prohibitions of section 9 of the ESA, the Corps and its cooperators, including the applicant must fully comply with conservation measures described as part of the proposed action and the following terms and conditions that implement the reasonable and prudent measures described above. Partial compliance with these terms and conditions may invalidate this take exemption, result in more take than anticipated, and lead NMFS to a different conclusion regarding whether the proposed action will result in jeopardy or the destruction or adverse modification of designated critical habitats.

1) To implement reasonable and prudent measure number 1 (construction activities), the Corps shall ensure that:

a. Conduct all work below the OHWM within as short a period as possible between (November 1 through February 28).

2) To implement reasonable and prudent measure number 2 (pile minimization), the Corps shall ensure that:
   a. The maximum number of piles per dock is limited to four 8-inch piles per structure.

   b. NMFS recommends limiting the number of piles to two per dock and allowing up to four helical screws to be used in place of piles to anchor the dock.

3) To implement reasonable and prudent measure number 3 (design criteria review), the Corps shall ensure that:

   a. The Corps will individually review each overwater structure and vegetation modification project to ensure that all direct and indirect adverse effects to listed salmon and their habitats are within the range of effects considered in this opinion. The Corps will submit a Specific Project Information Form (SPIF) for each project to NMFS for review. NMFS will then have 10 working days to review the SPIF for consistency and respond (via email or fax) to the Corps.

4) To implement reasonable and prudent measure number 4 (monitoring), the Corps shall ensure that:

   a. The Corps will submit yearly tracking and monitoring reports to NMFS by January 31 each year that details the number of overwater structures and vegetation modifications permitted.

   b. All reports will be sent to National Marine Fisheries Service, Washington State Habitat Office, Attention Justin Yeager, 304 South Water Street, Suite 201, Ellensburg, Washington 98926. NOTICE: To follow inactive projects and, if necessary, withdraw the opinion for an incomplete project, the Corps shall provide an annual report even if no actual work was completed in a particular year.

NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found in the action area, the finder must notify NMFS Law Enforcement at (206) 526-6133 or (800) 853-1964, through the contact person identified in the transmittal letter for this opinion, or through the NMFS Washington State Habitat Office. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder should carry out instructions provided by Law Enforcement to ensure evidence intrinsic to the specimen is not disturbed unnecessarily.

2.9 Conservation Measures

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. The Corps should pursue a no net increase in overwaters structures in the McNary reservoir, where the Corps requires the removal of an overwater structure or reduction of overall overwater structures before building any new overwater structure.

2. The Corps should require restoration and mitigation for vegetation modifications that were not permitted by the Corps.

3. The Corps should survey and track dock and vegetation modifications in the McNary Reservoir to determine if unpermitted docks or vegetation modifications are occurring and take enforcement actions as necessary.

2.10 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this opinion, or 4) a new species is listed or critical habitat designated that may be affected by the action.

Consistent with subpart (1) of the preceding paragraph, the expected extent of take is also the threshold for reinitiating consultation. The extent habitat modifying activities in this consultation expected to be a source of take are the 12,960 square feet of new overwater structure and 600 new piles that decrease space for benthic and littoral food production and increase space for predatory opportunity. Should any of these limits be exceeded during project activities, the amount of take would increase beyond that examined in this consultation, and thus the reinitiation provisions of this opinion apply. To reinitiate consultation, contact the Washington State Habitat Office of NMFS and refer to the NMFS Tracking Number 2010/03597

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) designated EFH for groundfish (PFMC 1998b), coastal pelagic species (PFMC 1998a), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of Chinook salmon and coho salmon (PFMC 1999).

3.1 Essential Fish Habitat Affected by the Project

The proposed action and action area are described in the BA and this letter. The project area includes habitat which has been designated as EFH for various life stages of Chinook salmon (*O. tshawytscha*) and coho salmon (*O. kisutch*).

3.2 Adverse Effects to Essential Fish Habitat

Based on information provided in the BE and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will adversely affect EFH designated for Chinook salmon and coho salmon because it will perpetuate and further exacerbate the existing degraded habitat conditions, specifically important to ocean-type Chinook salmon rearing habitat. The proposed project will permit the construction of 27 new docks in the McNary Reservoir adding 12,960 square feet of new overwater structure and 600 piles, which together increase suitable habitat for piscivorous fish that prey on juvenile salmonids. The action will also increase boat traffic in and around the new docks and the Columbia and Snake rivers, which impairs water quality, substrate, and aquatic vegetation. These changes to EFH are long-lasting effects. The project also includes the short term effects of increased sound pressure waves, within the aquatic habitat.

Specifically, NMFS has determined that the action will adversely affect EFH as follows:

1. The permanent alteration of the near-shore environment by placement of in- and overwater structures.

2. Permanent shading of benthic habitat and creating functional migration obstacles to migrating salmon and steelhead.

3. Short-term addition of sound pressure waves from pile driving activities.

4. Episodic degradation of water quality (turbidity, oil, gas, and chemicals) from construction activities, watercraft use, and construction materials.

3.3 Essential Fish Habitat Conservation Recommendations

The NMFS believes that the following conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH.

1. The Corps should reduce the number of piles to the minimum amount possible by substituting helical screws or other anchor techniques where feasible.

2. The Corps should pursue the removal of other inwater structures or derelict structures in the McNary Reservoir to offset addition of any new docks.

3.4 Statutory Response Requirement

Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations (50 CFR 600.920(k)(1)). The response must include a description of measures proposed to avoid, mitigate, or offset the adverse affects of the activity on EFH. If the response is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations. The reasons must include the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920(l)).

4.0 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users.

The intended users of this opinion are the Corps. Other interested users could include the citizens of Benton, Franklin, and Walla Walla, Washington and Umatilla County Oregon and others interested in the conservation of UCR spring-run Chinook salmon, UCR steelhead, MCR steelhead, Snake River Basin steelhead, Snake River fall-run Chinook salmon, Snake River spring/summer-run Chinook salmon, and Snake River sockeye salmon. Individual copies of this opinion were provided to the Corps. This opinion will be posted on the NMFS Northwest Region web site (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style

4.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01, et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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Appendix F:

US Fish and Wildlife Service Letter of Concurrence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
Eastern Washington Field Office
11103 East Montgomery Drive
Spokane Valley, WA 99206

November 19, 2010

Michael Francis
Chief, Environmental Compliance Section
Department of the Army
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, WA 99362-1876

Subject: McNary Shoreline Management Plan Section 7 Consultation
FWS reference: 13410-2010-I-0485
Cross-reference: 1-9-09-I-0093

Dear Mr. Francis:

We received a letter on July 28, 2010, from Rodney Huffman, acting Chief of the Environmental Compliance Section. The letter, dated July 27, 2010, requested informal consultation on the McNary (Lake Wallula) Shoreline Management Plan and included a biological assessment. The Fish and Wildlife Service (Service) and Corps of Engineers (Corps) staff discussed this project on several occasions by telephone and E-mail. Subsequent to our discussions, the Corps provided a revised biological assessment (BA), dated September 17, 2010. The proposed action addresses activities on the shoreline and in parts of the Columbia River up and downstream of the Tri-Cities, Washington, and including portions of the Yakima, Snake and Walla Walla Rivers near their mouths. The proposed project re-allocates shoreline uses and addresses private use of federally owned shoreline on the McNary pool by nearby landowners with readily available access to the shoreline, including individual boat docks, community boat docks, vegetation modification to provide access to the shoreline, stairways, steps, hard-surfaced walkways, and erosion control devices. The biological assessment addresses four shoreline allocations: limited development areas, public recreation areas, protected shoreline, and prohibited access areas. The proposed action may include up to 54 new docks in the limited development area (p.1, BA). The Shoreline Management Plan will be re-evaluated every 5 years.

The Corps determined in the BA that the proposed project would have no effect on the Columbia Basin pygmy rabbit, Canada lynx, or the Ute ladies' tresses (plant). The Corps also determined that the proposed project is not likely to adversely affect the bull trout or designated critical habitat for the bull trout.

Based on the information provided in the BA, and additional information received via telephone and E-mail, the Service concurs that the proposed project is not likely to adversely affect the bull trout, or designated critical habitat for the bull trout. This determination is based on the following rationale:

- Only minor vegetation modifications are permitted, and mitigation is required. Per Appendix B of the BA, and clarified by an E-mail from the Corps dated October 25, 2010, any impact to native vegetation will be mitigated with native vegetation plantings at least at a 2:1, or as much as a 20:1 ratio, depending on the existing site condition. Plantings must meet 100% survivability for the first 5 years post-construction (BA, p.45, Annex A, and Annex B). This will minimize effects to salmonid food base derived from riparian vegetation.
- The Corps clarified in an E-mail dated October 25, 2010, that they would provide an annual report to the Service regarding implementation progress on the shoreline management plan.
- New docks will meet ESA-compliant designs. Existing docks in protected shoreline areas will be upgraded to ESA compliant designs. Meeting the ESA criteria will minimize cover for potential predatory fish. As described in Appendix A and on page 48 of the BA, residential docks will be no larger than 160 square feet, and community docks will not exceed 320 square feet. Grating, covering 100% of the surface area, will allow at least 50% open area to allow for light penetration.
- The proposed action will not use impact hammers for piling installation. Vibratory hammers are required (BA p.49, and Annex A), and the piles are limited in size (8 inches in diameter) and in depth driven into the substrate (about 2.67 feet), therefore acoustic exposure is likely to be less than levels expected to cause behavioral effects or injury to bull trout.
- Less than 3 miles out of 284 miles of shoreline under Corps jurisdiction are open to limited development (BA).
- Pile installation associated with new or retro-fitted docks may create a turbidity plume in the immediate vicinity, although this impact to water quality is likely to dissipate in a few hours (BA p. 44). Hyporheic exchange is not likely to be affected due to the size of the piles. In the BA the Corps calculated that each dock could impact substrate from 4.7 cubic feet to 28.3 cubic feet, depending on the number of piles used. Given the size of the action area (44,266 acres), and the width of the rivers/reservoir (varying from 3000 to 9,600 feet wide), and the short duration of any turbidity plumes, it is likely that the effects will be insignificant to water quality and quantity.
- Although bull trout may use the action area for subadult rearing, foraging, and overwintering; migration and use of the area is unlikely to be significantly altered due to the low density of individual fish, and the short-term duration of instream work and the insignificant potential for hydroacoustic and turbidity effects.

The Corps agreed to provide the annual progress report in December of each year, starting in 2011, and include information on: numbers and location of docks permitted; confirm that the docks are compliant with the expectations described in the BA; describe location, amount, and survival of mitigation vegetation plantings; and ensure that the rate and number of docks implemented is not greater than the projections described in the BA.

If you have any questions about this letter or our joint responsibilities under the Endangered Species Act, please contact Michelle Eames at (509) 893-8010.

Sincerely,

Mark G. Miller

for Ken S. Berg, Manager
Washington Fish and Wildlife Office

c: FWS, Lacey (Scafidi)
NMFS, Ellensburg (Yaeger)

Appendix G:

Lake Wallula/McNary Pool Dock Design Criteria

Appendix G: Dock Design Criteria

Lake Wallula/McNary Pool Residential Overwater Structure Design Criteria

Approved by:
National Marine Fisheries Service
Washington State Department of Fish and Wildlife
U. S. Army Corps of Engineers - Walla Walla
June 2010

These dock design criteria were developed by the US Army Corps of Engineers (Corps), National Marine Fisheries Service (NMFS), and Washington Department of Fish and Wildlife (WDFW) to minimize impacts to Endangered Species Act (ESA) species and critical habitat. The criteria are designed to minimize structure in the water, maximize light penetration under dock floats, and maximize depth under dock floats.

1. Objectives

- Overwater structure design, construction, and use shall minimize degradation of aquatic, near-shore, and shoreline habitats.

- Overwater structures shall not impede any juvenile or adult salmonid life stage, including migration, rearing, and spawning.

- Overwater structures shall not enhance habitats used by potential salmonid predators (especially fishes and birds).

2. Overwater structure definitions

- A residential overwater structure typically consists of a shoreline anchor, ramp, and float. The structure may also include pile(s) and/or float anchor(s).

- Functional grating is the area not covered or blocked by any objects (i.e., framing wood, flotation tubs, etc.). The percent of functional grating is in relation to the surface area of the float.

3. Piers and ramps

- To prevent damage to shallow-water habitat, piers and/or ramps shall extend at least 40 feet perpendicular from the ordinary high water mark (OHWM). The Corps recognizes that in some instances and sites, it may not be practical to extend a ramp 40' from OHWM (for instance, where this could conflict with navigation). The Corps will consider exceptions on a case-by-case basis.

- Piers and ramps shall be no more than 4 feet in width.

- The bottom of either the pier or landward edge of the ramp shall be elevated at least 2 feet above the plane of OHWM.

- Grating shall cover the entire surface area (100%) of the pier and/or ramp. The open area of grating shall be at least 50%, as rated by the manufacturer. Skirting shall not be placed on piers, ramps, or floats. Protective bumper material will be allowed along the outside edge of the float as long as the material does not extend below the bottom edge of the float frame or impede light penetration.

- Shoreline concrete anchors must be placed at least 10 feet landward from the OHWM, and shall be sized no larger than 4-feet wide by 4-feet long, unless otherwise approved by NMFS, the Corps, and WDFW. The maximum anchor height shall be only what is necessary to elevate the bottom of either the pier or landward edge of the ramp at least 2 feet above the plane of OHWM. The intent of this criterion is to limit impacts to riparian vegetation along the shoreline. The Corps may evaluate placement of anchor blocks individually if requested, and allow variance from the 10 foot landward requirement if site conditions warrant. Exceptions will be considered on a case-by-case basis.

4. Preservatives

- The dock shall be built with materials that do not leach preservatives or other materials.

- No treated wood of any kind shall be used on any overwater structure (float, pier, or ramp).

- No paint, stain, or preservative shall be applied to the overwater structure.

5. Preconstruction and construction activities

- If native vegetation is moved, damaged, or destroyed, it shall be replaced with a functional native species equivalent during site restoration.

- Any large wood, native vegetation, topsoil, and/or native channel material displaced by construction shall be stockpiled for use during site restoration.

- No existing habitat features (i.e., woody debris, substrate materials) shall be removed rom the shore or aquatic environment without approval or permits from the Corps.

- Construction impacts shall be confined to the minimum area needed to complete the project.

- The boundaries of clearing limits associated with site access and construction shall be flagged to prevent ground disturbance of riparian vegetation, wetlands, and other sensitive sites beyond the flagged boundary. This action shall be completed before any significant alteration of the project area.

- A supply of sediment control materials [i.e., silt fence, straw bales, coconut fiber (coir) bales] shall be available onsite. This action shall be completed prior to significant alteration of the project area.

- All temporary erosion controls shall be in place and appropriately installed downslope of project activities within the riparian area until site restoration is complete.

6. General

- No electricity shall be provided to, or on, the overwater structure.

- No boat lifts or watercraft lifts (e.g., jet ski lifts) of any type will be placed on, or in addition to, the overwater structure. The Corps will assess boat lifts and their impacts, if proposed, if the applicant can demonstrate that the proposed boat lift meets the intent of the criteria to minimize structure, maximize light penetration, and maximize depth. However, these structures must meet the size criteria of the plan (total 160 square feet).

- Shoreline armoring (i.e., bulkheads, rip-rap, and retaining walls) shall not occur in association with installation of the overwater structure.

- Construction of the overwater structure shall be completed during the in-water work window (November 1 to February 28).

7. Piling and float anchors

- Piling shall not exceed 8 inches in diameter. The Corps will work with current dock owners who have pilings. The intent of this criterion is not to require existing pilings to be removed, cut, or capped, but to place limits on the size of new pilings. The Corps recognizes that removal of existing pilings has potential to cause damage to critical habitat, and where it makes sense, will work with current owners who have pilings. In areas where safety considerations merit it, larger pilings may be considered on a case-by-case basis.

- Pilings shall be spaced at least 18 feet apart on the same side of any component of the overwater structure. The pier/ramp and float are separate components.

- Each overwater structure shall utilize no more than 4 piles total for the entire project. A combination of two piles and four helical anchors may be used in place of four piles.

- All pilings shall be fitted with devices to prevent perching by piscivorous (fish-eating) birds.

- Submerged float anchors will be constructed from concrete; and shall be horizontally compressed in form, by a factor of 5 or more, for a minimum profile above the stream bed (the horizontal length and width will be at least 5 times the vertical height).

- No in-water fill material will be allowed, with the exception of pilings and float anchors. (Note: uncured concrete or its by-products shall not be allowed.)

8. Floats

- Float components shall not exceed the dimensions of 8- by 20-feet, or an aggregate total of 160 square feet, for all float components.

- Flotation materials shall be permanently encapsulated to prevent breakup into small pieces and dispersal in water (e.g., rectangular float tubs).

- Grating shall cover 100% of the surface area of the float(s). The open area of the grating shall be no less than 50%, as rated by the manufacturer.

- Functional grating will cover no less than 50% of the float.

- Floats shall not be located in shallow-water habitat where they could ground or impede the passage or rearing of any salmonid life stage.

- Nothing shall be placed on the overwater structure that will reduce natural light penetration through the structure.

- Floats shall be positioned at least 40 feet horizontally from the OHWM and no more than 100 feet from the OHWM, as measured from the landward-most edge of the float. The Corps recognizes that in some locations this may present issues of safety or be excessive for site conditions, and will work with landowners on an individual basis to adjust this requirement where it makes sense on a case-by-case basis.

- Project construction shall cease under high flow conditions that could result in inundation of the project area except for efforts to avoid or minimize resource damage.

9. References

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Appendix H:

Mitigation Plan

APPENDIX H: Mitigation Plan

1. Mitigation planting, care, and replacement shall be the responsibility of the permittee or grantee for the life of the permit. At the expiration or relinquishment of the instrument, all plantings shall remain in place and any remaining requirements shall be assumed by the new instrument holder, or if none, by the US Army Corps of Engineers (Corps). Pruning, trimming, or removal of planted vegetation shall only be allowed for the protection of public health or safety, and with suitable replacement. Failure to complete any planting, care, or replacement work shall be grounds for termination of the instrument and removal of all private property.

2. All mitigation work shall be performed by the holder of the instrument or their designated contractor. The Ice Harbor Dam Natural Resource staff will work with each individual permittee or grantee to establish mitigation requirements. It shall be the responsibility of the individual to submit a detailed, drawing to scale, and timeline for mitigation to the Corps for approval. This plan shall be made a condition of the permit.

3. Mitigation Locations

    - The exact area of mitigation for each dock permit will be determined by Corps personnel in the field.
    - In most cases, priority will be given to lands immediately adjacent to the dock, or in very close proximity to it. In unusual cases where conditions do not permit establishment of all aspects (i.e., severely eroded or steep shoreline), some parts of the planting requirements may be moved to other suitable areas. On occasion, all or part of mitigation plantings may be moved offsite to areas identified as highly desirable restoration areas.
    - The Corps has identified areas of shoreline not necessarily in the immediate vicinity of the dock where mitigation can occur. The Ice Harbor Dam Natural Resources staff will work with the permittee on mitigation locations.

4. Mitigation requirements, components, and ratios for docks and vegetation modifications:

    a. 5:1 for new docks
    b. 2:1 for vegetation modifications
    c. Mitigation will be considered in the following order:
        i. Onsite
        ii. In Lake Wallula, if onsite is not possible
        iii. In-lieu, if Lake Wallula is not possible

iv. In-lieu will be
    1. Through non-profit
    2. Applicant pays non-profit
    3. Corps designates mitigation location

d. Mitigation will be 5:1 per dock
    i. Individual dock
        1. Dock = 160 ft^2
        2. Ramp (4x40ft) = 160 ft^2
        3. Total = 320 ft^2
        4. 5:1 for each dock = 1,600 ft^2
        5. 0.0367 acre per dock
    ii. Group dock
        1. Dock = 320 ft^2
        2. Ramp (4x40ft) = 160 ft^2
        3. Total = 480 ft^2
        4. 5:1 for each dock = 2,400 ft^2
        5. 0.0551 acre per dock
        6. 27 new docks
            a) 64,800 ft^2
            b) 1.4876 acres

5. Approved Mitigative Planting List and Maintenance

    a. A mitigation planting shall include native shrubs and trees from the following list. The use of native shrubs and trees not listed herein must be approved by the Corps and Washington Department of Fish and Wildlife (WDFW).
        i. Shrubs:
            1. Sitka Willow, *Salix sitchensis*
            2. Scouler's Willow, *Sailxscouleriana*
            3. Coyote Willow, *Salix exigua*
            4. MacKenzie's Willow, *Salix prolixa*
            5. Pacific Willow, *Salix lasiandra*
            6. Red-Osier Dogwood, *Cornus stolonifera*
            7. Common Juniper, *Juniperus communis*
        ii. Trees:
            1. Black Cottonwood, *Populus trichocarpa*
            2. Red Alder, *Alnus rubra*
            3. Ponderosa Pine, *Pinus ponderosa*
    b. Shrubs and trees shall be planted at intervals of 3 and 10 feet, respectively. Trees and shrubs will be planted at a 1-to-10 ratio (1 tree for every 10 shrubs planted)
    c. All plants shall be planted between February 15 and June 1. Plantings must be completed by June 1 of the same year following the start of construction of the overwater structure.

d. Plantings must have 100% survival for the first 5 years following planting. After the first 5 years, survival must be maintained at 80% for shrubs and 100% for trees. Individual plants that die must be replaced in kind (i.e., replace a tree with a tree), with species from the native list above or other species approved by the Corps and WDFW. All trees and shrubs shall be maintained (watered, beaver protection installed, and replaced) for as long as the overwater structure is present, regardless of ownership of the structure.

6. Mitigation Implementation. Planting locations will be identified in geographic information system (GIS) maps and tables.

    a. Locations will be tracked in GIS to ensure proper mitigation requirements are being met
    b. A map will be provided by the individual performing mitigation, with planting location(s) clearly identified
    c. Map will include:
        i. Dock or vegetation modification being mitigated
        ii. Individual performing mitigation
        iii. Types of species planted
        iv. Number of plants planted
        v. Date
        vi. Location(s) of plantings
    d. Mitigation follow-up will be scheduled upon implementation of mitigation to ensure adherence to 100% survival for the first 5 years following planting. Quantification and success of mitigation will be tracked in GIS, and reported to National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) as part of Reasonable and Prudent Measure (RPM) #4 in the Biological Opinion.

FINDING OF NO SIGNIFICANT IMPACT

for the Shoreline Management Plan Update for

Lake Wallula, Oregon and Washington

The U.S. Army Corps of Engineers, Walla Walla District (Corps), has prepared a Revised Programmatic Environmental Assessment (EA) to evaluate proposed changes to the 1983 *McNary Lakeshore Management Plan, Lake Wallula, Oregon and Washington*, which is attached hereto and incorporated herein by reference.

I. Proposed Action

The Corps is proposing to update the 1983 Lakeshore Management Plan (1983 LMP) (the updated plan will hereinafter be referred to as the Shoreline Management Plan or SMP) in accordance with 36 C.F.R. Part 327.30 and Engineer Regulation (ER) 1130-2-406, *Project Operation – Shoreline Management at Civil Works Projects.* The proposed action is formal review of the 1983 LMP and subsequent implementation of the SMP.

II. Purpose and Need

The purpose of the proposed action is to identify a management strategy the Corps will use to manage the shoreline in a manner that will promote the safe and healthful use of these shorelines by the public while maintaining environmental safeguards to ensure a quality resource for use by the public. The Corps' main objective is to achieve a balance between permitted private uses, compliance with the current shoreline management regulations and resource protection specifically supporting threatened and endangered fish species. The secondary objective is to reasonably limit impacts to current permit holders, if at all possible.

The need for the proposed action is to meet the regulatory requirements established by 36 C.F.R. 327.30 and the Chief of Engineers (ER 1130-2-406), which require that an SMP be prepared for each Corps water resource development project where private shoreline use is allowed, and that the SMP be reviewed every five years and revised as necessary. The original Lakeshore Management Plan was prepared in 1980, and the last revision was completed in 1983. Since that time, several changes have taken place, such as the listing of several fish species and critical habitat under the Endangered Species Act (ESA) and increased development along the shoreline. The updated SMP seeks to balance increasing demands for private shoreline use with the changing resource requirements.

III. Alternatives Considered

The Corps identified three alternatives: Alternative 1 - the No Action Alternative, Alternative 2 - the Best Balanced Alternative between Private Use and Environmental Considerations (preferred), and Alternative 3 – Maximum Environmental Benefits.

The No Action Alternative is prescribed by the Council of Environmental Quality (CEQ) Regulations to serve as the baseline against which all other alternatives are analyzed. In this case, the No Action Alternative is actually the no change alternative, as private use of the shoreline would continue as described in the 1983 LMP for Lake Wallula.

Implementation of Alternative 2 would achieve the best balance between private use and environmental considerations and is the alternative the Corps has selected as preferred. Implementation of this alternative would provide opportunities for private use of Corps-managed Federal lands and McNary Project waters (Lake Wallula), while maintaining compliance with environmental laws. The 1983 LMP would be updated and the shoreline would be re-allocated by reducing the Limited Development Areas (LDAs), wherein private use is authorized. The Corps would continue to issue new permits for boat docks, however new docks must be constructed to meet SMP dock criteria. Existing docks would be allowed to remain per the conditions of the 2011 dock inspection if the dock is in a safe condition and has not been extensively modified without authorization. Upon sale or transfer of the adjacent property, existing docks must be upgraded to meet SMP dock criteria. When replacing major dock components (e.g. floats, decking) dock owners will replace with SMP dock criteria-compliant components. Those upgrading or installing new docks (such as new homeowners) will have four (4) full in-water work windows (November 1 through February 28) after the issuance of their permit to accomplish construction. Permits for special status docks (those that existed prior to November 17. 1986) will be renewed, but will require upgrading when the adjacent property is sold/transferred. When replacing major dock components (e.g. floats, decking, walkways) owners of special status docks will replace with SMP dock criteria components. The Corps would issue new permits and renewals for vegetation modification, but would require mitigation (restoration of riparian habitat to offset any negative environmental impacts). Activities characterized as other shoreline uses would only be permitted after the applicant received a real estate license for the activity on Corps land and mitigation would be required.

Alternative 3 – Maximum Environmental Benefits – would provide maximum benefits to key environmental resources, specifically threatened and endangered species and their critical habitat. The Corps would revise the 1983 LMP to reallocate the shoreline to further reduce the LDAs. No new permits would be issued for boat docks, however permits would be renewed for existing docks once the dock was upgraded to meet the SMP dock criteria. No new permits would be issued for vegetation modification, however existing permits would be renewed but only after mitigation requirements were implemented. Activities characterized as other shoreline uses would only be permitted after the applicant received a real estate license for the activity on Corps land and mitigation would be required.

IV. Factors Considered in Determining that No Environmental Impact Statement is Required

The EA examines the potential effects of the three alternatives on resource areas and areas of environmental and socioeconomic concern: water quality, soils, vegetation, aquatic resources, wildlife, threatened and endangered species, cultural resources, recreation, socioeconomics, and cumulative impacts.

Implementing the No Action Alternative would be expected to result in a combination of short- and long-term adverse and beneficial effects. Implementing the No Action Alternative would be expected to result in minor adverse effects on water quality, soils, vegetation and wildlife. Moderate adverse effects could be expected for aquatic resources, threatened and endangered species, and cultural resources due to the fact that an unlimited number of docks could be constructed. Minor to moderate beneficial effects to recreation and socioeconomics would result from implementation of this alternative.

Implementing the Preferred Alternative – Alternative 2 – Best Balanced Alternative between Private Use and Environmental Considerations – would be expected to result in a combination of short- and long-term minor adverse and beneficial effects. Implementing this alternative would be expected to result in short-term minor adverse effects on water quality, soils, vegetation, some aquatic resources, wildlife and threatened and endangered species, mostly due to disturbances associated with construction activities. There would be long-term beneficial effects to aquatic resources, threatened and endangered species and cultural resources associated with compliance with environmental laws and the mitigation requirements. Negative effects to recreation would be minor as new permits and renewals would still be allowed, albeit with less docks in a reduced LDA. There would be both adverse and beneficial negligible effects on the socioeconomics of the vicinity. Because the proposed action affects such a small portion of the overall Tri-Cities population, any potential negative socioeconomic impacts would be non-controversial and insignificant to the majority.

Implementation of Alternative 3 – Maximum Environmental Benefits – would be expected to result in a combination of short- and long-term minor adverse and beneficial effects. Implementing this alternative would result in minor short-term adverse effects to water quality, soils, vegetation, some aquatic resources, wildlife, and threatened and endangered species, again, mostly due to disturbances associated with construction activities. There would be long-term beneficial effects to aquatic resources, threatened and endangered species, and cultural resources as private use and construction along the shoreline would be reduced. There would be minor adverse effects on recreation and socioeconomics in the vicinity.

V. Mitigation Requirements

Potential adverse effects to various environmental resources associated with the proposed action of updating the SMP will be minimized or avoided by the mitigation measures required in the SMP, as outlined below and in Appendix H of the EA:

- New dock permits will require: 1) the dock must be constructed to meet the SMP dock criteria; and 2) the restoration of riparian habitat at a ratio of 5 to 1 based on the square footage of the dock.
- Existing docks must be upgraded upon sale or transfer of the adjacent property to meet the SMP dock criteria with four (4) in-water work windows allowed to accomplish the upgrade.
- Vegetation modification permits will require restoration of riparian habitat at a ratio of 2 to 1 based on the square footage of disturbed ground.
- Activities or facilities classified as “Other Shoreline Uses” will require mitigation and will be addressed on a case-by-case basis.

Mitigation requirements will be a condition of the Shoreline Management Permit and, if applicable, the upland support structure real estate license.

The Corps will conduct onsite monitoring to ensure full compliance with mitigation requirements.

VI. Public Review

In May 2011, the Corps released the updated SMP and Revised Programmatic Environmental Assessment for public review and comment and a public meeting was held in Pasco on June 9, 2011. During the 90-day review period from May 27 to August 27, 2011 approximately 66 comments were received. In response to those comments and after extensive review, the Corps modified the SMP and accompanying EA. The revised EA and Draft Finding of No Significant Impact (FONSI), as well as the updated Draft SMP, were formally released for a 30-day public review and comment period on October 27, 2011. The Corps also held a public meeting on November 9, 2011, in Pasco, in which interested parties were given the opportunity to comment on the revised documents. As a result of those comments, the Corps modified the shoreline allocations slightly and created a 2,018 foot limited development area on the Snake River in the Burbank Heights area.

VII. Conclusion/Finding

Having reviewed the Environmental Assessment and associated appendices, I find that the documents provide sufficient discussions on the purpose of and need for the proposed action, alternatives, the environmental impacts of the proposed action and the alternatives, and a listing of agencies and persons consulted. Therefore, I believe these documents provide sufficient evidence and analysis to meet the Corps' requirements pursuant to the National Environmental Policy Act and for the Corps to make a finding of no significant impact to the quality of the human environment. I have taken into consideration the technical aspects of the project, best scientific information available, and public comments received. Based on this information, I find that implementation of the preferred alternative would not result in significant impacts on the quality of the human environment. Therefore, an environmental impact statement is not required.

David A. Caldwell	14 December 2011
David A. Caldwell Lieutenant Colonel, Corps of Engineers District Commander	Date