Washington Department of FISH and WILDLIFE

HYDRAULIC CODE RULE CHANGES

TITLE 220-110 WASHINGTON ADMINISTRATIVE CODE

DRAFT

Programmatic Environmental Impact Statement

ESA

Prepared for

Washington Department of Fish and Wildlife **October 2013**

Mission

of the

Washington Department of Fish and Wildlife

To preserve, protect and perpetuate fish, wildlife, and ecosystems
while providing sustainable fish and wildlife
recreational and commercial opportunities.

Image provided by ESA

ACRONYMS

BMP	best management practice
CFR	Code of Federal Regulations
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
DAHP	Department of Archaeology and Historic Preservation
DPS	Distinct Population Segment
Ecology	Washington Department of Ecology
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESSB	Engrossed Substitute Senate Bill
ESU	Evolutionarily Significant Unit
F	Fahrenheit
FPA	Forest Practices Act
GMA	Growth Management Act
HCP	Habitat Conservation Plan
HPA	Hydraulic Project Approval
JARPA	Joint Aquatic Resources Permit Application
LWD	large woody debris
LWM	large woody material
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
OHWL	ordinary high water level
OHWM	ordinary high water mark
PATON	Private Aids to Navigation
PCBs	polychlorinated biphenyls
PEIS	Programmatic Environmental Impact Statement
RCW	Revised Code of Washington
SBEIS	Small Business Economic Impact Statement
SEPA	State Environmental Policy Act
SMA	Shoreline Management Act
TMDL	Total Maximum Daily Load
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources

State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

October 1, 2013

Dear Interested Parties:

The Washington Department of Fish and Wildlife (WDFW) has prepared this Draft Programmatic Environmental Impact Statement (PEIS) on proposed changes to the Hydraulic Code Rules -Chapter 220-110 Washington Administrative Code (WAC). The PEIS meets the requirements of the State Environmental Policy Act (SEPA) Chapter 43-21C RCW, SEPA rules (Chapter 197-11 WAC), and other relevant state laws and regulations. The proposed rule changes together with the DEIS are now available for a 45 day public review.

WDFW protects fish life by using its authority to provide approvals for construction projects that might affect the bed or flow of waters of the state. WDFW issues Hydraulic Project Approvals (HPAs) for projects that use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state. HPAs are issued based on the Hydraulic Code Rules. WDFW is revising the Hydraulic Code Rules to improve protections for fish and streamline the permit approval process.

The Hydraulic Code Rules, with the exception of those for mineral prospecting, were last updated in 1994 before Washington fish species were listed under the Endangered Species Act. There have also been changes to the hydraulic code (Chapter 77.55 RCW), to other regulations, and to fish science and design technology during that time. The current Hydraulic Code Rules do not reflect those changes in circumstances. WDFW is re-writing and replacing the entire chapter (220-110 WAC) so that the content is easier for the applicant to understand, to reflect statutory changes in procedure, and to update rules based on contemporary science and design technology.

MAJOR CONCLUSIONS
This is a non-project review proposal. The purposes of the proposed rule changes are to update the requirements to respond to statutory changes, meet current fish science and design technology, and improve procedural and administrative requirements. Specifically the rule changes will:

- Incorporate up-to-date fish science and technology;
- Simplify the permitting of certain types of projects;
- Improve procedural and administrative requirements to better align with statutory changes made since the rules were last revised; and
- Establish a structure for adaptive management in response to changing science and technology and/or the results of effectiveness monitoring.

These actions will deliver cost and time savings for some applicants, improve the overall effectiveness of the program, eliminate inconsistencies between the statute and the rules, and enhance a transparent decision making process with our stakeholders.

AREAS OF CONTROVERSY
Areas of controversy include water crossing structures, timing windows, and changes that are necessary to implement legislation, including rules for single family bulkheads, tidegates and flood gates. Many people are concerned about the cumulative effects of hydraulic project approvals issued by the agency. While the structure of the hydraulic code prevents consideration of issues beyond the project proposal under review, we can't deny that there are cumulative effects to the environment from hydraulic projects and development. WDFW's goal is to assist applicants to develop a project that best meets their needs while providing protection to fish life and fish habitat.

PUBLIC MEETINGS for discussion of the proposed rule changes and DEIS are being held as follows:

REGION	DATE	TIME	LOCATION
Mill Creek, Wa.	10/17/2013	6:00 PM - 8:00 PM	Mill Creek Regional Office 16018 Mill Creek Blvd Mill Creek WA 98012
Olympia, Wa.	10/23/2013	6:00 PM - 8:00 PM	Natural Resources Building Capitol Campus NRB Room 172
	10/24/2013	6:00 PM - 8:00 PM	Natural Resources Building Capitol Campus NRB Room 172
Spokane, Wa.	10/28/2013	6:00 PM - 8:00 PM	Center Place 2426 N Discovery Place Spokane Valley WA 99216
Ephrata, Wa.	10/29/2013	6:00 PM - 8:00 PM	Grant County Public Works 124 Enterprise St SE Ephrata, WA 98823
South Central Washington	10/30/2013	6:00 PM - 8:00 PM	Moxee City Hall 255 W Seattle Ave Moxee WA 98936
Vancouver, Wa.	11/4/2013	6:00 PM - 8:00 PM	Water Resources Center 4600 S.E. Columbia Way Vancouver WA 98661

Contact: Randi Thurston
Phone: (360) 902-2602 E-mail: randall.thurston@dfw.wa.gov

Agencies, affected tribes, and members of the public are invited to review and comment on this DEIS. We must receive your comments within 45 days of the date of issuing this DEIS. This means we must receive your comments no later than **5pm** on **November 15, 2013.**

See Fact Sheet for details on availability and commenting.

WDFW believes this DEIS will assist decision makers to identify the key environmental issues and options associated with this action. Based on comments received from agencies and interested parties

during public review of this draft document and the associated proposed rule changes, WDFW will prepare and distribute a Final Programmatic Environmental Impact Statement (FEIS) in 2014.

Sincerely,

Bob Zeigler
SEPA/NEPA Coordinator
Agency Responsible Official
Protection Division
Habitat Program

SEPA FACT SHEET

Title: Hydraulics Code Rule Changes – Draft Programmatic EIS

Description: The Washington State Department of Fish and Wildlife (WDFW) has prepared this Draft Programmatic Environmental Impact Statement (PEIS) on the Hydraulic Code Rule Changes. This document was prepared in compliance with the Washington State Environmental Policy Act (SEPA).

The Hydraulic Code Rules, with the exception of those for mineral prospecting, were last updated in 1994 before Washington fish species were listed under the Endangered Species Act. The purposes of the proposed rule changes are to update the requirements to respond to statutory changes, meet current fish science and design technology, and improve procedural and administrative requirements. Specifically the rule changes will:

- Incorporate up-to-date fish science and technology;
- Simplify the permitting of certain types of projects;
- Improve procedural and administrative requirements to better align with statutory changes made since the rules were last revised; and
- Establish a structure for adaptive management in response to changing science and technology and/or the results of effectiveness monitoring.

Location: Statewide

Proponent and Lead Agency:

Washington Department of Fish and Wildlife (WDFW)
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WDFW Responsible Official:

Bob Zeigler, SEPA/NEPA Coordinator
Washington Department of Fish and Wildlife
600 Capitol Way North
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Natural Resources Building, 5th Floor
Phone: (360) 902-2578
Email: SEPAdesk2@dfw.wa.gov

Permits and Licenses Required: No permits, licenses, or approvals are required for the proposed Hydraulic Code Rule Changes. Adoption of the rule changes is in compliance with Chapter 34.05 RCW (Administrative Procedure Act) Part III Rule-Making Procedures.

Authors and Principle Contributors:

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Randi Thurston, Teresa Scott, Pat Chapman
Consultants:
ESA Environmental Consultants

Date Issued: The Draft PEIS is available for review and download beginning 1 October 2013 on WDFW's website at**:** http://wdfw.wa.gov/licensing/sepa/sepa_comment_docs.html

Document Availability: The PEIS for the Hydraulic Code Rule Changes can be viewed online at: http://wdfw.wa.gov/licensing/sepa/sepa_comment_docs.html. The document may be obtained in hard copy or CD by written request to the SEPA Responsible Official listed above, or by calling (360) 902-2578. Supplies are limited. To ask about the availability of this document in a format for the visually impaired, call WDFW at 360-902-2578. Persons with hearing loss can call 711 or 1-800-833-6388 for Washington Relay Service, including TTY service. Persons with a speech disability can call 1-877-833-6341 to access a Communications Assistant with Washington's Speech-to-Speech service.

DEIS Comment Period: Agencies, affected tribes, and members of the public are invited to review and comment on this DEIS. We must receive your comments within 45 days of the date of issuing this DEIS. ***This means we must receive your comments no later than 5:00 PM*** on ***15 November 2013***

Method of Comment: The following procedures shall govern the method to comment on agency SEPA proposals. Comments received through these procedures are part of the official SEPA record for this proposal.

You can submit your comments any one of the following ways:

- Email to SEPAdesk2@dfw.wa.gov;
- Online at the WDFW SEPA website comment link at: http://wdfw.wa.gov/licensing/sepa/sepa_comment_docs.html
- Fax to (360) 902-2946;
- Oral or written comments at the workshops and public meetings; or
- **Mail comments to SEPA Responsible Official:**

Bob Zeigler, SEPA/NEPA Coordinator,
600 Capitol Way North,
Olympia, WA 98501-1091

When you send us your comments, please include the **name of the proposal** and **your name** in the subject line of your comment, following this example:

Re: Hydraulics Code Rule Changes Draft PEIS **- Your Name**

Meetings for Public Participation: Public meetings for discussion of the HPA rule changes and DEIS are being held at the following locations and dates:

REGION	DATE	TIME	LOCATION
Mill Creek, Wa.	10/17/2013	6:00 PM - 8:00 PM	Mill Creek Regional Office 16018 Mill Creek Blvd Mill Creek WA 98012
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Contact: Randi Thurston
Phone: (360) 902-2602 E-mail: randall.thurston@dfw.wa.gov

Date of Next Action and Date Final Action is Planned: WDFW anticipates releasing the Final Programmatic EIS on the Hydraulic Code Rules in mid-2014. The Fish and Wildlife Commission is anticipated to adopt the new rules in mid-2014 as well.

WDFW will be preparing a cost-benefit analysis and Small Business Economic Impact Statement on the project, both of which will be available on the WDFW HPA Rule Changes web site:
http://dfw.wa.gov/licensing/hpa/rulemaking/

Background Data and Materials Referenced in the DEIS are Available at:

Washington Department of Fish and Wildlife**,**
Habitat Program, Protection Division
Natural Resources Building, 5th Floor,
[Mailing address: 600 Capital Way North, Olympia, WA 98501-1091]

Background is also available on the from the WDFW HPA Rule Changes web site:
http://dfw.wa.gov/licensing/hpa/rulemaking/

HPA Aquatic Habitat Guidelines and "White Papers" are available at:
http://dfw.wa.gov/conservation/habitat/planning/ahg/

Distribution List: Notice of the availability of this DEIS is posted on the WDFW SEPA website: http://wdfw.wa.gov/licensing/sepa/sepa_comment_docs.html, sent to local planning departments (city and county); affected Tribes; all state and federal agencies with jurisdiction; selected environmental organizations, individuals who have already commented on draft rules or EIS scoping, and interested parties.

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Chapter 1 Introduction and Background

1.1 Introduction

The Washington Department of Fish and Wildlife (WDFW) has prepared this Draft Programmatic Environmental Impact Statement (PEIS) on proposed changes to the Hydraulic Code Rules (Chapter 220-110 Washington Administrative Code (WAC)). The PEIS meets the requirements of the State Environmental Policy Act (SEPA) (Chapter 197-11 WAC).

WDFW protects fish life by using its authority to provide approvals for construction projects that might affect the bed or flow of waters of the state. WDFW issues Hydraulic Project Approvals (HPAs) for projects that use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state. HPAs are issued based on the Hydraulic Code Rules. WDFW is revising the Hydraulic Code Rules to improve protections for fish and streamline the permit approval process. The Hydraulic Code Rules, with the exception of those for mineral prospecting, were last updated in 1994 before Washington fish species were listed under the Endangered Species Act. There have also been many changes to other regulations, fish science, and design technology in that time. The current Hydraulic Code Rules do not incorporate those changes.

WDFW initially undertook revision of the Hydraulic Code Rules in 2006 as part of the process of preparing a Habitat Conservation Plan (HCP). An HCP is a management strategy that can provide long-term certainty of Endangered Species Act (ESA) compliance. It can be used for a particular set of activities, such as administrative rules, while providing conservation of listed species. WDFW was developing an HCP to assure that agency permitting actions contributed to conservation and recovery of listed species and to provide federal assurances to permit holders for activities under an HPA. Updating the Hydraulic Code Rules was a centerpiece of developing the HCP. WDFW discontinued work on the HCP in 2012 when stakeholder and tribal support waned. However, WDFW has continued to work on revisions to the Hydraulic Code Rules.

In 2012, the Washington legislature passed a bill (ESSB 6406) that requires WDFW to perform rule making in order to implement its new HPA application fee and WDFW intends to complete adoption of the rules in 2014. This PEIS is being prepared as part of the rule making process.

The sections in this chapter include descriptions of:

- The Purpose and Need for the proposed action;
- Statutory authority for the proposed action;
- The SEPA review process;
- Related regulations and policies;
- Public involvement; and
- A guide to reading this document.

1.2 Project Purpose

Updates to the Hydraulic Code Rules are needed to make the rules consistent with statutory changes since the last updates and with current fish science and design technology. Understanding of the impacts of hydraulic projects on fish life and habitat has advanced since the last rule change, but WDFW

has not modified the rules to properly protect fish life and habitat. The current rules also do not reflect technological advancements for constructing many hydraulic projects, and the rules are inconsistent, resulting in overly restrictive provisions in some cases and overly permissive provisions in other cases. In addition, certain administrative aspects of submitting and processing applications need to be updated to reflect improved methods of filing and processing applications. New rules will result in clear application and permit-processing procedures for applicants and WDFW, and will enable WDFW to prevent or mitigate the impacts to fish life and habitat posed by hydraulic projects by applying best available science.

The purposes of the proposed rule changes are to update the requirements to respond to statutory changes, meet current fish science and design technology, and improve procedural and administrative requirements. Specifically the rule changes will:

- Incorporate up-to-date fish science and technology;
- Simplify the permitting of certain types of projects;
- Improve procedural and administrative requirements to better align with statutory changes made since the rules were last revised; and
- Establish a structure for adaptive management in response to changing science and technology and/or the results of effectiveness monitoring.

These actions will deliver cost and time savings for some applicants, improve the overall effectiveness of the program, eliminate inconsistencies between the statute and the rules, and enhance a transparent decision making process with our stakeholders.

1.3 Statutory Authority

WDFW has sole authority to implement the Hydraulic Code Rules (Chapter 220-110 WAC) under Chapter 77.55 RCW (Construction Projects in State Waters).

1.4 Environmental Policy Act Review Process

This document is a SEPA EIS prepared at a programmatic level in accordance with the State of Washington SEPA Rules (Chapter 197-11 WAC). This programmatic EIS evaluates the adoption of the updated Hydraulic Code Rules under WAC 197-11-704(2)(b)(i). This EIS evaluates the potential negative or beneficial impacts of adopting the updated rules. It does not evaluate the site-specific impacts of activities requiring an HPA. Generally, projects that require an HPA undergo site-specific SEPA documentation prior to issuing an HPA.

1.5 Related Regulations and Policies

This section describes the major regulations and policies that relate to hydraulic projects. These regulations and policies are implemented by a variety of entities and agencies including, the Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (Corps), Washington Department of Ecology (Ecology), Washington Department of Natural Resources (WDNR), and local governments.

1.5.1 Aquatic Resources Protection Permits

The Joint Aquatic Resources Permit Application (JARPA) process is used by multiple regulatory agencies in Washington State to allow project proponents to apply for more than one aquatic resources protection permit with a single form. The JARPA form is used to apply for a Hydraulic Project Approval (HPA) as well as the following approvals:

- Federal: Section 10 and Section 404 permits (Corps of Engineers) and Private Aids to Navigation (PATON) approvals (U.S. Coast Guard);
- State: 401 Water Quality Certification (Ecology);
- Aquatic Use Authorization (WDNR); and
- Local: Shoreline Substantial Development Permits, Shoreline Conditional Use Permits, Shoreline Variances, and Shoreline Exemptions, unless local governments have their own permit applications.

1.5.2 Endangered Species Act

The federal Endangered Species Act (ESA) was enacted by Congress in 1973 in response to concerns over the decline of a number of fish and wildlife species. The purposes of the ESA are to protect endangered or threatened species and to provide a means for conservation of their habitats. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). The USFWS has primary jurisdiction of terrestrial (land) and freshwater species, while NMFS has jurisdiction over marine species such as salmon and marine mammals.

The primary provision of ESA that applies to hydraulic projects is Section 7 which requires that proponents of projects that have a federal "nexus" must consult with the USFWS and NMFS to determine if the project would affect listed species. A federal nexus occurs if a project is located on federal land; receives federal funding; or requires a federal permit, license or other authorization. USFWS and NMFS designate critical habitat for listed species. Critical habitat includes the area occupied by a species at the time of its listing that is essential to conservation of the species and may require special management considerations or protection. Areas outside the area occupied by the species may also be listed if the areas are determined to be essential for conservation of the species.

Several fish and aquatic species in Washington are listed under the ESA and have designed critical habitat. Sections 3.2, 3.6, and 3.7 of this PEIS list those species. Because of the number of listed species and because hydraulic projects often include a federal nexus, many hydraulic projects require ESA consultation.

1.5.3 Clean Water Act

The federal Clean Water Act (CWA) is the principal federal law addressing surface water quality. It employs a variety of regulatory and non-regulatory tools to limit direct discharge of pollutants into waterways, finance municipal wastewater treatment facilities, and manage stormwater runoff from streets, construction sites, and farms. These tools are implemented to achieve the overall goal of the act, which is to restore and maintain the chemical, physical, and biological integrity of the navigable waters of the United States so they can support the protection and propagation of shellfish, fish, and wildlife.

Many provisions of the CWA are regulated by the EPA. In some cases EPA has delegated its authority to state agencies; in Washington the authority is delegated to Ecology. The Corps also implements sections of the CWA. Although WDFW regulates hydraulic projects, it has no authority to administer provisions of the CWA.

EPA's authority includes discharge of pollutants from a point source into navigable waters regulated through a National Pollutant Discharge Elimination System (NPDES) Permit in accordance with Section 402 of the CWA. NPDES permits also apply to municipal stormwater systems. EPA is also responsible for implementing Section 303 of the CWA, which includes federal water quality standards and provisions for establishment of Total Maximum Daily Loads (TMDLs). Section 401 of the CWA requires issuance of a

Section 401 Water Quality Certification for activities that involve deposition of fill or excavation in navigable waters or associated wetlands. The certification states that the project is consistent with federal discharge requirements and the aquatic protection requirement of state law. In Washington State, EPA has delegated its CWA authority to the Department of Ecology, including issuance of NPDES permits and Section 401 Water Quality Certification, and, establishment of TMDLs.

Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the U.S. Waters of the U.S. include wetlands as well as navigable waterways. The Corps of Engineers implements Section 404 of the CWA.

1.5.4 Forest Practices Act

The Forest Practices Act (FPA) provides for management of public and private commercial forest lands in Washington in a manner that is intended to balance maintenance of a viable forest products industry with the need to protect natural resource attributes including forest soils, fisheries, wildlife, water quantity and quality, air quality, recreation, and scenic beauty (RCW 76.09.010). Forest practices include all practices related to growing, harvesting, and processing timber, including such activities as road construction and maintenance, thinning, salvage, harvesting, reforestation, brush control, and application of fertilizers and pesticides. The FPA is administered by the Washington Department of Natural Resources (WDNR) through the forest practice rules (Title 222 WAC).

The most recent amendment to the FPA, entitled the Forests and Fish Law, was adopted in 1999. It was developed in response to federal ESA listing of salmon and steelhead and is considered an integral part of the state's salmon recovery strategy. The Forests and Fish Law contains requirements for private forestland owners to maintain or improve salmon habitat and water quality. Among the provisions of the law are requirements for improved road culverts to facilitate fish passage, enhanced road construction practices to reduce erosion and sedimentation, and enlarged stream buffers to provide better shading.

During the 2012 legislative session, 2ESSB 6406 amended the Forest Practices Act and the hydraulic code rules to integrate fish protection standards contained within the current hydraulic code rules into forest practices rules. All forest practices hydraulic projects (FPHPs) will be regulated under forest practices rules as soon as fish protection standards are integrated into the forest practices rules.

The amended statutes also included a requirement that the WDFW adopt rules establishing our own procedures for the concurrence review process. Within this process, WDFW habitat biologists are required to review and provide concurrence or non-concurrence on forest practices hydraulic projects meeting specific criteria defined in 2ESSB 6406. The department recently completed the CR-102 rule-making process and these rules were adopted by the director.

After adoption of the current hydraulic code rules, the Forest Practices Board must make subsequent changes to the FPHP fish protection standards whenever the Fish and Wildlife Commission adopts changes to the hydraulic code rules and associated fish protection standards. 2ESSB 6406 states when WDFW proposes changes to the hydraulic code rules *"that would affect state or private forest landowners and impose restrictions or burdens on forest practices beyond those contemplated in the FFR…"*, WDFW must invoke the adaptive management process as outlined in Appendix M of the Forest and Fish Report (FFR). This provides the Forest Practices Policy Committee an opportunity to a review and comment on the proposed new hydraulic code rule as part of the normal rule making process.

1.5.5 Land and Shoreline Use Planning and Management

Land use planning and management in Washington is regulated through local planning and zoning regulations. The 1990 state Growth Management Act (GMA) establishes goals for land use planning and

a number of mandatory planning requirements that serve to express the state's interest in local land use planning decisions. The state's fastest growing counties, as well as cities within those counties, are required to prepare comprehensive plans consistent with the goals and mandatory requirements of the act. The provision of the Act that most relates to hydraulic projects is the requirement that all counties and cities in the state must designate natural resource lands and critical areas within their jurisdiction (RCW 36.70A). Natural resource lands include:

- Agricultural lands that are not already characterized by urban growth and that have long-term significance for the commercial production of food or other agricultural products;
- Forest lands that are not already characterized by urban growth and that have long-term significance for the commercial production of timber; and
- Mineral lands that are not already characterized by urban growth and that have long-term significance for the extraction of minerals.

Critical areas as defined under GMA include:

- Wetlands,
- Areas with critical recharging effect on aquifers used for potable water,
- Fish and wildlife habitat conservation areas,
- Frequently flooded areas, and
- Geologically hazardous area.

The GMA requires that all counties and cities adopt development regulations to ensure conservation of natural resource lands and the protection of critical areas (RCW 36.70A.060). Counties and cities must give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries. Typical protection measures include restrictions of types of development in critical areas and provisions for wetland and stream buffers to protect riparian areas.

Shorelines of the state are protected by the Shoreline Management Act (SMA) of 1971 (Chapter 90.58 RCW). The SMA applies to the following classes of waters of the state:

- All marine waters of the state,
- Streams and rivers with a mean annual flow of 20 cubic feet per second (cfs) or more,
- Lakes and reservoirs larger than 20 acres in area, and
- Wetlands and floodplains associated with the above.

The SMA also applies to upland areas extending landward for 200 feet of the ordinary high water mark (OHWM). The SMA requires cities and counties to adopt shoreline Management Plans (SMP) that meet the requirements of its administrative rules, which were last updated in 2003 (Chapter 173-26 WAC). The new administrative rules include requirements for such hydraulic projects as shoreline stabilization; piers and docks, fill, breakwaters, jetties, groins, and weirs; dredging and dredge material disposal; and shoreline habitat and natural systems enhancement projects.

The SMA exempts public and private projects that are designed to improve fish and wildlife habitat or fish passage from the requirement to obtain a substantial development permit, provided all of the following conditions are met:

- The project has been approved by WDFW;

- The project has received an HPA by WDFW; and
- The local government has determined that the project is substantially consistent with the local shoreline master program (RCW 90.58.147).

1.5.6 Cultural Resources

The State Department of Archaeology and Historic Preservation (DAHP) works with project proponents to ensure compliance with various cultural resource regulations, including Section 106 of the National Historic Preservation Act (NHPA) and the Governor's Executive Order 05-05. The NHPA requires all projects with federal funding to identify cultural resources and obtain an opinion from DAHP on the site's significance and the impact of the project on the site. Governor's Executive Order 05-05 requires that state agencies integrate DAHP and tribes into their capital planning processes in order to protect cultural sites. Federal and state laws, including the Archaeological Resource Protection Act of 1979, Archaeological and Historic Preservation Act of 1974, Executive Order 05-05, RCW 27.44 Archaeological Sites and Resources, WAC 25-48 Archaeological Excavation and Removal Permit, and WAC 25-46 Registration of Historic Archaeological Resources on State-Owned Aquatic Lands, protect archaeological sites when inadvertently disturbed by construction activities. Hydraulic projects often include excavation and other ground disturbing activities in riparian and marine areas, which have a higher likelihood of presence of historic and cultural resources, so compliance with regulations that protect cultural resources is important for projects receiving hydraulic project approval from WDFW.

1.6 Stakeholder and Public Involvement

WDFW has involved the public and stakeholders in development of the updated Hydraulic Code Rules. WDFW formed a Stakeholder Advisory Group to provide comments on an initial draft of the HPA rules update in a series of meetings held in late 2011. This group included eighteen representatives from industry, non-governmental organizations, state and federal agencies, and tribes. This group met eight times between October 31 and the end of December, 2011, receiving presentations on and discussing issues relating to one or two specific aspects of the HPA rules at every meeting. The group engaged in policy discussions about each proposed change and the ramifications to their interests, and responded to new rule drafts prepared by WDFW by submitting comments on a structured form. Those draft rule documents were also posted on the WDFW web site for comment by any reader. Three separate drafts of the revised code rules have been posted on the WDFW website along with forms to comment on the rules. A near-final draft accompanies this environmental impact statement. This draft will be revised based on EIS comments and finalized concurrent with the final EIS. The Fish and Wildlife Commission will consider the final rules draft and hear public testimony prior to adopting final rules in the summer of 2014.

WDFW also conducted a public scoping process for this EIS in summer 2012. The scoping notice was issued June 22, 2012 and the scoping comment period ended July 16, 2012. Scoping comments were accepted by email, through an online WDFW comment website, by fax and by mail. WDFW received thirty-one comments documents. Generally, comments provided detailed suggestions for how rule changes should address specific problems or situations, or ways the proposals should not be changed from existing rules. Few commenters stated a preference among the alternatives presented, although a partiality for the preferred alternative was inferred from the tenor of the comments provided. A more detailed summary of the scoping comments is provided in Appendix A.

1.7 How to Read this Document

This EIS is organized into six chapters:

- Chapter 1 provides background information on the Hydraulic Code Rules update process; the Purpose and Need for the action; statutory authority, related permits, actions, and laws; and a description of public involvement.
- Chapter 2 presents a description of the No Action Alternative and the Proposed Rule Changes Alternative. The chapter also summarizes how the alternatives were developed and describes alternatives eliminated from detailed evaluation.
- Chapter 3 describes the affected environment and existing conditions.
- Chapter 4 describes the potential impacts and benefits of the two alternatives.
- Chapter 5 lists the references used in compiling this EIS.

Chapter 2 Alternatives

2.1 Introduction

2.1.1 Summary of Alternatives

This PEIS evaluates two alternatives for changes to the Hydraulic Code Rules—the No Action Alternative, which consists of the Current Rule, and the Preferred Alternative, comprising Proposed Rule Changes. The Proposed Rule Changes Alternative is the result of over six years of work by WDFW and stakeholders to change the Hydraulic Code Rules to be consistent with changes to other regulations, fish science, and design technology.

Several approaches and alternatives were considered in developing the Proposed Rule Changes (Section 2-5). WDFW staff and stakeholders have prepared and reviewed four drafts of the proposed rules. Those drafts considered different options for how hydraulic projects should be regulated. The stakeholder group was consulted on the Hydraulic Code Rules that WDFW proposes for adoption including new fish science and design technology. The proposed rules are also consistent with other regulations. For these reasons, WDFW is proposing only one set of proposed rules. Those proposed rules are the Preferred Alternative.

This chapter describes the two alternatives and the process to develop the alternatives. The proposed changes to the Hydraulic Code Rules are summarized Table 2-1. This chapter also includes a discussion of alternatives that were considered but eliminated from further study as well as some of the proposed changes to the rules that were not included in the proposed alternative. At the end of the chapter is a table that compares the environmental impacts of the two alternatives.

2.1.2 Identification of Preferred Alternative

WDFW has selected the Proposed Rule Changes Alternative as the Preferred Alternative. It is the alternative that meets the purpose of the proposed project. The Proposed Rule Changes would update the requirements for hydraulic projects to respond to statutory changes, meet current fish science and design technology, and improve procedural and administrative requirements. The No Action Alternative, which would retain the Hydraulic Code Rules that were last updated in 1994, would not meet the purpose of the project.

2.2 Formulation of Alternatives

As described in Section 1.1, WDFW first began to revise the Hydraulic Code Rules in 2006 as part of developing a Habitat Conservation Plan (HCP) to provide long-term certainty of ESA compliance related to agency permitting action. WDFW has continued to develop revised Hydraulic Code Rules after work on the HCP was discontinued. The rule revision process involved extensive public and stakeholder involvement.

To develop the HCP, WDFW established a Stakeholder Advisory Group consisting of representatives of customers as well as non-governmental organizations, state and federal agencies, and Tribes. The Stakeholder Advisory Group provided input on how to balance protection of fish with economic impacts. A first draft of the revised rules was reviewed by the advisory group in late 2011. The rule revisions evaluated in this PEIS incorporate advisory group comments on the second and third drafts.

WDFW conducted a Customer Service Survey and participated in the *Lean Process* to develop procedural changes to the Hydraulic Code Rules that would improve efficiency of implementing the rules. The Lean approach is an internal review process led by trained state employees in use throughout state government to deliver essential services with innovation, efficiency, and integrity. The *Lean Process* uses a standard set of principles, methods, and tools to identify efficiencies. The *Lean* review has helped WDFW understand how to improve and streamline HPA program implementation. System upgrades and efficiencies will allow WDFW staff to provide applicants with upfront and on-the-ground assistance prior to project development.

WDFW also prepared a series of white papers to evaluate the impacts of hydraulic projects and to determine appropriate design technology and best management practices for projects. The white papers have also identified best available fish science. The scientific and design information in the white papers was used to develop the specific standards for hydraulic projects in the Hydraulic Code Rules. The white papers are located on the WDFW website at http://wdfw.wa.gov/publications/search.php?Cat=Habitat.

2.3 No Action Alternative – Current Rule

The No Action Alternative represents the most likely future expected in the absence of implementing the proposed action. Under the No Action Alternative, WDFW would not upgrade the Hydraulic Code Rules and would continue to implement the existing rules (Chapter 220-110- WAC). The current rules can be accessed at the following web site: http://apps.leg.wa.gov/wac/default.aspx?cite=220-110. The current rules would not be updated to incorporate best available science regarding fish science and technology and the procedural and administrative requirements would not be improved.

2.3.1 Inconsistencies of the Existing Hydraulic Code with Current Statutes, Fish Science, and Design Technology

The state Legislature gave the department the responsibility of preserving, protecting, and perpetuating all fish and shellfish resources of the state. To assist in achieving that goal, the state Legislature in 1943 passed a state law called *Construction projects in state waters* (available on the web at http://apps.leg.wa.gov/RCW/default.aspx?cite=77.55). The law has been amended since it was originally enacted; however, the basic authority has been retained.

The state statutes (Revised Code of Washington) give state agencies the authority to issue regulations. These regulations are a primary source of law in Washington State. The Washington Administrative Code (WAC) codifies these regulations and arranges them by subject and agency. Chapter 220-110 WAC Hydraulic code rules (available on the web at http://apps.leg.wa.gov/wac/default.aspx?cite=220-110) establishes regulations for the construction of hydraulic project(s) or performance of other work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state,

and sets forth procedures for obtaining a hydraulic project approval (HPA). In addition, this chapter incorporates criteria generally used by the department for project review and conditioning HPAs. The following is a list of statutes that have been enacted or amended since 1994 that require a change to the regulations to make the state hydraulic code consistent with the statutes:

RCW 77.55.021 Permit

RCW 77.22.041 Derelict fishing, crab and other shellfish gear

RCW 77.55.111 Environmental excellence program

RCW 77.55.121 Habitat incentives program

RCW 77.55.131 Dike vegetation management guidelines

RCW 77.55.151 Permit issued to a marina or marine terminal for regular maintenance activities

RCW 77.55.161 Stormwater discharges

RCW 77.55.171 Water restoration projects – permit processing

RCW 77.55.181 Fish habitat enhancement project – permit review and approval process

RCW 77.55.201 Landscape management plan

RCW 77.55.221 Flood damage repair and reduction activities

RCW 77.55.241 Off-site mitigation

RCW 77.55.251 Mitigation plan review

RCW 77.55.261 Placement of large woody debris as a condition of a permit

RCW 77.55.281 Fishways on certain agricultural drainages

RCW 77.55.321 Application fee for a hydraulic project permit or permit modification – projects exempt from fees – disposition of fees (expires June 30, 2017)

RCW 77.55.331 Hydraulic project approval account

RCW 77.55.351 Department to develop system to provide access to hydraulic project approval applications

RCW 77.55.361 Limitations of chapter to a forest practices hydraulic project – adoption of rules for concurrence review process – department's duties regarding chapter 76.09 RCW

RCW 90.74 Aquatic resources mitigation

2.4 Preferred Alternative – Proposed Rule Changes

The Preferred Alternative includes changes to existing sections of the Hydraulic Code Rules, new sections, new definitions, and new procedures for implementation. The updated rules have also been revised to be more easily readable and to include explanations for the code requirements for the

hydraulic projects by describing the fish life concerns for each type of project. This PEIS is primarily concerned with changes to the regulations related to hydraulic projects, such as construction requirements, stream bank and shoreline stabilization, docks, dredging, etc. These are the actions that are most likely to impact the natural or built environment. Changes to application procedures and administration of the rules are described in Section 2.4.2. Impacts of these procedural changes are evaluated in the separate Small Business Economic Impact Statement although some impacts to applicants are addressed under Social and Economic Issues (Section 4.11).

2.4.1 Summary of Changes to Hydraulic Project Regulations

Table 2-1 generally summarizes the changes proposed to regulations pertaining to hydraulic projects. The table is organized to show the WAC section of the proposed rule, the WAC section of the existing rule, and a general summary of the new or revised provisions. Following Table 2-1 is a more detailed description of each hydraulic project activity.

Table 2-1 Summary of Changes to Hydraulic Project Regulations (Chapter 220-110 WAC)

Table 2_1:

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
WAC 220-110-060	Integration of hydraulic project approvals and forest practices applications	New section	ESSB 6406 transferred forest practices hydraulic project (FPHP) authority from WDFW to DNR.	This new section specifies WDFW will review all FPHPs in Type S and F waters and provide comments to DNR prior to the permit decision. WDFW will also conduct a concurrence review of three hydraulic project types and provide written notice to DNR of WDFW's concurrence or non-concurrence: 1) Culvert installation, replacement, or repair at or below the bankfull width in Type S and F waters that exceed five percent gradient; 2) Bridge construction, replacement, and repair at or below the bankfull width in unconfined streams in Type S and F waters; and 3) Fill within the flood level 100-year of unconfined streams in Type S and F waters.	ESSB 6406 RCW 77.55.361 Limitations of Chapter to a Forest Practices Hydraulic Project – Adoption of Rules for Concurrent Review Process – Department's Duties Regarding Chapter 76.09 RCW RCW 77.55.371 Memorandum of Agreement to Implement Integration of Hydraulic Project Approvals into Forest Practices Applications — Interagency Contract.
WAC 220-110-080	Mitigation requirements for hydraulic projects	New section	The new section was needed to implement new statutes and policies. The section clarifies when WDFW may require compensatory mitigation and establishes the baseline for measuring impacts as the existing habitat condition.	This new section specifies mitigation requirements, compensatory mitigation, and mitigation plan requirements to assure no-net-loss. A section on mitigation banks and credits is included. It also includes the requirements for and contents of a mitigation plan. This section makes the	RCW 77.55.241 Off-site Mitigation RCW 77.55.251 RCW Mitigation Plan Review RCW 90.74 RCW Aquatic Resources Mitigation State of Washington Alternative

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
				Hydraulic Code Rules consistent with WDFW's current mitigation statutes.	Mitigation Policy Guidelines from the Departments of Ecology and Fish and Wildlife (2000) Interagency Regulatory Guide on Advance Permittee-Responsible Mitigation (2012) Policy 5002 Requiring or Recommending Mitigation
WAC 220-110-090	Technical provisions	WAC 220-110-040 and 220-110-230	Combined the separate freshwater and saltwater technical requirements introductions into a single introduction section.	There are no substantive changes to the existing language.	Not Applicable
WAC 220-110-100	Common construction requirements	New section	Combined the common construction requirements that apply to many types of hydraulic projects into a single section.	This new section specifies the construction requirements common to most hydraulic projects. The intent is to minimize disturbance from construction activities and includes requirements to maintain water quality, isolate the work area, and notification of fish kills.	White Paper – Treated Wood Issues Associated with Overwater Structures in Marine and Freshwater Environments (2001) Integrated Streambank Protection Guidelines (2002) Draft Shoreline Modifications White Paper (2007)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
WAC 220-110-110	Authorized work times in freshwater areas	New section	Freshwater work times were needed for all project types.	This new section specifies the criteria WDFW will follow to determine when work should occur. The criteria includes life history stages of fish life present, the expected impact of construction activities, BMPs proposed by the project proponent. It requires WDFW to publish the times when spawning salmonids and their eggs and try are least likely to be in freshwaters of Washington. These criteria will allow WDFW to be more flexible in establishing work windows for specific conditions rather than the current system of standards dates applicable to all waters.	Times When Spawning or Incubating Salmonids are Least Likely to be Within Washington State Freshwaters (2010) Draft Shoreline Modifications White Paper (2007)
WAC 220-110-120	Freshwater habitats of special concern	New section	The habitat of some fish species requires protective measures for their survival due to their population status or sensitivity to habitat alteration.	This new section lists priority freshwater habitats by species.	Threatened and Endangered Species (2012) Washington State Status Report for the Margined Sculpin (1998) Washington State Status Report for the Olympic Mudminnow (1999) Washington State Status Report for the Pygmy Whitefish (1998) 21st Century Salmon and Steelhead Initiative Priority Habitats and Species List

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
					(2008) Management Recommendations for Washington's Priority Habitats and Species (1991) Washington and Oregon Eulachon Management Plan (2001) Draft Shoreline Modifications White Paper (2007)
WAC 220-110-130	Streambank protection and lake shoreline stabilization	WAC 220-110-050 and 220-110-223	There are several common bank protection techniques for which there are no rules currently. The requirement for the rationale for selecting a proposed technique ensures the appropriate lake or streambank treatment is selected based on site conditions, reach conditions and habitat impacts.	Subsections covering groins, barbs, engineered logjams, floodplain roughness and flow spreaders have been added. The new language requires the applicant to provide rationale for the technique proposed. The rule also requires the permittee to establish benchmarks so WDFW can verify compliance with the approved plans. A list of common alternatives to shoreline stabilization, ranked by level of impact, has also been added.	Integrated Streambank Protection Guidelines (2002) White Paper – Ecological Issues in Floodplains and Riparian Corridors (2001) Draft Bank Protection/Stabilization White Paper (2006) Draft Flow Control Structures White Paper (2007) Draft Shoreline Modifications White Paper (2007) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-140	Residential docks, watercraft lifts, and buoys in	WAC 220-110-060	The section reflects current fish science and technology measures to avoid or minimize adverse	Subsections were added for watercraft lifts, mooring buoys, piers, ramps, floats, grating, treated wood, piling,	White Paper – Overwater Structures: Freshwater Issues (2001)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
	freshwater areas		modifications to fish and shellfish habitat from overwater structures.	noise and pile driving, and piling removal. There are substantive changes to the requirements in this section including length, width and grating requirements. There is a new requirement that new docks in waterbodies with salmon, steelhead and bull trout be a pier, ramp and float design.	Overwater Structures and Non-Structural Piling White Paper (2006) White Paper – Treated Wood Issues Associated with Overwater Structures in Marine and Freshwater Environments (2001) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-150	Boat ramps and launches in freshwater areas	WAC 220-110-224	The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from boat ramps and launches.	New regulations have been added, including requirements that boat ramps are located to avoid impacts to spawning areas, footings and bases be located below pre-existing grade, and boat ramps be at the same elevation as pre-construction streambed and banks.	White Paper – Overwater Structures: Freshwater Issues (2001) Overwater Structures and Non-Structural Piling White Paper (2006) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
WAC 220-110-160	Marinas and terminals in freshwater areas	New section	Currently, there are no rules for marinas and terminal in freshwater areas. The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat.	This new section adds requirements for marinas and terminals in freshwater areas, which were not covered in the existing WAC. Requirements for site selection, railway- type boat launches, maintenance, design, pilings, noise and pile driving, and breakwaters have been added. The section mimics the saltwater section where applicable.	Draft Marinas and Shipping/Ferry Terminals White Paper (2007) White Paper – Overwater Structures: Freshwater Issues (2001) Overwater Structures and Non-Structural Piling White Paper (2006) White Paper – Treated Wood Issues Associated with Overwater Structures in Marine and Freshwater Environments (2001) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009) RCW 77.55.151 Permit Issued to a Marine or Marine Terminal for Regular Maintenance Activities ESSB 6406
WAC 220-110-170	Dredging in freshwater areas	WAC 220-110-130	The department may require reports to evaluate the impacts to fish, shellfish and their habitat.	New regulations include a requirement that WDFW evaluate the impacts of dredging in eulachon spawning areas, provisions that WDFW may require bathymetric or biological surveys or sediment sampling reports, and a requirement that dredging occur in daylight to the extent practicable.	White Paper – Freshwater Gravel Mining and Dredging Issues (2002) Draft Channel Modifications White Paper (2007) Draft Shoreline Modifications White Paper (2007) Washington and Oregon Eulachon

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
					Management Plan (2001) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-180	Sand and gravel removal	WAC 220-110-140	No substantive changes proposed.	There are no substantive changes to the existing language.	White Paper – Freshwater Gravel Mining and Dredging Issues (2002) Draft Channel Modifications White Paper (2007) Draft Shoreline Modifications White Paper (2007) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-190	Water crossing structures	WAC 220-110-070	This section covers the design and construction of stream simulation and no-slope culverts and bridges as well as temporary crossings, and culvert abandonment. The existing rules did not cover stream simulation, fords or culvert abandonment (removal). Hydraulic method was moved to fish passage improvement structures since this method does not pass all fish at all life stages.	Performance-based criteria and design-type criteria are intended to protect fish life and its habitat. The revised regulations strengthen the requirements for bridge design and construction standards to avoid flood impacts and channel disturbance. New restrictions on culvert construction and design are included. Many of the changes relate to modeling requirements for designing water crossing structures. Criteria are also included for fords, temporary water crossings, and water crossing removal.	Water Crossing Design Guidelines (2013) Water Crossings White Paper (2006) Draft Fish Passage White Paper (2008) Draft Evaluation of the Stream Simulation Culvert Design Method in Western Washington, a Preliminary Study (2003) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
WAC 220-110-200	Fish passage improvement structures	New section	There are no requirements for the design and construction of fish passage facilities for upstream migrating fish in the existing rules. The section reflects current fish science and technology measures to avoid or minimize adverse impacts to fish, shellfish and their habitat.	This new section establishes criteria for constructing and operating fish ladders, weirs for fish passage, roughened channels, and trap-and-haul operations. Specifications for design and operation of hydraulic culvert provisions are also included.	Draft Fishway Guidelines for Washington State (2000) Draft Fish Passage White Paper (2008) Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual (2009) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-210	Channel change/ realignment	WAC 220-110-080	Ensure that fish life have adequate water downstream of channel change/realignment projects.	A new requirement has been added stating that the channel downstream must never be dewatered by more than half the flow.	White Paper – Channel Change (2001) Draft Channel Modifications White Paper (2007) Draft Habitat Modifications White Paper (2007) Draft Shoreline Modifications White Paper (2007) Stream Habitat Restoration Guidelines (2012) White Paper – Ecological Issues in Floodplains and Riparian Corridors (2001) Complied White Papers for Hydraulic Project Approval

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
					Habitat Conservation Plan (2009)
WAC 220-110-220	Large woody material placement, repositioning, and removal in freshwater areas	WAC 220-110-150	Large wood provides important habitat functions.	Conditions under which removal of large woody debris may be authorized and regulations for the removal process have been added. A provision has been added that large woody debris cannot be cut for firewood.	Draft Habitat Modifications White Paper (2007) Draft Shoreline Modifications White Paper (2007) Stream Habitat Restoration Guidelines (2012) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-230	Beaver dam management	New section	There are no specific requirements for this common project type. The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat.	This new section introduces regulations for beaver dam removal and installation of water leveling and exclusion devices. Beaver dams can be removed or breached, when there is a threat to private and public land or infrastructure. The methods for removal are specified and include requirements to protect fish habitat and compensatory mitigation may be required for lost habitat.	Draft Habitat Modifications White Paper (2007) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-240	Pond construction	WAC 220-110-180	No substantive changes proposed.	No substantive changes have been made.	Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-250	Water diversions and intakes	WAC 220-110-190	No substantive changes proposed.	No substantive changes have been made.	Draft Flow Control Structures White Paper (2007)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
					Draft Fish Protection Screen Guidelines for Washington State (2000) Draft Fish Screens White Paper (2008) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-260	Outfall structures in freshwater areas	WAC 220-110-170	This section now aligns with the RCW 77.55.161. The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from outfall structures.	A new section on the limits of WDFW's authority and a new regulation on energy dissipation have been added to reflect the changes in the statute since 1994. Criteria for energy dissipaters are added and include both natural methods (large logs pads of native plants) and manufactured in-line dissipaters.	Draft Flow Control Structures White Paper (2007) Draft Shoreline Modifications White Paper (2007) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009) RCW 77.55.161 Stormwater Discharges
WAC 220-110-270	Utility crossings in freshwater areas	WAC 220-110-100	There are no specific requirements for two common construction methods. The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from utility crossings.	Provisions for directional drilling and jacking and boring have been added. Additional regulations on siting have also been added, including avoidance of meander bends, groundwater upwelling, etc. and depth of the conduit.	Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-	Felling and	WAC 220-110-	No substantive changes proposed.	No substantive changes have been	Complied White Papers for Hydraulic Project Approval

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
280	yarding of timber	160		made.	Habitat Conservation Plan (2009)
WAC 220-110-290	Aquatic plant removal and control	WACs 220-110-331, 220-110-332, 220-110-333, 220-110-334, 220-110-335, 220-110-336, 220-110-337 and 220-110-338	No substantive changes proposed.	Multiple existing sections have been combined.	Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-300	Mineral prospecting	WACS 220-110-200, 220-110-201 and 220-110-202, and 220-110-206	The rules adopted by the Washington State Parks and Recreation Commission allowing certain beach prospecting activities in marine waters are covered by the Gold and Fish pamphlet so an individual HPA to legally prospect on ocean beaches is not required. Timing change to the Nooksack and Wenatchee Rivers reflect the results of spawning surveys.	Multiple sections have been combined. A new section on mineral prospecting on ocean beaches has been added, including where beach prospecting may occur and what equipment may be used. General requirements for mineral prospecting are included in the *Gold and Fish* pamphlet. Authorized work times for mineral prospecting in state waters have been changed and are listed in a table.	Small-Scale Mineral Prospecting White Paper (2006) Memo from Ned Currence and Mike Maudlin, Nooksack Indian Tribe, to the department dated April 26, 2013.
WAC 220-110-310	Tidal reference areas	WAC 220-110-240	No substantive changes proposed.	No substantive changes have been made.	Not Applicable
WAC 220-110-320	Authorized work times in saltwater areas	WAC 220-110-250	Timing reflects best available science.	Timing has changed for juvenile salmonid, surf smelt and herring protection based on information from fish programs and the results of	Juvenile Salmon and Forage Fish Presence and Abundance in Shoreline Habitats of the San Juan Islands, 2008-2009: Map

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
				studies. The new times are included in a table. Timing has been added for razor clams in tidal reference area 14. Regulations for work outside work windows for surf smelt spawning season have been refined. New criteria are added for modifying timing. These criteria will allow WDFW to be more flexible in establishing work windows for specific conditions rather than the current system of standards dates applicable to all waters.	Applications for Selected Species (2012) Juvenile Salmonid Composition, Timing, Distribution, and Diet in Marine Nearshore Waters of Central Puget Sound in 2001 – 2002 (2004) Draft Salmon in the Nearshore and Marine Waters of Puget Sound (2005) Juvenile Pacific Salmon and the Nearshore Ecosystem of Puget Sound (2006) Juvenile Salmon Use of Sinclair Inlet, Washington in 2001 and 2002 (2006) Draft Shoreline Modifications White Paper (2007)
WAC 220-110-330	Saltwater habitats of special concern	WAC 220-110-250	Rock sole are not obligate beach spawning fish so they were removed. Olympia oyster was added because they are a priority species dependent on intertidal beach habitat.	Olympia oyster settlement areas have been added and rock sole spawning beds have been removed. Geomorphic processes that form and maintain saltwater habitats of special concern have also been added.	Forage Fish Management Plan (1998) Priority Habitats and Species List (2008) Juvenile Pacific Salmon in Puget Sound Marine Forage Fishes in Puget Sound Kelp and Eelgrass in Puget Sound

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
					Beaches and Bluffs of Puget Sound Marine Riparian Vegetation Communities of Puget Sound Management Recommendations for Washington's Priority Habitats and Species (1991)
WAC 220-110-340	Intertidal forage fish spawning habitat surveys	New section	WDFW currently requires forage fish surveys in areas with year around spawning or when work has to occur outside the work window to ensure no eggs are present.	This new section describes WDFW's current protocols for surveys of intertidal forage fish spawning habitat.	Marine Beach Spawning Fish Ecology Forage Fish Spawning Beach Survey Manual (2001) Spatiotemporal Detection of Forage Fish Eggs Derived from Long-term Spawning Surveys (2009)
WAC 220-110-350	Seagrass and macroalgae habitat surveys	New section	WDFW requires surveys for seagrass and macroalgae habitat to ensure protection of these important habitats.	This new section describes WDFW's current protocols for surveys of seagrass and macroalgae habitat.	Eelgrass/Macroalgae Habitat Interim Survey Guidelines (2008) Estimating Sufficient Sample Sizes to Detect Changes in Eelgrass Density
WAC 220-110-360	Bulkheads and other bank protection in saltwater areas	WACs 220-110-280 and 220-110-285	The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from bank protection structures.	Bank protection alternatives have been listed from least to most impacting. Requirements for single-family bulkheads have been updated to match the requirements in RCW 77.55.141. Provisions have been added allowing WDFW to require geotechnical and engineering analyses, bioengineering	White Paper – Marine and Estuarine Shoreline Modification Issues (2001) Protecting Nearshore Habitat and Functions in Puget Sound (2010) Draft Shoreline Modifications White Paper (2007)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
				methods, and incorporation of large woody debris if appropriate.	RCW 77.55.141 Marine Beach Front Protective Bulkheads or Rockwalls
WAC 220-110-370	Residential piers, ramps, floats, watercraft lifts and buoys in saltwater areas	WAC 220-110-300	The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from overwater structures.	A new subsection has been added describing the requirements for watercraft lifts and mooring buoys. There are substantive changes to the requirements in this section based on current best practices, including design standards to minimize shading; new length, width and grating requirements: restrictions on the location of chemicals used for treated wood; additional restrictions on pile driving and other noises; and specifications for removing pilings.	White Paper – Overwater Structures: Marine Issues (2001) Overwater Structures and Non-Structural Piling White Paper (2006) Eelgrass/Macroalgae Habitat Interim Survey Guidelines (2008) White Paper – Treated Wood Issues Associated with Overwater Structures in Marine and Freshwater Environments (2001) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-380	Boat ramps and launches in saltwater areas	WAC 220-110-290	The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from boat ramps and launches.	Designs and techniques have been tightened to increase protection of fish habitat. New requirements have been added for boat ramps and railway-type boat launches.	White Paper – Overwater Structures: Marine Issues (2001) Overwater Structures and Non-Structural Piling White Paper (2006) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-	Marinas and	WAC 220-110-	The section reflects current fish	New requirements have been added	Draft Marinas and Shipping/Ferry

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
390	terminals in saltwater areas	230	science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from marinas and marine terminals. Maintenance requirements include a requirement for a 5-year renewable HPA for maintenance activities to comply with RCW 77.55.151.	concerning piling, noise and pile driving, breakwaters, maintenance, and locations and design requirements for marinas and terminals. New requirements include restrictions on marinas and terminals in key habitat areas such as seagrass and kelp. Modeling of water exchange and circulations may be required and design requirements minimize the overwater coverage to deep areas and to minimize the size of facilities. Detailed construction requirements are included to minimize habitat impacts. Maintenance requirements are also described, including a requirement for a 5-year renewable HPA for maintenance activities.	Terminals White Paper (2007) Overwater Structures and Non-Structural Piling White Paper (2006) White Paper – Overwater Structures: Marine Issues (2001) White Paper – Treated Wood Issues Associated with Overwater Structures in Marine and Freshwater Environments (2001) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009) RCW 77.55.151 Permit Issued to a Marine or Marine Terminal for Regular Maintenance Activities ESSB 6406
WAC 220-110-400	Dredging in saltwater areas	WAC 220-110-230	The department may require reports to evaluate the impacts to fish, shellfish and their habitat.	Provisions have been added allowing WDFW to require hydrodynamic modeling to assess changes in salinity, turbidity, and other physicochemical regimes for new dredging projects and expansions. WDFW may also require multi-season pre- and post-dredge project bathymetric biological surveys for new dredging projects and expansions. Protection for other species besides	White Paper – Dredging Activities: Marine Issues (2001) Draft Shoreline Modifications White Paper (2007) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
				eelgrass and kelp has been added. Language has been added requiring that dredging projects should not convert intertidal to subtidal habitat.	
WAC 220-110-410	Artificial Aquatic habitat structures	New section	There has been an increased interest in recent years in the creation artificial habitat structures. The existing WACs have no specific technical requirements for these structures. The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat.	This new section includes requirements for artificial aquatic habitat structures and includes the needs the structures must meet, a requirement that resource benefits of the structure must outweigh negative impacts, and requirements for preconstruction surveys. It is includes specific requirements for locating and constructing artificial reefs.	Draft Habitat Modifications White Paper (2007) Policy 401 Regulating Aquatic Habitat Enhancement Structures (Draft) Palsson, W.A. 2000. Artificial Reef Problem Statement Puget Sound Rockfish Conservation Plan White Paper – Marine and Estuarine Shoreline Modification Issues (2001) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)

Proposed WAC Number	Title	Existing WAC Number	Reason for Rule Change (e.g. why new section?)	New or Revised Provisions	Citation(s) for "Best Available Science", Regulation or Policy
WAC 220-110-420	Outfall and tide and flood gate structures in saltwater areas	New section	This section now aligns with the RCW 77.55.161 and RCW 77.55.281. The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from outfall and tide gate structures.	This new section describes the limits of WDFW's authority to regulate outfalls including those covered by NPDES permits. In locations not covered by an NPDES permit, WDFW must make a finding that the discharge would harm fish life and allow the applicant an opportunity to avoid adverse impacts through local ordinances. Construction requirements to minimize impacts to fish habitat are included. The new section also limits WDFW's authority to regulate tide gates on agricultural drainage systems.	Draft Flow Control Structures White Paper (2007) White Paper – Marine and Estuarine Shoreline Modification Issues (2001) Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009) RCW 77.55.161 Stormwater Discharges RCW 77.55.281 Fishways on certain agricultural drainages
WAC 220-110-430	Utility lines in saltwater areas	WAC 220-110-310	The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from utility line activities.	A new regulation has been added requiring that utility lines be located to avoid impacts to saltwater habitats of special concern.	Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)
WAC 220-110-440	Boring in saltwater areas	New section	The section reflects current fish science and technology measures to avoid or minimize adverse modifications to fish and shellfish habitat from boring activities.	This new section includes new requirements for boring conducted for sediment sampling. Requirements include minimizing turbidity and discharge of silt, specifics for deposit of waste materials and for sealing the boring hole.	Complied White Papers for Hydraulic Project Approval Habitat Conservation Plan (2009)

2.4.2 Description of Hydraulic Projects

The following sections describe the hydraulic projects that are regulated by the Hydraulic Code Rules. The project descriptions are taken from the descriptions that have been added to the proposed Hydraulic Code Rules.

Streambank protection and lake shoreline stabilization (WAC 220-110-130)

Streambank protection and lake shoreline stabilization structures are permanent or temporary structures constructed for the purpose of protecting or stabilizing the bank. Bank protection and stabilization methods are either hard approaches or soft approaches. Hard approaches armor the bank with material such as riprap, concrete, or timber. Hard approaches are intended to resist shear forces experienced at the work area that would prevent erosion of the bank. Soft approaches attempt to mimic natural processes with the use of biotechnical methods such as live plantings, rootwads, and large woody material (LWM). Soft approaches to streambank protection are generally less impacting to fish life than are hard approaches. Many projects integrate both hard and soft approaches.

Residential docks, watercraft lifts, and buoys in freshwater areas (WAC 220-110-140)

An overwater structure is built out over or on the water. Typically, a person builds the structure to have access to a boat. A pier is a stationary overwater structure supported by piling that extends out from the shoreline. A float is a walkway or other surface that floats on the water. A ramp is a walkway that connects a pier or other shoreline to a float and provides access between the two. Pilings, which are associated with several of these structures, are timber, steel, reinforced concrete or composite posts that are driven, jacked, or cast vertically into the bed. A watercraft lift is a structure that lifts boats and personal watercraft out of the water. A mooring buoy is floating surface structure used for private and commercial vessel moorage.

Boat ramps and launches in freshwater areas (WAC 220-110-150)

A boat ramp is a sloping stabilized roadway constructed on the shoreline for launching boats from vehicular trailers. Ramps extend into the water at a slope of twelve percent to fifteen percent and are oriented perpendicular to the shoreline. The width of the ramp varies with the intended use, whereas the length often depends on the slope of the shoreline and fluctuating water levels. Ramps extend from the upland to below the expected low water line and are usually constructed in protected areas with access to deep water close to shore. Construction materials commonly consist of gravel, concrete, or asphalt. Ramps are often associated with marinas. A railway-type boat launch consists of a pair of rails supported by pilings extending from the upland down to the shoreline.

Marinas and terminals in freshwater areas (WAC 220-110-160)

A marina is a public or private facility providing vessel moorage space, fuel, or commercial services. Commercial services include but are not limited to overnight or live-aboard vessel accommodations (RCW 77.55.011(13)).

A terminal is a public or private commercial wharf located in the navigable waters of the state and used, or intended to be used, as a port or facility for the storing, handling, transferring, or transporting of goods, passengers, and vehicles to and from vessels (RCW 77.55.011(14)).

Dredging in freshwater areas (WAC 220-110-170)

Dredging includes the removal of substrate or sediment from rivers and lakes to improve vessel navigation or moorage, to maintain channels and sediment traps for flow conveyance, and for flood abatement. Dredging is also used to clean up contaminated sediments.

Sand and gravel removal (WAC 220-110-180)

The mechanical removal of sand and gravel from river channels is done primarily to collect material to produce construction aggregate.

Sand and gravel deposited by river processes is used as construction aggregate for roads and highways (base material and asphalt), pipelines (bedding), septic systems (drain rock in leach fields), and concrete (aggregate mix) for highways and buildings. In some areas, people remove aggregate primarily from river deposits, either from pits in river floodplains and terraces, or by removing gravel directly from riverbed with heavy equipment.

Water crossing structures (WAC 220-110-190)

Water crossings are structures constructed to facilitate the movement of people, animals, or materials across or over water from bank to bank. These structures include bridges, culverts, fords and conduits. This chapter covers bridges, culverts, and fords. WAC 220-110-270 covers conduit crossings. Generally, people use bridges to cross over large streams and rivers or unstable channels; they use culverts to cross over small streams with an average channel width less than fifteen feet and they use fords to cross the stream when they do not have to cross the stream very often and this is the least impacting option.

Fish passage improvement structures (WAC 220-110-200)

Fishways facilitate the passage of fish through or around a barrier. They restore upstream and downstream fish access to habitats that have become isolated by human activities (e.g., placement of culverts, dams, and other artificial obstructions). Fishways can be mitigation measures for adverse effects associated with flow control structures such as dams.

Channel change/ realignment (WAC 220-110-210)

Artificial realignment and relocation of channels is used to restore habitat lost because of human uses. The department discourages channel changes/realignments and will only approve them where the applicant can demonstrate benefits or lack of adverse impact to fish life. As a last resort, a person may relocate a channel where erosion threatens a building or road. Channel relocation is often a means to solve problems of channel encroachment and/or confinement, and foster the development of a new, static channel with healthy riparian buffers. A person can relocate the entire channel to a new alignment, or just move the channel side-to-side within the existing alignment. Channel relocation permanently changes the location of the channel while preserving or recreating other characteristics, such as the overall channel profile, pattern, cross-section, and bed elevation.

Large woody material placement, repositioning, and removal in freshwater areas (WAC 220-110-220)

Large woody material (LWM) is trees and tree parts that mainly enter stream channels from streambank undercutting, wind throw and slope failures. Large woody material is often placed in streams where wood is limited to restore fish habitat. Public agencies and others reposition and remove large woody material where it is necessary to address a threat to life, the public, or property.

Beaver dam management (WAC 220-110-230)

A person may need to remove, breach or modify a beaver dam to prevent damage to private and public land or infrastructure caused by flooding. Removal is normally accomplished using hand tools or equipment such as backhoes.

Installation of a water level (flow) control device is a preferred alternative to dam removal or breaching of an established dam. A person can install a water level control device to maintain a desirable beaver wetland. These devices are installed at the intended depth, extending upstream and downstream of the dam. This preserves the ponds habitat benefits.

Another alternative to dam removal or breaching is the installation of a beaver exclusion device. These devices prevent beavers from building a dam at the mouth or inside of culverts and blocking water flow.

Pond construction (WAC 220-110-240)

A person may construct an out-of-channel pond for livestock watering, irrigation, fire protection or another purpose.

Water diversions and intakes (WAC 220-110-250)

Surface water diversions are common instream features in agricultural areas where the water is used for irrigation. Throughout the state, people also divert water for other agricultural, hydropower, industrial, recreational, residential, municipal, and hatchery purposes.

Outfall structures in freshwater areas (WAC 220-110-260)

Outfalls move water from one place to another, typically to a body of water. They may convey irrigation water, stormwater, or other waste materials.

Utility crossings in freshwater areas (WAC 220-110-270)

Utility lines are cables and pipelines that transport gas, telecommunications, fiber optics, power, sewer, oil and water lines from one side of a watercourse to the other.

Felling and yarding of timber (WAC 220-110-280)

Timber felling means to cut down a tree and includes "bucking" or cutting the felled tree into predetermined log lengths and also includes limbing of the bucked tree. Yarding is the process of hauling logs from the cutting area to the landing and includes methods such as dragging the logs across the ground which is referred to as skidding. There are three major kinds of yarding systems; ground based, cable and aerial logging.

Aquatic plant removal and control (WAC 220-110-290)

This section covers the physical and mechanical methods for aquatic plant removal and control. It does not address aquatic plant control using grass carp, herbicides or water column dye.

Mineral prospecting (WAC 220-110-300)

Mineral prospecting projects excavate, process, or classify aggregate using hand-held mineral prospecting tools and mineral prospecting equipment. When prospectors locate valuable minerals through prospecting, they may attempt to recover larger quantities of the minerals using a variety of machines, including suction dredges, high bankers, and heavy equipment. The rules in this section apply to the use of hand-held mineral prospecting tools and small-motorized equipment.

Tidal reference areas (WAC 220-110-310)

The department has divided the coastline into tidal reference areas to delineate the major segments of state's marine shorelines. These segments have similar coastal landforms.

Intertidal forage fish spawning habitat surveys (WAC 220-110-340)

The department uses intertidal forage fish spawning habitat surveys to determine presence, absence, quantity and timing of Surf smelt (*Hypomesus pretiosus*) and Pacific sand lance (*Ammodytes hexapterus*) spawning. The presence of spawning may restrict project type, design, location, and timing.

Seagrass and macroalgae habitat surveys (WAC 220-110-350)

The department may require an applicant to hire a qualified professional diver/biologist to conduct one or more seagrass and macroalgae surveys. The department has developed survey guidelines for seagrass and macroalgae habitat to improve protection of these important habitats in Puget Sound and coastal waters. The guidelines contain protocols for both preliminary and advanced surveys to assist in the evaluation of potential impacts to these habitats at work areas with various conditions. Statistical considerations are an integral part of the advanced surveys so the guidelines include a sample size calculator to aid in determining the appropriate number of samples the diver/biologist must take at a particular site. The guidelines are available on the department's website.

Bulkheads and other bank protection in saltwater areas (WAC 220-110-360)

A bank protection structure is a permanent or temporary structure constructed for the purpose of protecting or stabilizing the bank. Bank protection methods are either hard approaches or soft approaches. Hard approaches armor the bank with material such as riprap, concrete, or timber bulkheads intended to resist shear forces experienced at the work area that would prevent erosion of the bank. Soft approaches attempt to mimic natural processes with the use of biotechnical methods such as live plantings, rootwads, and large woody material (LWM) and beach nourishment. Many projects integrate both hard and soft approaches.

Residential piers, ramps, floats, watercraft lifts and buoys s in saltwater areas (WAC 220-110-370)

An overwater structure is built out over or on the water. Typically, a person builds the structure to have access to a boat. A pier is a stationary overwater structure supported by piling that extends out from the shoreline. A float is a walkway or other surface that floats on the water. A ramp is a walkway that connects a pier or other shoreline to a float and provides access between the two. Pilings, which are

associated with several of these structures, are timber, steel, reinforced concrete or composite posts that are driven, jacked, or cast vertically into the bed. A watercraft lift is a structure that lifts boats and personal watercraft out of the water. A mooring buoy is floating surface structure used for private and commercial vessel moorage.

Boat ramps and launches in saltwater areas (WAC 220-110-380)

A boat ramp is a sloping stabilized roadway constructed on the shoreline for launching boats from vehicular trailers. Ramps extend into the water at a slope of typically twelve percent to fifteen percent and are typically oriented perpendicular to the shoreline. Ramp widths vary with its intended use, whereas the length often depends on the slope of the shoreline and tidal amplitudes. Ramps extend from the upland to below the low intertidal zone and are usually constructed in protected areas with access to deep water close to shore. Construction materials commonly consist of gravel, concrete, or asphalt; they are often associated with marinas and parking lots. A railway-type boat launch consists of a pair of railroad tracks supported by pilings extending from the upland down to the beach.

Marinas and terminals in saltwater areas (WAC 220-110-390)

A marina is a public or private facility providing vessel moorage space, fuel, or commercial services. Commercial services include but are not limited to overnight or live-aboard vessel accommodations (RCW 77.55.011(13)).

A terminal is a public or private commercial wharf located in the navigable waters of the state and used, or intended to be used, as a port or facility for the storing, handling, transferring, or transporting of goods, passengers, and vehicles to and from vessels (RCW 77.55.011(14)).

Dredging in saltwater areas (WAC 220-110-400)

Dredging includes the removal of substrate to improve vessel navigation and to maintain channels. Dredging is also used to clean up contaminated sediments.

Artificial aquatic habitat structures (WAC 220-110-410)

An artificial aquatic habitat structure is a human placed and designed structure that is intended to provide long-term alterations to fresh or saltwater bottom or mid-water habitat. The structure is designed and located to contribute to the management of fish and shellfish. Examples include the construction of artificial reefs and the creation or restoration of spawning beds.

Outfall and tide and flood gate structures in saltwater areas (WAC 220-110-420)

Outfalls move water from one place to another, typically another body of water. They may convey stormwater, or other waste materials.

Utility lines in saltwater areas (WAC 220-110-430)

Utility lines are cables and pipelines that transport gas, telecommunications, fiber optics, power, sewer, oil and water lines underneath watercourses.

Boring in saltwater areas (WAC 220-110-440)

Boring is used to obtain information about the physical properties of the bed. This information is often needed to design foundations for proposed structures and for repair of structures.

2.4.3 Procedural Changes

Table 2-2 summarizes the procedural and administrative changes to the Hydraulic Code Rules. These changes are intended to improve WDFW's ability to provide a predictable application process and reduce permit processing times for lower risk project types.

Table 2-2 Procedural and Administrative Changes to the Hydraulic Code Rules

Proposed WAC Number	Title	Existing WAC Number	New or Revised Provisions
WAC 220-110-010	Purpose	WAC 220-110-010	The purpose statement has been simplified.
WAC 220-110-020	Instructions for using chapter 220-110 WAC	New	This new section provides a guide to the Hydraulic Code Rules.
WAC 220-110-030	Definitions	WAC 220-110-020	Definitions have been separated into three categories: general terms, mineral prospecting specific terms, and aquatic plant removal and control specific terms. Existing definitions have been updated and new definitions have been added.
WAC 220-110-040	Applicability of hydraulic project approval requirements	WAC 220-110-035	This section reflects changes to the statute since 1994. A provision has been added requiring the permittee or authorized agent to pay for any surveys, studies, or reports required by the department. New exemptions have been added, including landscape management plans, removal of derelict fishing gear and crab pots, installation or removal of temporary portable boat hoists, installation, maintenance, or removal of scientific instruments, and forest practices.
WAC 220-110-050	Procedures – hydraulic project approvals	WAC 220-110-030 and 220-110-031	Subsections have been added to clarify the application requirements for chronic danger HPAs, fish habitat enhancement project HPAs, and marina and marine terminal maintenance HPAs to reflect changes to the statute since 1994. A section has been added allowing WDFW to develop simplified HPA applications for qualifying projects. New sections have been added detailing procedures for incomplete applications, requirements for a completed package, and the application review period. A section has been added describing the limited conditions under

Proposed WAC Number	Title	Existing WAC Number	New or Revised Provisions
			which an application fee can be refunded.
WAC 220-110-060	Integration of hydraulic project approvals and forest practices application	New section	This section implements ESSB 6406 which transferred forest practices hydraulic project (FPHP) authority from WDFW to DNR.
WAC 220-110-070	Changes to hydraulic project approval technical requirements	WAC 220-110-032	There are no substantive changes to the existing language.
WAC 220-110-450	Informal appeals of adverse administrative actions	WAC 220-110-470	There are no substantive changes to the existing language.
WAC 220-110-460	Formal appeal of administrative actions	WAC 220-110-350	This section has largely remained the same. Information has been added about the time period for requesting a formal appeal is suspended during consideration of a timely informal appeal.
WAC 220-110-470	Compliance	WAC 220-110-360	The requirements have been changed to reflect the Governor's directive to develop rules for civil enforcement. The section emphasizes correction action rather than civil or criminal penalties. New sections have been added detailing procedures for technical assistance visits and notices of correction. Complies with RCW 77.55.291 Civil penalty.

2.4.4 Science Supporting the Proposed Alternative

Several white papers and guidance manuals have been prepared for the department since the last major revision of the state hydraulic code in 1994. These documents assess the potential impacts of hydraulic projects and recommend habitat protection, conservation and mitigation strategies to protect fish life. These strategies are based on science and technology. These documents support the proposed changes to the hydraulic code rules that will make them consistent with current science and design technology.

The governor's 1999 *Statewide Strategy to Recover Salmon* recommended regulatory consistency and cooperation between state and federal agency policies, permits, and protocols. The strategy also called for the development comprehensive and integrated guidelines for carrying out aquatic habitat restoration and mitigation projects. The Aquatic Habitat Guidelines (AHG) program was initiated in 1999 in support of salmon recovery efforts to ensure aquatic and floodplain restoration planning and design efforts were strategic, effective and the best use of limited resources. The Program became a joint effort among state resource management agencies in Washington, including the Washington Departments of Fish and Wildlife, Ecology, Transportation, and Natural Resources; the Recreation and Conservation Office, and the Puget Sound Partnership.

AHG documents were developed for each of the following activities: stream bank protection, water crossings, fishways, fish protection screens and stream habitat restoration. Other guidelines were planned but never funded. Guidelines developed in the AHG program employ an integrated approach to marine, freshwater, and riparian habitat protection and restoration. That is, they seek to protect and restore the structure and function of whole ecosystems by striving to consider projects in their landscape and watershed contexts. Development of AHG documents and underlying scientific surveys has involved broad participation from academic, public, and private sector practitioners, planners, and regulators.

The five AHG documents that were developed are the following:

- **Integrated stream bank protection guidelines** (ISPG), 2003, prepared by Michelle Cramer P.E., and Ken Bates P.E (WDFW) and Dale Miller, Karin Boyd, Lisa Fotherby, Ph.D., P.E., Peter Skidmore, Todd Hoitsma, (Inter-Fluve, Inc.) (available at http://wdfw.wa.gov/publications/00046/):

  Design considerations for integrated stream bank protection: mechanisms and causes of failure (general bank erosion, scour, avulsion, mass failure, subsurface entrainment), shear, vertical distribution of shear, habitat, risk, site- and reach-based assessment, channel form, channel process (equilibrium and disequilibrium). Mitigation considerations: duration and extent of impacts (construction, lost habitat, etc.), lost opportunity, emergency bank protection. Project design includes decision-making matrices for selecting appropriate solutions.

- **Water crossing design guidance (formerly design of road culvers for fish passage)**, 2013, prepared by Bob Barnard, Ken Bates, Bruce Heiner, Pat Klavas, Don Ponder, Pad Smith and Pat Powers (WDFW) (available on the web at http://wdfw.wa.gov/publications/01501/):

  Promotes water crossing selection and design process intended to have the least effect on the natural processes that create and support the stream structure in which fish live and migrate. The geomorphic approach to design is generally based on readily-measured characteristics of the natural channel in the adjacent reaches. Five different water crossing design methods are covered including no-slope culverts, stream simulation culverts, bridges, temporary culverts and hydraulic design fishways.

- **Fishway guidelines for Washington State**, 2000, prepared by Ken Bates (WDFW) (available on the web at http://wdfw.wa.gov/publications/00048/):

  Pre-design data requirements and considerations, design considerations for fishway entrances (entrance pool and transportation channel design), auxiliary water systems (diffuser and water supply source), fish ladders (pool and weir fishways, vertical slot fishways, roughened channels, hybrid fishways), fishway exit, tributary fish passage, upstream juvenile fish passage, flap gates, fishway flow control. Design considerations: types and applications of screen styles (drums, fixed plate, traveling, pump screens, infiltration galleries), screen design criteria, hydraulic design, fish bypass systems, debris management.

- **Fish protection screen guidelines for Washington State (draft)**, 2000, by Ken Bates (WDFW) and Bryan Nordlund (NMFS) (available on the web at http://wdfw.wa.gov/publications/00050/wdfw00050.pdf):

  Design criteria and practical considerations for the design of fish protection screens including applications for hydroelectric facilities, irrigation, municipal and industrial water withdrawal projects. The major objective of the fish screen guidelines is to highlight important design elements that should be considered in the design of fish screens at water diversion projects to provide the safe downstream passage of migrating juvenile salmonids.

- **Stream habitat restoration guidelines**, 2012, by Michelle Cramer (WDFW) (available at http://wdfw.wa.gov/publications/01374/):

  Design criteria and practical considerations for the design of stream restoration projects including site, reach, and watershed assessment, problem identification, general approaches to restoring stream and riparian habitat, factors to consider in identifying and selecting an approach, approaches to solving common restoration objectives, and stream and riparian habitat restoration techniques. Watershed processes and conditions that shape stream channels, stream ecology, geomorphology, hydrology, hydraulics, planting considerations and erosion control, and construction considerations are also presented in the main text and appendices.

In addition to the AHG documents, a series of *white papers* were commissioned in 2001 and 2002 summarizing the current state of knowledge for each topic of concern, to provide the scientific basis for the AHG, and to support anticipated rule changes. Each white paper addresses the adverse (and beneficial) impacts of development and land management activities on aquatic habitat, and also researches potential mitigation measures for adverse impacts. The white papers provide the scientific evidence supporting the AHGs and substantiating proposed changes to regulatory language drafted for the state hydraulic code.

Each white paper includes the following elements: overview of the guidelines project, overview of the subject white paper, guiding principles, assessment of the state of knowledge, summary of existing guidance, recommendations for the guidance documents, glossary of technical terms, bibliography, and an appendix containing other references and information sources.

The following white papers contributed the science to support development of AHG documents and proposed rule changes:

- **Over-water structures: marine issues**, 2001, by Barbara Nightingale and Charles Simenstad (University of Washington) (available on the web at http://wdfw.wa.gov/publications/00051/):

  Marine issues associated with the following structures: docks, piers, floats, rafts, log rafts, boat ramps, hoists, launches, boat houses, house-boats and associated moorings, marinas, driving and removal of pilings, trash booms and trash racks, work barges, and dolphins.

- **Over-water structure: freshwater issues**, 2001, by José Carrasquero (Herrera Environmental Consultants) (available on the web at http://wdfw.wa.gov/publications/00052/):

  Freshwater issues associated with the following structures: docks, piers, floats, rafts, log rafts, boat ramps, hoists, launches, boat houses, house-boats and associated moorings, marinas, driving and removal of pilings, trash booms and trash racks, work barges, and dolphins.

- **Treated wood issues associated with overwater structures in marine and freshwater environments**, 2001, by Ted Poston (Battelle) (available on the web at http://wdfw.wa.gov/publications/00053/):

  Issues associated with the use of treated wood in over-water and on-water structures.

- **Channel design**, 2001, by Dale Miller (Inter-Fluve, Inc.) (Available on the web at http://wdfw.wa.gov/publications/00057/):

  Design and ecological considerations for new channels, habitat restoration and mitigation, channel relocation and realignment, channel modification for habitat and stability, placement of large woody debris (including removal and relocation), placement of boulders (including smaller rocks and substrate), off-channel ponds (rearing and other), off-channel channels (new floodplains, high-flow bypass), gradient control structures, habitat enhancement activities and structures.

- **Marine and estuarine shoreline modification issues**, 2001, by Greg. Williams and Ron Thom (Battelle Marine Sciences Laboratory) (available on the web at http://wdfw.wa.gov/publications/00054/)

  Design and ecological considerations associated with hard and soft structural shoreline stabilization (bulkheads, rock revetments, groins, jetties, beach nourishment, and biotechnology), non-structural stabilization (setbacks, vegetation management, and ground/surface water management), estuary and shoreline restoration, tidegates, outfalls, and artificial reefs.

- **Ecological issues in floodplain and riparian corridors**, 2001, by Susan Bolton and Jeff Shellberg (University of Washington) (available on the web at http://wdfw.wa.gov/publications/00058/):

  Ecological impacts of floodplain fill (levees, road approaches, other fill); instream structures (weirs, groins, barbs, spurs); bulkheads; vegetative additions; diversion of floodplain and hyporheic flow (i.e., subsurface water movement) via forcing, floodway conveyance, or

relocation; levee removal; channel confinement; hyporheic zone issues including floodplain gravel pits.

- **Dredging activities: marine issues**, 2001, by Barbara Nightingale and Charles Simenstad (University of Washington)(available on the web at http://wdfw.wa.gov/publications/00055/):

  Hydrologic, ecological and biological effects (physical and chemical) of construction and maintenance dredging in saltwater areas associated with navigation channels, marinas, sediment clean-up, as well as other commercial developments.

- **Freshwater gravel mining and dredging issues**, 2002, by G. Mathias Kondolf, Matt Smeltzer, and Lisa Kimball (Center for Environmental Design Research)(available on the web at http://wdfw.wa.gov/publications/00056/):

  Hydrologic and ecological effects of in-channel bar scalping, risks and avulsions associated with floodplain pits, freshwater dredging, instream sediment sumps, gravel pits, and gravel removal.

In 2006 and 2007, WDFW contracted with Anchor Environmental, Herrera Environmental Consultants, Jones & Stokes Associates, and R2 Resource Consultants to further develop white papers documenting the state of the science on a range of topics specifically related to HPAs. These papers consolidate some of the original white papers, and update them with more recent scientific information. These papers were then peer reviewed by a panel of experts outside of WDFW, and those review comments are incorporated into the documents listed below.

The white papers provide a solid scientific foundation upon which to build conservation measures for avoiding potential impacts, but they are not an exhaustive review of every potential impact of hydraulic projects. Rather, they reflect WDFW's goal of establishing a solid scientific foundation for hydraulic project approvals.

The objectives of the white papers are to:

- Compile and synthesize the best available scientific information related to the potential human impacts on fish, their habitats, and associated ecological processes resulting from the construction, operation, and maintenance of fish passage structures.
- Use this scientific information to estimate the circumstances, mechanisms, and risks of harm potentially or likely to result from the construction, operation, and maintenance of fish passage structures.
- Identify appropriate and practicable measures, including policy directives, conservation measures, and best management practices (BMPs), to avoid and/or minimize the risk of harm to fish life.

The eleven more-recent white papers are the following:

- **Channel modifications (Draft)**, December 2007, by Herrera Environmental Consultants, Inc. (available on the web at http://wdfw.wa.gov/publications/01002/)

Compiles and synthesizes existing scientific information on channel modification projects including dredging, gravel mining and scalping, sediment capping and channel creation and alignment.

- **Bank Protection/Stabilization (Draft)**, December 2006, by Jones & Stokes Associates, Anchor Environmental, L.L.C., and R2 Resource Consultants (available on the web at http://wdfw.wa.gov/publications/00996/)

  Compiles and synthesizes existing scientific information on bank protection and stabilization projects including hard approaches, soft approaches and integrated approaches.

- **Fish passage (Draft)**, March 2008, by Herrera Environmental Consultants, Inc., and Ken Bates (available on the web at http://wdfw.wa.gov/publications/01001/):

  Compiles and synthesizes existing scientific information on culverts, fish ladders/fishways, roughened channels, weirs and trap and haul.

- **Fish Screens (Draft)**, March 2008, by Herrera Environmental Consultants, Inc., and Ken Bates (available on the web at http://wdfw.wa.gov/publications/01000/):

  Compiles and synthesizes existing scientific information on in-channel screens and off-channel screens.

- **Flow control structures (Draft)**, December 2007, by Herrera Environmental Consultants, Inc., (available on the web at http://wdfw.wa.gov/publications/00999/):

  Compiles and synthesizes existing scientific information on dams, weirs, dikes and levees, outfall, intake and diversions and tide gates.

- **Habitat modifications (Draft)**, December 2007, by Herrera Environmental Consultants, Inc. (available on the web at http://wdfw.wa.gov/publications/00998/):

  Compiles and synthesizes existing scientific information on beaver dam removal/modification, large woody debris placement/movement/removal, spawning substrate augmentation, in-channel/off-channel habitat creation/modification, riparian planting/restoration/enhancement, wetland creation/restoration/enhancement, beach nourishment, reef creation/restoration/enhancement and eelgrass and other aquatic vegetation creation/restoration/enhancement.

- **Marinas and Shipping/Ferry Terminal (Draft)**, December 2007, by Herrera Environmental Consultants, Inc. (available on the web at http://wdfw.wa.gov/publications/00997/):

  Compiles and synthesizes existing scientific information on marina and terminal structures and the area of alteration.

- **Shoreline modifications (Draft),** December 2007, by Herrera Environmental Consultants, Inc. (available on the web at http://wdfw.wa.gov/publications/01003/):

  Compiles and synthesizes existing scientific information on jetties, breakwaters, groins and bank barbs.

- **Overwater structures and non-structural piling (Draft)**, December 2006, by Jones & Stokes Associates, Anchor Environmental, L.L.C., and R2 Resource Consultants (available on the web at http://wdfw.wa.gov/publications/00995/):

  Compiles and synthesizes existing scientific information on docks, piers, floats, ramps, wharfs, ferry terminals and other structures that are supported above or float on the water. This includes all structural or supporting pilings. Non-structural pilings are individual, non-structural pilings, power poles, transmission lines, conduits, etc. Pilings are driven into the stream, lake, and ocean bed.

- **Small-scale mineral prospecting**, December 2006, by R2 Resource Consultants (available on the web at http://wdfw.wa.gov/publications/00293/):

  Identified and evaluated seven impact mechanisms associated with the operation of small-scale mineral prospecting activities that could potentially affect aquatic species being considered for coverage under the HCP ("potentially covered species"). These mechanisms describe activities and modifications to habitat arising from activities that can be temporary or permanent in duration.

In 2009, many of the previous white papers were consolidated into one document. The intent of this consolidation was to establish the scientific basis for the HCP and assist stakeholder advice and WDFW decision-making on what specific HPA activities should be covered by the HCP. This document remains a useful resource for WDFW staff involved in HPA permitting.

- **Compiled white papers for hydraulic project approval habitat conservation plan**, March 2009, by Anchor Environmental, Herrera Environmental Consultants, Jones & Stokes Associates, and R2 Resource Consultants (available on the web at http://wdfw.wa.gov/publications/00803/wdfw00803.pdf)

  White papers consolidated within this document include:

  - Water crossings (bridges, culverts, conduits)
  - Fish passage (fish ladders, culverts, weirs, roughened channels, trap and haul)
  - Flow control structures (dams, weirs, dikes, levees, tide gates, intakes, outfalls)
  - Bank protection/stabilization (bulkheads, retaining walls, revetments, toe protection, beach nourishment, subsurface drainage, biotechnical bank protection, bank reshaping or regrading, soil reinforcement, coir and straw logs, integrated approaches)
  - Shoreline modifications (groins, jetties, breakwaters)
  - Channel modifications (dredging, gravel mining and bar scalping, sediment capping, channel creation and alignment.)
  - Habitat modification (beaver dam removal, large woody debris manipulations, spawning substrate augmentation, riparian planting, wetland creation/restoration, enhancement,

beach nourishment/contouring, reef creation, eelgrass planting/restoration/enhancement, in-channel and off-channel habitat modifications

- Overwater structures (docks, floats, piers, ramps, wharfs, pilings and non-structural pilings)
- Marinas and Terminals
- Fish screens (in-channel, off channel)

These scientific compilations are living documents that are and will continue to be updated as the science changes and WDFW resources allow.

2.5 Alternatives and Proposed Rule Changes Eliminated from Detailed Study

As described in Section 2.2, development of the revised Hydraulic Code Rules has included several iterations and has evaluated several different approaches to the rule revisions. The major options considered but not carried forward are described in the following sections. The reasons for eliminating the alternatives are provided. Generally, the alternatives were eliminated because they did not meet the project purpose by not updating the rules to reflect recent fish science and design technology or making the rules consistent with other regulations (Section 1.2). Several of the approaches were rejected because they did not simplify the application process or provide increased certainty for applicants.

2.5.1 Alternatives

2.5.1.1 Development of Habitat Conservation Plan

As described in Section 1.1, WDFW originally began revising the Hydraulic Code Rules as part of developing an HCP. The HCP development effort was abandoned in 2012 when the approach lost the support of agencies and tribes. WDFW is no longer developing an HCP.

2.5.1.2 "Prescriptions Only" Approach

Early in the process, WDFW considered a prescription-only alternative, which would only contain rules, as directed by RCW 77.55.081 and RCW 77.55.091, for removal or control of noxious weeds and for small scale mining and prospecting. With those two exceptions, the Hydraulic Code Rules would not include general permits or general requirements applicable to construction activities. Instead, each proposed hydraulic project would be evaluated on a site-by-site basis. All requirements for each project, (no matter how common or routine that type of project is), would be established through an analysis of the unique conditions present at that specific site. Protection of fish life would be optimized site-by-site.

This alternative was contained in the SEPA Scoping Notice issue in June 2012. WDFW eliminated this alternative from further consideration because the complexity and cost of implementing such an approach made the alternative infeasible for WDFW to implement. The approach would provide no certainty for applicants, etc.

2.5.1.3 Procedural Alternative

A procedural alternative was proposed early in the planning process. That alternative would have only made changes to the Hydraulic Code Rules that were necessary because of changes to the enabling laws, including recodifications. This approach would have met the purpose of ensuring that the rules met statutory requirements; however, it would not incorporate best available science, nor would it necessarily improve protection of fish, shellfish, and their habitats.

2.5.1.4 One Activity at a Time Alternative

This alternative proposed an approach similar to that used by WDFW to update the rules for mineral prospecting. The rules for only one selected activity at a time would be updated. While this approach could meet the project purpose for the selected activity, it would not improve the application process, and would not ensure that the permit program as a whole meets the regulatory standard of fish, shellfish, and their habitats.

2.5.1.5 "Most Commonly Permitted" Activity

This alternative would have only changed sections of the Hydraulic Code Rules that cover the most-frequently permitted types of construction projects. While this approach could have met the purpose and need for the selected activities, it would not improve the application processing or ensure that the rules as a whole met the regulatory standard of protection of fish, shellfish, and their habitats.

2.5.2 Proposed Rule Changes

In addition to alternatives that were proposed but not carried forward, WDFW received numerous suggestions for individual rule changes that were not incorporated into the proposed rules. Many of those comments were received during the scoping process for this PEIS. The recommendations and the reasons for not incorporating them are summarized in Appendix A.

2.5.3 Adaptive Management

Adaptive management addresses the lack of current knowledge about how hydraulic projects affect fish life. Adaptive management integrates a continual learning process into ongoing management through monitoring. Monitoring is essential to adaptive management. Monitoring is the only way to assess the department's success at achieving the objective of protecting fish life. Consequently, the department will monitor hydraulic project compliance and effectiveness to improve HPA program management through time.

Chapter 3 Affected Environment

3.1 Introduction

This chapter describes environmental resources potentially affected by adoption of the revised Hydraulic Code Rules. Because the rules will be implemented statewide and the environmental landscape of Washington State varies widely from region to region, a general description of the resource categories is provided. The focus of the discussion is on the portions of the existing natural and built environments that will be most affected by implementation of the Hydraulic Code Rules. Because water resources and fish will be most affected, more detail is provided on those resources. This EIS does not include descriptions of the affected environment or impacts for resources unlikely to be affected by the Hydraulic Code Rules.

Resources included in this EIS are:

- Fish
- Water Resources
- Earth
- Climate
- Wildlife
- Vegetation
- Land and Shoreline Use
- Recreation
- Cultural Resources
- Social and Economic Issues

3.2 Fish

The freshwater rivers and lakes of Washington State provide habitat for a variety of fish species. The connection of these waters to Puget Sound and the Pacific Ocean provides habitat for a large number of salmon species, or salmonids. Salmonid populations in general have experienced declines across the state and several species are listed as threatened or endangered under the ESA or have special status listings in Washington State (See Section 3.2.5). The following sections describe salmonids and other species of other fish found in Washington's waterbodies.

3.2.1 Freshwater Resident Salmonids

Resident salmonids remain in freshwater habitat for their entire life cycle. All resident salmonids require clean, cool water to thrive. Some populations of resident salmonids in Washington State are

declining. A number of factors have been attributed to the declines including the loss of suitable rearing habitat, water quality degradation, and loss of clean spawning gravels.

Resident salmonids typically feed on plankton, insects, other invertebrates, and smaller fish. Some of the most important and widespread native species of resident salmonids are rainbow trout, cutthroat trout, bull trout, and Dolly Varden. These species are discussed in more detail below. In addition to those species discussed below, there are a number of introduced (nonnative) resident salmonid species in Washington's lakes and streams including brown trout, golden trout, Lahontan cutthroat trout, lake trout, eastern brook trout, and tiger trout (hybrid between a brook trout and brown trout).

Rainbow Trout – Rainbow trout are widely distributed in Washington's lakes and streams and are the state's most popular game fish. Because of their popularity, natural populations are supplemented by WDFW stocking programs that add over 17 million rainbow trout each year to the state's lakes and streams. Resident rainbow trout generally grow to a length of 18-24 inches. Rainbow trout include the sub-species of concern known as the red-band trout that is native to Washington State and other parts of the Columbia River basin.

Cutthroat Trout – Resident coastal cutthroat trout are found in streams and ponds throughout much of western Washington. Although they may grow to a length of about 18 inches, in smaller bodies of water they may grow no larger than eight or nine inches. One group, or what is referred to as a Distinct Population Segment (DPS), of coastal cutthroat trout, the Southwestern Washington DPS, was proposed for listing as a threatened species under the ESA in 1999; however, the Southwest Washington DPS of coastal cutthroat trout is currently only identified as a federal species of concern. Westslope cutthroat trout, another subspecies of cutthroat trout, are more common in eastern Washington lakes and streams and are stocked by WDFW in a number of high-country lakes.

Bull Trout – Although commonly called trout, bull trout are actually members of the char subgroup of the salmon family. Scientists distinguish char from other salmonids (trout and salmon) by the absence of teeth in the roof of the mouth and the presence of light colored spots on a dark background (trout and salmon have dark spots on a lighter background). Bull trout living in streams may grow to about four pounds while those living in lakes reach a weight of 20 pounds. Some bull trout live out their lives in areas near where they were hatched (resident), while others migrate from streams to lakes and reservoirs (adfluvial), from small streams to larger river systems (fluvial), or to salt water bodies (amphidromous) a few weeks after emerging from their nests. While bull trout are known to live as long as 12 years, they reach sexual maturity between four and seven years of age. They spawn in gentle stream reaches with cold, unpolluted water and gravel and cobble substrate. Spawning occurs in the fall after stream temperatures have dropped to a satisfactory level. Bull trout were listed as threatened by the USFWS in 2001; critical habitat was most recently identified in 2012.

Dolly Varden – As with bull trout, Dolly Varden are members of the char subgroup of the salmon family (salmonids). Dolly Varden are common in many rivers and some lakes in coastal areas of Washington. The Dolly Varden is similar in appearance to bull trout, but is generally smaller. Dolly Varden populations have generally been declining, and fishing for Dolly Varden has been restricted in a number of areas by WDFW. Dolly Varden (*Salvelinus malma*) was proposed for listing as endangered by the USFWS in 2001 due to similarity of appearance with bull trout and because they occur together only

within the area occupied by the Coastal-Puget Sound bull trout DPS (66 Federal Register 6). A designation of threatened or endangered under the similarity of appearance provisions of the ESA extends the take prohibitions of Section 9 to cover the species. However, under section 4(e) of the ESA, a designation of threatened or endangered due to similarity of appearance, does not extend other protections of the ESA, such as the consultation requirements for federal agencies under section 7 of the ESA.

3.2.2 Anadromous Salmonids

Fish that hatch and rear in freshwater, spend a portion of their life in salt water, and then return to freshwater to spawn are referred to as anadromous species. In Washington, the five Pacific salmon species including Chinook, coho, chum, sockeye, and pink salmon as well as steelhead exhibit this migratory life history form. Two other species, native to Washington waters, exhibit a similar migratory life history form, which is termed amphidromous. Unlike strictly anadromous species such as Pacific salmon, amphidromous species often return seasonally to fresh water as subadults sometimes for several years before returning to spawn. These species include the coastal cutthroat trout, often referred to as the sea-run cutthroat trout, and bull trout.

Salmon habitat extends from the smallest inland streams to the Pacific Ocean and is comprised of a vast network of freshwater, estuarine, and ocean habitats. Freshwater habitats are used by salmon for spawning, incubation, and juvenile rearing. In estuarine habitats, juvenile salmon experience rapid growth and make critical adjustments in the chemical balance of their body fluid as they transition between fresh and salt water. Salmon gain most of their adult body mass in ocean habitats before returning to rivers to spawn.

Throughout their lives, salmon feed on a variety of freshwater and marine invertebrate organisms and fishes, while being fed upon by a variety of parasites, predators, and scavengers. Juvenile salmon feed on salmon carcasses, eggs, and invertebrates, including invertebrates that may have previously fed on salmon carcasses such as caddis flies, stoneflies, and midges. Thus, returning salmon provide a flow of nutrients into freshwater habitats and play a critical role in the ability of watersheds to retain overall productivity of salmon runs.

Salmon populations have declined significantly over the past several decades such that many salmon stocks in Washington State are now listed by the National Marine Fisheries Service (NMFS) as either threatened or endangered under the federal ESA.

Chinook Salmon – Chinook salmon are the largest of all salmon. There are different seasonal "runs" or modes in the migration of Chinook salmon from the ocean to freshwater. These runs are usually identified as spring, summer, fall, or winter based on when the adult salmon enter freshwater to begin their spawning migration. Freshwater entry and spawning are believed to be related to local water temperature and water flow regimes. An adult female Chinook will prepare a spawning bed, called a redd, in a stream area with suitable gravel composition, water depth, and velocity. An adult female may deposit four to five "nesting pockets" within a single redd. Chinook salmon eggs will hatch 90 to 150 days after deposition and fertilization by males. Juvenile Chinook may spend from three months to two years in freshwater before migrating to estuarine waters as smolts. After a period of

rapid growth, the smolts migrate to the ocean to feed and mature. Juvenile Chinook that spend a shorter amount of time in freshwater (weeks to several months) before migrating to the ocean are often referred to as "ocean maturing" as opposed to those that spend an extended amount of time in freshwater before migrating to the ocean, which are referred to as "freshwater maturing". Chinook remain in the ocean for one to six years, most commonly two to four. Chinook salmon are the largest of the Pacific salmon, typically about 40 pounds; although those with long ocean residence time can sometimes grow to over 100 pounds.

Coho Salmon – Coho salmon spend approximately half their life cycle rearing in streams and tributaries. The long freshwater rearing period makes coho salmon more dependent on flow and freshwater habitat than salmonids with shorter freshwater rearing times. The remainder of their life cycle up to the point of returning to their stream of origin to spawn and die is spent foraging in estuarine and marine waters of the Pacific Ocean. Most adults return as three year olds; however, small number return after two. A mature coho is usually about 2 feet in length and weighs an average of about 8 pounds.

Chum Salmon – Chum salmon are large salmon, second only to Chinook salmon in size. They spawn in the lower reaches of rivers and creeks, typically within 60 miles of the Pacific Ocean. They migrate almost immediately after hatching to estuarine and ocean habitats; thus, survival and growth of juvenile chum depends less on freshwater habitat conditions than on estuarine and marine habitat conditions. They usually arrive at their stream of origin from November to the end of December. Most chum salmon mature in between three to five years. The weight of a mature chum salmon is between 18 to 22 pounds.

Sockeye Salmon – Sockeye salmon exhibit a variety of life history patterns that reflect varying dependency on freshwater environments. Most sockeye salmon spawn in or near lakes where juveniles rear for one to three years before migrating to the ocean. For this reason, the major distribution and abundance of this salmon species is closely related to the location of rivers that have accessible lakes in their watersheds, such as the Wenatchee River (Lake Wenatchee) and Cedar River (Lake Washington).

There are also non-anadromous forms of sockeye salmon that spend their entire life in fresh water. Occasionally, a portion of the juveniles in an anadromous population will remain in their rearing lake environment throughout their lives and will eventually spawn together with their anadromous siblings. In Washington State, non-anadromous sockeye are referred to as kokanee.

Pink Salmon – Pink salmon are the most abundant northwest salmon. They spawn in odd number years a short distance up coastal rivers. With only a two year life cycle, they tend to be small relative to other salmon, averaging three to four pounds and seldom reaching 10 pounds (WDFW, 2001).

Steelhead – Steelhead are sea- going rainbow trout. They begin their lives in freshwater rivers and creeks where they rear for two years before migrating to marine waters. Consequently, they are very dependent on flows and freshwater habitat. They reside in marine waters for one to six years (typically two to three years), then return to their home streams to spawn. Unlike salmon, which die after their spawning runs, adult steelhead can return to the sea and repeat the cycle. Adult steelhead

typically range from 5 to 14 pounds; although, those with long ocean residence time may reach about 30 pounds.

Most steelhead spawn from mid-winter to late-spring; however, two distinct "runs" of steelhead return to freshwater at different times, a winter run and a summer run. Winter run steelhead return to numerous streams in Washington from November to the end of April. WDFW stocks hatchery winter run-steelhead in about 75 streams to enhance fish populations. Summer run steelhead return to freshwater from April to the end of September in about 36 Washington rivers and creeks. Summer-run hatchery stocks are planted in approximately 45 rivers and creeks by WDFW (WDFW, 2001). In general, summer run steelhead migrate longer distances to reach their spawning grounds and thus enter freshwater in a less than developed reproductive state. Winter steelhead, on the other hand, tend to enter streams at an advanced stage of sexual maturity (gonads fully developed) and therefore do not have to travel as far before spawning. For example, steelhead that migrate into the upper Columbia and Snake River drainage are "summer run" steelhead, while most runs, although not all, in the Puget Sound drainages are "winter run" steelhead.

3.2.3 Other Fish

This discussion of "other fish" is comprised of two subsections: freshwater fish and salt water fish. It is recognized that some of the fish described below live at least a portion of their lives in estuaries or portions of rivers affected by tides that are transitional areas between freshwater and marine waters. In addition, native and non-native species, such as white sturgeon, eulachon, longfin smelt, Pacific lamprey, and American shad are anadromous.

3.2.3.1 Freshwater Species

Approximately 70 non-salmonid fish species can be found in freshwater bodies of Washington State at some point in their life cycles. Of this number, over 30 species are introduced including some of the more popular sport fish such as: largemouth bass, smallmouth bass, walleye, crappie, yellow perch, channel catfish, tiger muskie, and bluegill. Native freshwater species include sturgeon, the largest freshwater fish species; a variety of minnows such as northern pikeminnow, redside shiner, leopard dace, and speckled dace; burbot (a member of the cod family); largescale sucker; Columbia River smelt (eulachon), and a number of sculpin species (WDFW, 2001).

3.2.3.2 Saltwater Species

A number of fish species are present in the marine waters of Washington State. Puget Sound alone, excluding the outer Washington Coast, is represented by 71 families of fish. A complete list of the marine fishes of Puget Sound can be found at: http://www.burkemuseum.org/static/FishKey/. Species of interest, primarily because of importance to recreational and commercial fisheries include species such as: Pacific herring, Pacific cod, walleye Pollock, numerous rockfish species, ling cod, Pacific halibut and others. Other representative families include the sharks, rays, sculpin, sablefish, and gunnels. Marine forage fish including sand lance and surf smelt utilize the intertidal areas of beaches for reproduction and are thus at an increased risk of exposure to development activities along the marine

nearshore. Protection of these and other forage fish species including Pacific herring are important because they provide a source of food for a variety of fish and wildlife species including salmon.

3.2.4 Other Aquatic Organisms

Saltwater habitats associated with Washington's marine waters support a variety of mollusk species including several recreational and commercial shellfish species. In addition to clams and oysters, the marine waters of Puget Sound and the Washington Coast contains crab, geoduck, abalone, mussels, razor clams, shrimp, the Pacific giant octopus and squid. The following sections briefly describe those species relevant to the Hydraulic Code Rules.

3.2.4.1 Native Aquatic Organisms

In addition to the numerous fish species that occupy marine and freshwater habitats in Washington State, there are also just as many, if not more, organisms including crustaceans (crabs, shrimp, and crayfish), mollusks (gastropods and bivalves), echinoderms (starfish, urchins, and sea cucumbers).

The Dungeness crab (*Cancer magister*) and red rock crab (*Cancer productus*) are recreationally and commercially harvested in Washington waters. Clams, oysters, and abalone are also recreationally and commercially harvested in the marine water of Washington. The Pacific oyster, which is the largest component of the commercially harvested oysters in Washington State was introduced from Japan in the early 1900s. The Olympia oyster is native to Washington State and is also a relevant commercial species. Other mollusks off the Coast of Washington and within Puget Sound that are both commercially and recreationally harvested include geoduck clam, razor clams, native littleneck clams, cockles, horse clams, manila clams (non-native), eastern soft-shell clams, macoma clams, bay mussels and California mussels. Other species of annelids (worms), echinoderms, mollusks and crustaceans include: pandalid shrimp, pink shrimp, abalone, nudibranchs, sea stars, sea cucumbers, scallops, Pacific giant octopus, market squid, sea urchins, anemone, sand dollars, and polychaete worms.

Freshwater mollusks are also present in Washington State and include species such as the blue gray taildropper, California floater, giant Columbia River limpet, Dalles sideband, among others. Washington is home to only one native freshwater crayfish, the signal crayfish (*Pacifasticus leniusculus*). Several non-native and invasive crayfish have also been documented in Washington waters. Another important component of the freshwater environment is the presence of healthy populations of aquatic macroinvertebrates. Aquatic macroivertebrates are an important food source for numerous fish species as well as other aquatic and terrestrial organisms. Aquatic macroinvertebrates are the larval stage of insects including mayflies, stoneflies, caddis flies, dragonflies and damselflies, dipterans (mosquitoes and midges) to name a few. These organisms play a critical role in the food-web of the freshwater aquatic environment as most resident and juvenile salmonids depend upon them for their survival.

Many of the native aquatic species also have special status listings either at the Washington State level or under the ESA. A list of these species is included in Appendix B.

3.2.4.2 Invasive Aquatic Organisms

"Aquatic invasive species" means nonnative species classified by the state fish and wildlife commission under RCW 77.12.020 as prohibited aquatic animal species or regulated aquatic animal species, or

aquatic plants. Once nonnative species become established in a new environment where natural enemies, pests, or disease that kept them in check in their native environment are missing, they may spread rapidly and cause unanticipated negative biological and economic impacts. There are numerous examples of the impacts of aquatic invasive species in both marine and freshwater environments in Washington State. Freshwater invasive species include the New Zealand mudsnail (*Potamophyrgus antipodarum*), the Asian clam (*Corbicula fluminea*), and Eurasian water milfoil (*Myriophyllum spicatum*). Invasive species in the marine environment of Washington include the European green crab (*Carcinus maenus*), the oyster drill (*Ceratostoma inornatum*), Cordgrass (*Spartina spp*.), Japanese eelgrass (*Zostera japonica*) and several non-native tunicates including the club tunicate (*Styela clava*), transparent tunicate (Ciona savignyi), and colonial tunicate (*Didemnum vexillum*). More information on aquatic invasive species in Washington State can be found at: http://wdfw.wa.gov/ais/.

3.2.5 Species and Habitats with Special Status

Table 3-1 notes the fish species and habitats with special status designations under the federal ESA as well as those with special status in Washington State. Those with special status designations under the ESA include species listed as endangered, threatened, candidate species, species proposed for listing as threatened or endangered, species of concern, and those areas designated or proposed as critical habitat. Critical habitats are those areas that are essential to the conservation of the species. Those with special status designations in Washington State are those considered "species of concern" by WDFW, which includes those species listed as State Endangered, State Threatened, State Candidate, State Sensitive, or State Monitor.

Table 3-1. Listed Fish Species

Common Name (ESU/DPS)	Scientific Name	State Status	Federal Status	Designated Critical Habitat
Bull trout	*Salvelinus confluentus*	SC	FT	Designated
Chinook salmon (Lower Columbia)	*Oncorhynchus tshawytscha*	SC	FT	Designated
Chinook salmon (Puget Sound)	*Oncorhynchus tshawytscha*	SC	FT	Designated
Chinook salmon (Snake R. Fall)	*Oncorhynchus tshawytscha*	SC	FT	Designated
Chinook salmon (Snake R. Sp/Su)	*Oncorhynchus tshawytscha*	SC	FT	Designated
Chinook salmon (Upper Columbia Sp)	*Oncorhynchus tshawytscha*	SC	FE	Designated
Chinook salmon (Upper Willamette)	*Oncorhynchus tshawytscha*	SC	FT	Designated
Chum salmon (Hood Canal Su)	*Oncorhynchus keta*	SC	FT	Designated
Chum salmon (Lower Columbia)	*Oncorhynchus keta*	SC	FT	Designated
Coho salmon (Lower Columbia)	*Oncorhynchus kisutch*	none	FT	Proposed
Coastal cutthroat trout (SW WA)	*Oncorhynchus clarki clarki*	none	Fco	none
Sockeye salmon (Ozette Lake)	*Oncorhynchus nerka*	SC	FT	Designated
Sockeye salmon (Snake R.)	*Oncorhynchus nerka*	SC	FE	Designated
Steelhead (Lower Columbia)	*Oncorhynchus mykiss*	SC	FT	Designated
Steelhead (Middle Columbia)	*Oncorhynchus mykiss*	SC	FT	Designated
Steelhead (Puget Sound)	*Oncorhynchus mykiss*	none	FT	Proposed
Steelhead (Snake River)	*Oncorhynchus mykiss*	SC	FT	Designated
Steelhead (Upper Columbia)	*Oncorhynchus mykiss*	SC	FT	Designated
Steelhead (Upper Willamette)	*Oncorhynchus mykiss*	SC	FT	Designated
Black rockfish	*Sebastes melanops*	SC	none	none
Bocaccio rockfish	*Sebastes paucispinis*	SC	FE	none
Brown rockfish	*Sebastes auriculatus*	SC	FCo	none

Common Name (ESU/DPS)	Scientific Name	State Status	Federal Status	Designated Critical Habitat
Canary rockfish	*Sebastes pinniger*	SC	FT	none
China rockfish	*Sebastes nebulosus*	SC	none	none
Copper rockfish	*Sebastes caurinus*	SC	FCo	none
Eulachon	*Thaleichthys pacificus*	SC	FT	Designated
Green sturgeon	*Acipenser medirostris*	none	FT	Designated
Greenstriped rockfish	*Sebastes elongatus*	SC	none	none
Kokanee (Lk Sammamish)	*Oncorhynchus nerka*	none	FC	none
Lake chub	*Couesius plumbeus*	SC	none	none
Leopard dace	*Rhinichthys falcatus*	SC	none	none
Margined sculpin	*Cottus marginatus*	SS	FCo	none
Mountain sucker	*Catostomus platyrhynchus*	SC	none	none
Olympic mudminnow	*Novumbra hubbsi*	SS	none	none
Pacific cod (S&C Puget Sound)	*Gadus macrocephalus*	SC	FCo	none
Pacific hake (Pacific-Georgia Basin DPS)	*Merluccius productus*	SC	FCo	none
Pacific herring	*Clupea pallasi*	SC	FCo	none
Pacific Lamprey	*Entosphenus tridentatus*	SM	FCo	none
Paiute sculpin	*Cottus beldingi*	SM	none	none
Pygmy whitefish	*Prosopium coulteri*	SS	FCo	none
Quillback rockfish	*Sebastes maliger*	SC	FCo	none
Redstripe rockfish	*Sebastes proriger*	SC	none	none
Reticulate sculpin	*Cottus perplexus*	SM	none	none
River lamprey	*Lampetra ayresi*	SC	FCo	none
Salish sucker	*Catostomus catostomas*	SM	none	none
Sand roller	*Percopsis transmontana*	SM	none	none
Slimy sculpin	*Cottus cognatus*	SM	none	none
Tiger rockfish	*Sebastes nigrocinctus*	SC	none	none
Umatilla dace	*Rhinichthys umatilla*	SC	none	none
Walleye pollock (So. Puget Sound)	*Theragra chalcogramma*	SC	FCo	none
Widow rockfish	*Sebastes entomelas*	SC	none	none
Yelloweye rockfish	*Sebastes ruberrimus*	SC	FT	none
Yellowtail rockfish	*Sebastes flavidus*	SC	none	none

State Endangered (SE), State Threatened (ST), State Candidate (SC), State Sensitive (SS), State Monitor (SM)
Federal Endangered (FE), Proposed Endangered (FPE), Threatened (FT), Proposed Threatened (FPT), Candidate (FC), or Species of Concern (FSC).

3.3 Water Resources

With approximately 50,000 miles of rivers and streams, 7,800 lakes, and 3,200 miles of coastline, water is an essential resource for the economic, social, and cultural well-being of the state of Washington. These areas provide the necessary physical, chemical, and biological elements to support the numerous fish and wildlife species that inhabit these aquatic habitats. The Washington State Hydraulic Code is intended to protect these resources and allow for the fish and wildlife dependent upon these systems to thrive and maintain diversity.

3.3.1 Surface Water

The construction of hydraulic projects or any work that will use, divert, obstruct, or change the flow or bed of a watercourse is regulated under the Hydraulic Code Rules. "Watercourse" means any portion of a channel, bed, bank, or bottom waterward of the ordinary high water line of waters of the state, including areas in which fish may spawn, reside, or pass, and tributary waters with defined bed or banks

that influence the quality of fish habitat downstream. This includes watercourses that flow on an intermittent basis or that fluctuate in water levels during the year, and applies to the entire bed of such watercourse whether or not the water is at peak level. A watercourse includes all associated wetlands. RCW 77.08 (Definitions) defines "State waters" as all marine waters and fresh waters within ordinary high water lines and within the territorial boundaries of the state. This includes freshwater rivers and streams, lakes, and marine waters and shorelines as described in the following sections.

The definition for "State waters" in RCW 77.08 does not include watercourses and waterbodies that are considered artificial. This includes irrigation ditches, canals, stormwater treatment and conveyance systems, or other entirely artificial watercourses, except where they exist within in a natural watercourse that has been altered by humans. As such, construction of projects within these artificial watercourses is not regulated under the Hydraulic Code Rules.

3.3.1.1 Freshwater - Rivers and Streams

The Columbia River, the largest river in the western United States, drains the eastern portion as well as part of the southwestern portion of Washington. Because of the large volume of water conveyed by the Columbia River and substantial change in elevation along its course, a number of hydroelectric dams have been constructed on the river, including 11 in Washington State. As such, many reaches of the Columbia are controlled pools or artificial lakes behind dams, such as Franklin D. Roosevelt Lake behind Grand Coulee Dam. The largest tributary of the Columbia, the Snake River, is also highly developed for hydroelectric power generation with four dams in operation within Washington. Other major tributaries of the Columbia River in eastern Washington, listed from upstream to downstream, include the Pend Oreille, Kettle, Colville, Spokane, Sanpoil, Okanogan, Methow, Chelan, Entiat, Wenatchee, Yakima, Walla Walla, Klickitat, and White Salmon river systems. Washington tributaries of the Columbia River in the reach flowing from the Cascade Range Divide to the Pacific Ocean include the Wind, Washougal, Lewis, Kalama, Coweeman, Cowlitz, Elochoman, and Grays river systems. A number of large western Washington river systems discharge to Puget Sound, including, from north to south, the Nooksack, Skagit, Stillaguamish, Snohomish, Duwamish-Green, Puyallup, Nisqually, and Deschutes. Hood Canal, the western arm of the Puget Sound, is the receiving body for several moderate to large size river systems including the Quilcene, Dosewallips, Duckabush, Hamma Hamma, and Skokomish.

Rivers on the north end of the Coast Range region flow into the Strait of Juan de Fuca, which connects Puget Sound with the Pacific Ocean. These include the Dungeness, Elwha, Lyre, and Hoko rivers systems. Rivers on the west side of the Coast Range region flow directly into the Pacific Ocean or embayments of the ocean such as Grays Harbor and Willapa Bay. These include the Sol Duc, Hoh, Queets, Quinault, Humptulips, Chehalis, and Willapa river systems.

Streamflow in the state's rivers is primarily determined by the amount and type of precipitation that falls during winter months. Precipitation that falls during the remainder of the year is typically returned to the atmosphere through evaporation and transpiration by plants. Stream flows in rivers whose headwaters are at relatively low elevations and that are located in areas where winter temperatures are above freezing for most of the winter and are dominated by rainfall patterns. They respond quickly and

directly to rainfall events and generally have a strong winter peak in their annual flow pattern (hydrograph). The Chehalis River is an example of a river exhibiting this type of flow pattern.

Precipitation feeding rivers whose headwaters are at relatively high elevations and/or are located in areas where winter temperatures are below freezing for most of the winter falls predominantly in the form of snow. Generally, flows in such rivers are low during the winter, but peak strongly in spring and early summer corresponding to snowmelt within their watersheds. Most eastern Washington rivers, including the east-slope Cascade rivers, exhibit this flow pattern.

Rivers originating from the higher portions of the Olympic Mountains and the upper west-slopes of the Cascade Mountains have headwaters in areas where snowfall is the predominant form of winter precipitation, but temperatures are above freezing for most of the winter in the reaches below the headwaters. Flow patterns in such rivers typically show a winter peak associated with seasonal rainfall in the mid- and lower reaches as well as a spring or early summer peak associated with snowmelt in the upper reaches (Hamlet et al. 2001). However, rivers that are fed by glacial melt water, in addition to snow pack, will exhibit a different flow pattern. Glaciers can contribute a considerable amount of flow to rivers during late summer and early fall after the snow pack has melted and when precipitation is normally low.

An increase in human development has affected ecological processes in many freshwater bodies within Washington. Development has affected changes in hydrologic, hydraulic, sediment, and temperature regulation/water quality functions.

Hydrologic Stressors

Hydrologic alteration has occurred in many rivers and streams within Washington. Hydrologic alteration can be defined as any human-caused disruption in any of the five important characteristics of a flow regime: magnitude, frequency, duration, timing (or predictability), and the rate of change (or flashiness) (Poff et al., 1997). Hydrologic alterations resulting from dam construction and other human activities have negatively impacted the biodiversity and ecological integrity of rivers worldwide (Dudgeon, 2000; Pringle et al., 2000).

These consequences of hydrologic alteration have included habitat fragmentation, conversion of lotic (moving-water) habitat to lentic (still-water) habitat, variable flow and thermal regimes, degraded water quality, altered sediment transport processes, and changes in timing and duration of floodplain inundation (Cushman, 1985; Pringle, 2000). These alterations can result in adverse impacts on crucial life stages of aquatic organisms, such as reproduction, recruitment or migration, and a reduction in riparian and wetland functions. These alterations have occurred through three major pathways including: 1) modifications of the landscape, or watershed, through land-use activities, 2) surface water diversion, and 3) construction of impoundments.

Modifications to the landscape through human-caused land-use activities, including development, forestry, and farming has resulted in negative effects to all the characteristics of a flow regime. A decrease in areas with native soils and vegetation and commensurate increases in impervious surfaces reduces the infiltration, interception, and evapotranspiration of precipitation and can reduce

groundwater recharge and increase surface water runoff. This in turn can result in more frequent and abnormally intense peak stream flows, reduced base flows, and other hydrologic effects.

There are presently 1,141 dams in the State of Washington, including 106 dams that are greater than 50 feet in height (Ecology, 2013). Many of these dams are located on large river systems, including the Columbia River, and impound substantial quantities of water, which is used for power generation, drinking water, and irrigation. Water releases from these structures often does not coincide with the natural hydrologic regime, resulting in substantial hydrologic alterations.

Similar hydrologic alterations can occur due to stream or lake diversions of water for human uses. These withdrawals alter the hydrologic regime, and can result in extremely low streamflow in the summer months. Groundwater withdrawals can also have similar effects, reducing groundwater recharge capability of streams. Lastly, land-use activities also can alter natural drainage and flood pathways, result in a loss of open channel area, and decrease surface water storage areas through loss of wetlands and floodplains.

Flood risk is a major concern for projects in proximity to the waters of Washington State. Flooding of rivers, streams, and other shorelines is a natural process that is affected by factors and land uses occurring throughout the watershed. Past land use processes have disrupted hydrological processes and increased the rate and volume of runoff, thereby exacerbating flood hazards and reducing ecological functions.

Flood risk is regulated by local flood-damage-prevention ordinances adopted in compliance with the National Flood Insurance Program. Streambank stabilization measures, shore armoring, and flood risk reduction are regulated by the Shoreline Management Act and the Critical Areas regulations of GMA. Flood hazard reduction measures often consist of structural measures that are regulated by the hydraulic code rules, including dikes, levees, revetments, floodwalls, shore armoring, and channel realignment. Nonstructural flood hazard reduction measures can also include hydraulic projects such as dike removal and wetland restoration.

Hydraulic and Sediment Stressors

Human development has also resulted in changes to natural hydraulic and sediment functions and processes. Two of the physical functions affected are slope/bank stability and sediment transport. Development has often resulted in simplified and straightened stream channels that are often confined within levees or dikes, with hardened/armored banks, limited floodplain area or channel migration zone (CMZ), lack of bankside riparian vegetation, and limited or no channel complexity and structure. These simplified channels, which are also usually affected by changes in the hydrologic effects discussed above, can result in dramatic changes in sediment transport processes by altering natural erosion (scour) and depositional patterns and increasing stream velocities. Bank erosion can result, leading to a surplus of fine sediments that can be transported downstream and deposited. Also, altered hydrologic and hydraulic processes, coupled with alteration of riparian areas, can simplify instream structure, including channel form, stream and floodplain roughness, and debris presence and recruitment.

Stream Temperature and Water Quality

Changes to stream temperature and water quality regulation also result from human disturbance and development. Cleared riparian zones increase the amount of solar radiation reaching a waterbody, which can result in substantial increases in stream temperature in small and medium-sized waterbodies. Furthermore, when these riparian areas are developed and lack vegetation, the ability of the landscape to infiltrate and intercept chemicals in stormwater runoff is decreased, resulting in greater increases in pollutant loading.

3.3.1.2 Freshwater - Lakes

The state has numerous fresh water lakes, the largest of which is Lake Chelan, an approximately 55-mile long glacial lake in north central Washington. The state's lakes include naturally formed lakes, constructed reservoirs on rivers and streams, and natural lakes that are artificially raised and/or controlled through constructed impoundments. Lakes are typically fed by water from inflowing rivers or creeks, but may also be fed by groundwater and direct precipitation.

Human-caused stressors within lacustrine (lake) systems in Washington have resulted from increased human development around lake edges. In addition, many lakes are dammed or the outlet otherwise restricted, which in turn has caused hydrologic and water quality effects in some lakes.

3.3.1.3 Marine Waters and Shorelines

The major marine water features of Washington State are comprised of the Pacific Ocean, the Strait of Juan de Fuca, and Puget Sound, including Hood Canal (Figure 3-1). Additional marine water features are large coastal estuaries including Grays Harbor at the mouth of the Chehalis River, Willapa Bay at the mouth of the Willapa River, and the Columbia River estuary at the mouth of the Columbia River, as well as the straits and bays of the San Juan Archipelago. Fifteen counties have marine shorelines--Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum, and Whatcom counties. Collectively, these counties share 2,337 miles of marine shoreline comprised of 157 miles of Pacific coastline, 144 miles of coast along the Strait of Juan de Fuca, 89 miles in Grays Harbor, 129 miles in Willapa Bay, 34 miles in the Columbia River Estuary, and 1,784 miles bordering Puget Sound and the Strait of Georgia. Approximately 73 percent of these shorelines consist of sand or pebble beaches, while 27 percent consist of rocky headlands, marshes, or other shoreline types (Ecology and NOAA, 2001).

Increased human development along marine shorelines and increased use of marine waters for transportation has resulted in shoreline armoring and overwater structures (e.g., docks, bulkheads, piers), alteration of drift cell and sediment dynamics (piers, jetties, breakwaters, and marinas), degraded water quality from stormwater runoff, degraded nearshore conditions from loss or alteration of estuarine, wetland, and riparian habitats. The loss of estuary habitat due to fill placement and disconnection of floodplain and tidal wetlands in the estuary is also a factor limiting salmon productivity.

3.3.2 Water Quality

Ecology's most recent federal Clean Water Act section 303(d) list was approved by the U.S. Environmental Protection Agency (EPA) in December 2012. The list is part of Ecology's Water Quality

Assessment, which categorizes waters in Washington State into five categories. Category 5 constitutes the 303(d) list, the list of impaired water bodies that require a total maximum daily load (TMDL) plan. The list assesses water bodies for over 100 parameters, including temperature, fecal coliform, dissolved oxygen, instream flow, bacteria, and turbidity. Ecology's 303(d) list can be accessed at: http://www.ecy.wa.gov/programs/wq/links/wq_assessments.html.

An EPA report based on 2008 monitoring lists the most prevalent causes of impairment to rivers and stream to be, in order: water temperature, fecal coliform, dissolved oxygen, pH, instream flow, and polychlorinated biphenyls (PCBs). For lakes, the most prevalent causes of impairment were PCBs, invasive exotic species, water temperature, dissolved gas, dioxin, and fecal coliform. For marine waters, the most prevalent causes of impairment were fecal coliform, dissolved oxygen, invasive exotic species, sediment bioassay, PCBs, and metals (EPA, 2013).

3.3.3 Wetlands

Wetlands under RCW 90.58.030 (Shoreline Management Act of 1971) are defined as:

> Those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Washington State has a wide variety of wetlands, ranging from the estuarine salt marshes of Puget Sound and the Pacific Coast, riparian wetlands adjacent to rivers streams as an integral part of riparian habitat, potholes and vernal pools of eastern Washington, and high elevation meadows and fens. Many of the freshwater wetlands of western Washington are associated with ponds, lakes, rivers, and shorelines; however, a significant number of wetlands are "isolated" wetlands, wetlands that are not directly connected to other surface water bodies. Such wetlands depend on groundwater discharge and precipitation for their hydrology. The climate of eastern Washington gives rise to a variety of permanent and intermittent wetlands that are typically very different from western Washington wetlands in their origin, seasonality, chemistry, and plant species distribution.

Wetlands in the state are critical to maintaining regional biodiversity. Although wetlands represent only 2.1 percent of the area of the state (Dahl, 1990), over two-thirds of all terrestrial vertebrate species in Washington can be considered "wetland users" (Knutson and Naef, 1997; Kaufmann et al., 2001). Wetlands also provide important habitat structure for anadromous and resident fish (Sheldon et al., 2005). Anadromous and resident fish benefit from:

- Ponded or impounded surface waters that are either seasonal or permanent and connected to streams;
- Interspersed land and water or shorelines that provide protection from wind, waves, and predators, and natural territorial boundaries;
- Varying depths of water, such as deep and shallow pools (e.g., shallow waters provide refuge for some young freshwater fish, while the deeper waters provide refuge for the larger adults);

- Overhanging vegetation that regulates water temperature;
- Vegetation cover that provides protection from predation (e.g., overhanging or submerged vegetation, submerged logs and rocks, floating debris); and
- Large woody debris that provides cover and habitat for macroinvertebrates.

Many of Washington's wetlands have been lost since the early 1900s due to various types of development activities (e.g., urban development, utility infrastructure construction, logging, and agriculture). Many of the remaining wetlands in the state have been degraded through alteration of hydrology, sedimentation, removal of vegetation.

3.4 Earth

The geology of Washington State is very complex and has been shaped by a variety of geologic processes including subduction of the Pacific Plate, dormant and active volcanism, and repeated glaciation. These processes have created a complex patchwork of geologic regions that are illustrated on Figure 3-1 and described below.

The far western portion of Washington State is part of the Coast Range region. The Coast Range consists of the Willapa Hills of southwest Washington and the Olympic Mountains, which extend north from the Chehalis River valley and form the Olympic Peninsula. The Puget Trough, a structural depression that extends the length of the state, lies to the east of the Coast Range. The Puget Trough is generally flat, but in places is characterized by hummocky glacial deposits. A substantial portion of the northern half of the trough is occupied by Puget Sound, a marine estuary of the Pacific Ocean.

East of the trough is the geologically complex Cascade Range. This range, which extends the entire length of the state, separates western Washington from eastern Washington. The most prominent geographic feature in the southeast portion of the state is the Columbia Plateau. The plateau is an extensive basin formed by numerous basalt flows. The Columbia and Snake Rivers flow through deeply incised trenches cut into the plateau largely as a result of the Missoula Floods that occurred during the last ice age (approximately 15,000 years ago).

The northeast portion of the state is occupied by several mountainous areas including the Okanogan Highlands, the Kettle River Range, and the Selkirk Mountains, a portion of the Rocky Mountain Range.

According to the Natural Resource Conservation Service's (NRCS) *Washington Soil Atlas*, broad variation in topography, climate, and geologic formations within the state has caused there to be thousands of recognized soil types in the state (Hipple, 2013). Common parent materials for soil in Washington include volcanic ash, glacial till, granite, schist, limestone, basalt, and tuff. Portions of southeast Washington are occupied by fertile, windblown dust called loess.

3.5 Climate

Washington's climate varies dramatically from west to east with the western part of the state having a mild, humid climate and the eastern part a more extreme and dry climate. Western Washington has frequent cloud cover and considerable fog and rain. Portions of western Washington on the west side

of the Olympic Mountains receive as much as 160 inches per year of precipitation, making that area the wettest in the 48 conterminous states. Precipitation in the Puget trough is much less, typically in the range of 40 to 50 inches per year with approximately 60 to 80 percent of that total falling in the six-month period between October and March. Some areas of western Washington experience the rain shadow effect of the Olympic Mountains and have significantly less rainfall. For example, average annual precipitation for the City of Sequim is only 16 inches.

Precipitation increases dramatically near the Cascade Mountains. Palmer, a site approximately 20 miles west of the Cascade crest, receives an annual average of 90 inches of precipitation. In an average year, Snoqualmie Pass, located at the Cascade crest, receives a water equivalent of 104 inches of precipitation, although much of that precipitation falls in the form of snow.

Temperatures in western Washington are moderate. Typical average maximum temperatures in July for western Washington are about 70°F in coastal areas, and 5 to 10 degrees warmer inland. Average minimum temperatures in July are generally in the low to mid-50s (F). Average maximum temperatures in January are in the mid-40s (F) with average minimum temperatures in the low 30s (F).

Many portions of eastern Washington receive less than 10 inches of total annual precipitation, and much of that precipitation falls in the form of snow. Total precipitation approaches 20 inches per year in areas closest to the Cascade Range and the Selkirk Mountains.

Temperature ranges in eastern Washington are more extreme than those of western Washington. Characteristic average maximum temperatures in July are in the mid-80s (F) to near 90°F. Average minimum temperatures in July are generally in the mid- to upper 50s (F). Average maximum temperatures in January are in the low to mid-30s (F), except in southeast Washington where the average maximum temperatures are closer to 40°F. Average minimum temperatures in January are typically in the teens to mid-20s (F).

3.5.1 Climate Change

According to the *Washington Climate Change Impacts Assessment*, average annual temperatures in the Pacific Northwest are anticipated to increase by 2.0° F by the 2020s, 3.2°F by the 2040s, and 5.3°F by the 2080s. Increases in temperature are projected to decrease precipitation as snow, resulting in decreasing snowpack in Washington by 28 percent by the 2020s, 40 percent by the 2040s, and 59 percent by the 2080s. Changes in the magnitude of snowpack and timing of snowmelt will shift streamflow timing. Stream temperatures would rise, impacting quality and extent of fish habitat. By the 2080s, periods of thermal stress for salmon would double or possibly quadruple in duration. Increases in thermal stress are projected to be greatest in the Interior Columbia River Basin and the Lake Washington Ship Canal. Sea level rise associated with climate change is expected to increase bluff erosion and shift coastal beaches inland (Climate Impacts Group, 2009).

3.6 Wildlife

The wildlife of Washington State is quite diverse. This diversity of species inhabit an equally diverse variety of habitat types ranging from desert to rainforest in the terrestrial environment, and mountain spring to ocean in the aquatic environment. The variety of amphibian, reptile, bird, mammal, mollusk,

arthropod, and echinoderm life in Washington State prohibits an exhaustive listing of species and habitats. However, wildlife most pertinent to the Hydraulic Code Rules includes species that use freshwater and saltwater bodies and their riparian or shoreline vegetation for nesting, breeding, foraging, and refuge. The following sections generally describe groups of species and particular wildlife that rely on habitats provided by watercourses in the state.

3.6.1 Marine mammals

Three kinds of marine mammals—cetaceans (whales, dolphins, and porpoises), pinnipeds (seals and sea lions), and mustelids (sea otters)—occur within the project vicinity. A complete list of all federally and state listed marine mammals is provided in Appendix B. All marine mammals are federally protected under the Marine Mammal Protection Act, regardless of their listing status under ESA.

The order Cetacea consists of whales, porpoises, and dolphins. Cetaceans are either filter feeders that use their baleen to strain plankton and other tiny organisms from the water, or toothed whales that feed primarily on fish, squid, and crustaceans. Larger toothed whales also eat aquatic birds and mammals (including other cetaceans). (Nowak,1999; Reeves, et al., 2002).

Over 20 species of cetaceans are present in the marine waters of Washington State. Six of these species are federally listed under ESA, including killer whale, gray whale, humpback whale, blue whale, sperm whale, sei whale, and Northern Pacific right whale. Many of these species, such as blue whale and sei whale are relatively rare visitors to the Salish Sea and generally inhabit areas of the continental shelf where they migrate along the Pacific coast between their breeding grounds and feeding grounds. However, these species are occasionally present in the waters of Washington State, while other species such as killer whale spend considerable portions of the year within the Salish Sea and inner coastal waters.

Pinnipeds distributed in Washington State include Northern fur, Northern elephant, and harbor seals, and California and Steller sea lion. Seals and sea lions generally feed on fish, squid, octopus, and shellfish, and crustaceans. The distribution of these species varies substantially. For example, harbor seals are considered a non-migratory species, breeding and feeding in the same area throughout the year while several of other pinnipeds are migratory, moving hundreds or thousands of miles from their breeding grounds in Mexico, Canada, Oregon, and Washington. For example, although California and Steller sea lions do not breed in Washington waters they utilize portions of Puget Sound and the lower Columbia River, where they feed on salmon. Pinnipeds temporarily leave the water between periods of foraging (haulouts), along shorelines, and often congregate on beaches, logbooms, docks, and floats. Steller sea lion is federally listed under ESA.

Sea otter, a mustelid, is also distributed within the marine waters of Washington. Previously widely distributed within the State, they now occupy almost exclusively rocky habitat along the Olympic Peninsula coast and western Strait of Juan de Fuca (Lance et al., 2004). Sea otters feed primarily on shellfish species including sea urchins, clams, crabs and mussels.

3.6.2 Amphibians

Amphibians, which include frog, toad, newt, and salamanders, inhabit a wide variety of habitats with most species living within terrestrial or freshwater aquatic ecosystems. Most amphibians typically begin as larva living in water. The young generally undergo metamorphosis from larva with gills to an adult air-breathing form with lungs. Amphibians use their skin as a secondary respiratory surface and some small terrestrial salamanders and frogs lack lungs and rely entirely upon skin. Tadpoles and aquatic amphibians utilize gills for respiration. Some amphibian species are fully aquatic throughout life, some take to the water intermittently, and some are entirely terrestrial as adults.

Within the State of Washington, several species of frogs and toads are closely associated with open water areas such as streams, lakes, and wetlands, and riparian areas (Johnson and O'Neil, 2001). These include bull frog (*Rana catesbeiana*), Cascades frog (*Rana cascadae*), northern red-legged frog (*Rana aurora aurora),* Pacific chorus frog *(Hyla regilla)*, Western toad (*Bufo boreas*) and Oregon-spotted frog (*R. pretiosa*). Oregon spotted frog is listed as a candidate species under the ESA.

Although salamanders reproduce in Washington's freshwater streams and ponds, the adults for most salamander species are also closely associated with open water areas such as streams, lakes, wetlands, and riparian areas (Johnson and O'Neil, 2001). Salamander species present within Washington include Long-toed salamander (*Ambystoma macrodactylum*), Northwestern salamander (*A. gracile*), and Pacific giant salamander (*Dicamptodon tenebrosus*), Dunn's Salamander (*Plethodon dunni*) Van Dyke Salamander (*P. vandykei*), and Western Red-backed salamander (*P. vehiculum*). Cascade torrent salamander, (*Rhyacotriton cascadae*), and Olympic Torrent Salamander (*R. olympicus*) (Jones et al, 2006). The rough-skinned newt (Taricha granulosa) is also distributed in Washington. None of these species is listed under ESA, although some species of salamander are federal species of concern and/or state candidate species (see Appendix B).

3.6.3 Reptiles

Reptiles are a class of cold-blooded (poikilothermic) egg-laying vertebrate animals with scales or scutes (bony plates). They include lizards, snakes, and turtles. Of these species, turtles are most associated with marine and freshwater habitats. Several species of sea turtle freshwater turtle are present within aquatic and terrestrial habitats within Washington.

Sea turtles include the leatherback sea turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), and Olive Ridley sea turtle (*Lepidochelys olivacea*). While all of these species are known to inhabit offshore areas of the Columbia River mouth and Puget Sound, they are rare within Washington waters with no known significant nesting (breeding) locations. Only the leatherback sea turtle has been sighted in Puget Sound (Strait of Juan de Fuca). All four of these species are listed as threatened or endangered under the ESA (see Appendix B).

Washington has only two native land based turtles, the painted turtle (*Chrysemys picta*) and the Western pond turtle (*Clemmys marmorata*), both of which live exclusively in freshwater ponds and streams. Western pond turtle is classified as a state endangered species (see Appendix B).

3.6.4 Birds

A wide variety of birds, comprising hundreds of individual species, are documented as spending at least a portion of their lives within the boundaries of Washington. The following discussion focuses on those groups of birds most closely associated with freshwater and marine aquatic habitat.

Waterfowl include swans, geese and ducks, mid-sized to large birds most commonly found on or near water. Most waterfowl feed while on the water, diving or by submerging their bodies to search for fish, plants and invertebrates. Approximately 50 species of waterfowl are distributed in Washington State.

Loons are large, fish-eating birds with spear-shaped bills and long, thickset necks that utilize their diving ability to expert divers, able to dive to depths of approximately 250 feet and remain underwater for long periods. All loon species nest on fresh water, but are found most commonly in winter on saltwater. There are only five species of loons worldwide, and all five have been seen in (Washington Seattle Audubon Society, 2013).

Six species of grebes are present within Washington. Grebes are water-dwelling diving birds with thick, waterproof plumage, which consume fish, aquatic insects, and other small water creatures. During the breeding season they can be found on marshy ponds, where they build floating nests and in the winter, grebes live on open water.

Albatrosses and petrels, also known as tube-nosed seabirds, spend much of their life on the open ocean foraging from the water's surface. For most species, the nesting season is the only time of the year that they touch land. Four species of albatross, 12 species of shearwaters and petrels, and four species of storm-petrels utilize nearshore and offshore areas within Washington.

Pelicans and cormorants are aquatic, medium-sized to large, and feed on small fish and other animals found in the water that mostly nest in colonies. Representatives of five of the order's six families have been found in Washington, including one species of tropicbirds, two species of boobies, two species of pelican, and one species of frigatebird.

Herons and ibises are large birds with long legs and necks. Many live on or near water where they wade in search of prey and many breed in colonies. Herons and egrets are generally colony associated wading birds that generally inhabit wetlands and slow-moving waters. Nine different species have been observed in Washington, as have three species of ibis, tactile feeders that generally inhabit wetlands and use their long, often decurved bills to probe in shallow water or mud for invertebrates or small vertebrates.

Rails, coots, and cranes are members of a diverse group of mostly aquatic or marsh-dwelling birds. Despite their wet habitat, members of this order do not have webbed feet, although in some groups their strong toes are slightly webbed or lobed. Coots and rails are generally omnivorous wetland dwellers that use a variety of foraging techniques. Four species of coots and rails are distributed within Washington on both sides of the Cascade Mountains (Seattle Audubon Society, 2013). A single species of crane, the sandhill crane is distributed in Washington. These cranes nest in wetlands in areas that are surrounded by lodgepole pine, ponderosa pine, grand fir, or Douglas fir forests.

The order Charadriiformes is well represented in Washington, and includes a large and highly varied group of birds representing shorebirds, gulls, and auks. Most of this group consists of water birds that feed on invertebrates or small aquatic creatures. These include plovers (nine species in Washington State), oystercatchers (one specie), stilts and avocets (two species), sandpipers and phalaropes (approximately 40 species), gulls and turns (approximately 30 species), skuas and jaegers (four species), and auks, murres, and puffins (14 species) (Seattle Audubon Society, 2013).

Of the bird species discussed above, two are currently listed under the ESA. These are the short-tailed albatross (*Phoebastria albatrus*), listed as endangered, and the Western snowy plover (*Charadrius alexanfrinus nivosus*) listed as threatened (Appendix B). Other listed bird species, such as northern spotted owl and marbled murrelet, are not associated with aquatic habitats. Many of the bird species included in the groups discussed above have a designated state status (see Appendix B).

3.6.5 Beavers

Beavers are widely distributed across Washington State along rivers, small streams, lakes, and wetlands where there is deep, calm water or adequate year-round flow. Beavers build dams across streams and other watercourses to impound water and create deep-water protection from predators, access to food supplies, and underwater entrances to dens. Beaver can have substantial effects on streams and riparian habitat. Through dam building and feeding, beavers alter hydrology, channel geomorphology, biogeochemical pathways, and community productivity (Naiman et al., 1986).

Beaver ponds and associated wetlands provide fish rearing habitat and habitat for birds and mammals (e.g., Bisson et al., 1987; Brown et al., 1996; McCall et al., 1996). Ponds also provide surface water and bank storage that can improve summer instream flow and benefit fish. Multiple studies have noted the interaction that used to exist between beavers and riparian areas and streams prior to the elimination of beaver in many locations (Naiman et al., 1986; Gurnell, 1998). Changes in hydrologic regime can also affect beaver populations. For example, streams with higher and more frequent peak flows affect dam building and stability. Relevant to the Hydraulic Code Rules, persistent breaching or removal of a beaver dam can increase the risk of negative impacts to fish habitat.

3.6.6 Other Species that Utilize Riparian Habitats

Throughout the state, riparian habitat occurs in areas adjacent to rivers, streams, seeps, and springs. Riparian areas provide diverse and productive habitat for wildlife because of the availability of water, moist rich soils, and a variety of plants. In addition to being critical for healthy fish populations, approximately 85 percent of the state's terrestrial (land) animals use riparian habitat for essential life activities (WDFW, 1998).

Riparian habitats provide large mammals (e.g., opossum, beaver, fox, mink, otter, elk, and deer) with an abundance of prey and carrion, a productive and varied plant community, reduced winter snow accumulation, vegetation in early spring, aquatic habitat and transportation corridors (Raedeke et al., 1988). Forested riparian habitat offers an abundance of snags that provide shelter for cavity-nesting birds and mammals (e.g., woodpecker, chickadee, wren) and a food source for tree-clinging, insect eating birds (e.g., nuthatches). Amphibians, reptiles, and small mammals find shelter in or under

downed trees and under dense vegetation. Large animals such as deer, elk, and moose can seek refuge from intense summer heat in relatively cool riparian zones (WDFW, 1998).

The size of the riparian area and the extent of interaction between the land and the water vary with the size of the stream (Bilby, 1988). Riparian habitat along smaller headwater streams is usually insufficient to support large mammals. Lowland riparian areas along large rivers once provided productive wildlife habitat, but has been highly modified by humans. Aquatic species such as otter, beaver, nutria, muskrat and mink are most affected by changes in size and composition of riparian areas (Raedeke, 1988).

3.6.7 Listed Species and Species of Concern

Appendix B lists the federally threatened or endangered wildlife species and those that are considered "species of concern" by WDFW, which includes those species listed as State Endangered, State Threatened, State Sensitive, or State Candidate. This table does not include those species designated as State Monitor that have no federal status.

3.7 Vegetation

The flora associated with watercourses in Washington varies between the east and west side of the Cascade Mountain range and between fresh and salt waters. As distance from the watercourse and elevation increase, changes in soil, moisture, temperature, precipitation, and other factors combine to create conditions that are suitable for different plants.

3.7.1 Riparian Species – Native and Invasive

Riparian areas on the west side of the state are extensions of a temperate rain forest and support species such as black cottonwood, red alder, and western red cedar. A dense shrub layer is typically present (e.g., Indian plum, oceanspray, salal) and the floor of the forest has a dense coverage of ferns and mosses. East of the Cascades riparian areas are dominated by willow species, black cottonwood, and other deciduous shrubs and are adjacent to ponderosa pine forests, shrub-steppe or grassland environments. Many watercourses east of the Cascades are void of riparian vegetation due to previous land activities and development.

Riparian vegetation communities present along the shores of Puget Sound are very diverse. Some of the more common trees and shrubs are the same as those found in freshwater riparian areas such as Douglas fir, Pacific madrone, vine maple, oceanspray, and salmonberry. Alder and maple (both vine and big leaf) forest communities are a common occurrence along the shores of Puget Sound. Salt-tolerant vegetation found in the backshore of beaches or in mudflats includes saltgrass and saltweed, pickleweed, seaside arrowgrass, and dune wildrye. Marine riparian vegetation communities are particularly important because they exhibit greater biodiversity than inland vegetation communities and influence the health and integrity of marine habitats and species (Brennan, 2007). Riparian areas maintain local biodiversity, and their ecological functions provide the basis for many valued fisheries, in addition to bird and other wildlife habitat (National Research Council, 2002).

3.7.2 Aquatic Species – Native and Invasive

Freshwater aquatic environments support native and invasive vegetation including algae. Floating plants can have leaves on the surface and be rooted to substrates (e.g., water lilies, pondweeds), tangled mats of stems, leaves, and flowers also rooted to substrates (e.g., water primrose or purslane, water pennywort), or entirely free floating (e.g., duckweed). Other species of pondweed, waterweed, startwort or bladderwort can grow entirely underwater at shallow depths. Several species of freshwater aquatic plants are considered invasive as they overrun habitats and crowd out native species, such as Eurasian watermilfoil.

Saltwater environments contain seagrasses, kelp, sea lettuce, and other macroalgae species. Eelgrass is common rooted seagrass that spreads horizontally at shallow water depths throughout intertidal and subtidal zones. Beds of *Zostera marina* and *Z. japonica* (an invasive species) are found throughout much of the Puget Sound shoreline growing in muddy and sandy substrates (Mumford, 2007). Kelp is a large seaweed present in intertidal and subtidal zones. Twenty-three species of kelp are found in Puget Sound, making it one of the most diverse kelp floras in the world (Druehl, 1969). Sea lettuce (several species of the genus *Ulva*) grows in shallow bays and inlets and can grow and accumulate rapidly in thick piles driven by winds and currents during summer months. All types of seaweeds, including sea lettuce, are essential components of the Puget Sound ecosystem. They provide food for several species of sea birds, fish, and other marine animals, as well as shelter for several fish species.

3.8 Land and Shoreline Use

Land use in Washington State is highly diverse. Portions of the Cascade Range and the Olympic Mountains are dedicated to federally owned wilderness areas, national parks, national recreation areas, and national forests. Approximately 30 percent of land in the State is federally owned. The national forests are managed for multiple uses including commercial timber production and recreation. Private forest lands are common in mountainous areas such as the coast range, Cascades, and northeast Washington. Land privately managed for timber production (e.g., Weyerhauser, Georgia Pacific, and Plum Creek) also accounts for 9.4 million acres (43 percent) of Washington's forest lands (Erickson and Rinehart, 2005).

The lowlands of Puget Sound are heavily urbanized and include some of the state's largest cities such as Seattle, Tacoma, Everett, Bellingham, Bremerton, and Olympia. Areas around Spokane, Richland, Kennewick, Pasco, Yakima, and Wenatchee in eastern Washington are also characterized by urban-level development. These urbanized areas are home to much of the state's population, as well as its manufacturing, commercial, and service industry base.

The state is also the site of extensive agricultural development. In western Washington, agricultural development is concentrated in the major river valleys, particularly those in the Puget Sound region. Major portions of eastern Washington have been developed for agricultural production. The Yakima, Wenatchee, and Okanogan River Valleys and the Columbia Basin in the central part of eastern Washington contain large scale irrigated agriculture. Southeast Washington is extensively developed for dry- land farming of primarily wheat.

Land use in riparian areas is managed by local zoning and critical areas ordinances, the Growth Management Act (Chapter 36.70A RCW) and the Shoreline Management Act (Chapter 90.58 RCW). The Growth Management Act requires affected cities and counties to designate their rural areas and urban growth areas and to conduct capital facilities planning to ensure that adequate public facilities are provided concurrent with future growth within designated urban growth areas. The Growth Management Act also requires all counties and cities to develop and adopt development regulations to protect critical areas such as wetlands, fish and wildlife habitat, and aquifer recharge areas. The Shoreline Management Act requires counties to adopt local master programs, which must be approved by Ecology. Shoreline Master Programs are intended to protect shorelines from development and to require mitigation of impacts where appropriate. Local Shoreline Master Programs are required to include regulations for shoreline stabilization measures and in-water work. More information on land use regulations is included in Section 1.5.5 of this document.

3.9 Recreation

Waters of the State of Washington are used extensively for recreation. Citizens of the state, as well as visitors, enjoy sightseeing, waterfowl watching, hunting, fishing, and other water oriented activities. Water activities include a variety of different pursuits including swimming or wading, motor boating, water skiing, personal water craft use (e.g., jet skis), sail boating, hand-power boating (kayaking, canoeing, or rowing), white water rafting, inner tubing, wind surfing, surfboarding, scuba diving, and beachcombing.

Water-oriented recreation in Washington often revolves around docks, piers, and marinas. Both publicly-owned and privately-owned marinas are common in Washington State. New docks are regulated by the Shoreline Management Act, which includes a policy preference for joint-use docks. However, privately-owned docks associated with single-family residential uses remain more common in the state.

Water recreation in and around smaller streams can include the construction of "play" structures along the shoreline. Some "water play" involves the impoundment of streams (construction of "recreational dams") to enhance the depth of a swimming hole, for example. These recreational structures can impede fish migration within the creek as flows decline into the fall months. In some cases, spawning migrations are impacted, to the detriment of fish productivity.

Recreation that is related to the presence of healthy fish life is a major economic engine in Washington, particularly in more rural areas. USFWS estimates in its 2011 report[1] that expenditures for recreational fishing in Washington tops $974,615,000. It is vital to the ecological health and community sustainability of Washington State that fish resources be protected.

[1] 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation U.S. Fish and Wildlife Service publication FHW/11-WA, Issued June 2013

3.10 Cultural Resources

Cultural resources consist of archeological, historic, and traditional cultural places including buildings, structures, sites, districts, objects, and landscapes. The State Department of Archeology and Historic Preservation (DAHP) has recorded over 20,000 archeological and traditional cultural places and over 100,000 historic properties within the state. This information is maintained in the Washington State Inventory of Cultural Resources.

Under the State Environmental Policy Act, potential significant adverse impacts to historic, archeological, and traditional cultural places associated with project actions must be identified and evaluated. The DAHP is the agency responsible for providing formal opinions to local governments and other state agencies on a site or property's significance and the potential impact of a proposed project action upon such sites or properties. Similarly, the National Historic Preservation Act requires that all federal agencies consider cultural resources as part of all licensing, permitting, and funding decisions. Governor's Executive Order 05-05 requires that state agencies integrate DAHP and tribes into their capital planning processes in order to protect cultural sites.

Many of the state's rivers and other surface water bodies have cultural significance to some population groups, including many Native American tribes. Rivers and their tributaries can be viewed as being analogous to the bloodstream of a watershed and have great importance on both a practical and spiritual level. For this reason, riparian and marine areas often have a higher likelihood of presence of historic and cultural resources.

3.11 Social and Economic Issues

In addition to forestry and agriculture (as discussed in Section 3.8), major industries in Washington State include computer software, aircraft, electronics, aluminum production, real estate, and retail. Other major industries in the state that rely on access to water include hydroelectric power generation, tourism, recreation, and importing and exporting.

The rivers, lakes, and marine waters of Washington State are central to many social and economic drivers in the state in addition to the many businesses that are dependent on access or proximity to water. Single-family residences are often located in proximity to water, including undeveloped residential plots. The economy of Washington is also dependent on its transportation infrastructure, much of which (including state and federal roads, bridges, railways, and the Washington State Ferry system) is located in proximity to waters regulated by the Hydraulic Code Rules.

Chapter 4 Regulated Activities and Effect on the Environment

4.1 Introduction

This chapter describes the impacts that could result from adoption of the revised Hydraulic Code Rules. Because this is a programmatic EIS that is evaluating the general impacts of implementing the revised rules, potential impacts are discussed generally. Specific hydraulic projects that require an HPA would be evaluated under the new Hydraulic Code Rules. This chapter compares the impacts of implementing hydraulic projects under the No Action Alternative (existing rules) and the Preferred Alternative (revised rules).

Because the Hydraulic Code Rules only apply to projects that effect the bed or flow of state waters, the resources that would be most affected are water resources, fish, and earth. Potential impacts to those resources are discussed in more detail below. Other resources that would be less affected or only indirectly affected by the revised rules are discussed in less detail.

Impacts of the No Action Alternative are evaluated primarily through a comparison with the revised rules. A brief description of the impacts of No Action is provided for each resource. Impacts to Fish are described first and a detailed comparison of impacts between the No Action Alternative and the Preferred Alternative is provided in Table 4-1. Corresponding effects to Water Resources, Earth, Wildlife, and Vegetation are discussed and reference the analysis in Table 4-1 because of the similarity in impacts.

4.2 Fish

There have been significant gains over the last decade and since the last revisions were made to the Hydraulic Code Rules with respect to how activities within our waterways affect fish and to a greater extent how these affects can be minimized by implementing specific design criteria, using avoidance measures where appropriate, implementing construction related BMPs, and adhering to allowable work windows aimed at protecting various life history forms of fish, primarily salmonids. The following text outlines potential impacts to fish resulting from activities regulated under the revised Hydraulic Code Rules.

4.2.1 No Action Alternative

Under the No Action Alternative, the revised rules would not be adopted and the rules would remain inconsistent with current science and design technology. Table 4-1 includes a comparison of the effect to fish from the existing rules and the revised rules . The following narrative provides a description of these elements.

4.2.2 General Impacts of Hydraulic Projects on Fish

This section provides a narrative discussion of the potential impacts of regulated activities on fish life. The impacts discussion is based primarily on the Fish Life Concerns included for each activity in the proposed Hydraulic Code Rules supplemented with additional information where necessary.

4.2.2.1 Freshwater

Construction or the performance of other work activities in or near the watercourses can alter the habitat that fish and shellfish depend on. Direct damage or loss of habitat causes a direct loss of fish and shellfish production. Damaged habitat can continue to cause lost production of fish and shellfish for as long as the habitat remains altered. Work activities can also alter the physical processes that form and maintain fish habitat such as hydrologic patterns and sediment movement. The types of impacts associated with various hydraulic projects include:

- *Alteration of light regime*
- *Alteration of migration patterns*
- *Disturbance of streambank or lake shoreline*
- *Direct loss of habitat*
- *Disturbance of riparian habitat*
- *Disturbance of substrate*
- *Alteration to stream morphology*
- *Alteration to sediment movement patterns*
- *Alteration to hydrologic patterns*
- *Impact to aquatic plants*
- *Alteration of beaver dams*
- *Felling and yarding of timber*
- *Aquatic plant removal and control*

4.2.2.2 Impacts to Fish Habitat

Alteration of light regime – Activities that add structures such as piers, floats, ramps, or marinas and terminals over freshwater shoreline habitats result in reduced light or shading of fish habitats, which reduces the survival of aquatic plants. Aquatic plants provide food, breeding areas, and protective nurseries for fish. Marinas and terminals have a larger impact area than residential docks and they are usually associated with heavy boat traffic and human use.

The shading and light reduction created by overwater structures may alter predator prey relationships. Overwater structures may contribute to attracting and congregating juvenile salmon for example and may also provide the necessary ambush habitat for predators of juvenile salmon such as smallmouth and largemouth bass. Overwater structures, especially if dense enough along the shoreline, may reduce phytoplankton primary productivity and therefore negatively affect food-web interactions and productivity at higher trophic levels.

The introduction of artificial lighting along docks, piers, and marinas may also result in altered predator-prey relationships by concentrating prey species and providing increased opportunities for predators. Artificial lighting may also result in behavioral effects by interrupting normal light/darkness patterns.

For example, nocturnal predators may show avoidance patterns and have reduced foraging success if prey is attracted to the light and the predator is repelled by the light.

Alteration of migration patterns – Activities that introduce in-water structures can alter the movement of juvenile salmon, steelhead and other fish species. The structure itself can physically block migration or force fish into deeper water and the light/dark of shading/no shading can affect migration, and increase risk of predation. Boat ramps and launches placed above bed grade can block sediment and wood movement, and alter nearshore migration of juvenile fish. Piers may increase the exposure of juvenile salmon, steelhead and other small fish to potential predators by providing predator habitat and changing migration patterns from shallow to deeper water. This can alter the natural predator/prey relationship to the detriment of listed and priority fish species.

Activities that install fishways such as ladders or weirs can impact the migration of some fish. Fish passage structures that consider the passage of one species or class of species may unintentionally limit the passage of other important species. Species selection can alter species composition and community relationships upstream of the passage barrier, with important implications for conservation of individual species and biodiversity.

Activities that install off-channel ponds for livestock watering, irrigation, fire protection or another purpose can provide beneficial habitat or can have detrimental effects on fish. Ponds can disrupt fish movement and also support elevated temperatures that are harmful to fish life. However, in some cases where off-channel habitat (areas of low energy) is limiting, these areas can provide important refugia from high flow events and important rearing habitat.

Certain activities may contribute to creating physiological barriers to migration. For example, construction activities that create large amounts of turbidity may delay migration.

Disturbance of streambank or lake shoreline - Activities that install permanent or temporary structures for the purpose of protecting or stabilizing a streambank or lake shoreline can result in loss of habitat or alter the bed or beach and the physical processes that form and maintain fish habitat. Direct loss of habitat may include loss of cover, spawning beds, large woody material, riparian function, floodplain connectivity, and alteration to the channel/beach that decreases the complexity of diversity of fish habitats. Bank protection and stabilization methods are either hard approaches or soft approaches. Hard approaches armor the bank with material such as riprap, concrete, or timber. Hard approaches are intended to resist shear forces experienced at the work area that would cause erosion of the bank. Soft approaches attempt to mimic natural processes with the use of biotechnical methods such as live plantings, rootwads, and large woody material (LWM). Soft approaches to streambank protection are generally less impacting to fish life than are hard approaches.

Direct loss of habitat - Activities that replace river or lakebed habitat used by fish and shellfish include the installation of boat ramps or launches, marinas and terminals, water diversions and intakes, and outfall structures. Bridges and their piers can also cause the loss of river or lakebed habitat. The larger the number of these structures in a given area, the greater the loss and fragmentation of habitat.

Disturbance of riparian habitat - Activities that require construction along streambanks or shorelines can disturb or remove riparian habitat. For example, streambank and shoreline stabilization activities

may require disturbance of the riparian zone during construction. The installation of outfalls can cause a direct loss of bank side riparian habitat to accommodate the structure or during construction. Activities that remove sand and gravel from the streambed may also involve extensive clearing of vegetation. This decreases loading of large woody material in the channel that is important as cover for fish and short term loss of macroinvertebrates that are food for fish. Road widening, new roads, powerline corridors, residential, commercial, industrial development, trails, utility infrastructure, agriculture and other activities have the potential to disturb and degrade riparian conditions.

Disturbance of substrate – Activities that disturb freshwater or nearshore substrates include installation of piles for piers or boat ramps and launches. Other activities that disturb sediment include dredging to improve vessel navigation or moorage to maintain channels and sediment traps for flow conveyance, and for flood abatement. Dredging activities for the purpose of cleaning up contaminated sediments also affect substrates. Dredging in lakes converts shallow-water habitats into deeper-water ones and may create a steeper bottom transition. This may change the size and species distribution of fish in the localized environment, altering predator/prey dynamics. The effect of dredging on rivers is more complex because localized alteration of channels can lead to dynamic shifts in channel form as the system adjusts to the changed conditions. Dredging may result in a loss of spawning gravel. These effects can extend a considerable distance beyond the bounds of the original dredging project.

Alteration to stream morphology – Activities that remove sand and gravel from the streambed can change the channel shape and bed elevation and may involve flow diversion, sediment stockpiling, and excavation of deep pits. Sand and gravel removal can also produce a local sediment shortage that can reduce spawning potential and success in gravel-starved stream reaches. Loss of gravel bar head control can create significant channel head cutting upstream from the project.

Bank protection can prevent the stream channel from naturally migrating across the floodplain. This can eliminate sources of woody material, sediment and side channels. Natural Channels evolve over time and migrate across their floodplains. When a channel naturally moves to a new alignment, it leaves behind vital habitat, such as floodplain sloughs and side channels. If the natural fluvial processes of a stream are restricted or interrupted, these side-channel habitats will diminish in productivity and will not be replaced. These habitats cannot be mitigated by the design of a project. They are lost when a channel is fixed in a specific location, regardless of the bank-protection technique.

Activities that involve changing or relocating a stream channel for the purpose of restoring habitat lost because of human uses can result in short term impacts. Channel realignment and bank regrading typically destroy bank and bed habitat in the active channel and will temporarily lead to elevated suspended sediment concentrations. This may result in the downstream burial of invertebrates, elevated suspended solids, and habitat destruction. In-channel work will have a much greater impact on the bank and channel when compared with off-channel work.

Activities that remove, place, and relocate large woody materials in stream channels are conducted where it is necessary to address a threat to life, the public, or property caused by streambank erosion or flooding. These activities can result in short term impacts during construction similar to those described for channel relocation. In general, this material must be replaced in a location within the stream where it could not result in damage, but would continue to contribute to the creation of complex habitats.

Alteration to sediment movement patterns – Activities that remove sand and gravel from an active channel bed may affect sediment movement if it disrupts the sediment balance in the river. This disruption may cause channel adjustments that extend considerable distances beyond the excavation site. Outfalls can increase erosion and lead to an increase in sediment supply to downstream reaches of rivers and streams and trap (accumulate) sediment. Overwater structures also act as groins, which affect longitudinal connectivity and sediment flow. In general, any activity that alters the channel profile by altering the slope or channel width can potentially have an adverse impact on sediment delivery.

Mineral prospecting and mining activities can alter streambed morphology and sediment movement patterns as a variety of machines, including suction dredges, high bankers, and other heavy equipment is used to remove large quantities of valuable minerals. These alterations affect the physical processes that form and maintain fish habitat.

Alteration to hydrologic patterns – Activities that introduce water crossing structures such as bridges or culverts can restrict the flow of streams and rivers and/or affect the movement and distribution of wood and sediment. Activities that involve surface trenching through streambanks and channels for the purpose of installing utility lines may also cause a proportion of surface and subsurface flows to shift, altering stream hydrology.

Impact to aquatic plants – Activities that install new structures and introduce associated vessel activity can cause aquatic vegetation disturbance or directly remove vegetation, which can affect fish life. Marinas and terminals have a larger impact area than residential docks and they are usually associated with heavy boat traffic and human use which can cause fish to avoid the area.

Alteration of beaver dams – Activities that remove, breach, or modify a beaver dam are conducted where it is necessary to address a threat to life, the public, or property caused by flooding. Such activities are only conducted when the use of water level (flow) control or beaver exclusion devices are not feasible. Breaching, notching or removing a dam can negatively affect fish, shellfish and their habitat by de-watering the upstream pond, stranding fish, releasing sediment and large volumes of water (that can be devoid of oxygen) downstream. The release of sediment can affect downstream spawning areas. The breaching or removal of a beaver dam may not prevent future beaver activity in the area. Persistent breaching or removal of a beaver dam can increase the risk of negative impacts to fish habitat.

Felling and yarding of timber – The potential impacts of felling and yarding of timber in a riparian area include: logs accidentally entering a watercourse and damaging existing riparian vegetation or stream channel banks and the release sediment to waters downstream of felling or yarding activities.

Aquatic plant removal and control – Activities that use physical and mechanical methods to remove aquatic noxious weeds are allowed; however, removal of aquatic plants can have an adverse impact on fish because they use plants as cover both for hiding from predators as well as prey and for foraging. Fish could potentially be directly harmed or injured during vegetation removal activities. These activities can also result in an increase in turbidity as bottom sediments are disturbed and suspended in the stream. These impacts are generally short in duration and do not persist following completion.

4.2.2.3 Impacts that directly harm fish

Construction or the performance of other work activities in or near the watercourses can kill or injure fish or shellfish directly. The types of impacts associated with various hydraulic project activities include:

Direct injury to fish - In addition to harming habitat, activities that dredge within freshwater streams or lake shorelines may kill and injure fish and shellfish when dredging equipment traps fish in the uptake of sediments and water.

Mineral prospecting and mining activities can harm fish by physically disturbing eggs or fry incubating within the bed or cause mortality from passing vulnerable fish through mineral prospecting equipment.

Fish can also be harmed during the fish salvage efforts (e.g., electrofishing, seining, dip netting) depending upon the method of fish removal and other environmental factors.

Sound waves generated by pile driving or blasting can cause injury or mortality.

Entrainment and stranding - Activities that remove sand and gravel from the streambed can create trenches or pits in the bed that can trap fish and lead to mortality. Surface water diversions are common instream features in agricultural areas where the water is used for irrigation. Throughout the state, people also divert water for other agricultural, hydropower, industrial, recreational, residential, municipal, and hatchery purposes. To protect fish, including salmon and steelhead, Washington State law (RCW 77.57.070 and RCW 77.57.010) requires that all surface water diversions be screened to prevent fish from being drawn into the diversions where they are at risk for injury or death.

For many project types, isolation of in-water work areas and the subsequent dewatering of those areas are required to allow construction activities to occur "in the dry." This is fairly common for projects such as bridge and culvert replacements. After isolation of the work area within cofferdams or via other means, the water left remaining within these isolated areas is pumped out to allow work to occur in the dry. Sometimes fish can be missed during salvage efforts and can be sucked into pump intakes or pumped to upland areas where they eventually die.

Impacts to water quality - Activities that disturb substrates release suspended sediments into the water column that can affect fish by interfering with breathing and feeding. Vessel activity associated with boat ramps and launches or marinas and terminals can also increase sedimentation and diminish water quality. The use of heavy machinery above and below the OHWL of any water body increases the risk of fish exposure to construction related contaminants such as fuels, oil, grease, or hydraulic fluids, which can be toxic to fish and other aquatic life.

Noise and vibration – Many hydraulic projects require construction activities that can create excessive underwater noise and vibration proximate to the construction site. Highly intensive noise generating construction activities such as impact pile driving or blasting can negatively affect fish by resulting in direct mortality (impact and vibratory pile driving/blasting), adverse behavioral effects (reduced feeding, impaired predator avoidance), delayed spawning, delayed migration, or impaired development during early life history stages (eggs/alevin).

4.2.2.4 Saltwater

4.2.2.4.1 Impacts that alter habitat and the physical processes that form and maintain fish habitat

Direct loss of habitat – Any activity that results in the displacement of natural habitat with something that is man-made can be considered a direct loss of fish habitat. Similar to the discussion under freshwater, these activities could include the construction of piers, floats, buoys, boat ramps. Many of these structures require the installation of piles or concrete forms that displace natural habitats. This can result in lost productivity at all levels of the food chain, can result in altered predator/prey relationships, increased competition for resources, altered migration patterns, and altered physical processes.

Shoreline disturbance – Activities such as construction of bulkheads, wharves, and piers can result in the removal of marine riparian vegetation, which supplies habitat and structure for the nearshore environment, a source of terrestrial food and nutrients. These activities can also alter sediment delivery to the nearshore, which contributes to supporting spawning habitat for many species, contributes to the composition and density of aquatic vegetation. These structures can also alter the slope of the marine nearshore; thus altering predator/prey relationships, current patterns, and marine vegetation composition and distribution and ultimately the productivity and composition of fish and other aquatic species in the marine nearshore.

Overwater structures – Similar to the discussion under freshwater, overwater structures such as piers and marinas can alter light transmission into the water and result in reduced capacity for growth of aquatic vegetation, destruction of existing aquatic vegetation, and altered predator/prey relationships. In addition, these activities can alter migration patterns along the shoreline resulting in an elevated risk of predation for many species.

Disturbance of substrate – Most structures constructed in the marine environment require footings or supports, such as steel pipe piles to support piers. Others such as boat ramps act as supports for vehicles loading and off-loading boats and other watercraft. These structures can result in disruption of foraging, migration and breeding habitats. For example, a boat launch constructed in the nearshore could potentially displace habitat used by sand lance and surf smelt for spawning resulting in reduced spawning success, lost productivity, and altered predator/prey relationships. Disturbance of substrates may also reduce habitat necessary to support marine vegetation such as eelgrass, which is vital to the life history of many marine species including juvenile salmonids, crustaceans, and many others.

4.2.2.4.2 Impacts that directly harm fish

Water quality/sediment – Construction of facilities along or within the marine nearshore presents many challenges to fish and other aquatic organisms. With the construction of facilities such as marinas and terminals with high levels of human traffic and a capacity to hold and store large numbers of watercraft, the potential for harm or injury to fish is more related to the accidental discharge of contaminants such as fuel and oil, as well as sewage. In industrial settings, piers, wharves and other facilities can support more high intensity construction and related activities such as ship building, ship maintenance and other activities where the potential for introduction of contaminants into the water are even higher.

Entrainment –In the marine environment, entrainment is more likely to occur during dredging activities. During these activities, fish, shellfish, and a number of other aquatic invertebrates can be killed or injured if trapped within the dredging device

Noise and vibration –Impacts caused to saltwater species from noise and vibration would be the same as those described for freshwater species.

4.2.3 Impacts of Revised Hydraulic Code Rules on Fish

Table 4-1 summarizes how the revised Hydraulic Code Rules affect fish, what impacts are caused by the hydraulic projects, and compares how the revised rules affect impacts of the hydraulic projects. Column 2 lists the potential impacts that the regulated hydraulic project could cause to fish based on the impacts described in Section 4.2.2. The third column lists the provisions of the proposed Hydraulic Code Rules that address the potential impacts in the second column. The right hand column includes a brief assessment of whether the proposed rule (Preferred Alternative) will improve, maintain, or degrade conditions compared to the existing rules (No Action Alternative). None of the proposed rules are expected to degrade conditions for fish.

Table 4-1. Summary of How Revised Hydraulic Code Rules Affect Fish

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
Streambank protection and lake shoreline stabilization (WAC 220-110-130)	• Increased sedimentation/turbidity • Habitat loss • Altered predator/prey relationships • Injury/mortality • Altered physical processes	• Requires a professional assessment of risk and justification for project • More robust design requirements will minimize impacts to habitat • Construction methods and material requirements will minimize impacts to fish and habitat • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish • Mitigation will adequately compensate for loss of habitat and function	Improved
Residential docks, watercraft lifts, and buoys in freshwater areas (WAC 220-110-140)	• Increased sedimentation/turbidity • Habitat loss • Altered predator/prey relationships • Injury/mortality (e.g., pile driving) • Altered physical processes • Reduction in primary productivity • Migration barrier	• More robust design requirements will minimize impacts to habitat (e.g., dock dimensions will be reduced) • Construction methods and material requirements will minimize impacts to fish and habitat (e.g., light penetration required via adequate grating) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish. • Restricting facility placement	Improved

[1] Differences in resource condition between Proposed Action and No Action alternatives (Improved/ Maintained/ Degraded)

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
		outside of breeding areas will minimize potential for injury and mortality as well as preserving breeding habitat • Requiring mitigation that will adequately compensate for loss of habitat and function	
Boat ramps and launches in freshwater areas (WAC 220-110-150)	• Increased sedimentation/turbidity • Habitat loss • Altered predator/prey relationships • Injury/mortality (e.g., Pile driving) • Altered physical processes • Migration barrier	• More robust design requirements will minimize impacts to habitat (e.g., most excavation to occur in upland) • Construction methods and material requirements will minimize impacts to fish and habitat (e.g., use of pre-cast concrete panels) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish • Restricting facility placement outside of spawning areas will minimize potential for injury and mortality as well as preserving spawning habitat • Requiring mitigation that will adequately compensate for loss of habitat and function	Improved
Marinas and terminals in freshwater areas (WAC 220-110-160)	• Increased sedimentation/turbidity • Habitat loss • Altered predator/prey relationships	• Facility siting requirements will minimize impacts to habitat (e.g., facilities to be located in areas of low or impaired biological integrity)	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
	• Injury/mortality (e.g., pile driving) • Altered physical processes • Reduction in primary productivity • Migration barrier • Water quality degradation	• More robust design requirements will minimize impacts to habitat (e.g., marina/terminal dimensions will be reduced). • Construction methods and material requirements will minimize impacts to fish and habitat (e.g., light penetration required via adequate grating) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish. • Restricting facility placement outside of spawning, rearing and migratory corridors will minimize potential for injury and mortality as well as preserving breeding and rearing habitat • Requiring mitigation that will adequately compensate for loss of habitat and function	
Dredging in freshwater areas (WAC 220-110-170)	• Increased sedimentation/turbidity • Altered predator/prey relationships • Injury/mortality • Altered physical processes • Altered habitat types (shallow to deep water)	• Construction methods and material requirements will minimize injury to fish and shellfish (e.g., keeping suction dredge intakes at or near bottom to prevent entrainment) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish. • Dredging in spawning areas will be	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
		restricted to approved restoration actions.	

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
Sand and gravel removal (WAC 220-110-180)	• Increased sedimentation/turbidity • Reduced productivity (loss of spawning habitat) • Altered Physical Processes (sediment transport) • Loss of prey • Injury/mortality • Reduced habitat complexity	• Direct impacts to fish minimized by only allowing activities to occur in dry portions of the channel along exposed bars. • Activities must maintain grade and not create pits or depressions that could entrain fish (pre- and post-construction surveys may be required) • Habitat features (i.e., LWD) must be returned and repositioned as necessary to continue to contribute to formation of habitats and gravel retention. • No equipment may operate below the OHWL thus minimizing impacts related to sedimentation, turbidity, and degraded water quality • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish.	Maintained
Water crossing structures (WAC 220-110-190)	• Migration barriers • Increased sedimentation/turbidity • Reduced productivity (loss of spawning habitat) • Altered physical processes (sediment transport) • Future risk of failure • Loss of prey • Injury/mortality	• Design must allow for upstream and downstream passage at all flows. • Design must not alter natural processes (e.g., sediment transport). • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish.	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
	• Reduced habitat complexity	• Increased probability of providing passage for fish at all life stages	
Fish passage improvement structures (WAC 220-110-200)	• Migration barrier • Increased sedimentation/turbidity • Reduced productivity (loss of spawning habitat) • Altered physical processes (sediment transport) • Loss of prey • Injury/mortality • Reduced habitat complexity	• Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish. • Design must allow for upstream and downstream passage at all flows.	Improved
Channel change/ realignment (WAC 220-110-210)	• Sedimentation/turbidity • Injury/mortality (stranding) • Water quality degradation • Loss of rearing habitat • Altered predator/prey relationships • Barrier to migration	• Plan approval by WDFW required • More robust design requirements will minimize impacts to habitat • Construction methods and material requirements will minimize impacts to fish and habitat Mitigation may be required to compensate for habitat loss • Work windows established to minimize impacts to incubating fish	Improved
Large woody material placement, repositioning and removal in freshwater areas (WAC 220-110-220)	• Reduced channel complexity • Reduced cover (increased predation) • Reduced productivity (less gravel retention) • Reduced prey abundance/diversity • Altered physical processes (flow energy dissipation)	• All wood removed would be replaced in a location where it would provide similar benefits • Requires protection of banks and bed to minimize erosion, sedimentation and turbidity • All vegetation, and banks damaged must be restored to pre-project conditions	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
	• Sedimentation/turbidity		
Beaver dam management (WAC 220-110-230)	• Sedimentation/turbidity • Injury/mortality (stranding) • Water quality degradation • Loss of rearing habitat • Altered predator/prey relationships • Barriers to migration	• Procedures for dam breaching would minimize the potential for sedimentation and turbidity, stranding, and degradation of water quality • Mitigation may be required to compensate for habitat loss • Work windows established to minimize impacts to incubating fish • Design of water level control devices and beaver exclusion devices must allow for fish passage • Requires monitoring for fish stranding and removal, if necessary, to free flowing water • More robust design requirements will minimize impacts to habitat • Construction methods and material requirements will minimize impacts to fish and habitat	Improved
Pond construction (WAC 220-110-240)	• Sedimentation/Turbidity • Water Quality Degradation • Barriers to Migration	• More robust design requirements will minimize impacts to habitat • Ponds not intended as fish habitat must exclude all fish	Maintained
Water diversions and intakes (WAC 220-110-250)	• Entrainment and potential death of aquatic life	• Minimizes impacts by requiring screening of all diversions to prevent entry by fish • Minimizes impacts by requiring that all upstream and downstream	Maintained

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
		passage be maintained at point of diversions	
Outfall structures in freshwater areas (WAC 220-110-260)	• Sedimentation/turbidity • Water quality degradation • Riparian habitat damage • Entrainment	• Recommends use of flow spreaders in buffer rather than outfall in stream • Design must prevent fish entrainment • More robust design requirements will minimize impacts to habitat • Construction methods and material requirements will minimize impacts to fish and habitat	Improved
Utility crossings in freshwater areas (WAC 220-110-270)	• Sedimentation/turbidity • Altered hydrology • Altered substrate • Riparian vegetation damage	• Recommends use of less invasive techniques such as directional drilling and punch and bore drilling below scour potential of streambed. • Locating utilities in stable areas (no meanders, no active floodplain) minimizes risk of erosion and damage to facility • Located outside spawning areas • Conducted during approved work windows	Improved
Felling and yarding of timber (WAC 220-110-280)	• Sedimentation/turbidity • Altered hydrology • Altered substrate • Riparian vegetation damage	• Prohibits tree felling across a stream unless authorized in special provisions. • Restricts the removal of trees which accidentally enter a watercourse • Requires removal of limbs and small debris that enter the watercourse • Requires that transportation of logs	Maintained

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
		across a watercourse avoids damage to the bed and banks. • Restricts the placement of cable tailholds. • Requires precautions to minimize the release of sediment to the stream.	
Aquatic plant removal and control (WAC 220-110-290)	• Altered predator/prey relationships • Loss of breeding/rearing habitat	• Timing restrictions • Compliance with specific technical provisions • Maintaining existing habitat features (habitat logs/substrate)	Maintained
Mineral prospecting (WAC 220-110-300)	• Injury/mortality • Degraded physical habitat (spawning substrate) • Reduced prey availability • Reduced productivity	The revised rules minimize impacts by: • Restricting the type of equipment • Limiting excavation zones • Setting allowable work windows.	Improved
Intertidal forage fish spawning habitat surveys (WAC 220-110-340)	• Reduced prey base	The revised rules minimize impacts by: • Requires surveys to document presence/absence of forage fish in project areas • Places timing restrictions on projects where forage fish occur	Improved
Seagrass and macroalgae habitat surveys (WAC 220-110-350)	• Loss of rearing habitat • Loss of spawning habitat • Reduced productivity • Altered predator/prey relationships	The revised rules minimize impacts by: • Requires surveys to document presence/absence of seagrass and macroalgae • Places timing restrictions on projects where seagrass and macroalgae • Requires mitigation for impacts to seagrass and macroalgae	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
Bulkheads and other bank protection in saltwater areas (WAC 220-110-360)	• Loss of rearing habitat • Loss of spawning habitat • Reduced productivity • Altered Predator/prey relationships	The revised rules minimize impacts by: • Requires a professional assessment of risk and justification for project if waterward of OHWL • Applicants are required to use the most technically feasible and least impacting methods available • Construction methods and material requirements will minimize impacts to fish and habitat (e.g., soft armoring using native vegetation etc.) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish	Improved
Residential piers, ramps, floats, watercraft lifts, and buoys in saltwater areas (WAC 220-110-370)	• Increased turbidity • Habitat loss • Altered predator/prey relationships • Injury/mortality (e.g., pile driving) • Altered physical processes • Migration barrier	• More robust design requirements will minimize impacts to habitat (e.g., most excavation to occur in upland) • Construction methods and material requirements will minimize impacts to fish and habitat (e.g., treated wood can no longer be used for decking material for docks/piers or using bubble curtains to minimize underwater noise during pile driving activities) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
		• Restricting facility placement outside of breeding areas will minimize potential for injury and mortality as well as preserving breeding habitat • Requiring mitigation that will adequately compensate for loss of habitat and function	
Boat ramps and launches in saltwater areas (WAC 220-110-380)	• Increased sedimentation/turbidity • Habitat loss • Altered predator/prey relationships • Injury/mortality • Altered physical processes (sediment movement along nearshore) • Migration barrier	• More robust design requirements will minimize impacts to habitat (e.g., new facilities must be located in areas where dredging is not required to allow access for boats) • Construction methods and material requirements will minimize impacts to fish and habitat (e.g., use of pre-cast concrete panels) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish • Restricting facility placement outside of breeding areas will minimize potential for injury and mortality as well as preserving breeding habitat • Requiring mitigation that will adequately compensate for loss of habitat and function	Improved
Marinas and terminals in	• Increased sedimentation/turbidity	• Facility siting requirements will minimize impacts to habitat (e.g.,	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
saltwater areas (WAC 220-110-390)	• Habitat loss • Altered predator/prey relationships • Injury/mortality (e.g., pile driving) • Altered physical processes • Reduction in primary productivity • Migration barrier • Water quality degradation	facilities to be located in areas of low or impaired biological integrity) • More robust design requirements will minimize impacts to habitat (e.g., marina/terminal dimensions will be reduced). • Construction methods and material requirements will minimize impacts to fish and habitat (e.g., light penetration required via adequate grating) • Work windows will minimize overlap of authorized work with presence of relevant life history stages of fish. • Restricting facility placement outside of spawning, rearing and migratory corridors will minimize potential for injury and mortality as well as preserving breeding and rearing habitat (e.g., outside forage fish spawning areas) • Requiring mitigation that will adequately compensate for loss of habitat and function	
Dredging in saltwater areas (WAC 220-110-400)	• Increased turbidity • Altered predator/prey relationships • Injury/mortality • Altered physical processes • Altered habitat types (shallow to deep water)	• Construction methods and material requirements will minimize injury to fish and shellfish (e.g., keeping suction dredge intakes at or near bottom to prevent entrainment) • Work windows will minimize overlap of authorized work with	Improved

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
	• Water quality degradation (contaminated sediment cleanup)	presence of relevant life history stages of fish. • Dredging in forage fish spawning areas or habitats of special concern is prohibited (e.g., no dredging allowed in herring spawning habitat). • May require hydrodynamic modeling	
Artificial aquatic habitat structures (WAC 220-110-410)	• Altered fish community structure • Altered predator/prey relationships • Injury/mortality • Altered physical processes • Altered substrate	• More robust design requirements will minimize impacts to habitat • Construction methods and material requirements will minimize impacts to fish and habitat • Mitigation will adequately compensate for loss of habitat and function	Improved
Outfall, tide and flood gate structures in saltwater areas (WAC 220-110-420)	• Sedimentation/turbidity • Water quality degradation • Beach bank-side riparian habitat damage	• Location of outfalls and energy dissipaters must not cause the loss of fish/shellfish habitat • More robust design requirements will minimize impacts to habitat • Construction methods and material requirements will minimize impacts to fish and habitat	Improved
Utility lines in saltwater areas	• Sedimentation/turbidity • Altered hydrology • Altered substrate • Riparian vegetation damage	• Construction methods and materials must minimize impacts to aquatic life and habitat. • Located outside of saltwater	Maintained

Regulated Hydraulic Projects Activity (WAC)	Potential Impacts to Fish Caused by Regulated Projects	How Rules Affect Impacts	Differences in Resource Condition Between Alternatives[1]
(WAC 220-110-430)		habitats of special concern (e.g., forage fish spawning habitat) • Conducted during approved work windows	
Boring in saltwater areas (WAC 220-110-440)	• Increased noise/vibration • Turbidity	• Requires construction methods and material that minimize turbidity • All boreholes must be sealed following construction	Improved

4.2.4 Mitigation

As the proposed code revisions are improvements upon the existing rules and provide a higher level of protection for fish and other aquatic species and the habitats on which they rely, the action of implementing the new code revisions would be self-mitigating, meaning that no additional mitigation is required to offset adverse impacts of the action. There are no detrimental effects of implementing the proposed action as compared to the no-action alternative. Individual hydraulic projects may still require mitigation.

4.3 Water Resources

As discussed in Chapter 3, water resources within Washington include streams, rivers, lakes, wetlands, estuaries, and marine areas. Key functions of aquatic natural resources include properly functioning physical and chemical processes such as natural hydrology, adequate hydraulics and sediment processes, and water of sufficient quality. The level of function of such processes, in turn, directly contributes to the creation and maintenance of habitat for fish and wildlife.

The majority of changes to the regulated hydraulics project activities (see Table 4-1) affected by the No Action and Preferred Alternatives would result in some direct impacts to some of the processes that support water resources.

This section describes potential impacts to water resources that could be caused by hydraulic projects as regulated by WDFW. As described in Section 3.3.1, WDFW does not regulate water quality. Water quality is regulated by other agencies.

4.3.1 No Action Alternative

Under the No Action Alternative, the revised rules would not be adopted and the rules would remain inconsistent with current science and design technology. Since the rules would not change, no change in the type, magnitude, or distribution of effects on water resources would be expected. Future direct effects, including those to the hydrologic, hydraulic, and water quality functions that support properly functioning waterbodies, as well as indirect effects such as cause and effect interactions between those functions, would be expected to remain similar or identical to those occurring under existing conditions.

4.3.2 Impacts of Revised Hydraulic Code Rules on Water Resources

Several regulated hydraulics project activities have potential to directly affect water resources by causing primarily to localized effects to sediment processes, stream hydraulics, and water quality. The overall potential physical and chemical effects, and the resulting biological effects of the activities discussed below are presented in Table 4-1, which also documents how the Preferred Alternative rules affect the impacts of these activities.

Regulated activities likely to affect overall stream hydrology include streambank protection and lake shoreline stabilization (WAC 220-110-140), dredging in freshwater areas (WAC 220-110-180), and sand and gravel removal (WAC 220-110-190). These activities would alter the physical processes of streams and other waterbodies. Pond construction (WAC 220-110-250) could also alter the hydrologic regime.

Several regulated project activities that occur in freshwater have the potential to affect local hydraulic functions of water resources. These are activities associated with the modification of stream or river beds or banks, which may in turn affect the distribution and velocity of stream flows. In addition, any project activity that may alter hydraulics, also has the potential to affect sediment dynamics, including local scour depositional patterns, which are closely related. The primary project activities that have the potential to directly affect stream hydraulics and sediment mobilization and transport (most likely at a local or reach scale only) are as follows:

- Residential docks, watercraft lifts, and buoys in freshwater areas (WAC 220-110-150)
- Boat ramps and launches in freshwater areas (WAC 220-110-160)
- Marinas and terminals in freshwater areas (WAC 220-110-170)
- Dredging in freshwater areas (WAC 220-110-180)
- Sand and gravel removal (WAC 220-110-190)
- Water crossing structures (WAC 220-110-200)
- Fish passage improvement structures (WAC 220-110-210)
- Channel change/ realignment (WAC 220-110-220)
- Mineral prospecting WAC (220-110-310)

The regulated project activities listed above could also lead to potential impacts related to turbidity, which could generated in the construction or operation of all these project types. In addition, the regulated project activity involving outfall structures in saltwater areas (WAC 220-110-430) and outfall structures in freshwater areas (WAC 220-110-270) could also increase turbidity.

Lastly, project activities that alter the marine shoreline or benthos can also result in direct changes to local drift cells and alter shoreline sediment transport dynamics. Direct effects on marine water resources could result from the following regulated project activities (see Table 4-1 for more details):

- Bulkheads and other bank protection in saltwater areas (WAC 220-110-370)
- Residential docks (piers, ramps, and floats), buoys and other overwater structures in saltwater areas (WAC 220-110-380)
- Boat ramps and launches in saltwater areas (WAC 220-110-390)
- Marinas and terminals in saltwater areas (WAC 220-110-400)
- Dredging in saltwater areas (WAC 220-110-410)

In all cases, however, any potential effects of the activities listed above on water resources would be less for the Preferred Alternative than for the No Action Alternative. This is because the Preferred Alternative includes provisions to avoid and minimize potential physical, chemical, and biological impacts from the individual activities. Table 4-1 describes specific measures associated with each regulated activity to minimize or avoid impacts on water resources and ecological functions and processes. General examples of such measures include explicit requirements for the following:

- A professional assessment of risk and justification for project;
- More robust design requirements that will minimize impacts to habitat; and

- Construction methods (e.g., vibratory versus impact pile driving) and material (e.g., specifications for type, size, and material) requirements will minimize impacts to fish and habitat.

The majority of potential effects on water resources would be indirect effects from the interactions of slight alterations to ecological processes. As with the direct effects, the Preferred Alternative would result in improved or maintained conditions for water resources for each activity, as compared to the No Action Alternative. This is based on the rule revisions in the Preferred Alternative which are intended to avoid and minimize potential environmental and biological impacts. Therefore, it is expected that the overall condition of water resources would be improved under the Preferred Alternative, as compared to the No Action Alternative.

4.3.3 Mitigation

The rules associated with regulated hydraulics project activities under the Preferred Alternative are intended to avoid and minimize effects on water resources and other natural resources. Therefore, as compared to the No Action alternative, the Preferred Alternative in essence serves as a suite of mitigation measures. In addition, for many regulated activities, the Preferred Alternative explicitly includes mitigation to compensate for loss of hydrologic, hydraulic, or water quality functions and no additional mitigation would be required.

4.4 Earth

Impacts to earth from hydraulic projects are primarily limited to disturbance at the immediate project location. Those impacts would be increased potential for erosion and sedimentation and disturbance to substrate and banks. Most of the potential impacts to earth were discussed under Water Resources (Section 4.3).

4.4.1 No Action Alternative

Under the No Action Alternative, the revised Hydraulic Code Rules would not be adopted and the rules would remain inconsistent with current science and design technology that could minimize impacts to earth. Hydraulic project impacts to earth would remain the same as under current conditions.

4.4.2 Impacts of Revised Hydraulic Code Rules on Earth

The revised Hydraulic Code Rules contain numerous requirements and recommendations that would reduce impacts to Earth. The general construction requirements for hydraulic projects include provisions to minimize disturbance from construction by minimizing the construction area, installing erosion protection methods, protecting disturbed areas from erosion, and replacing vegetation following construction. Design standards for hydraulic projects such as boat ramps, docks, etc. will also minimize impacts on earth.

4.4.3 Mitigation

It is expected that the revised Hydraulic Code Rules will reduce impacts to earth; therefore, no additional mitigation is required.

4.5 Climate

The adoption of Hydraulic Code Rules would not directly affect climate change. However, it is possible that the proposed rules would result in improved conditions for fish that would help them withstand the impacts of climate change.

4.5.1 No Action Alternative

The No Action Alternative would not change the existing Hydraulic Code Rules; therefore, no changes to climate change impacts are anticipated.

4.5.2 Impacts of Revised Hydraulic Code Rules on Climate

The revised Hydraulic Code Rules do not include any provisions that would affect climate change. It is anticipated that hydraulic projects which generate greenhouse gas emissions would continue at the same general rate as under current conditions. Since the revised rules are intended to improve protection for fish and other aquatic species, the revised rules may improve the health of those species and make them more resilient to climate change.

4.5.3 Mitigation

Because the Preferred Alternative would not increase greenhouse gas emissions, no impacts to climate change are anticipated and no mitigation is required.

4.6 Wildlife

As discussed in Chapter 3, numerous marine mammals, birds, reptiles, and amphibians utilize the variety of riverine, marine, and wetland habitats available in Washington. Some of these species spend the entirety of their lives in or adjacent to the wetted perimeter of rivers, streams, wetlands and oceans while many others utilize such areas only for specific life history elements, such as breeding, feeding, and migration. Other wildlife species utilize upland habitats where hydraulic project activities could occur.

The majority of changes to the hydraulic project activities regulated by the Preferred Alternative would not result in direct impacts to most wildlife species. This is because:

- The majority of the regulated project activities with proposed rule changes would not generally affect individuals directly, but rather affect the habitats and prey items of individual organisms;
- Most wildlife species are mobile and able to walk, fly, or swim away from disturbances such as noise, light, human activity, or turbidity: and
- The vast majority of hydraulics project activities occur in areas that have already experienced some level of development and human activity, areas that would generally be avoided by many of the wildlife species discussed in Chapter 3.

The primary groups of wildlife that could potentially be susceptible to direct effects from regulated hydraulics project activities include the following:

- Amphibians associated with the wetted perimeter of freshwater streams, rivers, lakes, and wetlands. The habitat range and mobility of these species are somewhat limited and amphibians and reptiles are widely distributed throughout the landscape, including areas that have some level of existing development, indicating a susceptibility to direct effects from physical harm and/or stranding of larval forms.
- Marine mammals that are sensitive to in-water or in-air disturbances (particularly disturbance from noise and vibration) and that have at least moderate utilization of marine nearshore/shoreline areas. This would include pinnipeds, cetaceans, and diving birds.
- Aquatic wildlife that has utilization of marine or lacustrine benthic habitat or riverine bed habitat for feeding or migration. Such wildlife species (e.g., diving ducks) could be exposed to injury or death under certain regulated hydraulics project activities, such as dredging.
- Wildlife that directly utilizes streams, lakes, and rivers or the freshwater shoreline for nesting or denning. This would include beaver, muskrat, nutria, river otter, and similar wildlife species.

4.6.1 No Action Alternative

Under the No Action Alternative, the revised rules would not be adopted and the rules would remain inconsistent with current science and design technology. As the rules would not change, no change in the type, magnitude, or distribution of effects on wildlife would be expected. Future indirect effects, including injury, mortality, and behavioral changes, as well as indirect effects, including effects on habitat, predators, or prey, would be expected to remain similar or identical to those occurring under existing conditions.

4.6.2 Impacts of Revised Hydraulic Code Rules on Wildlife

As discussed in Section 4.6, the potential for regulated hydraulics project activities to directly affect wildlife is limited to a subset of the wildlife species in Washington. In addition, only a subset of the project activities could result in direct affects to wildlife

Several regulated hydraulics project activities under the Preferred Alternative have potential to directly affect marine mammals and diving birds in marine habitat, due primarily to potential acoustic impacts and physical entrainment. The overall biological and physical effects of these following activities, as well as information on how the Preferred Alternative rules affect the impacts of the activities, is given in Table 4-1.

- Bulkheads and other bank protection in saltwater areas (WAC 220-110-360)
- Residential piers, ramps, floats, watercraft lifts and buoys in saltwater areas (WAC 220-110-370)
- Boat ramps and launches in saltwater areas (WAC 220-110-380)
- Marinas and terminals in saltwater areas (WAC 220-110-390)
- Dredging in saltwater areas (WAC 220-110-400)
- Outfall and tide and flood gate structures in saltwater areas (WAC 220-110-420)

Likewise, some freshwater wildlife species may be exposed to direct impacts from regulated hydraulics project activities under the Preferred Alternative. These would result primarily from stranding and entrainment of amphibian species or effects from entrainment on benthic species. Such activities include:

- Residential docks, watercraft lifts, and buoys in freshwater areas (WAC 220-110-140)
- Boat ramps and launches in freshwater areas (WAC 220-110-150)
- Marinas and terminals in freshwater areas (WAC 220-110-160)
- Dredging in freshwater areas (WAC 220-110-170)
- Sand and gravel removal (WAC 220-110-180)
- Water crossing structures (WAC 220-110-190)
- Fish passage improvement structures (WAC 220-110-200)
- Channel change/ realignment (WAC 220-110-210)
- Mineral prospecting WAC (220-110-300)

Lastly, there are two activities that could have direct effects on regulated hydraulics project activities under the Preferred Alternative for specific species or species groups. Streambank protection and lake shoreline stabilization activities (WAC 220-110-130) could result in death or injury from destruction of the primary habitats (e.g., active dens in disturbed shoreline habitats) of bank-dwelling mammals and birds and beaver dam management activities (WAC 220-110-230) could result in similar affects on beaver.

In all cases, however, any potential effects of the activities listed above would be less for the Preferred Alternative than for the No Action Alternative. This is because the Preferred Alternative includes provisions to avoid and minimize potential environmental and biological impacts from the individual activities. Table 4-1 describes specific measures associated with each regulated activity to minimize or avoid impacts. General examples of such measures include explicit requirements for the following:

- A professional assessment of risk and justification for project;
- More robust design requirements that will minimize impacts to habitat;
- Construction methods (e.g., vibratory versus impact pile driving) and material (e.g., specifications for type, size, and material) requirements will minimize impacts to fish and habitat; and
- Work windows that will minimize overlap of authorized work with presence of relevant life history stages of fish.

The majority of potential effects on wildlife would be indirect effects from habitat alteration, physical or biological ecological functions (e.g., water quality), or alterations on a wildlife species predator or prey (e.g., fish) (see Table 4-1). As with the direct effects, the Preferred Alternative would result in improvement or maintenance in conditions for wildlife resources for each activity, as compared to the No Action Alternative. This is based on the inclusion of provisions to avoid and minimize potential environmental and biological impacts within the Preferred Action. Therefore, it is expected that the

overall condition of wildlife resources would be improved under the Preferred Alternative, as compared to the No Action Alternative.

4.6.3 Mitigation

The rules associated with regulated hydraulics project activities under the Preferred Alternative are intended to avoid and minimize effects on wildlife and other natural resources. Therefore, as compared to the No Action alternative, the Preferred Alternative provides mitigation measures for each regulated hydraulic activity. Therefore, it is expected that the Preferred Alternative will adequately compensate for loss of habitat and function and no additional mitigation would be required.

One exception for mitigation requirements is for the regulated activity of beaver dam removal. The primary aim of this activity is to destroy beaver habitat. Although no explicit mitigation measures are specified, the proposed rule prioritizes beaver dam removal methods that would have minimal effects on other wildlife, fish, and water resources. It also requires that beaver dam removal of established dams only be conducted when other measures for beaver control have not been effective.

4.7 Vegetation

As described in Chapter 3, the shorelines and shallow waters of the state's freshwater and marine watercourses support diverse vegetation. Many of the regulated hydraulics project activities have the potential to result in direct or indirect impacts to vegetation. However, the majority of impacts to vegetation would primarily be limited to disturbance at the immediate project location and dependent on whether construction activities occur above or below the water's edge. Vegetation that could potentially be impacted includes:

- Riparian vegetation associated with freshwater river and stream corridors and lake shorelines. This is likely to include deciduous shrubs and/or trees and coniferous trees in some areas;
- Wetland vegetation associated with emergent, shrub, or forest wetland communities present adjacent to streams or lakes;
- Riparian vegetation associated with marine shorelines including deciduous and coniferous shrubs and trees;
- Salt-tolerant vegetation present in backshore beaches including grasses and herbaceous species;
- Submerged and floating aquatic vegetation associated with the shoreline of freshwater lakes; and
- Submerged and floating aquatic vegetation associated with shallow marine waters along shorelines and estuaries.

4.7.1 No Action Alternative

Under the No Action Alternative, the revised Hydraulic Code Rules would not be adopted and the rules would remain inconsistent with current science and design technology that could minimize impacts to vegetation. It is anticipated that impacts of hydraulic projects on vegetation would remain the same as under existing conditions.

4.7.2 Impacts of Revised Hydraulic Code Rules on Vegetation

The potential for regulated hydraulic project activities to directly impact vegetation is limited to a subset of the vegetation species associated with freshwater rivers, streams and lakes, and found along marine shorelines. Impacts to vegetation could occur either during construction or as a result of the project siting.

In terms of construction, the revised Hydraulic Code Rules contain numerous requirements and recommendations that would reduce impacts to riparian, wetland, and aquatic vegetation. Overall, the general construction requirements for all hydraulic projects include provisions to minimize disturbance from construction by avoiding to the maximum extent practicable and then minimizing disturbance to aquatic and wetland plants (except aquatic noxious weeds), riparian and wetland areas, replacing vegetation following construction, and monitoring the replaced vegetation.

There are several hydraulic project activities that have the potential to directly affect vegetation because they require in-water or on-land construction in areas where vegetation is typically present. Such activities include:

- Streambank protection and lake shoreline stabilization (WAC 220-110-130)
- Residential docks, watercraft lifts, and buoys in freshwater areas (WAC 220-110-140)
- Boat ramps and launches in freshwater areas (WAC 220-110-150)
- Marinas and terminals in freshwater areas (WAC 220-110-160)
- Water crossing structures (WAC 220-110-190)
- Channel change/ realignment (WAC 220-110-210)
- Outfall structures in freshwater areas (WAC 220-110-260)
- Bulkheads and other bank protection in saltwater areas (WAC 220-110-360)
- Residential piers, ramps, watercraft lifts, and buoys in saltwater areas (WAC 220-110-370)
- Boat ramps and launches in saltwater areas (WAC 220-110-380)
- Marinas and terminals in saltwater areas (WAC 220-110-390)
- Dredging in saltwater areas (WAC 220-110-400)
- Outfall and tide and flood gate structures in saltwater areas (WAC 220-110-420)

The revised rules include provisions to minimize disturbance to vegetation and are expected to reduce direct impacts to vegetation associated with the activities listed above. It is expected that regulated activities that occur between the banks or waterward of shorelines could generally avoid impacts to vegetation. This includes:

- Dredging in freshwater areas (WAC 220-110-170),
- Sand and gravel removal (WAC 220-110-180),
- Fish passage improvement structures (WAC 220-110-200),
- Water diversions and intakes (WAC 220-110-250,
- Utility crossings in freshwater areas WAC (220-110-270) and saltwater areas (WAC 220-110-430),

- Mineral prospecting (WAC 220-110-300), and
- Boring in saltwater areas (WAC 220-110-440).

Such activities have the potential to affect vegetation, but the provisions described previously regarding general construction requirements would likely minimize those impacts.

There are two activities expected to have beneficial effects on aquatic vegetation. Aquatic plant removal and control (WAC 220-110-290) covers the physical and mechanical methods for removing aquatic noxious weeds (e.g., *Spartina* sp. and purple loosestrife) that threaten native vegetation, and fish and shellfish and their habitat. Seagrass and macroalgae habitat surveys (WAC 320-110-350) includes specific guidelines for the survey of seagrass and macroalgae habitats to improve protection and preservation. The revised rules contain protocols for both preliminary and advanced surveys to assist in the evaluation of the potential impacts associated with other regulated hydraulic project activities such as new or replacement docks, mooring buoys, or other overwater structures, and new or maintenance dredging, trenching, filling or grading.

The potential for impacts to vegetation from regulated hydraulic activities under the Preferred Alternative is expected to be less than the effects from the same activities under the No Action Alternative. This is because Preferred Alternative includes provisions to avoid and minimize impacts to vegetation during construction, provides specific guidelines to avoid and minimize impacts to vegetation for many of the individual regulated activities, and two of the regulated activities are expected to have beneficial effects on vegetation. Therefore, it is expected that the overall condition of vegetation would be improved under the Preferred Alternative when compared to the No Action Alternative.

4.7.3 Mitigation

It is expected that the revised Hydraulic Code Rules will reduce impacts to vegetation; therefore, no additional mitigation is required.

4.8 Land and Shoreline Use

The Hydraulic Code Rules do not directly affect land and shoreline use because the construction of hydraulic projects must be consistent with existing land use regulations, including zoning code restrictions, critical areas regulations, and Shoreline Management Programs and that will not change under the proposed rules. However, the regulations may place restrictions on what can be constructed on private property and how the projects would be constructed. The restrictions could also increase costs of construction to meet new design standards for such projects as docks and piers and because mitigation requirements that are included for most projects.

4.8.1 No Action Alternative

Under the No Action Alternative hydraulic projects would continue to be regulated under the existing Hydraulic Code Rules which are inconsistent with some aspects of the Shoreline Management Act, some local critical areas ordinances, and other regulations. This continued inconsistency would cause uncertainty among landowners about how projects should be constructed and could lengthen the time required to permit a hydraulic project.

4.8.2 Impacts of Revised Hydraulic Code Rules on Land and Shoreline Use

The revised rules increase the restrictions on hydraulic project construction beyond the existing regulations. They also further limit what can be constructed and where. For example, ponds could no longer be constructed within a watercourse (WAC 220-110-240). In addition, the revised code limits the location of marinas and terminals (WAC 220-110-160 and 390).

4.8.3 Mitigation

Although the revised Hydraulic Code Rules impose more restrictions on locations of hydraulic projects, the new rules would provide certainty about locating the projects. Current implementation of the existing rules also places limits on project locations through project specific restrictions, but those limits are not specified in the existing code. The revised rules will provide certainty to landowners about location requirements prior to construction, which may somewhat offset the new restrictions by making it easier for project proponents to know what is required prior to application.

4.9 Recreation

Water-oriented recreation in Washington often revolves around docks, piers, boat launches and marinas. These structures are all regulated under the Hydraulic Code Rules.

4.9.1 No Action Alternative

The existing Hydraulic Code Rules include provisions for construction of freshwater docks, piers, and floats and the driving or removal of piling (existing WAC 200-110-060); freshwater boat hoists, ramps, and launches (existing WAC 220-110-224); saltwater boat ramps and launches (existing WAC 220-110-290); saltwater piers, pilings, docks, floats, rafts, ramps, boathouses, houseboats, and associated moorings (existing WAC 220-110-300); and marinas in saltwater areas (existing WAC 220-110-330). Recreation-related hydraulic projects are also regulated site-by-site when necessary to protect fish life. These provisions currently limit locations, construction methods, and dimensions of structures built for water-oriented recreation. Under the No Action Alternative, impacts on recreation would remain the same as under current conditions.

4.9.2 Impacts of Revised Hydraulic Code Rules on Recreation

Hydraulic Code Rules for recreation-related structures have been significantly revised to match current fish science and construction techniques. Revised WACs 220-110-140 (Residential docks, watercraft lifts, and buoys in freshwater areas), 220-110-150 (Boat ramps and launches in freshwater areas), 220-110-160 (Marinas and terminals in freshwater areas), 220-110-370 (Residential piers, ramps, floats, watercraft lift and buoys in saltwater areas), 220-110-380 (Boat ramps and launches in saltwater areas) and 220-110-390 (Marinas and terminals in saltwater areas) all regulate recreation-related hydraulic projects. Changes to each section are summarized in Table 2-1.

In these sections, new regulations have been added covering activities that were not previously included in the Hydraulic Code Rules, including watercraft lifts, mooring buoys, piers, ramps, floats, grating and paint, treated wood, piling, noise and pile driving, and piling removal. Marinas and terminals in freshwater areas have been added as a regulated activity, with requirements similar to those for

marinas and terminals in saltwater areas. Length, width, and grating requirements have been added for residential docks, and existing requirements have been substantially changed based on current best practices. Boat ramps and launches are no longer allowed to be located in spawning areas. Allowable dock designs have been specified for waterbodies with salmon, steelhead, and bull trout. These regulatory changes would impact new recreational opportunities by adding constraints on where and how docks, ramps, and marinas can be constructed. Added design requirements would add to the cost and time needed to construct recreational structures. Recreational development under the revised hydraulic code rules would be more constrained than under current conditions.

Changes to the Hydraulic Code Rules that protect fish species are discussed in Section 4.2.2. These changes would help maintain and improve fishing opportunities. Changes to the Hydraulic Code Rules that protect water quality are discussed in Section 4.3.2. These changes would maintain and improve water quality for water-contact recreation (such as swimming) as well as fishing opportunities.

4.9.3 Mitigation

Water-oriented recreational development and public access to water are among the prioritized uses under the Shoreline Management Act (SMA) and individual Shoreline Master Programs enacted by cities and counties in the state. The revisions to the Hydraulic Code Rules bring the rules into consistency with the SMA. While new regulations for docks, launches, and marinas could increase design and construction time for these structures, procedural changes for hydraulic permits could offset some of this increase. Additionally, including detailed regulations in the code rules instead of relying on site-by-site provisions to protect fish would help give assurance to developers that certain recreational structures will be allowed and will minimize the need to revise designs during the permitting process.

4.10 Cultural Resources

As described in Section 3.10, there is a high probability of encountering cultural resources when hydraulic projects are constructed. Neither the existing or revised Hydraulic Code Rules include requirements for the protection of cultural resources; however, other state and federal regulations do require protection of those resources and would usually be triggered by hydraulic project construction.

4.10.1 No Action Alternative

Impacts to cultural resources from hydraulic projects would remain the same as under current conditions.

4.10.2 Impacts of Revised Hydraulic Code Rules on Cultural Resources

The revised Hydraulic Code Rules do not include requirements for protection of cultural resources; therefore, protection for cultural resources would continue to be provided by other regulations (Section 1.5.6). Impacts to cultural resources would be the same as under the No Action Alternative. However, provisions in the Hydraulic Code Rules that reduce the footprint of hydraulic project would help reduce potential impacts to cultural resources by reducing the amount of excavation.

4.10.3 Mitigation

Because no changes are anticipated to cultural resources from adoption of the revised Hydraulic Code Rules, no mitigation is proposed.

4.11 Social and Economic Issues

Social and economic issues will be evaluated in detail in the separate Small Business Economic Impact Statement (SBEIS) document. RCW 19.85.030 (Agency rules – Small business economic impact statement – Reduction of costs imposed by rule) requires that an SBEIS be prepared when any rule change imposes more than minor costs on businesses in an industry. An SBEIS must compare the cost of compliance for a small business with the cost of compliance for large businesses on a cost per employee, hour of labor, or one hundred dollars of sales basis. The SBEIS must also include a description of how the agency will involve small businesses in rule development, a list of industries that will need to comply with the rule, and an estimate of job creation or loss as a result of the rule.

This section generally discusses the social and economic impacts that could result from adoption of the revised Hydraulic Code Rules. No cost estimates are included in this document.

4.11.1 No Action Alternative

Under the current Hydraulic Code Rules, many protections for fish are included as site-by-site provisions for specific projects. This leads to uncertainty for applicants. Additionally, inefficient procedures for HPAs can lead to lengthy review times that delay projects. The Hydraulic Code Rules place restrictions on what property owners can do with their property. Though few uses are completely prohibited, complying with specific Hydraulic Code Rules in design and construction can add time and cost to projects. Under the No Action Alternative, these impacts would remain the same as under existing conditions.

4.11.2 Impacts of Revised Hydraulic Code Rules on Social and Economic Issues

The proposed changes to the Hydraulic Code Rules would increase the cost of compliance for applicants. The stricter design standards will likely increase the cost of constructing some hydraulic projects, such as mooring buoys which limits the type of materials that can be used for the buoys (WAC 220-110-150). Added BMPs, new requirements for maintenance and repair of in-water structures, and changes in work windows will also increase the cost of some projects.

Property owners could experience longer term costs from the Hydraulic Code Rule changes if they are not able to develop their property as expected. This is true of the No Action Alternative as well, but as some areas of the proposed rule changes are stricter than the existing rules, there is a greater potential for property owners to experience restrictions on the use of their property.

4.11.3 Mitigation

HPA application procedures have been streamlined, which will partially offset any increased design and construction time needed to comply with new rules and new work windows. Additionally, including detailed regulations in the code rules instead of relying on site-by-site provisions to protect fish would

help give assurance to developers that certain uses will be allowed and will minimize the need to revise designs during the permitting process.

4.12 Cumulative Impacts

The State Environmental Policy Act (SEPA) does not define cumulative impacts; however, the National Environmental Policy Act (NEPA) defines them as the effects that may result from the incremental impact of an action added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). That definition is generally used to define cumulative impacts under SEPA. Generally, an impact can be considered cumulative if: a) effects of several actions occur in the same locale; b) effects on a particular resource are similar in nature; and c) effects are long-term in nature.

Based on the three criteria above, the construction of individual hydraulic projects could result in adverse cumulative impacts. Hydraulic projects are often concentrated in one area, the effects of many hydraulic projects are similar in nature, and they are long-term. While the improved design requirements and specific mitigation measures in the proposed Hydraulic Code Rules are intended to decrease the impacts associated with individual hydraulic projects, impacts, especially to habitat, will occur as the number of projects constructed increases. In addition to the requirement that hydraulic projects meet the Hydraulic Code Rules, most hydraulic projects undergo additional environmental review which may also help mitigate the impacts of individual projects.

Overall, the cumulative impacts of adopting the Preferred Alternative are expected to be less than the cumulative impacts of the No-Action Alternative. As indicated in Table 4-1, the proposed rule changes are expected to result in improved or maintained conditions over the No Action Alternative. The proposed rules do not directly address impacts of the past; however, over time it is expected that the improved requirements for hydraulic projects will result in improved habitat conditions.

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Appendix A

EIS SCOPING COMMENTS RECEIVED

Appendix A - EIS Scoping Comments Received

Comments Received on Scoping for the Environmental Impact Statement

On June 22, 2012, Washington Department of Fish and Wildlife (wdfw) issued a determination of significance and request for comments on scope of an environmental impact statement to examine the impacts of revisions to rules (220-110 WAC) for administering the Hydraulic Code (Section 77.55 RCW).

A total of sixty comments were tabulated from thirty-one separate individuals. Very few of the comments were directed at the scope of the Hydraulic Project rules EIS. Topics suggested for inclusion in the EIS include: Climate change, cumulative effects, land use, shorelines, transportation, and tribal trust responsibility. Economic analysis was suggested as an EIS topic, but is more properly completed as a Washington State rulemaking requirement. One commenter suggested that the "prescription only" alternative be analyzed in the EIS, however that alternative was not chosen for continued study. Finally, one comment requested that comments on previous drafts of the rules be incorporated; The EIS provides a description of the iterations of comment received on the draft rules before the EIS was begun.

In addition many comments were received about the substance of the rules themselves. Following are the general topics and comments received, along with a response indicating the disposition of the comment.

Topic	Comment	Response
General definitions and procedures	Permit procedures, HPA jurisdiction, and what constitutes complete plans and specifications	See NEW rule WAC 220-110-030, 040, 050
Applicability of HPA requirements	Impacts of the HPA exemption for marina maintenance	See NEW rule WAC 220-110-040 (RCW 77.55.151)
	Impacts of the HPA exemption for tidegates and floodgates	See NEW rule WAC 220-110-040 (RCW 77.55.281)
	Definition of HPA jurisdiction	See NEW rule WAC 220-110-040
	Existing structures - maintenance required	See NEW rule WAC 220-110-080, 100
Procedures - Types of permits	Conditions that govern the proper or improper use of emergency permits	See NEW rule WAC 220-110-050
	General permits	See NEW rule WAC 220-110-050
	General permits - multiple locations, multiple years	See NEW rule WAC 220-110-050
	Urban flooding - human safety considerations (emergency)	See NEW rule WAC 220-110-050 for emergency

		HPA provisions
Regulatory duplication	Jurisdictional consistency with CWA and ESA	EIS Chapter 1
Integration with forest practices rules	HPA/FPA concurrence	See NEW rule WAC 220-110-060 and EIS
Changes to HPA technical requirements	New technologies; fish-friendly designs	See NEW rule WAC 220-110-070, 090
	Rule provisions for future changes - adaptive management	See NEW rule WAC 220-110-070, 090
Mitigation	Mitigation and the lack or inconsistency of mitigation requirements	See NEW rule WAC 220-110-080
	Funding for compliance or implementation monitoring	See NEW rule WAC 220-110-080
	Use of in-lieu fees and off-site mitigation, and the potential to misdirect mitigation to other species, stocks, or life stages other than those being impacted	See NEW rule WAC 220-110-080
	Mitigation ratios of greater than 1:1 to offset temporal impacts	See NEW rule WAC 220-110-080
Common construction requirements	Lack of HPA rules protecting riparian clearing	See NEW rule WAC 220-110-100 re: riparian protection during hydraulic project; otherwise this is beyond the scope of Hydraulic Code
	Rules and guidance on fish removal and fish exclusion	See NEW rule WAC 220-110-100
	Treated wood products - creosote	See NEW rule WAC 220-110-100 and EIS
Habitats of Concern	Effects to bull trout critical habitat	Addressed in the EIS
	Protection for ESA species	Addressed in the EIS
	Specific effects to eulachon	See NEW rule WAC 220-110-120 and EIS
Bank armoring, bulkheads, stabilization	Bulkhead effects	Addressed in the EIS
	Individual and cumulative impacts of single-family residential bulkheads	Addressed in the EIS; cumulative impacts beyond scope of Hydraulic Code RCW 77.55.141

Piers, docks, buoys	Individual and cumulative impacts of piers and docks in Lakes Washington, Sammamish, Union and the Ship Canal upon salmon and their habitats.	See NEW rule WAC 220-110-140, 370 cumulative impacts beyond scope of Hydraulic Code
	Areas and conditions under which mooring buoy cumulative impacts reach unacceptable levels	Addressed in the EIS; making a determination about cumulative impacts is beyond scope of Hydraulic Code, which directs project-scale review
	Buffer for overwater structures	See NEW rule WAC 220-110-140, 370
	Shading effects	See NEW rule WAC 220-110-140, 370 and EIS
Water crossing structures	Water crossing structure regulations and the ability to pass all fish at all life stages	See NEW rule WAC 220-110-190(3)(a)
Outfall structures	HPA approval of projects that discharge stormwater and the potential for these discharges to reduce the amount of available rearing habitat for juvenile salmon or flush juvenile salmon downstream as a result of increases in water volumes, peak flow frequencies and durations and the simplified habitat conditions of waters receiving stormwater.	See NEW rule WAC 220-110-260 (3), 420 (3) RCW 77.55.161
Utility crossings	Utilities	See NEW rule WAC 220-110-270, 430 and EIS
Mineral prospecting	Adequacy of the pamphlet permits, particularly Gold & Fish, to protect fish life	Addressed in the EIS
	The extent to which the authorized work times in fresh water (the work windows) actually avoid fish, particularly the authorized work times for small-scale mining.	See NEW rule WAC 220-110-300
	Mineral prospecting costs & safety	Cost and safety considerations are beyond scope of Hydraulic Code
	Mineral prospecting effects in bull trout areas	See NEW rule WAC 220-110-300
	Mineral prospecting water contaminants	See NEW rule WAC 220-110-300
Intertidal forage fish survey	Lack of guidance on forage fish surveys	See NEW rule WAC 220-110-340

guidance		
Seagrass and macroalgae survey guidance	Lack of guidance on seagrass and macroalgae surveys	See NEW rule WAC 220-110-350
Compliance	HPA enforcement and use of civil authority	See NEW rule WAC 220-110-470
Science in support of HPA provisions	Science supporting rulemaking (work windows, rules for mineral prospecting)	See NEW rule WAC 220-110-090, 300, and EIS

Some of the comments received are beyond either the scope of the Hydraulic Project Approval rules, beyond the scope of the rulemaking process, or beyond the scope of the Hydraulic Code itself. These comments are listed below along with responses:

Topic	Response
Habitat impacts that result from HPA exemptions	HPA exemptions are set in statute. Rules reiterate some, but not all exemptions; those that are addressed in the revised rules are discussed in rule WAC 220-110-050. Evaluating other statutory exemptions is outside of the scope of this rulemaking activity.
Necessity of granting permits that remain in effect for five years	The five-year duration for permits is mandated in statute, and is not an element of the rules that has changed. The rules have been modified to clarify that monitoring and reporting can be required by permit writers so that status of activity on permits can be better assessed by the agency.
Low number of permit denials, even when impacts are not fully mitigated	The number of permit denials is intended to decrease because the rules are clearer to the applicant. Mitigation sequencing is set forth in the revised rule. Indeed, the objective of the Hydraulic Project Approval program is to work with applicants to permit projects that achieve the best possible outcomes for fish life. Please review and provide comments on proposed rule changes for mitigation sequencing.
Mitigation ratios of greater than 1:1 to offset temporal impacts	Please review and provide comments on proposed rules changes for mitigation sequencing.
HPA approval of heat pumps and exchanges within state waters, particularly those waters already identified to be warming (i.e. Lake Washington) or exceed state water temperature standards.	Addressing water quality issues such as water temperature falls under the authority of the Clean Water Act.

HPA approval of tree removal along streams and rivers that currently exceed state water quality standards that are fish-bearing.	Addressing water quality issues falls under the authority of the Clean Water Act, and requirements related to land clearing are subject to local building codes. The HPA rules address riparian tree removal only when it is part of a hydraulic project, See NEW rule WAC 220-110-100 and 280.
Analyze whether new water diversion structures are prudent	Issuing new water rights is the purview of Washington State Department of Ecology, and sometimes also involves federal agencies and local districts. The Hydraulic Code does not address the question of the need for a project, which is better addressed by the State Environmental Protection Act. The Hydraulic Code and Hydraulic Project Approval rules address the question of how to shape the project to achieve the best possible outcomes for fish life.
Frequency Large Woody Debris is removed/repositioned & benefits	This topic is addressed at the pre-project stage, and is beyond the scope of the Hydraulic Code.

The final version of this section will include comments submitted to WDFW about the draft environmental impact statement and rules.

Appendix B

LISTED WILDLIFE SPECIES

Appendix B - Listed Wildlife Species

Table B-1 lists the federally threatened or endangered wildlife species and those that are considered "species of concern" by WDFW, which includes those species listed as State Endangered, State Threatened, State Sensitive, or State Candidate. This table does not include those species designated as State Monitor that have no federal status.

Table B-1. Listed Wildlife Species and Species of Concern

Common Name	Scientific Name	State Status	Federal Status
Marine Mammals			
Fin whale	*Baleonoptera physalus*	SE	FE
Gray whale	*Eschrichtius robustus*	SS	none
Humpback whale	*Megaptera novaeangliae*	SE	FE
Killer whale	*Orcinus orca*	SE	FE
North Pacific Right Whale	*Eubalaena japonica*	SE	FE
Pacific harbor porpoise	*Phocoena phocoena*	SC	none
Sea otter	*Enhydra lutris*	SE	FCo
Sei whale	*Baleonoptera borealis*	SE	FE
Sperm whale	*Physeter macrocephalus*	SE	FE
Steller sea lion	*Eumetopias jubatus*	ST	FT
Land Mammals			
Black-tailed jackrabbit	*Lepus californicus*	SC	none
Blue whale	*Baleonoptera musculus*	SE	FE
Cascade red fox	*Vulpes vulpes cascadensis*	SC	none
Columbian white-tailed deer	*Odocoileus virginianus leucurus*	SE	FE
Annual Report			
Fisher	*Martes pennanti*	SE	FC
Gray wolf	*Canis lupus*	SE	FE
Gray-tailed vole	*Microtus canicaudus*	SC	none
Grizzly bear	*Ursus arctos*	SE	FT
Keen's myotis	*Myotis keenii*	SC	none
Lynx	*Lynx canadensis*	ST	FT
Mazama (Western) pocket gopher	*Thomomys mazama*	ST	FC
Olympic marmot	*Marmota olympus*	SC	none
Preble's shrew	*Sorex preblei*	SC	FCo
Pygmy rabbit	*Brachylagus idahoensis*	SE	FE
Tacoma pocket gopher - Mazama	*Thomomys mazama tacomensis*	ST	FC
Townsend's big-eared bat	*Corynorhinus townsendii*	SC	FCo
Townsend's ground squirrel	*Urocitellus townsendii townsendii*	SC	FCo
Washington ground squirrel	*Urocitellus washingtoni*	SC	FC
Western gray squirrel	*Sciurus griseus*	ST	FCo
White-tailed jackrabbit	*Lepus townsendii*	SC	none
Wolverine	*Gulo gulo*	SC	FC
Woodland caribou	*Rangifer tarandus*	SE	FE
Amphibian			
Cascade torrent salamander	*Rhyacotriton cascadae*	SC	none
Columbia spotted frog	*Rana luteiventris*	SC	none

Dunn's salamander	*Plethodon dunni*	SC	none
Larch Mountain salamander	*Plethodon larselli*	SS	FCo
Northern leopard frog	*Rana pipiens*	SE	FCo
Oregon spotted frog	*Rana pretiosa*	SE	FC
Rocky Mountain Tailed Frog	*Ascaphus montanus*	SC	FCo
Van Dyke's salamander	*Plethodon vandykei*	SC	FCo
Western toad	*Anaxyrus boreas*	SC	FCo
Reptile			
California mountain kingsnake	*Lampropeltis zonata*	SC	none
Green sea turtle	*Chelonia mydas*	ST	FT
Leatherback sea turtle	*Dermochelys coriacea*	SE	FE
Loggerhead sea turtle	*Caretta caretta*	ST	FE
Sagebrush lizard	*Sceloporus graciosus*	SC	FCo
Sharptail snake	*Contia tenuis*	SC	FCo
Striped whipsnake	*Masticophis taeniatus*	SC	none
Western pond turtle	*Actinemys marmorata*	SE	FCo
Birds			
American white pelican	*Pelecanus erythrorhynchos*	SE	none
Bald eagle	*Haliaeetus leucocephalus*	SS	FCo
Black swift	*Cypseloides niger*	SM	FCo
Black-backed woodpecker	*Picoides arcticus*	SC	none
Brandt's cormorant	*Phalacrocorax penicillatus*	SC	none
Brown pelican	*Pelecanus occidentalis*	SE	FCo
Burrowing owl	*Athene cunicularia*	SC	FCo
Cassin's auklet	*Ptychoramphus aleuticus*	SC	FCo
Clark's grebe	*Aechmophorus clarkii*	SC	none
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus*	ST	FCo
Common loon	*Gavia immer*	SS	none
Common murre	*Uria aalge*	SC	none
Ferruginous hawk	*Buteo regalis*	ST	FCo
Flammulated owl	*Otus flammeolus*	SC	none
Golden eagle	*Aquila chrysaetos*	SC	none
Greater Sage-grouse	*Centrocercus urophasianus*	ST	FC
Lewis' woodpecker	*Melanerpes lewis*	SC	none
Loggerhead shrike	*Lanius ludovicianus*	SC	FCo
Marbled murrelet	*Brachyramphus marmoratus*	ST	FT
Northern goshawk	*Accipiter gentilis*	SC	FCo
Northern Spotted Owl	*Strix occidentalis*	SE	FT
Oregon vesper sparrow	*Pooecetes gramineus affinis*	SC	FCo
Peregrine falcon	*Falco peregrinus*	SS	FCo
Pileated woodpecker	*Dryocopus pileatus*	SC	none
Purple martin	*Progne subis*	SC	none
Sage sparrow	*Amphispiza belli*	SC	none
Sage thrasher	*Oreoscoptes montanus*	SC	none
Sandhill crane	*Grus canadensis*	SE	none
Short-tailed albatross	*Diomedea albatrus*	SC	FE
Slender-billed white-breasted nuthatch	*Sitta carolinensis aculeata*	SC	FCo
Snowy plover	*Charadrius nivosus*	SE	FT
Streaked horned lark	*Eremophila alpestris strigata*	SE	FC
Tufted puffin	*Fratercula cirrhata*	SC	FCo
Upland sandpiper	*Bartramia longicauda*	SE	none
Vaux's swift	*Chaetura vauxi*	SC	none
Western grebe	*Aechmophorus occidentalis*	SC	none
White-headed woodpecker	*Picoides albolarvatus*	SC	none
Yellow-billed cuckoo	*Coccyzus americanus*	SC	FC

Mollusk			
Bluegray Taildropper	*Prophysaon coeruleum*	SC	none
California floater	*Anodonta californiensis*	SC	FCo
Columbia oregonian	*Cryptomastix hendersoni*	SC	none
Columbia pebblesnail	*Fluminicola columbiana*	SC	FCo
Dalle's Sideband	*Monadenia fidelis minor*	SC	none
Giant Columbia River limpet	*Fisherola nuttalli*	SC	none
Northern abalone	*Haliotis kamtschatkana*	SC	FCo
Olympia oyster	*Ostrea lurida*	SC	none
Poplar oregonian	*Cryptomastix populi*	SC	none
Butterfly or Moth			
Chinquapin hairstreak	*Habrodais grunus herri*	SC	none
Great arctic	*Oeneis nevadensis gigas*	SC	FCo
Johnson's hairstreak	*Mitoura johnsoni*	SC	none
Juniper hairstreak	*Mitoura grynea barryi*	SC	none
Makah copper	*Lycaena mariposa charlottensis*	SC	FCo
Mardon skipper	*Polites mardon*	SE	FC
Oregon silverspot butterfly	*Speyeria zerene hippolyta*	SE	FT
Puget blue	*Plebejus icarioides blackmorei*	SC	none
Sand-verbena moth	*Copablepharon fuscum*	SC	none
Shepard's parnassian	*Parnassius clodius shepardi*	SC	none
Taylor's checkerspot	*Euphydryas editha taylori*	SE	FC
Valley silverspot	*Speyeria zerene bremnerii*	SC	FCo
Yuma skipper	*Ochlodes yuma*	SC	none
Other Insect			
Beller's ground beetle	*Agonum belleri*	SC	FCo
Bog idol leaf beetle	*Donacia idola*	SC	none
Columbia clubtail (dragonfly)	*Gomphus lynnae*	SC	FCo
Columbia River tiger beetle	*Cicindela columbica*	SC	none
Hatch's click beetle	*Eanus hatchi*	SC	FCo
Island Marble	*Euchloe ausonides*	SC	FCo
Mann's Mollusk-eating Ground Beetle	*Scaphinotus mannii*	SC	none
Pacific clubtail	*Gomphus kurilis*	SC	none
Silver-bordered fritillary	*Boloria selene atrocostalis*	SC	none

State Endangered (SE), State Threatened (ST), State Candidate (SC), State Sensitive (SS), State Monitor (SM)
Federal Endangered (FE), Proposed Endangered (FPE), Threatened (FT), Proposed Threatened (FPT), Candidate (FC), or Species of Concern (FSC).