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 19, 2009

Dear Interested Parties:

The Washington Department of Fish and Wildlife (WDFW) has published a Draft Environmental Impact Statement (DEIS) titled: **Puget Sound Rockfish Conservation Plan (PSRCP)**. WDFW has prepared this Draft Environmental Impact Statement (DEIS) in compliance with the State Environmental Policy Act (SEPA) and other relevant state laws and regulations. The draft plan together with the DEIS is now available for a 30 day public review.

Public Meetings for discussion of this Plan and DEIS are being held at the following locations:

Place	Mill Creek Office WDFW 16018 Mill Creek Blvd, Mill Creek
Date	October 29, 2009
Time	7:00 pm to 9:00 pm
Place	Commons Room University of Washington, Friday Harbor
Date	November 2, 2009
Time	12:00 to 2:00 pm
Place	Room 172 Natural Resources Building, 1111 Washington Street, Olympia
Date	November 4, 2009
Time	7:00 pm to 9:00 pm
Place	Raven Room Skookum Inc, 385 Benedict St, Port Townsend
Date	November 6, 2009
Time	4:00 to 6:00 pm

Agencies, affected tribes, and members of the public are invited to review and comment on this DEIS. We must receive your comments within 30 days of the date of issuing this DEIS. *This means we must receive your comments no later than 5pm on November 19 2009*
See Fact Sheet for details on availability and commenting.

MAJOR CONCLUSIONS

This is a phased non-project review proposal. The goal of the PSRCP is to restore and protect our natural heritage of Puget Sound rockfish populations. To attain this goal, the Washington Department of Fish and Wildlife has developed a range of policies, strategies, and actions that will help restore and maintain rockfish abundance, distribution, diversity, and long-term productivity in their natural habitats. The plan also offers a framework for state rockfish managers to follow in developing detailed regulations, establishing priorities, and providing guidelines for the development of additional plans with co-managers.

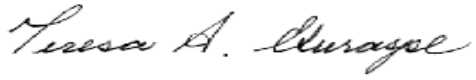
AREAS OF CONTROVERSY AND UNCERTAINTY

The PSRCP proposes eight categories of actions. The two most controversial categories are:

1. Fishery management- the PSRCP proposes a strategy which could reduce fishing opportunities for rockfish and other species.
2. Habitat restoration enhancement- the PSRCP proposes a strategy to consider restoration of degraded rockfish habitat and creation of new habitat for rockfish. This strategy could have adverse impacts on other animals.
3. Hatchery production of rockfish- the PSRCP proposes development of hatchery production that could be used to restore rockfish population. The plan does not propose a hatchery program that would be used to sustain fisheries for rockfish at levels higher than can be supported naturally.

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, WDFW will prepare and distribute a Final Environmental Impact Statement (FEIS). The FEIS will be released in 2010.

Sincerely,



Teresa A. Eturaspe
SEPA/NEPA Coordinator
Agency Responsible Official
Regulatory Services Division
Habitat Program

DRAFT

Environmental Impact Statement for the *Puget Sound Rockfish Conservation Plan*

Including Preferred Range of Actions

LEAD AGENCY

Washington Department of Fish and Wildlife
Fish Program
Natural Resources Building, 6th Floor
1111 Washington Street Southeast
Olympia, WA 98501-1091

October, 2009

FACT SHEET

Title: Puget Sound Rockfish Conservation Plan (PSRCP) Draft Environmental Impact Statement (DEIS)

Description: This is a phased non-project review proposal. Phased review allows agencies and the public to focus on issues that are ready for decision and excludes from consideration issues already decided or not yet ready. To ensure healthy stocks of rockfish populations in Puget Sound, the Washington Department of Fish and Wildlife (WDFW) proposes a PSRCP that includes policies, strategies, and actions that will help restore and maintain rockfish abundance, distribution, diversity, and long-term productivity in their natural habitats. The plan also offers a framework for state rockfish managers to follow in developing detailed regulations, establishing priorities, and providing guidelines for the development of additional plans with co-managers.

Location: Puget Sound, including Hood Canal, the San Juan Islands, and the Strait of Juan de Fuca. (Thurston, Pierce, King, Snohomish, Skagit, Whatcom, Island, San Juan, Mason, Jefferson and Clallam Counties)

Proponent and Lead Agency:

Washington Department of Fish and Wildlife (WDFW)
Fish Program
600 Capitol Way North
Olympia, WA 98501-1091

EIS Project Manager: Greg Bargmann, (360) 902-2825

WDFW Responsible Official:

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Natural Resources Building, 5th Floor
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Permits and Licenses Required: None required

Authors and Principle Contributors:

Washington Department of Fish and Wildlife
Greg Bargmann, Wayne Palsson, Craig Burley, Henry Cheng, Darren Friedel, Theresa Tsou

Date Issued: The DEIS is available for review and download beginning October 19, 2009 on WDFW's website at**:** http://wdfw.wa.gov/hab/sepa/sepa.htm

If you prefer a printed copy or you would like a CD copy of the DEIS (supplies limited), please contact the Fish Program at (360) 902-2844.

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 30 days of the date of issuing this DEIS.
***This means we must receive your comments no later than 5PM on November 19, 2009* .**

You can submit your comments by email to SEPAdesk2@dfw.wa.gov, through the WDFW SEPA website comment link at http://www.wdfw.wa.gov/hab/sepa/sepa.htm fax to (360) 902-2946, or mail to the address below. When you send us your comments, please include the name of the proposal in your comment letter:
"Puget Sound Rockfish Conservation Plan DEIS**"**

Mail comments to:
Responsible Official: Teresa A. Eturaspe, SEPA/NEPA Coordinator, 600 Capitol Way North, Olympia, WA 98501-1091

Meetings for Public Participation:

Contact: Greg Bargmann at (360) 902-2825

Public meetings for discussion of this Plan and DEIS are being held at the following locations and dates:

Place Mill Creek Office WDFW 16018 Mill Creek Blvd, Mill Creek
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Place Raven Room Skookum Inc, 385 Benedict St, Port Townsend
Date November 6, 2009
Time 4:00 to 6:00 pm

Date Final Action is Planned: The Final Environmental Impact Statement (FEIS) on the PSRCP will be released in 2010.

Date of Next Action and Subsequent Environmental Reviews:

The Final Environmental Impact Statement (FEIS) is a phased non-project action. The PSRCP will be provided to the Director of the Washington Department of Fish and Wildlife (WDFW) for action in 2010. Future phased agency actions are anticipated as detailed regulations are developed for specific water basins.

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

Washington Department of Fish and Wildlife**,** Fish Program, Natural Resources Building, 6th Floor, 600 Capital Way North, Olympia, WA 98501-1091

Distribution List:

Notice of the availability of this DEIS is posted on the WDFW SEPA website: http://wdfw.wa.gov/hab/sepa/sepa.htm. Copies have been sent to all local government planning departments (city and county); affected Tribes; all state and federal agencies with jurisdiction; selected environmental organizations and interested parties.

Table of Contents

Chapter 1. Executive Summary

1.1 State Environmental Policy Act Process Overview

1.1.1 Introduction

The Washington Department of Fish and Wildlife (WDFW) recognizes the importance of the State Environmental Policy Act (SEPA) in the process of adopting the Puget Sound Rockfish Conservation Plan (PSRCP- Appendix 1). The environmental impact statement (EIS) process provides opportunities for other agencies, stakeholders, tribal governments, and the public to participate in developing and analyzing information. This process, as detailed in WAC197-11, helps ensure that WDFW understands the environmental consequences of its decisions and considers mitigation of probable significant adverse environmental impacts when making decisions. The EIS process includes:

- Scoping
- Preparing a draft EIS (DEIS), which analyzes the probable impacts of a proposal and reasonable alternatives
- Issuing a DEIS for review and public comment
- Preparing a final EIS (FEIS), which includes analyzing and responding to comments received on the DEIS
- Issuing a FEIS
- Using the FEIS in decision-making.

State Environmental Policy Act processes have been used to ensure public input into policy development. Key steps in the policy development process have been:

1. A Scoping notice was sent to approximately 110 individuals and interested groups in August 2008.

1.1.2 Alternatives

Considering the current and anticipated factors affecting the rockfish resource, the PSRCP will consist of a set of strategies to address WDFW's mandate to conserve rockfish populations while secondarily to provide opportunities to view rockfish in their natural setting and to providing sustainable fishing opportunities where appropriate. This DEIS will focus on analyzing a range of reasonable alternatives to assess their risk of possible significant impact to elements of the environment and to identify mitigation measures that would avoid or minimize related adverse environmental impacts.

Alternative strategies are one of the required components of an EIS. They present meaningful options for the Department to consider in managing rockfish in Puget Sound. Policy proposals to be considered by WDFW are presented in the set of reasonable alternatives categorized in Table 3 and described in Chapter 3 of this DEIS. These alternatives present policy choices consistent with the purpose and need of the PSRCP as described in section 1.2 and relate each choice to the environmental impacts identified in this DEIS in Chapter 3. This process used the environmental checklist

called for in WAC 197-11- 444, and provided in WAC 197-11-960, as the basis for determining any potential environmental impacts resulting from the approval and implementation of the PSRCP non-project action.

The alternatives incorporate information gathered and issues raised through the SEPA scoping process. The specific alternatives discussed in Chapter 3 for the eight policy subject areas can be grouped across a spectrum from most conservative for rockfish to least conservative, into four generalized alternatives (Table 3):

1) The **most**-**conservative** alternative seeks to provide maximum conservation efforts to accelerate the rate of rebuilding rockfish populations to healthy levels of abundance. This could require significant reductions in fishing opportunities for other species, including salmon, lingcod, and halibut. Research efforts would be increased, as would outreach and education efforts. Habitat protection and restoration efforts would increase. Significant efforts to develop rockfish culture and development of the use of artificial habits would be considered.

2) The **conservative** alternative seeks to provide increased rates of rockfish rebuilding and maintenance of healthy populations while providing limited fisheries for rockfish. Research, habitat protection, habitat restoration and public education would be increased over present levels of effort. This alternative would require limited effort to develop the use of rockfish culture or artificial habitat in rockfish management.

3) The **status quo (**no action) alternative seeks to maintain our current approach and emphasis of achieving balance in conservation and utilization needs.

4) The **least-conservative** alternative addresses the feasibility of increasing recreational opportunity while preserving rockfish stocks. Emphasis would be placed on maintaining or increasing fishing opportunities for rockfish and other species. This alternative is predicted to increase the time and decrease the probability of meeting conservation and recovery objectives, when compared to the other alternatives.

A summary of each alternative, across all of the policy categories, is provided in Chapter 3.

1.1.3 Non-Project Proposal

The PSRCP is considered to be a “non-project action” under SEPA (WAC 197-11-442). Non-project actions include the adoption of plans, policies, programs, or regulations containing standards that will guide future actions. The probable significant adverse

environmental impacts analyzed in a non-project EIS are those impacts foreseeable at this stage, before specific project actions are planned. If more specific actions are needed in the future, management decisions will be guided by the policies developed during this process.

1.1.4 Scoping

Scoping initiates public involvement in the SEPA process. Its three purposes are to:

- Narrow the focus of the EIS to significant environmental issues;
- Eliminate insignificant impact issues or those not directly related to the proposal; and
- Help identify reasonable alternatives, consistent with the purpose and need of the proposed action, to be analyzed in the EIS.

The scoping process alerts the public, the project proponent, and the lead agency to areas of concern and potential controversy early in the process. Here, WDFW is both the project proponent and the lead agency. The SEPA process for the PSRCP was formally initiated in 2008 with the publication of the Scoping Notice. In addition to the formal scoping process, Department staff met with tribal co-managers in May 2008 to discuss rockfish conservation strategies.

1.1.5 Next Steps

After issuing this DEIS, WDFW will hold public meetings in Olympia, San Juan County, Mill Creek, and Port Townsend, Washington. These meetings will allow the public to ask questions and give comments on the DEIS and the draft plan. The public meetings are scheduled for 2009. It is anticipated that interested individuals and stakeholders will attend these public meetings and provide comments to WDFW on the DEIS. Those comments will be reviewed and responded to in the FEIS, which is expected to be completed in 2010. The FEIS will include the necessary information to allow the director of WDFW to decide which policies will be adopted in the PSRCP. Upon approval of the PSRCP and FEIS, WDFW will have updated working policies to guide management of rockfish throughout Puget Sound.

1.2 Purpose and Need for the Non-Project Action

1.2.1 Purpose

Consistent with the Scoping Document, the purpose of the PSRCP is to restore and protect our natural heritage of Puget Sound rockfish populations. Increases in the abundance, distribution, diversity and productivity of rockfish will help restore the Puget Sound ecosystem, provide opportunities to view rockfish in the marine environment and, when appropriate, provide sustainable fishing opportunities.

The rockfish conservation plan is needed in order to protect and restore the diversity and long-term productivity of rockfish throughout Puget Sound. WDFW will accomplish this goal with the guidance from relevant state and federal legislation, treaties, the Department's mission statement, its strategic goals and objectives, and Washington

Fish and Wildlife Commission policies, including the existing Puget Sound Groundfish Management Plan (Palsson *et al.* 1998). WDFW will work with tribal governments to ensure fish and wildlife management objectives are met, including sustaining ceremonial, subsistence, commercial, and recreational fisheries, and providing non-consumptive fish benefits and other cultural and ecological values.

Expectations are increasing for fish managers to balance varied public needs to maintain and restore natural stocks, provide sustainable fishing opportunities, fulfill treaty responsibilities with tribal governments and support additional important environmental values such as a healthy marine ecosystem. WDFW will develop the PSRCP to guide the evaluation and development of WDFW's harvest, research, habitat, and outreach and education programs to aid in the conservation and restoration of natural rockfish stocks and provide harvest opportunity consistent with conservation objectives. WDFW must also identify information gaps and develop research and monitoring programs to improve rockfish management decisions.

The draft PSRCP specifies preferred range of actions to achieve the goal of the plan. There are eight policy categories to the plan, each with its objective. The WDFW is now inviting comments from the public and others on each of the preferred objectives. The complete name of the plan is the "Draft Puget Sound Rockfish Conservation Plan with Preferred Range of Actions". However, for clarity, this document refers to the plan as the "Draft Puget sound Rockfish Conservation Plan."

1.2.2 Plan Objectives

The objectives for the PSRCP *(*Appendix 1) are as follows:

1. Provide a framework of policies, strategies and actions for preserving healthy stocks of rockfish in Puget Sound by restoring and maintaining their abundance, distribution, diversity and long-term productivity in their natural habitats;
2. Seek to maintain rockfish populations throughout Puget Sound to achieve cultural, economic, and ecosystem benefits for current and future residents of Washington State in a manner consistent with the primary conservation goal;
3. Meet all federal and state laws, including treaty obligations;
4. Ensure policies are succinct, relevant and easily understood by the public and Department employees;
5. Seek productive partnerships that help the WDFW achieve policy objectives;
6. Use the best available science, sound fisheries management, and professional judgment to achieve excellence in stewardship of public resources; and
7. Monitor and periodically report to the Washington Fish and Wildlife Commission and the public on the implementation and outcomes of Commission-approved policies.

1.3 Issues Identified Through Scoping

WDFW received twelve responses to the Scoping Notice: three from organizations and nine from individuals. These comments contained a wide range of suggestions and are summarized in Table 1.

Table 1. Summary of Comments Made in Scoping Process.

COMMENT	NUMBER OF TIMES MADE	DEPARTMENT RESPONSE
Create underwater parks/marine protected areas as part of rockfish management	3	Considered in Plan
Consider climate change in recovery plan	5	Considered in Plan
Adopt a precautionary approach	1	Considered in Plan
Utilize adaptive management	1	Considered in Plan
Expand monitoring of rockfish to juvenile life stages	1	Considered in Plan
Review effectiveness of existing policies	1	Considered in Plan
Include outreach and education as part of management plan	1	Considered in Plan
Identify important rockfish habitat	1	Considered in Plan
Study rockfish discards (i.e., effect of 1 fish bag limit)	1	Considered in Plan
Consider bycatch in other fisheries	1	Considered in Plan
Restrict fishing gear (e.g., downriggers, lures and depth)	1	Considered in Plan
Restrict fishing for other species (e.g., lingcod and halibut)	1	Considered in Plan
Rely on natural production for stock rebuilding (i.e., no rockfish hatcheries)	1	Considered in Plan
Propagate plankton to increase food supply	1	Outside the range of the scoping notice and will not be considered
Restore eelgrass as rockfish habitat	1	Considered in Plan
Take no action (rockfish are doing fine)	1	A status quo alternative is considered
Do something!	1	Several alternatives are considered which include many action items

1.4 Summary of Initial Environmental Impact

The PSRCRP is a **non-project action** intended to provide guidelines for improving the management, status and utilization of rockfish in Puget Sound, Washington. It develops policies that are intended to address WDFW's dual mandates to conserve the wild rockfish resource and to provide utilization opportunity to the citizens of the state (RCW 77.040.12). Considering the current and anticipated factors affecting the rockfish resource, a key element of the plan is to emphasize conservation and rebuilding of rockfish populations.

The establishment of new guidelines to manage rockfish populations and harvest opportunity is not expected to have direct adverse environmental impacts in itself.

However, if the PSRCP is approved as proposed, it is likely that specific project actions will be recommended to achieve some of the strategies. This initial review was conducted to set the framework for the more detailed evaluation of potential environmental impacts associated with any subsequent actions. Environmental review of subsequent actions will refer to this document.

The review of the initial impact was conducted using the format provided by State Environmental Policy Act (WAC 197-11-960) which provides an environmental checklist of elements to be considered in an EIS. We reviewed the initial likely environmental impact on each of the elements (Table 2).

Table 2. Environmental Impact Potential Review Summarized By Element:

The elements in UPPER CASES (#5 and #12) are addressed in this DEIS because the intent of the PSRCP is to focus on strategies affecting rockfish populations, habitat, and harvest. Items in **bold,** but not in upper case, indicate other possible elements which may be affected by this plan but are judged to be non-significant. Items in bold may be impacted by future actions and will be included in environmental reviews of such action to be considered during watershed plan development.

1. Earth
    a. No clearing, grading or filling. **Potential impacts to the seafloor of Puget Sound if habitat restoration or habitat construction activities are implemented.**
    b. No additional impervious surface due to construction activity.
    c. **Potential reduction of access and fishing related impacts in some areas.**

2. Air
    a. **Quantities of emissions from fishing related boating activity will likely decrease to a small degree.**

3. Water
    a. No dredge or fill operations in surface waters.
    b. In-channel monitoring and evaluation activities are conducted during normal stream flow and under established protocols.
    c. No groundwater withdrawal or discharges into ground.
    d. No activities to affect surface runoff flow or quality.

4. Plants
    a. No removal or alteration of existing vegetation.
    b. No additions to existing vegetation.

5. ANIMALS
    a. Some rockfish species are proposed to be listed under ESA as being Threatened or Endangered.

b. For all species, the plan will be in compliance with the ESA process to allow fisheries and incidental take. The process includes utilization of 4 (d) rules.
c. The primary purpose of the plan is the preservation and improvement of rockfish populations and their ecosystems.

6. Energy and Natural Resources
    a. No change in energy use requirements as a result of this plan.
    b. Will not affect alternative energy projects or potential use.

7. Environmental Health
    a. **No change in the amount of distribution of fishing effort.**
    b. No new special emergency services required.
    c. **Reduced fishing or boating activity in some areas would decrease the overall noise level.**

8. Land Use and Shoreline Use
    a. No structures demolished.
    b. No introduction or displacement of people.

9. Housing
    a. No housing introductions or eliminations.

10. Aesthetics
    a. No aesthetics impact (degraded or blockage of views).

11. Light and Glare
    a. No light or glare impacts.

12. RECREATION
    a. Fishing restrictions could reduce or modify some recreational fishing opportunities.
    b. **Recreational fishing would be allowed when/where appropriate, as outlined in the plan.**

13. Historic and Cultural Preservation
    a. No environmental impacts.

14. Transportation
    a. Proposal will not affect existing state of Washington transportation infrastructure.
    b. Vehicular trip reduction possible to a minor degree.

15. Public Services
    a. No environmental impacts.

16. Utilities
    a. No environmental impacts.

1.5 Summary Table of Alternatives by Policy Area

The four alternatives discussed in section 1.1.2 were used to address each of the eight policy areas covered in the Plan:

Natural Production
Habitat
Fishery Management
Ecosystem Effects
Evaluation, Monitoring and Adaptive Management
Research
Outreach and Education
Enhancement

The DEIS contains an analysis of all four alternatives for each of the eight policy area resulting in a total of 32 alternate strategies. The DEIS indicates which of the four alternatives is the preferred alternative for each policy area. The selection of the preferred alternative was based on meeting plan objectives while minimizing adverse environmental impacts. While all of the policy areas further the goal of the PSRCP, none is sufficient by itself to address all of the objectives.

The 32 alternatives are shown in Table 3 and an analysis of each alterative is presented in Chapter 3. The approved option will be used to provide a framework to achieve the goal of the PSRCP.

Table 3. Range of Policy Options Proposed For Puget Sound Rockfish Recovery Plan. The preferred option is indicated in bold.

	RANGE OF ACTION			
POLICY CATEGORY	**ALTERNATIVE 1 MOST CONSERVATIVE**	**ALTERNATIVE 2 CONSERVATIVE**	**ALTERNATIVE 3 NO-ACTION/STATUS QUO**	**ALTERNATIVE 4 LEAST CONSERVATIVE**
Natural Production	All fishery and ecosystem management protects and recovers all rockfish species and stocks to healthy levels.	**Rockfish management shall place a high priority on the protection of key rockfish species and stocks to maintain and restore stocks to healthy levels using the natural capacity of the population to sustain itself.**	Rockfish will be generally managed under the terms of the Puget Sound Groundfish Management Plan.	All rockfish will be managed passively, and rockfish will not be considered in the management plans of other species.
Habitat	**Protect and restore all marine habitat types for all rockfish species**.	Protect and restore rocky habitats for key rockfish species**.**	Primarily rely on the HPA process to protect priority rockfish habitats and conduct opportunistic activities to protect rockfish habitats.	Rely on the HPA process to protect rockfish habitats. No research will be conducted.
Fishery Management	**All fisheries in Puget Sound waters will be managed to ensure the health and productivity of all rockfish populations**.	All fisheries in Puget Sound marine waters will be managed to ensure the health and productivity of key rockfish populations.	Some bottomfish fisheries will be managed to ensure the health and productivity of some rockfish populations.	Fisheries in marine waters will be passively managed with respect to the status of rockfish populations.
Ecosystem	Protect and restore the functions of all rockfishes in the complex marine ecosystem and food web in Puget Sound.	Protect existing functions of key rockfish and conduct opportunistic activities to restore the functions of key rockfish in the complex ecosystem and food web in Puget Sound.	**Conduct opportunistic activities to protect and restore the function of some rockfish in the complex ecosystem and food web in Puget Sound. Focus will be on determining the proper ecological functioning of rockfish.**	The ecosystem functions of rockfishes are not considered in rockfish management.

	RANGE OF ACTION			
POLICY CATEGORY	**ALTERNATIVE 1 MOST CONSERVATIVE**	**ALTERNATIVE 2 CONSERVATIVE**	**ALTERNATIVE 3 NO-ACTION/STATUS QUO**	**ALTERNATIVE 4 LEAST CONSERVATIVE**
Monitoring, Evaluation, and Adaptive Management	All rockfish populations will be monitored emphasizing fishery-independent and fishery-dependent information.	**Key rockfish populations will be monitored emphasizing fishery-independent and fishery-dependent information**.	Key rockfish populations will be monitored using primarily fishery dependent with some fishery-independent information.	Key rockfish populations will be monitored only with fishery dependent information.
Research	Implement new and cooperative research to understand the diversity, biology and productivity of all rockfish as well as needs for recovery.	**Implement new and cooperative research to understand the diversity, biology and productivity of key rockfish as well as needs for recovery.**	Conduct rockfish research to examine growth, population structure and habitat requirements for key rockfish populations.	Conduct no research on rockfish; only use information in the existing literature or nearby studies to manage rockfish stocks.
Outreach and Education	**Conduct a comprehensive outreach and education program to inform Washington citizens of the value of rockfish populations in Puget Sound.**	Conduct a comprehensive outreach and education program to inform Washington fishers of the value of rockfish populations in Puget Sound.	Write occasional popular articles, work with the media, use the rule-making process, and give public presentations on the importance of rockfish populations.	Rely on others to inform the citizens of Washington of the value of rockfish populations in Puget Sound.
Enhancement (Artificial Reef and Hatchery Production)	Develop plans to: 1. Utilize hatchery production to assist in recovery of depleted rockfish populations consistent with natural production goals; and 2. Enhance habitat for all species of rockfish through the use of artificial habitat.	**Develop plans to:** **1. Utilize hatchery production to assist in recovery of depleted rockfish populations consistent with natural production goals; and** **2. Enhance habitat for key species of rockfish through the use of artificial habitat.**	Hatchery production for rockfish may be used to recover key depleted populations and for research. Artificial reef habitat will be considered on a case-by-case basis.	Artificial reef habitat will be implemented opportunistically with limited or no assessment.

1.6 Key Relationships Within the Plan

The PSRCP proposes a series of policies, strategies and actions in eight categories. All of the categories are related and needed to achieve the goal of the PSRCP. For example, protecting and restoring rockfish populations will require protecting and restoring rockfish habitat and ensuring that fisheries management provides sustainable populations. Neither habitat protection or fisheries management alone will be sufficient to protect and restore rockfish in Puget Sound.

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1.7 Significant Issues and Environmental Choices Among the Alternatives

1.7.1 Major Conclusions

During the preparation of this DEIS for this plan, an environmental checklist (Appendix 5) was used as an aid to determine the potential significant adverse impacts identified at the beginning of Chapter 3. Consistent with WDFW's dual mandates to conserve wild rockfish populations and provide utilization opportunities, the Department will address the potential impacts to animals and recreation through this DEIS (see Chapter 3 for the analysis.

It should be noted that the impacts evaluated in this DEIS relate to opportunity (fishing, observation, photography, etc.) and not impacts such as noise, transportation, energy use, etc., which are related to boat or other vehicle activity. Those impacts will be separately, for example, when evaluating existing road, infrastructure, marinas, and boat ramp construction projects.

1.7.2 Unavoidable Measures

No unavoidable significant-adverse environmental impacts were identified during the preparation of this DEIS. The intent of the PSRCP is to protect and, when necessary, restore rockfish populations to healthy levels. This intent does not include increasing rockfish populations to levels above historical, natural population levels.

1.8 Phased Review

SEPA review is required on proposals for project and non-project actions such as the PSRCP. WDFW will propose future project and non-project actions related to implementing the plan, such as planning site specific construction proposals. These more detailed actions may or may not require additional SEPA review. Actions that simply expand activities, but don't result in impacts outside the scope of those evaluated in this DEIS, will not require a separate SEPA review.

1.9 Alternatives Considered, But Not Analyzed

Under SEPA, a reasonable alternative is defined as "an action that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation. Reasonable alternatives may be those over which

an agency with jurisdiction has authority to control impacts, either directly or indirectly “ (WAC 197-11-786). For some policy subject areas, alternatives were considered, but not included in the detailed analysis, because they did not fully address the stated purpose and need of the PSRCP and were not considered to be “reasonable.” Examples of alternatives which were considered but not analyzed include:

1. Maximizing harvest opportunities for rockfish;
2. Seeking methods to increase food supply of rockfish;
3. Intentionally decreasing abundance of rockfish predators to increase populations of rockfish;
4. Transplanting rockfish from outside Puget Sound into Puget Sound;
5. Implementing catch-and-release fisheries for rockfish; and
6. Implementing a temporary prohibition on all types of fishing which impact rockfish.

Chapter 2 Background

2.1 The Natural Environment

The natural environment considered in this DEIS includes all of the water and associated intertidal and subtidal substrate within Puget Sound. The natural environment includes plants and animals which may interact with rockfish in Puget Sound. The natural environment is common to all elements considered in the PSRCP.

2.1.1 Puget Sound

In this document "Puget Sound" refers to the marine waters of Washington State east of the Sekiu River and south of the Canadian-United States border, including all waters south to Olympia and Hood Canal (Figure 1). Although not stated in the PCRCP, the existing Puget Sound Groundfish Plan (Palsson *et al*. 1998) considers Puget Sound in two major areas or regions as follows.

> North Puget Sound: Those waters of the Strait of Juan de Fuca and the San Juan Islands. The western boundary is the Sekiu River (which is east of Cape Flattery); the northern boundary is the U.S.-Canadian border and the southern border is a line from Point Wilson (near Port Townsend) to Partridge Point on Whidbey Island.
>
> South Puget Sound: those marine waters south of the Point Wilson- Partridge Point line and east of Deception Pass. South Puget Sound includes the Whidbey Basin, Admiralty Inlet, Hood Canal, the central basin, and the southern basin of Puget Sound.

This geographical division is based largely on the stock identification of rockfish and by the major oceanographic patterns within the Sound. Although the Puget Sound Partnership recognizes seven action areas within the Sound, existing WDFW policy will manage rockfish by two large regions. This division into two areas represents a balance between benefits and costs of managing rockfish by smaller water basin or by larger region.

Figure 1. Map of Puget Sound showing management regions.

2.1.2 Sensitive, Threatened and Endangered Species

Puget Sound is home to a wide variety of animals whose continued existence may be in jeopardy. These species are listed under the federal Endangered Species Act (ESA) or the Washington State species of concern list (Table 4).

Table 4. Animals Found In Puget Sound That Are Listed In The Federal Endangered Species Listing Or In The List Of Washington Department Of Fish And Wildlife Species Of Concern ((WDFW 2009) With Possible Interaction With Rockfish

COMMON NAME (STATUS[1])	SCIENTIFIC NAME	POSSIBLE INTERACTION WITH ROCKFISH
Southern Resident Killer Whale (E)	*Orcinus orca*	Rockfish are minor prey item
Humpback Whale(E. SE)	*Megaptera novaeangliae*	
Stellar Sea Lion (T,ST)	*Eumetopias jubatus*	Rockfish may be a minor prey item
Marbled murrelet(T,ST))	*Brachyramphus marmatus*	
Brown pelican (E,SE)	*Pelecanus occidentalis*	Minor competition for food
Chinook salmon (T)	*Oncorhynchus tshawytscha*	Rockfish are both prey and predators
Summer chum salmon (T)	*Oncorhynchus keta*	
Steelhead trout (T)	*Oncorhynchus mykiss*	
American white pelican (SE)	*Pelecanus erythrorhynchos*	Possible competition for food
Brandt's Cormorant (SC)	*Phalacrocorax penicillatus*	
Cassin's auklet (SC)	*Ptychoramphus aleuticus*	
Common mure (SC)	*Uria aalge*	
Black rockfish (SC)	*Sebastes melanops*	
Yelloweye rockfish (SC,PT)	*Sebastes ruberimmus*	
Bocaccio rockfish (SC, PE)	*Sebastes paucispinis*	
Brown rockfish (SC)	*Sebastes auriculatus*	
Canary rockfish (SC, PT)	*Sebastes pinninger*	
China rockfish SC)	*Sebastes nebulosus*	
Copper rockfish (SC)	*Sebastes caurinus*	
Greenstriped rockfish (SC)	*Sebastes elongates*	
Pacific cod (SC)	*Gadus macocephalus*	Competition for food, predation, bycatch in rockfish fisheries
Pacific hake (SC)	*Merluccis productus*	Competition for food, predation, bycatch in rockfish fisheries
Pacific herring (SC)	*Clupea pallasi*	Rockfish prey on herring; herring prey on rockfish larvae

[1] E or T means listed an Endangered or Threatened under the federal Endangered Species Act, if preceded by a "P" it indicates that the listing status is potential; SE, ST, SC and SS means the species is listed on the Washington state Endangered, Threatened, Candidate or Sensitive list.

COMMON NAME (STATUS[1])	SCIENTIFIC NAME	POSSIBLE INTERACTION WITH ROCKFISH
Quillback rockfish (SC)	*Sebastes maliger*	
Tiger rockfish (SC)	*Sebastes nigrocinctus*	
Walleye pollock (SC)	*Theragra chalcogramma*	Competition for food
Widow rockfish(SC)	*Sebastes entomelas*	
Yellowtail rockfish (SC)	*Sebastes flavidus*	
Gray Whale (SE)	*Eschrichtius robustus*	
Pacific harbor porpoise (SC)	*Phocoena phocoena*	
Northern abalone (SC)	*Haliotis kamschatkana*	
Olympia Oyster (SC)	*Ostrea conchaphila*	

2.2 The Governing Environment

Authority for regulating rockfish, their habitats, and threats to their health and human use in Puget Sound is divided among many federal, tribal, state, and local (city and county) governmental entities (Table 5). Different entities are responsible for fisheries management, habitat, and water quality. The diffuse nature of regulatory authority requires at least the cooperation and participation of many management agencies to ensure success.

Table 5. Agencies with Authority Affecting Rockfish Conservation and Rebuilding Efforts.

AGENCY	REGULATORY AUTHORITY
NOAA-Fisheries (federal)	Administers the Endangered Species Act (ESA) for fish and marine mammals and the Marine Mammal Protection Act
U.S. Fish and Wildlife Service (federal)	Administers the ESA for seabirds
U.S. Army Corps of Engineers (federal)	Administers Section 10 and Section 404 permits which affect rockfish habitat
Tribal governments	Manage treaty fisheries and habitat within reservation boundaries
Dept of Fish and Wildlife (state)	Manages non tribal fisheries; limited management authority over habitat
Dept of Ecology (state)	Manages water quality
Puget Sound Partnership	Coordinates the restoration of Puget Sound
Dept of Natural Resources (state)	Manages state lands and marine vegetation and authorizes uses of rockfish habitat
Dept of Health (state)	Issues consumption advisories, which affect demand. Current advisories are in effect in many portions of Puget Sound
Local (city and county)	Manages substantial developments, growth management act, conditional use permits, shoreline development, critical areas, and issues consumption advisories.

2.3 Rockfish[2]

Rockfish are members of the family Scorpaenidae and are members of the *Sebastes* or *Sebastolobus* genera. Rockfish are characterized by having spines on their head (at least at some stage during their development), stiff dorsal fins, and venom glands at the base of fins, internal fertilization of eggs, and birth of live larvae. Over sixty species of rockfish exist in the Pacific northwest and exhibit a wide range of differences: some species are dull colored; others are brightly colored. Some species school, others are solitary. Some species can exceed thirty pounds in weight, others never exceed a pound.

Rockfish have a variety of local names. Perhaps the most common name applied to local rockfish is "rock cod." Rockfish are also called "sea bass" (although they are not a member of the bass family) or "red snapper" (although they are not true snappers).

A total of 28 species of rockfish have been identified in Puget Sound, (Appendix 4) but some are very rare and uncommon (i.e., rougheye and silvergray). Others are found only in very specific areas of the Sound (i.e., blue and China rockfish). Other species are, or were, very common and provide valuable ecological functions and are included in commercial and recreational fisheries. Rockfish as a group are among the most common species of fish found in the Sound. They are year-round residents and can be found in nearly every area, depth, and habitat type. Many species of rockfish co-occur in the same habitats and depths (Moulton 1977, Love *et al*. 2002, Gunderson and Vetter 2006) and are similar in appearance, making species identification difficult. It is not unusual for a single fishing trip to land several species of rockfish, often caught at the same location and depth. The complex nature of the multi-species fishery and difficulties in identification makes fishery management challenging.

2.3.1 Rockfish Life History and Biology

Rockfish are some of the longest-lived fish known in Puget Sound, with maximum age for several species spanning more than 50 years. Rockfish mature as early as age 2, but ages at maturity from 6 to 11 years are common, and may be as old as 22 years for yelloweye rockfish.

Female rockfish give birth to free-swimming larvae, usually during the spring months. The larger the female, the greater the number of larvae produced. For example, female copper rockfish that are 8 inch (20 cm) in length produce 5,000 eggs while a female 20 inch (50 cm) in length may produce 700,000 eggs (Palsson *et al*. 2009). Recent research indicates that older female rockfish produce more competent larvae which have a greater chance of survival (Berkeley *et al*. 2004.) Currently, rockfish are commonly caught before they reach sexual maturity, eliminating their entire reproductive potential.

A dominant feature of rockfish reproduction is a pattern of infrequent and irregular successful recruitment and many years with poor recruitment (Hollowed *et al*. 1987,

[2] A detailed description of rockfish in Puget Sound is found in Palsson *et al*. 2009

Hollowed and Wooster 1995, Ralston and Howard 1995). Reproductive success may occur only during narrow spatial and temporal windows when conditions are favorable for larval survival.

Rockfish have swim bladders which contain gas that is slowly regulated to allow the fish to maintain buoyancy at various depths. However rockfish, unlike other species such as salmon, do not have a mechanism to rapidly expel gas from the swim bladder. When rockfish are brought to the surface, the gas within the bladder expands, causing internal injuries or death. The effects of rapid decompression include: over-inflation and rupture of the swim bladder; inability to submerge when released; exposure to predation and solar radiation; abnormal or erratic swimming behavior; gas embolisms in the blood vessel, gills, skin, and eyes; distortion of internal organs through the mouth; internal and external hemorrhaging; cloacal protrusions; and death (Kerr 2001, Meyer 2006, Parker *et al*. 2006, Rogers *et al*. 2008. Berry (2001) found clouded or bulging eyes in a third to more than half of quillback rockfish captured causing permanent eye damage. Parker *et al*. (2006) found that all swim bladders of tested black rockfish were ruptured when brought to the surface, but most survived at least a short time when quickly recompressed back to depth. Meyer (2006) performed pressure experiments on copper rockfish captured from northern Puget Sound and examined similar aspects of physiology. He found signs of depressurization stress when fish were brought to the surface from 10-, 20-, and 30-meter (33 to 100 feet) simulated depths, and these signs included hyper-inflated swim bladder, hyper-inflated pericardial chambers, and gas bladder rupture. Injuries are more severe with increasing capture depths. Fish captured from a simulated 10 meters (33 feet) did not die and might be safely caught and released. Fish captured from greater depths have life-threatening injuries. One of three captured from 20 meters (65 feet) died, and all fish captured from 30 meters (100 feet) died.

This facet of rockfish anatomy limits fishery management options due to the high mortality rates of released fish.

2.4 Rockfish Habitats

The term “habitat” refers to the physical, chemical, and biological conditions that support a species or species assemblage. The structural components of habitats are created and sustained by long-term physical processes such as tidal currents, human activities and also by habitat forming species such as eelgrass meadows and kelp forests.

2.4.1 Nearshore Vegetated and Rocky Habitats

The primary habitat for nearshore rockfish is composed of pebble, cobble, boulder, bedrock, and hardpan substrates that are continuous or isolated and form crevices or other structures to protect rockfish from currents and predators (Matthews 1990a, b, c Buckley 1997, Pacunski and Palsson 2002). In shallow waters of less than 18 meters (60 feet) in depth, rocky habitats are typically covered during the summer months with macroalgae including canopy and understory kelps, bladed and filamentous red and brown algae, and, in high energy environments, surfgrasses (Mumford 2007). These formations are important to the health of juvenile and adult rockfish as described above.

Demersal species that use these habitats include copper, quillback, brown, and tiger rockfish. Pelagic assemblage species also make use of these habitats, especially where there are steep drop offs. These species include black, yellowtail, and Puget Sound rockfish.

Copper, quillback, and brown rockfish have an affinity for natural rocky habitats with high relief. Most exhibit small home ranges of approximate 30 meters^2 (323 ft^2) and exhibit high site fidelity (Matthews 1990b, c). Less is known about the specific habitat associations and distributions of other adult rockfish species in Puget Sound.

2.4.2 Deep-Benthic Habitats

Deep-benthic habitats for rockfish primarily include boulder, bedrock, and hardpan outcroppings in waters deeper than 37 meters (120 feet). Deep-water habitats also include extreme slopes of unconsolidated substrates, or sand, shell, and cobble fields often located in the periphery of rocky outcroppings. These deep, unconsolidated habitats occur off many of the islands and points of the South Sound such as Camano Head, Possession Bar, Mukilteo, Jefferson Head, Point Edwards, Point Monroe, Skiff Point, Restoration Point, Blake Island, Southworth, Dalco Point, Tacoma Narrows, Fox and Ketron Islands, and along the steep walls of Hood Canal. In addition, quillback and other sedentary rockfish are found to lesser degrees on habitats composed of coarse and fine sediments. The more common occurrence of copper, quillback, and brown rockfish in the South Sound indicates that these species may make use of isolated shelters created by benthic debris, sunken logs, or benthic vegetation mats swept into deep basins from the nearshore.

2.4.3 Open-Water Habitats

Open-water habitats include the water column, both shallow and deep, and the surface waters that contain drift vegetation. This habitat may be segregated by the depth preferences of several rockfish species. Several schooling species such as yellowtail, redstripe, and widow rockfish characterize the deeper segments of this habitat. Schools of yellowtail rockfish occasionally occur in deep waters of the western Strait of Juan de Fuca and widow rockfish were found once off the southwest corner of San Juan Island (Miller and Borton 1980). In shallower waters, near pinnacles and steep walls, black and Puget Sound rockfish occupy open-water habitats.

The juveniles of some rockfish species make use of floating mats of vegetation in open water (Buckley 1997). These tend to occur throughout the North Sound and the northern portions of the South Sound and are often associated with tidal and other oceanographic fronts.

2.4.4 Artificial Habitats

Artificial habitats include piles of boulders, concrete wastes, tires, sewer pipes, breakwaters, shipwrecks, pilings, and other jettisoned or anthropogenic material not of natural geological origin. These structures mimic natural features of relief, crevice spaces, and settlement substrates for vegetation and invertebrates but may not provide equal functions as natural habitats. Artificial habitats include artificial fishing reefs that

were deployed to enhance fishing in the South Sound and urban habitats where rocky habitats were naturally limiting (Buckley 1982). WDFW created nine offshore artificial reefs and four urban reefs (and others were created by the Washington Department of Natural Resources (WDNR) and by illegal or accidental dumping. Some artificial habitats have been configured with smaller rock sizes than used on adult reefs in order to attract post-settlement rockfish (West *et al*. 1994, 1995, Buckley 1997).

Rockfish are found among artificial habitats (Matthews 1990a) and quickly colonize new artificial habitats soon after deployment. New habitats likely attract itinerant fish from the surrounding environment (Buckley and Hueckel 1985, Laufle and Pauley 1985), but how well the artificial reefs simulate the function of natural habitats is unclear. Matthews (1990b) found that home ranges are greater for rockfish living on artificial habitats than natural habitats, and fish living on artificial habitats are more likely to move to low-relief natural rocky habitats during the summer. In contrast, rockfish living on natural high-relief rocky habitats (vertical relief greater than two meters (6 feet)) apparently have more suitable conditions because they remain in smaller home ranges throughout the year. Moreover, most rockfish displaced from natural high-relief rocky habitats return to them after being displaced to artificial reefs, but rockfish displaced from artificial reefs to high-relief natural reefs do not return and remain at the high-relief natural habitats. These findings indicate that artificial habitats may not provide habitat of the same quality as natural habitats.

Artificial habitats have been suggested as a habitat mitigation tool for the loss of natural habitats because they attract concentrations of rockfish and other rocky habitat species (Hueckel *et al*. 1989). But issues of habitat quality, function, and replacement of underlying natural habitats may limit their use as replacement habitats.

2.5 Fisheries for Rockfish

Fisheries for rockfish have existed in Puget Sound for a long time, probably since humans first inhabited the region (Stewart 1977). Modern commercial fishing for rockfish and other species of bottomfish started in the 1920s and greatly increased in the 1970s and 1980s (Figure 2). This increase occurred in both northern and southern Puget Sound and in both recreational and commercial fisheries (Figure 3). The increase in landings was due to increased fishing effort, not to an increase in the abundance of rockfish (Palsson *et al*. 2009).

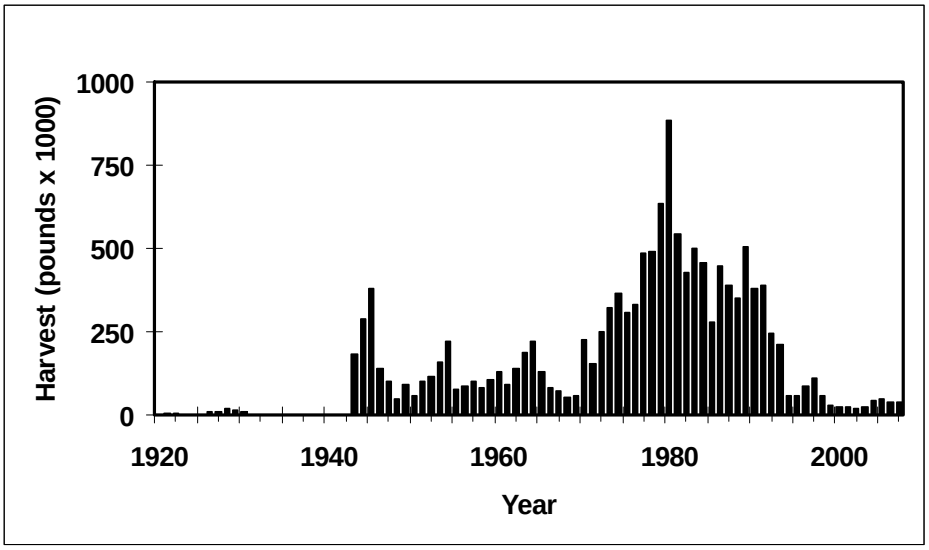

Figure 2. Estimated catch of rockfish in pounds from Puget Sound 1920 -2008. Source: Palsson, *et al.* 2009.

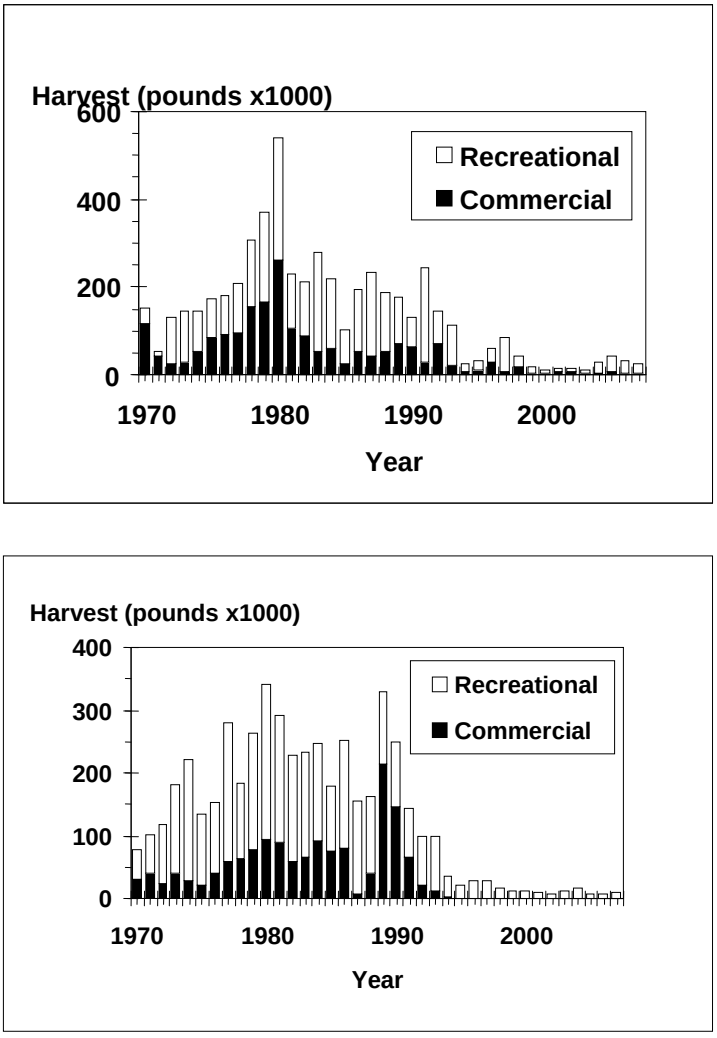

Figure 3. Annual catch of rockfish from Puget Sound. Northern Puget Sound is shown above and South Puget Sound, below. Source: Palsson *et al*. 2009

Since the 1980s, a series of management actions has been taken to reduce the impact of fishing on rockfish. These actions include the prohibition of certain gear types, imposition of daily or trip catch limits, and establishment of no fishing areas. No annual catch limits for any species of rockfish have been established in Puget Sound. These actions have reduced the size of the rockfish catch. In 2009, the annual catches of rockfish by both commercial and recreational fisheries are low, the lowest since complete record keeping began in the 1970s (Palsson *et al.* 2009).

2.5.1 Commercial Fisheries

Many different types of commercial fishing gear have been used in Puget Sound to catch rockfish. Some of this gear is designed to catch rockfish, and other types are designed to catch other species of fish such as salmon and flatfish, but may catch rockfish incidentally. The major commercial gear types which have caught rockfish, but are no longer allowed in Puget Sound, are roller trawl, handline jig and bottomfish troll.

Existing gears that may encounter rockfish incidentally are bottom trawl, set net and setline. Commercial fisheries are capable of operating at any depth in Puget Sound.

At present, the commercial catch of rockfish in southern Puget Sound is nearly zero and has been at that level since the early 1990s. In northern Puget Sound, a harvest of rockfish (primarily yellowtail) by trawl occurs regularly in the Strait of Juan de Fuca.

The catch estimates for commercial fisheries do not include estimates for rockfish encountered during commercial fishing operations and released at sea. No monitoring program exists with which to estimate the magnitude of this release rate. The amount of this release is thought to be low, but the mortality rate high (Palsson *et a*l. 2009).

2.5.2 Recreational Fisheries

Several different types of recreational fisheries have captured rockfish. While recreational fishers undoubtedly sought and harvested rockfish prior to 1968 (Buckley 1967, 1968; Buckley and Satterthwaite 1970), consistent statistical surveys were not implemented to estimate total recreational harvests in Puget Sound until 1970, and early estimates indicated that recreational harvests of rockfish were minimal (Palsson 1988). Targeted rockfish fisheries have included the boat-based, hook-and-line fishery for bottomfish, the spearfishery and the shore-based hook-and-line fishery. By far, boat-based anglers account for the majority of harvested rockfish. Typically, these anglers target rockfish on areas of high, rocky relief. Anglers can fish to depths of more than 122 meters (400 feet) often on deep pinnacles or artificial structures. Using modern fishing gear and electronic aids, anglers can effectively fish at any depth or location in the Sound.

Anglers who fish specifically for bottomfish encounter rockfish. In addition rockfish, are encountered while fishing for halibut, lingcod and salmon (Table 6). Anglers fishing from shore occasionally catch rockfish using spinning gear and lures and baited hooks. However, the catch of rockfish tends to be minimal by shore anglers (Bargmann 1982). Divers spear rockfish, a sport that co-developed with the recreational diving. Divers using pole spears and spear guns have harvested rockfish in great numbers and can account for approximately a quarter of the total recreational harvest of rockfish in some areas and years (Bargmann 1984). More recent regulations restrict recreational fishing of rockfish with the imposition of a one-fish daily bag limit and the prohibition of spearfishing for rockfish.

In recent years (2004-2007), recreational anglers have encountered approximately 35,000 rockfish annually. Most of these are encountered by people fishing for bottomfish. Smaller numbers of rockfish are encountered by anglers fishing for salmon, halibut or other species of fish (Table 6). Considerable numbers of these rockfish are released. Of all rockfish encountered while recreational fishing in Puget Sound, nearly two-thirds are released. Anglers fishing for bottomfish released the largest number of rockfish, while salmon anglers released the highest proportion of their encountered rockfish (Table 6).

Table 6. Patterns of Rockfish Encounters in the Puget Sound Recreational Fishery, 2004-2007. Source : Palsson *et al*. 2009

TARGET SPECIES	AVERAGE NUMBER OF ROCKFISH ENCOUNTERED ANNUALLY	AVERAGE PERCENT OF ROCKFISH RELEASED
Bottomfish	21,490	64
Halibut	658	50
Salmon	8,742	77
Any Species	4,435	42
Total	35,325	64

Current management strategy is designed to: 1) minimize the catch of rockfish by reducing the bag limit to one fish per day and establishing fishing seasons for rockfish, and 2) minimize wastage by allowing anglers to retain one rockfish per day. The ongoing high rate of release in the recreational fishery remains a concern (Palsson *et al*. 2009).

2.5.3 Treaty Fisheries for Rockfish

Rockfish bones have been found in native middens and archeological studies have shown that Native Americans historically harvested several species of rockfish (Stewart 1977). By treaty, several tribal governments have the authority to authorize fisheries for rockfish and other species in Puget Sound. However, the amount of rockfish harvested by persons fishing under the authority of a tribal government has been very small in recent years. Rockfish harvested by tribal fishers have contributed less than 2 percent to the total Puget Sound harvest for most years since 1991. The annual harvested poundage was the greatest in 1992 at 15,600 pounds and in 1998 when 1,371 pounds were landed. In both of these peak years, trawl gear was the primary gear of harvest. During other years, harvests have ranged from none to approximately 500 pounds with troll and other gear being the dominant source of the landings.

2.6 Current Stock Status for Rockfish in Puget Sound

The PSRCP concludes that many stocks of rockfish are in poor condition. This conclusion is based on previous analysis conducted by WDFW staff (Palsson *et al.* 2009) which assigns rockfish stocks to one of the four following categories of stock status:

> **Healthy Stock Status**: A healthy stock is one that is stable or increasing and at, or above, historic levels of abundance. For healthy rockfish stocks, the reproductive biomass must be at least 50 percent of the biomass which produces the maximum sustainable yield (B_{MSY}). When an estimate of B_{MSY} is not available, proxies may be used.
>
> **Precautionary Stock Status:** Precautionary stocks are those that meet the Vulnerable Criteria but conservation and management measures are in place to halt, further decline or promote rebuilding. Alternatively, precautionary stocks are

those with spawning biomass less than 50 percent but greater than 25 percent of the B_{MSY}. When this information is missing, proxies may be used. A stock may be placed in this category when data are lacking and the stock status is unknown.

Vulnerable Stock Status: A vulnerable rockfish stock is one whose spawning potential has been reduced to less than 25 percent of the B_{MSY}, and there are no additional risk factors.

Depleted Stock Status: A depleted rockfish population far exceeds the Vulnerable Criteria and has a spawning potential or biomass much less than 25 percent of the B_{MSY} and the stock has additional risk factors such as rarity, limited range, or specialized habitat requirements. When this information is missing, proxy values may be used.

The stock assessment techniques were based on evaluation methods developed by the American Fisheries Society and modified to account for situations where the amount of information is limited (Palsson *et al* .2009).

The stock status of each species was evaluated for both regions of Puget Sound. The majority of rockfish stocks or populations in Puget Sound are in the Precautionary status, and several species once important to recreational fisheries are in the Vulnerable or Depleted status (Table 7). The patterns of stock status are generally similar between the two regions. Fewer than 20% of the populations present in either North or South Sound are in Healthy status.

Table 7. Summary of the Status of Rockfish Populations in Puget Sound. Source: Palsson *et al*. 2009

SPECIES	NORTH SOUND	SOUTH SOUND
Copper rockfish	Precautionary	Vulnerable
Quillback rockfish	Vulnerable	Depleted
Brown rockfish	Precautionary	Precautionary
Black rockfish	Precautionary	Precautionary
Yelloweye rockfish	Depleted	Depleted
Yellowtail rockfish	Precautionary	Precautionary
Canary rockfish	Depleted	Depleted
Bocaccio	Precautionary	Precautionary
Redstripe rockfish	Healthy	Healthy
Greenstriped rockfish	Healthy	Healthy
Splitnose rockfish	Precautionary	Precautionary
Shortspine thornyhead	Healthy	Healthy
Tiger rockfish	Precautionary	Precautionary
China rockfish	Precautionary	Not Present
Blue rockfish	Precautionary	Not Present
Vermilion rockfish	Precautionary	Precautionary
Puget Sound rockfish	Precautionary	Healthy
Number Healthy	3	4
Number Precautionary	11	7
Number Vulnerable	1	1
Number Depleted	2	3
Total Stocks Examined	17	15

Stock condition is closely related to the frequency of a species entering the recreational catch with the more commonly caught species being in poor condition, and smaller species, which are seldom caught, being in the healthiest conditions. Copper and quillback rockfish have been the two most important species in the recreational fishery, but three of four stocks are in Vulnerable or Depleted condition. Throughout Puget Sound, yelloweye and canary rockfish are in Depleted condition. Eleven species in North Sound and seven species in South Sound are in Precautionary status. These species, such as black, yellowtail, splitnose, and bocaccio, have been secondary species of importance in recreational and commercial fisheries.

This evaluation of stock status has many limitations, most notably the lack of complete recreational catch estimates between 1994 and 2003, the lack of information on the released portion of the rockfish encounters and the poor quality of species composition data from the commercial fishery, unknown influences of changing bag limits on the interpretation of the recreational catch rate trend, and the lack of age and other

biological data. Additionally, the analysis of stock status presumes that rockfish stocks in the early 1970s were at maximum levels and declines are measured from that time. However, almost certainly rockfish populations were not at their maximum in the 1970s, since harvest of rockfish had occurred for at least fifty years prior to that time. Thus, this analysis of stock condition may underestimate the real decline in abundance (Palsson *et al.* 2009).

2.7 Stressors and Limiting Factors

Potential stressors and limiting factors can negatively impact rockfish populations. Many stressors or threats to rockfish have been identified by West (1997). Those stressors and their potential to limit productivity and recovery of rockfish populations in Puget Sound are discussed in this section (Table 8). The likely known impact on productivity is rated as High, Moderate, or Low (Palsson *et al*. 2009). The definitions for each risk categories are as follows:

- High: The stressor has been documented to dramatically limit rockfish populations in Puget Sound or along the West Coast.
- Moderate: The stressor has been identified to cause direct mortality on local scales or to be a persistent factor but on a restricted scale.
- Low: The stressor has some potential to limit rockfish populations on a small scale or large scale, but the stressor has not been documented in Puget Sound.

Table 8. Likely Stressors Limiting Rockfish Populations in Puget Sound.

FACTOR	LIKELY IMPACT
Past Fishery Removals	High
Habitat Disruption	Low
Derelict Gear	High
Climate Change	Low
Water Quality	
Dissolved oxygen	Moderate
Nutrients	Low
Chemical Contamination	Moderate
Species Interactions	
Food Web	Moderate
Competition	Low
Salmon Hatchery Practices	Low
Diseases	Low
Genetic Changes	Low

2.7.1 Past Fishery Removals

Fishing affects rockfish in both time and space, affecting sustainable populations. In Puget Sound, past fishing practices have decreased both the number of fish and the average age and size of fish. Recent studies clearly show declines in abundance of

many species of rockfish, and several of the most commonly fished species show an average declining size as well. The comparison of rockfish densities and sizes in marine reserves to fished areas in Puget Sound shows that removals by fishing activities affect the abundance and size structure of rockfish populations (Palsson *et al.* 2009). We conclude that the decline in abundance and size observed for several species of rockfish is primarily due to the effects of past fishing.

Age truncation, the removal of older fish, can occur at even moderate levels of fishing for rockfish (Berkeley *et al*. 2004b). For long-lived fish such as rockfish, age truncation can have "catastrophic" effects (Longhurst 2002). A study of black rockfish revealed that age truncation occurs along the central coast of Oregon, and that older fish release their young earlier in the spring than younger fish (Bobko and Berkeley 2004). Further, older fish produce better quality embryos with larger oil globules and have higher absolute fecundities (Berkeley *et al*. 2004a, Bobko and Berkeley 2004). These and other results led Berkeley *et al*. (2004a) to conclude that older rockfish produce high quality larvae which are better able to withstand starvation and grow faster than the offspring of younger fish.

Age truncation as a result of fishing may affect rockfish populations in Puget Sound by reducing the number of larvae produced, the fitness of the larvae produced, and the period during which larvae are produced. All three of these factors may act to diminish the chances of successful recruitment in Puget Sound.

Rockfish often experience severe injury and death (e.g., "barotrauma") when brought to the surface from depth. Recent studies have revealed the potential for high mortality of fish caught at depth and subsequently released, and studies have shown mixed results in ameliorating the effects of barotrauma injuries. Techniques aimed at minimizing barotrauma have focused on reeling fish up slowly, venting or deflating the swim bladder and rapid re-submergence.

- **Speed of retrieval**-The speed of reeling and the ascent rate does not lessen the effects of barotrauma on rockfish. The low speed of reeling does not improve the survival of copper rockfish (Meyer 2006), and holding experiments of quillback rockfish brought to the surface slowly and those brought to the surface rapidly do not differ in their survival following four to six weeks in captivity (Berry 2001). Berry (2001) did find a higher incidence of eye damage by fast reeling with power reels in quillback rockfish.

- **Venting**-Venting (or "fizzing") involves puncturing the swim bladder to remove pressure on the organs by allowing the captured gas to escape (Berry 2001, Kerr 2001, Meyer 2006, Wilde 2009). The puncture is usually performed with a hypodermic needle or other sharp object along the side of the fish. In an analysis of 17 studies among 22 species or species groups, Wilde (2009) found little support that venting improves the survival of fish. Venting might be slightly beneficial to fish caught in shallow water, but is increasingly detrimental to fish captured in deeper water. Studies of quillback rockfish held in underwater cages

following capture found no difference in survival rates between vented fish and unvented fish (Berry 2001). A study in California found similar results for blue rockfish (Gotshall 1964). Autopsies of vented and unvented fish four to six weeks following capture, indicate that vented fish have a lesser rate of swim bladder lesions than unvented fish (Berry 2001). Following release, differences in behavior were noted between vented and unvented rockfish (Gotshall 1964).

- **Rapid submergence**- Reducing the time held at the surface or out of the water is more important in increasing survival than venting rockfish (Berry 2001, Parker *et al*. 2006, Hannah and Matteson 2007, Jarvis and Howe 2008). Parker *et al*. (2006) tested the effect of re-submerging captured black rockfish immediately after capture and found that after 21 days, rapidly submerged rockfish only suffer 3.3 % mortality. Hannah and Matteson (2007) found the success of recompression depends upon the species of rockfish, with blue rockfish showing more behavioral impairment than black, canary and yelloweye rockfish. For copper rockfish, the increasing depth of capture results in greater external signs of barotraumas, but artificial deflation and recompression offer potential benefits for minimizing the mortality of rockfish (Meyer 2006). Berry (2001) found quillback rockfish rapidly recompressed to a depth of 15 meters (50 feet) suffered less mortality and appeared more "normal" than fish slowly re-submerged to 15 meters (50 feet) during the course of two days.

The mortality rate of rockfish caught in depths greater than 20 meters (65 feet) is high. Consequently, the incidental catch and encounter of rockfish during fishing continues to be a substantial threat to rockfish populations in Puget Sound. There is some promise of rapid recompression limiting this mortality. We conclude that the bycatch component of fishery removals remains as a high impact stressor and that at present there are no reliable methods to reduce the mortality due to the effects of barotrauma.

2.7.2 Habitat Disruption

Habitat disruption and loss includes naturally and human caused activities that temporarily or permanently alter existing natural habitats. Habitat disruption results from filling, dumping dredge spoils, sedimentation, trawling, constructing beach bulkheads, installing pipelines and cables, sunken vessels, and constructing artificial habitats. The most vulnerable rockfish habitats are shallow-water vegetated areas and deeper rocky habitats.

Juvenile rockfish are highly associated with submerged and floating aquatic vegetation including eelgrass and kelp, while kelp is prevalent in the shallow portions of adult rockfish habitats. The disruption of submerged aquatic vegetation could pose a threat to the habitat quality of rockfish. Surveys conducted by the WDNR indicate that eelgrass abundance hasn't changed during recent years, but localized increases and decreases have occurred (Berry *et al*. 2003, Dowty *et al*. 2005, PSAT 2007). The amount of kelp beds along the Strait of Juan de Fuca varies greatly from year to year and some specific areas, such as near Protection Island, has shown long-term declines

(Berry *et al*. 2002). In other areas of Puget Sound, kelp beds are increasing, due in part, to kelp growing on manmade structures (Levings and Thom 1994).

One-third of the Puget Sound's shoreline has been modified by human activities such as bulkheading, filling, overwater structures, and boat ramps (Bailey *et al*. 1998). Shoreline structures that extend over or through the subtidal zone alter fish communities compared to shore zones consisting of sand, cobble, or shallow rip-rap (Toft *et al*. 2004).

Another potential threat to rockfish is habitat disruption resulting from the introduction of exotic aquatic vegetation into Puget Sound. *Sargassum muticum*, an exotic brown algae, was accidentally introduced into Puget Sound from oyster aquaculture activities and now is ubiquitous in the extreme nearshore, where rocks and cobbles are present (Britton-Simmons 2004). These are the same habitats that post-larval copper rockfish settle in, but whether *S. mutium* affects rockfish settlement is not known. In North Sound, settling juvenile copper rockfish transition to *S. mutium* as the first substrate-associated recruitment in areas with minimal kelp habitat (Buckley 1997).

Adults of many species are closely associated with rocky habitats. The amount of this habitat is naturally limited, especially in Southern Puget Sound. A WDFW study (Pacunski and Palsson 1998) estimated 207 square kilometers (51,150 acres) of rocky habitat exists in North Puget Sound and only 10 square kilometers (2,471 acres) occurs in South Puget Sound. This rocky habitat may be affected by the deployment of mobile fishing gear, cables and pipelines, construction of bridges, sewer lines, and other submerged structures, and burying by sediments from dredge spoils, dam removal, and natural subtidal slope failures.

In Puget Sound, some commercial bottom trawl activities have targeted rockfish living on rocky habitats. Around the world, mobile fishing gear reduces physical and biological structure on the seafloor, leaving long-lasting impacts (Auster 1998, Dorsey and Pederson 1998, Kaiser 1998). In Puget Sound, trawling is presently limited to the Strait of Georgia, the San Juan Islands, and the western Strait of Juan de Fuca. Roller gear, which can enhance the ability of trawls to fish on rocky habitats, is prohibited in Puget Sound. The extent of habitat disruption by bottom trawling in Puget Sound is not clear, but it is thought to be minimal (Bargmann *et al*. 1985).

The likely impact of large scale habitat disruption for rockfish in Puget Sound is low at present. However, localized habitat degradation may be impacting rockfish stocks.

2.7.3 Derelict Fishing Gear

Abandoned or lost fishing gear, especially gillnets, used for fishing for salmon and marine species is a threat to rockfish. Lost nets used for salmon fishing or trawling are distributed throughout Puget Sound. These nets have either become entangled on rocky habitats or obstructions or cut loose to sink to the seafloor. Up to 61,000 rockfish may be caught in this derelict fishing gear per year (Palsson *et al*. 2009), a magnitude of mortality greater than, or comparable to, recent annual recreational harvests and

bycatch of rockfish in Puget Sound. Based upon the documented extent of derelict gear on rockfish mortality, food webs, and habitats, there is a high risk to rockfish populations by derelict fishing gear in Puget Sound.

2.7.4 Climate Change

The survival and recruitment of marine fish, including rockfish, may be affected by climate-related oceanic conditions. The oceanography of Puget Sound and adjacent coastal waters are interlinked and affected by patterns that operate on seasonal, annual, decadal, and intermittent scales. Already, an increase in sea surface temperature of 1.7^{o} Centigrade has been detected at Race Rocks (near Victoria, British Columbia) since the early 1970s (Mantua *et al*. 2007). Potential climatic patterns that affect biological processes include upwelling (Hsieh *et al*. 1995), changes in water currents, upwelling and temperatures such as the Pacific Decadal Oscillations (Ebbesmeyer *et al*. 1991, Hare and Mantua 2000), El Niño or Southern Oscillation events (Pearcy and Schoener 1987, Newton 1995), droughts (Newton *et al*. 2003), and climate change (Mantua *et al*. 2007). If waters become warmer due to climate change, one logical expectation is that species from warmer southern waters may invade Puget Sound while cold-tolerant species may become less common due to differential recruitment and mortality, advection of recruits, or even direct movement of adults (Mantua *et al*. 2007).

How climatic changes directly affect rockfish in Puget Sound is unclear, but biological effects of climate change can affect the year-to-year success of reproduction for rockfish, other bottomfish, and salmonids. For example, successful year classes for different rockfish appear to be linked to warm, intermediate, and cold oceanographic conditions (Hollowed *et al*. 1987, Hollowed and Wooster 1995). Moser *et al*. (2000) found that juvenile rockfish abundance of several species was negatively correlated with warm water and El Niño events in the California current system. Major perturbations have been observed with many extreme El Niños affecting the Northeastern Pacific (Pearcy and Schoener 1987). A common pattern of rockfish recruitment, observed along the West Coast, is infrequent and irregular years of successful recruitment, with many years of poor recruitment (Parker *et al*. 2000). The synchronous recruitment event of 2006 in Puget Sound observed for copper and quillback rockfish in South Sound and black and yellowtail rockfish in North Sound (LeClair *et al*. 2007), suggests rockfish productivity is affected by sporadic recruitment events, which are likely related to broad-scale climatic events. Many rockfish species along the West Coast exhibit sporadic recruitment over many decades (Hollowed *et al*. 1987, Moser *et al*. 2000). Synchrony of rockfish recruitment in the California Current System appears to predominate on coast-wide rather than smaller regional scales, suggesting that large-scale climatic factors are affecting rockfish recruitment (Field and Ralston 2005). In contrast, different California regions can show different patterns in catch per unit effort for rockfish in response to El Niño conditions (Bennett *et al*. 2004). For example, as El Niño conditions developed or as ocean climate turned warm after 1977, catch rates for rockfish declined in southern California and increased in the north.

Unfortunately, knowledge of recruitment patterns is lacking for any species of rockfish in Puget Sound, so the impact or potential impacts of climatic change on recruitment cannot be directly addressed. Overall, how climate change affects rockfish in Puget Sound is unknown. A recent study of climate change by the University of Washington concluded that profound changes have occurred in the Puget Sound environment over the past century and that the next several decades will see even more changes (Snover *et al*. 2005). Projected changes that could impact rockfish include increases in water temperature, flooding, accelerated rates of sea level rise, loss of nearshore habitat, changes in plankton, and increased likelihood of algae blooms and low levels of dissolved oxygen. Each of these potential changes could adversely impact rockfish populations in Puget Sound, but at present the known impact on rockfish is low.

2.7.5 Water Quality

Throughout most of Puget Sound, the water quality (temperature, salinity, dissolved oxygen) is suitable for rockfish survival and growth. Most waters of Puget Sound are classified as "Excellent" by the Department of Ecology, with Hood Canal remaining a glaring exception. Other areas, including Budd Inlet, Discovery Bay, and Penn Cove, may have waters that limit fish populations, especially due to warm summer temperatures.

2.7.5.1 Water Quality- Hypoxia

In Hood Canal, persistent and increasing areas of low levels of dissolved oxygen (hypoxia) have been noted during the past decade (Newton *et al*. 1995, 2005, Warner *et al*. 2002). This exposure to low oxygen results in abnormal behavior by rockfish in Hood Canal. For instance, rockfish avoid waters with less than 2 mg/L of oxygen by moving to nearshore, shallow waters less than 9 meters (20 feet) in depth (Palsson *et al*. 2008). In some years, extreme hypoxia results in massive fish kills in Hood Canal (Palsson *et al*. 2008). In 2003, hypoxia resulted in a 26% direct mortality of the copper rockfish at the Sund Rock Conservation Area (Palsson *et al*. 2008). In addition to mortality, rockfish exposed to low levels of dissolved oxygen may experience decreased growth rates and decreased reproductive success.

Overall, the impact of hypoxia represents a moderate risk to rockfish at present, but the risk appears to be increasing. The impact of hypoxia on rockfish is greatest in Hood Canal.

2.7.5.2 Water Quality- Changes in Nutrients

Nutrients are chemical compounds needed by organisms for metabolism, growth, and other functions. Nutrients in Puget Sound come from rivers, streams, and the Pacific Ocean. Humans can add nutrients to the waters of Puget Sound through sources such as sewage, agricultural runoff, and storm water (Paulson *et al*. 2006). The nutrients are not utilized directly by rockfish, but could impact rockfish populations indirectly. The addition of relatively small amounts of nutrients could increase rockfish prey such as crustaceans, which feed on the organic material while the addition of larger amounts could reduce water quality by causing hypoxia. The addition of nutrients can stimulate the growth of algae during the summer months through a process called eutrophication.

The algae dies, sinks to the bottom and decomposes, a process that utilizes dissolved oxygen. Therefore, increased levels of nutrients may lead to lower levels of dissolved oxygen in places such as Hood Canal. Increased nutrients from septic systems may be exacerbating naturally-caused hypoxia in Hood Canal (Newton *et al*. 2007), and this human source, as well as natural sources of nitrogen, may be causing the hypoxia that adversely affects rockfish populations (Palsson *et al*. 2008).

There is a lack of long-term monitoring information for nutrients in Puget Sound. PSAT (2002) identifies several water bodies that are susceptible to eutrophication including portions of the Whidbey Basin, Sinclair Inlet, southern Hood Canal, and portions of southern Puget Sound. In addition, several freshwater sources have high concentrations of total nitrogen and phosphorus including Skagit Bay, the Puyallup River, and the Deschutes River in Olympia. This risk is judged to be low.

2.7.5.3 Water Quality- Chemical Contamination

Risks to rockfish health associated with their exposure to toxic contaminants can occur at all life history stages where the pollutants occur. Demersal adults and juveniles, and pelagic larvae and juveniles can all be exposed to a wide range of toxic contaminants in their habitat. Larvae, in particular, face unique additional risks associated with maternal transfer of toxics via the nutrients they receive during gestation.

Many rockfish are long-lived and exhibit relatively strong site fidelity and high trophic position as adults. These factors increase the risk of exposure to persistent bioaccumulative toxics (PBTs) for populations that reside in contaminated habitats. Demersal rockfishes in urban or industrialized areas have exhibited some of the highest tissue concentrations of mercury, PCBs, and DDTs of any species monitored in Puget Sound (West *et al*. 2002). On a larger spatial scale, rockfishes residing in Central and Southern Puget Sound may experience greater exposure than populations in other Puget Sound Basins because Pacific herring, an important rockfish prey, exhibit unusually high levels of PBTs (West and O'Neill 2008).

PBT exposure may affect rockfish growth in Puget Sound. Male quillback rockfish exhibit a lower growth rate than females in Elliott Bay, a pattern that is unique to that urban location, compared to samples from 98 other locations in Central Puget Sound, Admiralty Inlet, Georgia Basin, and the Strait of Juan de Fuca (West *et a*l. submitted). This unique sex-specific disparity in growth pattern correlates with higher levels of toxics that accumulate in male rockfish in Elliott Bay (females can "depurate" their PBTs to their developing embryos).

Impairment of rockfish reproduction may occur when PBTs are maternally transferred to developing embryos. Rockfish larvae from urban females are probably born with a pre-existing body burden of PCBs, thereby increasing the risk that fitness of this sensitive life stage is compromised. In addition, English sole (*Parophrys vetulus*) studies suggest that exposure to certain pollutants may cause feminization of males and unusual spawn timing in females (Johnson *et al*. 2008) of benthic species living in contaminated habitats.

The contribution of rockfish living in urban, contaminated areas to the full reproductive output of all Puget Sound populations is unknown and needs to be quantified. For some rockfish species, the oldest individuals are typically found in urbanized habitats. Such areas may act as *de facto* refuges, because it is either difficult to fish the habitats (e.g., habitats near ferry lanes) or access is restricted to fishers (i.e., at military bases like Sinclair Inlet's Puget Sound Naval Shipyard). The greatest pollutant-related risks to the conservation and recovery of rockfish in Puget Sound relate to reproductive dysfunction of rockfish populations due to exposure to contaminants. At present, this risk is judged to be moderate due to its localized impacts.

2.7.6 Species Interactions

Rockfish have naturally evolved to persist and thrive in the presence of other species in Puget Sound. However, the perturbations in community structure caused by fishing, habitat alteration, and other stressors may negatively affect or create an imbalance in the natural structure of marine communities. This impact has not been demonstrated in Puget Sound and the risk is judged to be low.

2.7.7 Food Web Dynamics

Rockfish function as both predators and prey in the complex food web of Puget Sound. Some of these linkages have been examined through diet studies, and only recently are food web interactions for rockfish and other species in Puget Sound (PSP 2008) being integrated into a conceptual and quantitative model of food web structure. Simenstad *et al*. (1979) identified copper rockfish as an important carnivore of rocky, subtidal habitats in northern Puget Sound.

Harbor seals are year-round residents of Puget Sound, whose population has expanded greatly since the 1970s, increasing from a few hundred to over 12,000 in 1999 (Schmitt *et al*. 1995, Jefferies *et al*. 2003) and 14,000 recently (PSAT 2007). There are indications that the growth rate of the seal population is decreasing, and that the population may be reaching its maximum carrying capacity in Puget Sound (Jefferies *et al.* 2003). The average weight of harbor seals in Puget Sound is approximately 63 kg (140 pounds) and daily food consumption rates are approximately 4 % of body weight (Schmitt *et al*. 1995). Based on these numbers, the estimated consumption of food by harbor seals in Puget Sound is quite high, 2.2 million kg (over 5 million pounds) annually. In the San Juan Islands, where there are approximately 7,000 seals, rockfish comprise 12% of seal diets annually and 23% during the winter (Lance and Jeffries 2007). Lance and Jefferies (2007) concluded that the consumption patterns of seals may have an important impact on reduced stocks of rockfish.

Like harbor seals, California sea lions have not been common until recently in Puget Sound. (PSAT 2007). The first large aggregation was observed in 1979. Since then, the abundance of California sea lions has been in the hundreds and occasionally over 1,000 animals (Schmitt *et al*. 1995). California sea lions are seasonal migrants in Puget Sound, occurring primarily from September through June. The average weight per animal is between 180 and 277 kg (450 to 700 pounds). Antonelis and Perez (1984)

estimated daily food consumption to be 5 to 10 percent of their body weight. Therefore, a 225 kg (500-pound) California sea lion would eat 11 to 23 kg (25 to 50 pounds) per day. In a review of predation by marine mammals in Puget Sound, no evidence was found of a significant consumption of rockfish by California sea lions (Schmitt *et al*. 1995). However, because California sea lions consume rockfish off California, the observed lack of rockfish in the diet of California sea lions in Puget Sound may reflect low rockfish abundance, or poor seasonal and geographic data on California sea lion diets. The great numbers of harbor seals and some aggregations of sea lions in Puget Sound may result in significant natural morality of depleted rockfish stocks.

Consumption of rockfish by orca whales in Puget Sound is thought to be a rare event and the impact is likely low, even at low levels of rockfish abundance (Palsson *et al*. 2009).

Steller sea lions inhabit Puget Sound, especially in the entrance waters at Tatoosh Island and in the San Juan Islands, where dozens are present during the spring (S. Jeffries, WDFW, personal communication). Steller sea lions have increased in abundance in the northern portion of the western United States; currently, 800 to 1,000 animals inhabit northern Puget Sound during the fall and winter months (PSAT 2007). The impact of these large mammals on rockfish is unknown. In the San Juan Islands, rockfish occurred in 8.3 % of Steller sea lion scats (Lance and Jeffries 2007).

Rockfish are an important prey for several species of marine birds. Juvenile rockfish can be especially important for birds feeding their young. There has been no known increase in populations of marine birds that would likely affect rockfish stocks, and several species of marine birds are in decline in Puget Sound (PSAT 2002).

Rockfish, especially juvenile rockfish, are important prey for lingcod and may even be their primary food (Matthews 1987, Beaudreau and Essington 2007). Abundances of lingcod was low in Puget Sound prior to the mid 1990s but has increased in recent years (PSAT 2007), suggesting that lingcod may have an increasing negative effect on rockfish abundance. In marine reserves, lingcod may cause a “tropic cascade” which changes the structure of the marine fish community (Salomon 2002, Salomon *et al*. 2002). The high densities of lingcod observed in the long-term marine reserves in Puget Sound may reduce the abundance of rockfish through predation upon adult and juvenile rockfish (Palsson *et al*. 2004). Rockfish were three times more likely to occur in the diets of lingcod captured from marine reserves in the San Juan Islands than from fished areas (Beaudreau and Essington 2007). Therefore, increased abundances of lingcod and management practices promoting lingcod conservation may impact the abundance and recovery of rockfish stocks in Puget Sound.

The likely importance of predation limiting rockfish stocks in Puget Sound is moderate.

2.7.8 Competition

Rockfish have been shown to have competitive interactions, or to partition their environment to avoid competition with other rockfish species (Larson 1980, Hallacher

and Roberts 1985). In Southern Puget Sound, the increase in brown rockfish may be a result of the removal of the larger copper and quillback rockfish by the fishery, allowing for brown rockfish to invade an open niche. The impacts of competition may also be exacerbated or caused by the availability of prey. The present known impact of competition on rockfish stocks is low.

2.7.9 Hatchery Practices

West (1997) suggested that a potential stress to rockfish in Puget Sound was predation of larval and juvenile rockfish by "delayed-release," hatchery-reared salmon. Delayed-release salmon are Chinook salmon and coho salmon which have been held longer in hatcheries or net pens, so they are less likely to migrate to sea and more likely to remain in Puget Sound. Since Chinook and coho salmon consume rockfish, especially in the larval and juvenile stage (Buckley 1997), releases of larger hatchery salmon may impede the productivity of rockfish stocks in Puget Sound (West 1997). The number of delayed release salmon released into Puget Sound averaged 21.2 million fish annually from 1983 to 2001 and has declined by over 33% since. Hatchery releases of salmon into Puget Sound increased by a factor of four between 1972 and 1990 (Palsson *et al*. 2009). The number of hatchery-released salmon declined from a peak of 8.5 million in 1990 to 4 million salmon in 2005. Overall, there is a lack of information on the direct impacts of hatchery releases on rockfish stocks in Puget Sound and the risk is judged to be low.

2.7.10 Disease

Rockfish are susceptible to diseases and parasites (Love *et al*. 2002), but the effect on rockfish populations Puget Sound is not known. Extensive scale loss has occurred on individuals living in high densities or in poor water quality. Sub-adult quillback rockfish living on the Boeing Creek Artificial Reef had a disease causing scale loss attributed to a protozoan parasite (W. Palsson, WDFW, unpublished data). Copper rockfish concentrated in dense schools during events of low dissolved oxygen in Hood Canal had extensive scale loss (W. Palsson, WDFW, unpublished data). Conboy and Speare (2002) found the eggs of a nematode infesting rockfish in a British Columbia fish market, but the pathology to the fish was not known. A wide variety of parasites and diseases affect rockfish (Love *et a*l. 2002) and stress, such as in Hood Canal during low dissolved oxygen events, may exacerbate the incidence and severity of naturally occurring diseases to the point of sub-lethal or lethal effects.

Overall, diseases are likely naturally occurring and pose a low risk impact to rockfish stocks in Puget Sound.

2.7.11Genetic Change

Fishing can alter the genetic characteristics of fish populations by lowering genetic diversity and by artificial selection (Kenchington 2003). Fishing can artificially select larger and typically faster growing individuals thus promoting the survival of individuals with slower growth rates (Biro and Post 2008). Overall population growth rates may decrease, and other effects such as smaller size at maturity, smaller size at age, and smaller maximum sizes can occur (Law 2000).

The impacts of genetic change are likely subtle and need at least 30 generations to be expressed for long-lived rockfish. Thus, it may require several hundred years to identify any genetic changes. However, genetic change may be exacerbated when population sizes are low or naturally limited. Demonstrated genetic threats are lacking, and the impacts of genetic change to rockfish stocks are low.

Chapter 3 Alternatives and Analysis

3.1 Overview

WAC 197-11-444 provides a comprehensive list of subjects that must be considered in this analysis with the caveat that the EIS must only study the elements that apply to this proposal. The alternatives introduced in section 1.1.2 of this Programmatic DEIS for the Puget Sound Rockfish Conservation Plan have been examined in the context of WAC 197-11-144 and found not to have a likely significant adverse impact to the environment except for the following two elements:

1) Plants and Animals - Habitat for and numbers or diversity of species of plants, fish, or other wildlife, unique species and fish or wildlife migration routes.
2) Land and Shorelines Use – Recreation.

3.2 Analysis of Alternatives to the Suggested Policy

This section provides an analysis of reasonable alternatives to each of the eight major policy areas proposed in the PSRCP. The alternatives are evaluated on their potential impact on stocks of rockfish in Puget Sound. The concept of stock is important or evaluating the success of the plan.

By “stocks” we mean we mean a group of interacting fish of the same species which are treated together for management purposes. The Puget Sound Groundfish Management Plan (Palsson *et al.* 1998) recognizes two stocks of most rockfish species in Puget Sound; based on geographical distribution (Figure 1); a northern stock and a southern stock. For example there are two stocks of quillback rockfish in Puget Sound; a northern stock and a southern stock,

The PSRCP proposes two alternatives for management of rockfish stocks in Puget Sound. One, the all species approach, would evaluate the condition of the stocks of rockfish and the other approach, the key species approach, focuses conservation effort on only a few selected species

All species approach- This approach would creat management strategies for up to 54 stocks of fish as follows: 28 known species of rockfish in the Sound, which is divided into two regions (north and south). Two species of rockfish (China and blue) are found only in one region. Thus the total number of rockfish stocks in the Sound is 54 (28 species times 2 regions minus 2 species in only one region). When the plan mentions all rockfish, it refers to 54 stocks to be managed.

Key species approach-This approach concentrates rockfish management and restoration on a subset of species. Some species are, or were, very common and

provide valuable ecological functions as well as inclusion in commercial and recreational fisheries. We classify these species as **key species** (Table 9). A species may also be classified as a key species due to acute conservation concerns regarding its current level of abundance. The draft plan proposes that the following species be considered as key species in Puget Sound:

Table 9. Species Of Rockfish Proposed As Key Species In Puget Sound.

SPECIES	COMPLEX	REASON
Copper rockfish	Nearshore	Important in recreational fisheries
Quillback rockfish	Nearshore	Important to recreational fisheries
Black rockfish	Pelagic	Important to recreational fisheries
Yelloweye rockfish	Deepwater	Conservation concerns, past economic importance
Bocaccio rockfish	Deepwater	Conservation concerns
Canary rockfish	Deepwater	Conservation concerns, past economic importance
Puget Sound rockfish (*Sebastes empheus)*	Nearshore	Important forage item

Species may be added or removed from this list as deemed necessary for resource management. As proposed in the PSRCP, there are seven key species, all of which are found in both regions, meaning that the number of stocks of key rockfish is 14. All of these stocks have the potential to be caught by commercial or recreational fisheries. Adoption of the key species approach would provide benefits to other species of rockfish as well as the proposed key species encompass the full range of representative habitats.

3.2.1 Affected Environment

The affected environment for all of the policy options and alternatives includes all of Puget Sound east of the Sekiu River that is utilized by larval, juvenile and adult rockfish. The environment includes the water column, intertidal and subtidal substrate, aquatic vegetation and animals that feed on rockfish or provide food for rockfish. The human environment is included as well: fishing; habitat alteration, pollution and construction activities.

3.3 Alternatives

The PSRCP proposes eight areas of policy action to achieve the goals. As described in Chapter 1 of this document, we developed a range of four alternatives for each of the action areas. These alternatives are described in Table 3.

3.3.1 Natural Production

The goal of the PSRCP to restore and maintain the abundance, diversity, and productivity of rockfish implies that stocks of wild rockfish will be maintained or restored to a healthy condition. By wild, we mean naturally produced rockfish regardless of parentage. By healthy, we mean rockfish stocks have sufficient abundance, productivity age, and spatial diversity to maintain populations through environmental fluctuations, climate change, and prolonged periods of low reproductive success. Another goal is to provide an increased number of larger, older rockfish in Puget Sound. Since many stocks of rockfish are at low levels of abundance with a scarcity of larger fish, realizing these goals will translate into higher numbers of rockfish with an increase in larger fish.

There are several potential environmental impacts if these goals are achieved. Increased numbers of rockfish and more, larger fish will mean increased demand and competition with other predators for forage. This increased demand could result in increased natural mortality rates for herring, shrimp, and other food items. Conversely increased populations of rockfish, especially younger, smaller individuals will act to increase the forage base of Puget Sound, because many other species, including birds and marine mammals, feed on rockfish.

While the goals of using natural production will act to increase the number of rockfish present in Puget Sound, we do not plan to utilize natural production to create unnaturally high populations of rockfish. Thus the environmental impact is predicted to remain at, or less than, historical levels of rockfish abundance.

Alternative 1 (Most Conservative):
All fishery and ecosystem management protects and recovers all rockfish species to healthy levels.

All rockfish species will be managed in an ecosystem context that considers the natural capacity of a population to sustain itself in relation to food web dynamics, targeted and bycatch fishery removals, other human induced stressors and limiting factors, and climatic factors. Stocks will be managed to assure intact genetic structure, sustainable production, age diversity and ecosystem services. The management of other marine species will consider fishery, habitat, population, and other impacts on the integrity and sustainability of natural rockfish populations.

Alternative 2 (Conservative): Preferred Option
Rockfish management shall place a high priority on the protection of key rockfish species and stocks to maintain and restore stocks to healthy levels using the natural capacity of the population to sustain itself.

All fishery and ecosystem management protects and recovers key rockfish species to healthy levels and considers the management and ecosystem impacts of other marine species.

This alternative has a narrower scope than Alternative 1 in that it limits activities to key species of rockfish rather than all species. Only key species will be managed in an ecosystem context that considers the natural capacity of a population to sustain itself in relation to food web dynamics, targeted and bycatch fishery removals, other human-induced stressors and limiting factors, and climatic factors. Stocks will be managed to assure intact genetic structure, sustainable production, age diversity, and ecosystem services. The management of other marine species will consider fishery, habitat, population, and other impacts on the integrity and sustainability of natural rockfish populations of key species.

Alternative 3 (No Action):
Rockfish will be generally managed under the terms of the Puget Sound Groundfish Management Plan (Palsson *et al.* 1998). This plan contains a policy of no net loss of habitat.

Natural production of rockfish will be considered as a complex of species, rather than individual species, attention to those species commonly harvested in recreational fisheries. (i.e. copper, quillback, brown and black rockfish).

Alternative 4 (Least Conservative):
All rockfish will be managed passively, and rockfish will not be considered in the management plans of other species. Habitat and ecosystem needs of rockfish will not be considered. Individual species will not be monitored or specifically managed.

Alternative 4 does not meet the stated need of the PSRCP.

3.3.2 Habitat

The management intent of this proposal is to protect and restore habitat important to rockfish. Habitat could be protected by enforcing existing rules and creating new rules encouraging other agencies (state, federal, local and tribal) to do the same. Research and surveys could be conducted to identify and protect rockfish habitat. Restoration could be accomplished by physical projects to improve the functioning of existing but degraded habitat, or new habitat which mimics natural habitat could be constructed. These projects could have a wide variety of approaches. Examples include removing derelict nets that are located on rocky reefs, improving water quality by removal of contaminants, minimizing habitat damage caused by fishing, restoring degraded vegetation beds, removing invasive species, and improving levels of dissolved oxygen.

As is the case with other options discussed in this document, the intent is to restore and maintain rockfish habitat to natural levels. This means that rockfish populations on protected and restored habitats will likely not exceed historical levels.

Protecting existing habitat means continued recreational opportunities for rockfish, both consumptive and non-consumptive. As degraded habitat is restored, recreational opportunities should increase as well.

Because this DEIS addresses a non-project activity, specific restoration proposals are not addressed. Any such proposal would be addressed separately as the details are developed, with reference to this plan and EIS as appropriate (WAC 197-11-442).

Under the hydraulic code (WAC 220-110); WDFW has the authority to regulate construction in marine waters of Puget Sound, including all rockfish habitat. The code, commonly referred as "HPA" (hydraulic project approval), is designed to protect fish life by regulating certain activities. While not designed specifically for rockfish, the code identifies three rockfish habitats of special concern (WAC 220-110-250):

Rockfish settlement and nursery areas
Eelgrass meadows
Kelp beds

However, the HPA code does not emphasize rocky marine habitat, the habitat type most commonly associated with rockfish in Puget Sound.

Alternative 1 (Most Conservative): Preferred Option
Protect and restore all marine habitats types for all rockfish species.

This alternative provides the maximum habitat protection to all fish and wildlife species. Restoring rockfish habitat will provide benefits to other animals because the restored and protected habitat will improve their habitats as well. Of all the alternatives, this one places greatest emphasis on restoration. Activities under this alternative include 1) increased regulatory authority, 2) partnerships with other agencies which can influence rockfish habitat, and 3) active on-the-ground projects within the authority of WDFW to restore habitat.

Alternative 2 (Conservative):
Protect and restore rocky habitats for key rockfish species.

The intent of this alternative is to protect and restore rock habitats for key rockfish spaces. It differs from Alternative 1 by limiting efforts to habitats of key species and to rocky habitats only**.** This alternative would fully implement and enforce current authorities, and increase participation in effective external conservation processes and encourage other agencies to follow suit.

,
Alternative 3 (No Action):
Primarily rely on the HPA process to protect priority rockfish habitats and conduct opportunistic activities to protect rockfish habitats.

This alternative would seek to protect habitat through the current HPA process, and maintain involvement in state and federal protection and restoration processes. Compared to Alternatives 1 and 2, this option places more emphasis on protecting existing habitat. Restoration may occur but at a lower priority and scope. Instead, emphasis will be placed on protecting existing habitat through the regulatory process.

The impacts on fish and wildlife will be to maintain current levels or show slight improvement.

Existing HPA authority would be utilized to evaluate proposed construction projects for their impact on rockfish. Existing staff would continue to evaluate habitat requirements for rockfish and suggest modifications to the HPA code as needed to provide additional protection.

The existing Puget Sound Groundfish Management Plan (Palsson *et al.* 1998) emphasizes a policy of no net loss of rockfish habitat. Therefore actions under this alternative would focus on maintaining existing habitat, not on restoring or increasing the amount of habitat.

Alternative 4 (Least Conservative):
Rely on the HPA process to protect rockfish habitats. No research will be conducted.

Existing HPA authority would be utilized to evaluate proposed construction projects for their impact on rockfish.

3.3.3 Fishery Management

Past harvesting of rockfish has been the largest single threat to most species of rockfish in Puget Sound. Harvest levels have decreased in recent years but fishing remains a risk to rockfish. Establishing proper harvest controls will greatly strengthen conservation and restoration efforts. Rockfish fishery management is complicated because of the widespread distribution of most rockfish species in Puget Sound, the high rates of mortality of released fish, the co-occurrence of many species, the limited ability of anglers to distinguish one species from another, and the large number of fishing gears which can unintentionally capture and kill rockfish.

Alternative 1 (Most Conservative): Preferred Option
All fisheries in Puget Sound will be managed to ensure the health and productivity of all rockfish populations.

This alternative will provide the greatest benefit to rockfish, because all stocks of rockfish will be considered in management decisions. All fisheries will be analyzed for their potential impact on rockfish stocks. Fishing opportunities for species other than rockfish (i.e., salmon, lingcod and halibut) may be limited or modified to reduce or eliminate their impact on rockfish. For example, lingcod fishing may be prohibited or restricted in areas or depths with high potential to encounter yelloweye or silvergray rockfish. Because this alternative includes consideration of rare species, fisheries management may not be able to protect, detect and otherwise account for these rare species.

The initial impact on recreational fishing and recreation could be negative and substantial. Substantial numbers of rockfish are caught in fisheries for other species. Some of these species are in need of stock rebuilding and the fisheries may be

constrained to keep meet rebuilding needs. These constraints could include reducing fishing seasons, restricting fishing areas, and changing allowable fishing gear (i.e., minimum hook sizes for angling).

Alternative 2 (Conservative):
All fisheries in Puget Sound marine waters will be managed to ensure the health and productivity of key rockfish populations.

This alternative differs from the first alternative in that only key stocks of rockfish will be considered in management decisions. When fisheries are examined for their potential impact on rockfish, the analysis will consider only the key species. In comparison to the example given in the first alternative, lingcod fishing will be examined for potential bycatch of yelloweye rockfish but not silvergray because the latter is not a key species.

This alternative will provide less protection to rockfish in that only key species will be considered, but it will have a reduced negative impact on recreational fishing for the same reason. This alternative will have a positive impact on rockfish populations, but less than the first alternative. The initial impact on recreational angling will likely be negative as fishing opportunities are constrained. However, the long-term impact on recreational activity could be positive compared to the third and fourth alternatives.

Alternative 3 (No Action):
Some bottomfish fisheries will be managed to ensure the health and productivity of some rockfish populations.

Fisheries for bottomfish will be examined for their impact on rockfish populations and conservation. For example, recreational fishing for salmon will not be modified to help meet rockfish conservation goals. The positive impact on rockfish will be much less than the impact of the first two alternatives. The initial impact on recreational fishing will be minor but could be substantially major and negative in the future, if rockfish populations do not respond favorably to the PSCRP.

Alternative 4 (Least Conservative):
Fisheries in marine waters will be passively managed with respect to the status of rockfish populations.

This alternative provides limited positive benefit to fish populations. Fishing seasons, areas, and gear specifications would be set without regard to conservation needs of rockfish. Instead, fishing would be allowed to continue uninterrupted. There is no benefit to rockfish under this alternative. While recreational fishing initially would be restricted, and may even see increased fishing opportunities, the long-term prediction is that the impact would be negative for the same reasons listed in Alternative 3.

This Alternative does not meet the stated needs of the PSRCP.

3.3.4 Ecosystem

Rockfish, as a group, occur throughout Puget Sound and provide a vital component of the food web in the Sound. Rockfish are major consumers of other fish and invertebrates and, in turn, provide food to a variety of other fish species, marine mammals and birds. Changes in rockfish abundance could have important effects throughout the food web in varied ways. For example, declines in abundance of juvenile rockfish could mean less food for other animals while decline in the abundance of larger rockfish could mean a lower rate of predation on other species.

Understanding the dynamics of food webs is difficult in Puget Sound (and in all other marine waters). This understanding requires detailed knowledge of food consumption patterns as well as understanding of biology and physiology of many types of organisms. At present, the Puget Sound Partnership and NOAA-Fisheries are developing an ecosystem model of portions of Puget Sound (Levin *et al.* 2009). At this time we conclude that insufficient information currently exists to manipulate rockfish populations in Puget Sound or the populations of other animals with the intent to restore ecosystem functions of rockfish. Efforts may be made to obtain additional information in this category, but would be conducted under the Research category (3.3.6).

The ecosystem functions of rockfish are largely unquanitifed. Since the functioning of healthy rockfish populations is largely undefined, it is not possible to chart a path to restore such functions or know when they have been restored.

Efforts to restore all rockfish populations to healthy levels provide the best way to achieve proper ecosystem functioning with Puget Sound. However, many other species in Puget Sound are not at healthy levels and restoration of rockfish species alone will not assure a healthy functioning ecosystem.

Alternative 1 (Most Conservative):
Protect and restore the functions of all rockfish in the complex marine ecosystem and food web in Puget Sound.

This alternative would seek to maintain or restore food web dynamics (e.g., predator-prey relationships). This may involve increasing or decreasing rockfish populations in attempts to meet forage requirements of other animals or to reduce predation. At this point, insufficient knowledge exists to accomplish these goals and there is a danger of unintended consequences of such effort.

Alternative 2 (Conservative):
Protect existing functions of key rockfish and conduct opportunistic activities to restore the functions of key rockfish in the complex ecosystem and food web in Puget Sound.

This alternative would maintain functioning at present levels or increase the levels of function by increasing populations of rockfish.

Alternative 3 (No Action): Preferred Option

Conduct opportunistic activities to protect and restore the function of some rockfish in the complex ecosystem and food web in Puget Sound. Focus will be on determining the proper ecological functioning of rockfish.

A limited number of activities would be conducted, focusing on relationships to determine the proper ecological functioning of rockfish in Puget Sound. This option poses little risk of unintended negative consequences to the ecosystem of Puget Sound, but continues research activities. If these research activities are successful, ecosystem measures could be implemented.

Alternative 4 (Least Conservative):
The ecosystem functions of rockfishes are not considered in rockfish management.

Under this alternative there is no direct management of rockfish function in the complex marine ecosystem and food web in Puget Sound. No attempt to maintain or conserve functions would occur. No attempt to gain additional information would occur.

3.3.5 Monitoring, Evaluation, Adaptive Management

Monitoring, evaluation and adaptive management are the activities required to produce successful management and to judge the success of current management efforts. They are defined as follows:

- Monitoring — collecting data on rockfish catch, abundance, life history characteristics
- Evaluation — analyzing the data to make inferences on the health of rockfish stocks
- Adaptive management — making changes in management practices as the result of the monitoring and evaluation to judge the success of current management efforts.

All three activities are required to produce successful management and to judge the success of current management efforts.

Fishery-dependent monitoring means collecting information from various fisheries, both commercial and recreational. Information typically collected includes amount of rockfish caught, the amount of effort required to make that catch, location of catch, and biological data on the catch such as age, length and sex. The advantage is that information from fishery-dependent monitoring is relatively inexpensive to collect, and the techniques for evaluating the data are well established. However, fishery-dependent monitoring for rockfish may be inaccurate because of changing fishery and management patterns (Palsson *et al*. 2009).

Fishery-independent monitoring means systematic collection of rockfish data independent of commercial or recreational fishing activities by professionals or trained observers. These surveys generally consist of measuring the density of rockfish (number per unit of area) at selected locations. These surveys can be conducted by

divers, use of electronic equipment, or use of scientific sampling devices. Certain types of fishery-independent data can be relatively expensive to collect, thus limiting the number of surveys that can be conducted. Additionally, some types of fishery-independent monitoring involve mortality of fish collected during the monitoring. However, the results can be precise and free of potential bias.

Alternative 1 (Most Conservative):
All rockfish populations will be monitored emphasizing fishery-independent and fishery-dependent information.

Some populations of rockfish are small and have always been so. Monitoring of small rockfish populations will be difficult and expensive. Additionally the ability to scientifically detect changes in population size or diversity will be very limited. This alternative has the greatest benefit to rockfish and associated animals because population changes in any population will be rapidly detected and adaptive management utilized.

Alternative 2 (Conservative): Preferred Option
Key rockfish populations will be monitored emphasizing fishery-independent and fishery-dependent information.

As the key stocks are most commonly encountered in fisheries and fishing is judged to be the greatest threat to rockfish, limiting monitoring and evaluation to key stocks will likely increase the benefit to the key stocks at a lower cost than Alternative 1. However, risks to stocks other than key stocks will be increased.

Alternative 3 (No Action):
Key rockfish populations will be monitored using primarily fishery-dependent and some fishery-independent information.

Monitoring will be limited to fisheries important to recreational fisheries. Both fishery independent and fishery dependent monitoring will occur. Monitoring will be largely fishery-dependent means with some fishery- independent monitoring occurring. This technique will pose risk to all rockfish stocks and limit the ability of management agencies to respond to changes in population or diversity.

Alternative 4 (Least Conservative):
Key rockfish populations will be monitored only with fishery-dependent information.

This option poses the greatest risk to rockfish. Limiting monitoring to fishery dependent means will decrease the cost of monitoring but increase the risk to rockfish. Fishery-dependent monitoring is not sensitive to changes in rockfish populations and may mask declines in abundance of rockfish. The ability of management agencies to respond to changing rockfish population will be severely curtailed.

Alternative 4 does not meet the stated need of the PSRCP.

3.3.6 Research

Research consists of collecting data relating to rockfish fisheries and the rockfish resources within Puget Sound, analyzing the data, drawing conclusions, and publishing the results. Research may be conducted by WDFW staff acting alone or in collaboration with scientists from other state, federal, tribal governments, non-governmental organizations or universities. As is the case with monitoring (3.3.5) there are two general categories of research: fishery-dependent and fishery-independent. However, research differs from monitoring by addressing problems and developing solutions. Monitoring serves to evaluate the success of the solutions.

Research can address a wide variety of topics such as determining the impact of climate change on rockfish, developing artificial production techniques, and developing methods to reduce mortality of released rockfish. Research proposed in this plan will be directed to problems of rebuilding rockfish and maintaining healthy populations and habitats.

Alternative 1 (Most Conservative):
Implement new and cooperative research to understand the diversity, biology and productivity of all rockfish as well as needs for recovery.

Both fishery-dependent and fishery-independent activities will be conducted. This option will provide the most benefit to fish and recreational opportunities. Changes in fish population or environmental quality will be rapidly detected and WDFW will have the ability to respond rapidly. This ability will help lessen the decline in abundance of selected species to minimize the changes of a rockfish stock falling into the vulnerable category and reducing the number of rockfish in the precautionary category as more information is collected.

This will foster the development of sustainable fishing opportunities more than any of the other alternatives.

Alternative 2 (Conservative): Preferred Option
Implement new cooperative research to understand the diversity, biology and productivity of key rockfish as well as needs for recovery.

This alternative will have less favorable impact to fish and wildlife and to recreation. Research efforts will focus on key species but none will be conducted on the other species of rockfish. This will increase the risk that other species will decline to vulnerable status resulting in reduced recreational fishing opportunity for rockfish and other species of fish.

This alternative will foster sustainable fisheries for key species of rockfish.

Alternative 3 (No Action):

Conduct rockfish research to examine growth, population structure and habitat requirements for selected rockfish populations.

Limited research, both fishery-dependent and fishery-independent, will be conducted on a few selected species and will focus on shallow-water rocky habitats for adults only. While providing some information, risk to fish will remain high as many species will be placed in the precautionary category due to lack of information. This could result in decreased or unsustainable fishing opportunities.

Alternative 4 (Least Conservative):
Conduct no research on rockfish; only use information in the existing literature or nearby studies to manage rockfish stocks.

Fishery-independent research only will be conducted, making it difficult to detect changes in abundance or habitat in a timely manner. Only when large changes in fish abundances have occurred or habitat deteriorated will the changes become evident.

3.3.7 Outreach and Education

The intent of this category of action is to educate Washington residents and others of the special management needs of rockfish in Puget Sound and the present need for strong conservation efforts. The most obvious target group for this education is those who engage in harvest activities in Puget Sound because their activities have a direct link to mortality of rockfish. However, even people who do not fish can contribute to rockfish recovery by altering their personal activities. The purpose of conducting an education effort to the non-fishing public is: 1) emphasize the detrimental impacts of human activity on rockfish; and 2) link their personal actions to the health of Puget Sound and rockfish recovery. Outreach efforts to the fishing public would be directed at collaboratively identifying solutions such as placement of Rockfish Recovery Areas and methods to reduce the mortality rate of released rockfish.

With all alternatives, the short-term impact on fish and wildlife and recreation would be indirect and minimal. We do not envision any education or outreach activities that would harm or kill fish and wildlife or impact recreation opportunities. Rather, the activities would be conducted via WDFW's web site, on printed materials, and speaking arrangements.

Alternative 1 (Most Conservative): Preferred Option
Conduct a comprehensive outreach and education program to inform Washington citizens of the value of rockfish populations in Puget Sound.

Efforts would target the entire population of Washington as well as non-residents who visit the state and fish in Puget Sound. Emphasis will be placed on rockfish biology and the connection between individual action and the health of Puget Sound and the impact of individual harvest practices.

Alternative 2 (Conservative):

Conduct a comprehensive outreach and education program to inform Washington fishers of the value of rockfish populations in Puget Sound.

Efforts would be limited to people who engage in harvest activities and also be limited to the impact of harvest practices on rockfish populations.

Alternative 3 (No Action):
Write occasional popular articles, work with the media, use the rule-making process, and give public presentations on the importance of rockfish populations.

Scientific and management staff would engage in education and outreach activities only as opportunities arise. Focus would be placed on people who fish in Puget Sound.

Alternative 4 (Least Conservative):
Rely on others to inform the citizens of Washington of the value of rockfish populations in Puget Sound.

No WDFW staff would be involved in outreach activities. Instead, we would rely on the efforts of other agencies (e.g., the Puget Sound Partnership), magazines, web sites and interested individuals and organizations. Focus would be on topics chosen by outside groups.

3.3.8 Enhancement (Artificial Habitat and Hatchery Production)

This set of alternatives relies heavily on technology to restore and maintain populations of rockfish in Puget Sound. The two techniques proposed in the PSRCP are hatchery production and creation of artificial habitat.

Hatchery production entails gathering females from the wild and allowing them to produce larvae within a hatchery environment. The young fish would be raised in the hatchery and then released into Puget Sound. Existing Commission Policy (C2611) limits the use of hatchery production of rockfish to research and the restoration of depleted populations. We do not plan to utilize hatchery culture of young rockfish exclusively to provide recreational fishing opportunities. We would utilize rockfish hatcheries only to restore populations to a healthy level. Once populations are restored, the hatchery production would end. Additionally research may be conducted to prepare culture techniques prior to their use. Collection of wild adult rockfish for culture may have a detrimental impact of rockfish populations. Some of the captured fish may die during capture or capacity. This impact is anticipated to be very minor.

An artificial habitat could be constructed to increase the amount of functioning rockfish habitat. Initial new artificial habitat will seek to mimic the functions of rocky substrate as rockfish habitat or vegetated areas and will be used to replace lost or degraded habitat. Under existing policy (C3003), any constructed rocky habitat would be closed to fishing for rockfish. Construction of artificial habitat will have impacts on fish and wildlife. Positive impacts include increasing the amount of rocky habitat that will benefit species such as lingcod and rockfish and some species of shellfish. The new artificial habitat will cover existing habitat and be detrimental to species utilizing the area. An example is bivalve clams inhabiting a soft bottom which is covered by rocks to provide rockfish habitat. While the new habitat may be beneficial to rockfish, it will be detrimental to the bivalves. The impacts of such construction are not included in the EIS as they are project related. These impacts would be evaluated when a construction project is proposed; the impacts are likely to vary for each project and will be considered on a

project-by-project basis and any such construction project will be evaluated individually for its environmental impact (WAC 197-11-442).

Construction of new habitat may have unintended consequences which should be evaluated. These consequences may include increasing predation by lingcod on salmon, and disrupting migration corridors.

The existing agency policy on artificial reef design and construction (POL-401) requires that the benefits of an artificial reef outweigh the potential impacts on the bottom habitat and other marine resources. Any artificial reef constructed under this plan will meet this standard.

As needed, artificial habitat will be constructed to enhance, or increase available habitat for rockfish populations. Initial emphasis will be on constructing rocky habitat. In the future, efforts may be conducted to increase the amount of vegetated areas in Puget Sound or to increase the amount of habitat needed by juvenile rockfish.

Alternative 1 (Most Conservative):
Develop plans to 1) utilize hatchery production to assist in recovery of depleted rockfish populations consistent with natural production goals and 2) enhance habitat for all species of rockfish through the use of artificial habitat.

Hatchery production for rockfish will be used to recover depleted populations and for research. Research will be conducted to develop techniques for the culture of rockfish. This research will include development of hatchery techniques to raise fish in a hatchery environment and include small scale release of cultured fish. The releases will be designed to investigate the survival and movements of released fish as well as their impact of naturally produced rockfish. If the research is successful, rockfish will be cultured and released to speed the recovery of selected stocks.

Alternative 2 (Conservative): Preferred Option
Develop plans to 1) utilize hatchery production to assist in recovery of depleted rockfish populations consistent with natural production goals and 2) enhance habitat for key species of rockfish through the use of artificial habitat.

Hatchery production for rockfish will be used to recover depleted populations of key species of rockfish and for research. Artificial reef habitats will be used to restore available habitat for key rockfish populations.

The hatchery component will be identical to that of Alternative 1. Construction of artificial reefs will be limited to benefit a small number of key species of rockfish. We anticipate that fewer, smaller artificial structures will be constructed compared to Alternative 1. Artificial habitats will be constructed only to replace lost or degraded natural rockfish habitats.

Alternative 3 (No Action):
Hatchery production for rockfish may be used to recover key depleted populations and for research. Artificial reef habitat will be considered on a case-by-case basis.

Research and releases will be limited to key species will be limited to key species. Construction of rockfish habitat will be limited to rocky artificial reef habitat. Enhancement activities will be considered on a case-by-case basis.

Alternative 4 (Least Conservative):
Artificial reef habitat will be implemented opportunistically with limited or no assessment.

Hatchery production for rockfish will be limited to research investigations. Artificial reef habitat will be created as opportunities arise with limited or no assessment.

Hatchery production will be much reduced compared with other options. Adult fish will still be captured and their progeny raised in a hatchery environment, but only a few will be released annually. No effort will be made to construct artificial reefs unless an unanticipated opportunity arises. It is likely that no artificial habitat will be constructed under this alternative.

D R A F T

PUGET SOUND ROCKFISH CONSERVATION PLAN

Policies, strategies and actions

October, 2009

Including

Preferred Range of Actions

prepared by

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

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INTRODUCTION

Rockfish in Puget Sound are in trouble. Many, but not all of rockfish species have declined in abundance, some quite severely, over the past two decades. These declines have resulted in increased scientific, economic and social concerns about the status of the resource and the economic viability of fisheries for rockfish in Puget Sound. This concern has manifested itself in several forums. In 1999, a petition was presented to the federal government to list several species of rockfish in Puget Sound under the federal Endangered Species Act (ESA). A scientific conference held in the San Juan Islands in 2003 concluded that the outlook for rockfish was "grim" (Mills and Rawson, 2004). A special review by the American Fisheries Society found several special of rockfish to be "vulnerable" in Puget Sound. A review of marine life in Puget Sound concluded that demersal rockfish were in decline, largely as a result of overharvest (West 1997). Another review of marine fish concluded that marine fish in Puget Sound were among the most threatened stocks of fish in North America (Musick *et al*. 1998). In 2007, another petition was received by the federal government. This petition requested that five species of rockfish in Puget Sound receive protection under the ESA; in 2009 the Department of Commerce concluded that two of these species (canary and yelloweye rockfish) warranted protection as threatened and one species (bocaccio rockfish) warranted protection as endangered.

These declines have largely been caused by historical fishing practices, although several other stress factors play a part in their decline. Rockfish in urban areas are exposed to high levels of chemical contamination, which may be affecting their reproductive success. Poor water quality in Hood Canal has resulted in massive periodic kills of rockfish as well as other species. Lost or abandoned fishing nets trap and kill large numbers of rockfish. This Puget Sound Rockfish Conservation Plan (PSRCP) provides a plan for rebuilding rockfish populations and providing sustainable fisheries when appropriate.

This plan was prepared by the Washington Department of Fish and Wildlife (WDFW) in response to these declines and threats. The goal of the plan is to provide a pathway to protect existing stocks of rockfish, rebuild depleted stocks, and provide sustainable fishing and other economic and harvest benefits to our citizens. The WDFW recognizes the Puget Sound tribes also have conservation concerns associated with rockfish populations. These concerns will be addressed with appropriate management provision identified during the development of agreed to Puget Sound rockfish state-tribal co-management plans.

WDFW has concluded that the adoption of this plan falls under the authority of the State Environmental Protection Act (SEPA). Accordingly, a draft Environmental Impact Statement (EIS) will be completed to accompany this plan. After undergoing a period of public review, the draft EIS and draft plan will be reviewed and revised as necessary and a final EIS and plan issued. After the completion of the final EIS and plan, the Department will consider formal adoption of the plan.

Once adopted, this plan will be used as the Department's basis for developing co-management plans with tribal governments, establishing priorities for funding and staff assignments and specific regulation changes.

Guiding Documents

The development of this plan was guided by:

1. State law defining the duties and powers of the Department of Fish and Wildlife (RCW 77) which can be found at:

http://apps.leg.wa.gov/rcw/default.aspx?Cite=77

2. Relevant polices adopted by the Fish and Wildlife Commission which include:

Puget Sound Groundfish Management (C3003);
http://wdfw.wa.gov/commission/policies/c3003.html

Marine Fish Culture (C-2611);
http://wdfw.wa.gov/commission/policies/c3611.html

Marine Protected Areas (C-3013;
http://wdfw.wa.gov/commission/policies/c3013.html

Artificial Reef Design and Construction (POL-401)
http://inside.dfw.wa.gov/documents/pols/old/fish/pol-401.htm

3. The Department's 2009-2015 Strategic Plan which is located at:

http://wdfw.wa.gov/about/strategic_plan/

4. Relevant rulings by the federal court regarding the role of tribal governments in resource management in Puget Sound which includes:

Amendment to Paragraph G of "Order to Implement Interim Plan" entered May 8, 2001 in United States v Washington, Sub proceeding No. 96-2.

Time Period of Plan:
Indefinite; once formally adopted, the plan will remain in existence until changed. Due to the long life spans of many species of rockfish recovery can be expected to require several decades. For example the stock rebuilding plan for canary rockfish in coastal waters is over fifty years (Methot 2005) and that for yelloweye rockfish is approximately ninety years (Tsou and Wallace 2006).

Geographic Area Covered By Plan: Puget Sound:
In this document, Puget Sound refers to the marine waters of Washington State east of the Sekiu River and south of the Canadian-United States border, including all waters south to Olympia and Hood Canal.

Definition of Rockfish

By rockfish, we mean any species of fish in Puget Sound belonging to the family Scorpaenidae and members of the Sebastes or Sebastolobus genera. At the time of writing this plan, 28 species of rockfish are known to occur in Puget Sound (Appendix 4). If additional species are found to occur in the Sound, they will be managed under the auspices of this plan.

Rockfish species can be grouped into several general categories, based on their life histories and habitat associations. Species in the **nearshore compl**ex live in close association with rocky habitats usually in water less than 40 meters (120 feet) in depth and, as adults, have high site fidelity. These species are commonly taken in hook and line fisheries in Puget Sound and include copper, quillback, and brown rockfish. A second category of rockfish is the **deepwater complex** which is composed of large, deep-bodied fish such as canary and yelloweye rockfish. As adults, these fish live in deeper water and are often associated with rocky habitats. A third category is the **pelagic complex,** which are the species that live higher in the water column and may move longer distances as adults. Species that fit this general description include the black, blue, yellowtail and widow rockfish.

While there are many species of rockfish found in the Sound, some are very rare and have apparently never been common (i.e., rougheye and silvergray). Others are found only in very restricted areas of the Sound (i.e., blue and China rockfish). Other species are, or were, very common and provide valuable ecological functions as well as inclusion in commercial and recreational fisheries. We classify these species as **key species** which deserve management focus. A species may be classified as a key species due to one or more of the following factors:

1. Is, or was, very common in Puget Sound,
2. Is or was important to recreational and/or commercial fisheries,
3. Provides important ecological functions,
4. Has been identified as at extreme low levels of abundance.

We propose that seven species of rockfish in Puget Sound be classified as a key species (Table 1).Through the co-management process with tribal governments, species may be added or removed from this list as needed for resource management.

Table 1. Key species of rockfish in Puget Sound.

SPECIES	COMPLEX	REASON
Copper rockfish	Nearshore	Important in recreational fisheries
Quillback rockfish	Nearshore	Important to recreational fisheries
Black rockfish	Pelagic	Important to recreational fisheries
Yelloweye rockfish	Deepwater	Acute conservation concerns, past economic importance
Bocaccio rockfish	Deepwater	Acute conservation concerns , past economic importance
Canary rockfish	Deepwater	Acute conservation concerns, past economic importance
Puget Sound rockfish (*S. emphaeus)*	Nearshore	Important ecological function (forage fish)

Summary of Life History Factors Relating to Rockfish Management and Recovery

This management plan will be based on the following life history and biological characteristics of rockfish. These characteristics will limit management flexibility and focus management effort.

1. Rockfish, as a group, are very vulnerable to the effects of fishing. Once populations are at a low level, recovery requires a great deal of time. Fishing strategies must be very protective of rockfish and allow only very low levels of exploitation.
2. Mortality of rockfish which are caught and released is very high.
3. Management goals for rockfish should include more than maintaining a specified level of biomass. A successful management plan should consider the age and size composition of the fish as well.
4. Several species of rockfish are similar in appearance and can be caught at the same location. It is very difficult for recreational anglers and commercial fishers to distinguish one species from another, resulting in limited management flexibility to selectively harvest most species and a general lack of public ability to identify species.
5. Rockfish occupy similar habitat and depths as lingcod and halibut and are commonly taken as bycatch in these fisheries as well as in fisheries for salmon.
6. Annual reproductive success is very variable and marked by numerous years of poor recruitment and occasional years of high recruitment. Maintenance of many ages of rockfish in the population is important to buffer the impacts of a sustained period of poor recruitment.

Stock Status

Stock assessment is the analysis of biological and statistical data used to determine the changes in abundance of fish stocks and, if possible, to predict the future trends of abundance. This plan will assign rockfish stocks to one of the four following categories of stock status:

Healthy Stock Status: A healthy stock is one that is stable or increasing and at, or above, historic levels of abundance.

Precautionary Stock Status: Precautionary stocks are those that meet the Vulnerable Criteria but conservation and management measures are in place to halt further decline or promote rebuilding.

Vulnerable Stock Status: A vulnerable rockfish stock is one whose spawning potential has been greatly reduced, and there are no additional risk factors.

Depleted Stock Status: A depleted rockfish population has been reduced to levels far below the Vulnerable Criteria and the stock may have additional risk factors such as rarity, limited range, or specialized habitat requirements

GOALS AND POLICIES

This document is intended to provide a framework of policies, strategies, and actions that will lead to the achievement of the following goal:

> **The goal of the PSRCP is to restore and protect our natural heritage of Puget Sound rockfish populations. Increases in the abundance, distribution, diversity and productivity of rockfish will help restore the Puget Sound ecosystem, provide opportunities to view rockfish in the marine environment and, when, appropriate, provide sustainable fishing opportunities.**

This plan considers the following eight different, but interlocking, policy elements:

Natural production
Habitat
Fishery management
Ecosystem effects
Evaluation, monitoring and adaptive management
Research
Outreach and Education
Enhancement

To meet this goal, this plan will include a set of strategies that:

- Recognizes the multi-species nature of the rockfish harvest.
- Considers the high mortality rates of released rockfish.
- Reduces mortality of released rockfish.
- Acknowledges the public's difficulty in distinguishing one species of rockfish from another.
- Recognizes the lack of detailed information needed for more precise management.
- Increases our knowledge of rockfish population status.
- Implements methods to achieve goals in a cost effective manner...
- Fosters likely acceptance and support by the public.
- Provides opportunities for utilization consistent with conservation of the rockfish stocks.
- Develops co-management plans with tribes and forms partnerships with other organizations to further rockfish conservation.

POLICY CATEGORY: NATURAL PRODUCTION

OBJECTIVE: Rockfish management shall place a high priority on the protection of key rockfish species and stocks to maintain and restore stocks to healthy levels using the natural capacity of the population to sustain itself.

Natural production means producing rockfish that are born in the wild in Puget Sound from naturally occurring stocks. Their habitat may be natural, restored or artificially created.

Strategies

1. **Protect and rebuild the diversity of rockfish stocks**. Diversity includes providing a wide variety of age and size classes of rockfish.
2. **Identify and reduce stressors on rockfish populations**. Many and varied stressors affect rockfish population in the Puget Sound.
3. **Consider all life stages of rockfish when evaluating proposals to modify habitat or develop management and fishery plans for other species**. The habitat requirements and distribution of juvenile rockfish in Puget Sound are poorly known.
4. **Identify and modify limitations to the production of rockfish**. Focus on human caused degradation of rockfish habitats.

Actions

1. Develop a science-based system of rockfish recovery areas that incorporates habitat needs, is of sufficient size for rockfish movements and considers likely dispersal of rockfish from the MPA. .
2. Develop actions to ensure that rockfish populations contain a wide variety of age groups, emphasizing protection of older rockfish. This wide variety will provide a longer period of larvae dispersal, making populations more resilient to environmental changes.
3. Work with the Puget Sound Partnership and others to identify key stressors and methods to reduce their effect of each stressor.
4. Remove derelict fishing nets and seek to reduce the incidence of new derelict fishing nets.

POLICY CATEGORY: HABITAT PROTECTION AND RESTORATION

Objective: Protect and restore all marine habitat types for all rockfish species.

Strategies

1. **Provide technical expertise to other agencies and interested groups to promote identification and protection of rockfish habitat.** The authority to protect rockfish habitat is spread among many agencies such as the state Departments of Ecology, Natural Resources and Fish and Wildlife. Counties also maintain significant authority to protect rockfish habitat.
2. **Consider water quality as a habitat issue.** The quality of water in which rockfish live may vary greatly. While most of the Sound has high quality water, there are areas of degraded water quality. Protecting the existing high quality water and improving degraded water conditions are important facets of habitat protection and restoration.
3. **Increase access to information-** Much of the existing information on habitat requirements and threats to that habitat is not readily available to the public and other agencies. We will work to make this information more available to increase the level of protection to rockfish habitat.
4. **Enhance the effectiveness of the Hydraulic Project Approval (HPA) process.** WDFW and other agencies have authority to review and approve proposed construction projects through the HPA process. A review and possible changes of the current effectiveness of this process could increase protection to rockfish habitat.

Actions

1. Review and update information used by WDFW and others to evaluate applications for construction projects in Puget Sound.
2. Work with the Puget Sound Partnership to increase the awareness of habitat needs of rockfish in Puget Sound.
3. Remove derelict fishing nets and seek to reduce the incidence of new derelict fishing nets.
4. Develop a science-based system of rockfish recovery areas that incorporates habitat needs, is of sufficient size for rockfish movements and considers likely dispersal of rockfish from the MPA.
5. Increase the awareness of rockfish habitat needs in the Priority Habitat and Species program.

POLICY CATEGORY: FISHERY MANAGEMENT

OBJECTIVE: All fisheries in Puget Sound waters will be managed to ensure the health and productivity of all rockfish populations.

Strategies

1. **Focus commercial fishing gears towards species other than rockfish:** Reduce the incidental impact of commercial fishing gears to rockfish.
2. **Obtain complete accounting of encounters:** The Department will seek to monitor the number, species, and mortality rates of rockfish captured and released by commercial and recreational fisheries.
3. **Consider rockfish when designing fisheries for other species:** The Department will consider, and reduce if necessary, the impact on rockfish when designing fisheries for salmon, halibut, lingcod and other species.
4. **Reduce encounters of rockfish with fishing gear.** To reduce bycatch mortality, it is necessary to reduce the likelihood of a rockfish encountering fishing gear, whether by a hook, a spear, or a net.

Actions

1. In fisheries where rockfish are captured incidentally to the harvest of other species, implement regulations to reduce this impact by a combination of gear, depth, time and area restrictions.
2. Develop regulations to allow complete accounting of all rockfish encountered in state managed commercial fisheries. The department will work with tribal co-managers to develop this package.
3. Improve accounting of rockfish released in the recreational fisheries.
4. Minimize or eliminate the encounters of rockfish from the deep water complex.
5. Implement measures to reduce the unintentional encounter of rockfish by any gear.
6. Develop a package of regulations which reduce the encounter of rockfish with fishing gear, both commercial and recreational: The department will work with tribal co-managers to develop this package
7. Implement measures to reduce the mortality rates of rockfish which are released alive. This measure will be delayed until the methods are developed and verified.
8. Recreational fishing guidelines for healthy stocks shall provide harvest opportunities that strive to maintain healthy stock status. When establishing harvest plans, stock condition of other species in the complex will be considered.
9. Minimize the encounters of rockfish whose stocks are in less than healthy condition.

10. Work with appropriate tribal governments to produce co-management plans which specify conservation and harvest objectives.

11. Develop a science-based system of rockfish recovery areas.

POLICY CATEGORY: ECOSYSTEM

Objective: Conduct opportunistic activities to protect and restore the function of some rockfish in the complex ecosystem in Puget Sound. Focus will be on determining the proper ecological functioning of rockfish.

Strategies

1. **Develop a network of Marine Protected Areas (MPAs) which are sufficient in size and location to provide ecosystem functions within their boundaries similar to the function in an undisturbed area**. Consider the use of MPAs within a broad approach which is not focused on the needs of rockfish but rather the entire aquatic ecosystem.
2. **Ensure that the population structure of fished populations contains sufficient numbers of older, larger fish**. Older and larger rockfish can produce higher quality larvae than younger fish. Also, the presence of a large array of age classes provide a longer period when larval fish are available as prey.
3. **Consider the ecosystem needs of rockfish in the management of other species such as lingcod and herring**.
4. **Incorporate new information on the effects of climate change on rockfish**.

Actions

1. Partner with other agencies and academic institutions to improve existing food web models.
2. Develop a science-based system of marine protected areas. Develop a network of linked areas of good rockfish habitat where fishing is prohibited or greatly restricted. This will ensure that larger and older rockfish remain present, and we will have an opportunity to study interactions between species in an area where human effects are minimized.
3. Seek to minimize introductions of species which may negatively impact rockfish.

POLICY CATEGORY: MONITORING, EVALUATION AND ADAPTIVE MANAGEMENT

Objective: Key rockfish populations will be monitored, emphasizing fishery-independent and fishery-dependent information.

Strategies

1. **Identify existing information gaps**.
2. **Focus existing monitoring and evaluation programs to ensure they address high priority information needs**.
3. **Develop new programs or modify existing programs to address high priority information needs**.
4. **Form partnerships with other agencies, universities, tribes and others to expand and focus the research and monitoring activities**.
5. **Adopt flexible management and regulatory programs that will allow rapid change in response to new information or altered environmental conditions**.
6. **Rapidly incorporate new information on the effects of climate change on rockfish**.

Actions

1. Develop a science-based system of rockfish recovery areas. Develop a network of linked areas of good rockfish habitat where fishing is prohibited or greatly restricted to provide an opportunity to study effects of environmental change on rockfish separate from human removals.

2. Reach agreements with tribal governments that incorporate common management goals, monitoring techniques and an agreed-upon format to exchange information.

3. Utilize local groups of citizens to improve monitoring (i.e., the Citizen Science program, county based Marine Resource Committees, Dive organizations, environmental organizations, and fishing associations).

4. Form partnerships with the Canadian government and the province of British Columbia to provide mutual benefits regarding rockfish management and rebuilding.

5. 5. Develop a network of marine protected areas to help evaluate the effects of fishing, climate change and to monitor reproductive success.

POLICY CATEGORY: RESEARCH

OBJECTIVE: Implement new and cooperative research to understand the diversity, biology and productivity of key rockfish as well as needs for recovery.

Strategies

1. **Increase partnerships with academic institutions, tribes, and state and federal agencies**.
2. **Form a workgroup to identify high priority information needs**.
3. **Identify high priority baseline research activities that should be conducted consistently over time**.
4. **Develop new information on the effects of climate change on rockfish**.

Actions

1. Better identify habitat areas and requirements for adult rockfish.
2. Collect and analyze information on rockfish growth and reproductive rates.
3. Develop computer models to evaluate the potential effectiveness of rockfish recovery areas as well as the risks involved.
4. Determine the effects of contamination on reproductive success of rockfish.
5. Develop and verify methods to reduce the mortality rate of rockfish caught unintentionally.
6. Develop a program of utilization of non-fishing areas to investigate changes in rockfish populations independent of the effects of fishing.
7. Develop a program to learn the distribution abundance and habitat requirements for juvenile rockfish.

POLICY CATEGORY: OUTREACH AND EDUCATION

OBJECTIVE: Conduct a comprehensive outreach and education program to inform Washington citizens of the value of rockfish populations in Puget Sound.

Strategies

1. **Develop a public information and outreach effort to**:
   - Educate the public about the status of rockfish populations in Puget Sound, where the federal government has proposed listing three species for protection under the Endangered Species Act.
   - Inform anglers and the general public about WDFW's effort to conserve and restore Puget Sound rockfish.
   - Educate anglers about effective methods of reducing the incidental encounter of rockfish, as well as release techniques that increase the rate of survival.

Actions

1. Develop a webpage featuring the Puget Sound Rockfish Conservation Plan and the Department's effort to protect and restore rockfish in Puget Sound.
2. Issue news releases and post information on WDFW's website about opportunities for the public to comment on the conservation plan.
3. Work with the Anadromous and Marine Resources Sportfishing Advisory Groups to develop methods to reduce the incidental encounter of rockfish.
4. Work to enlist sportfishing advisory group members' assistance in expanding understanding of the conservation plan and implications for fisheries in Puget Sound, as well as methods to reduce the incidental encounter of rockfish and effective methods of releasing the fish to increase the rate of survival.
5. Include within the *Fishing in Washington* sportfishing rules pamphlet information on the importance of minimizing the incidental encounter of rockfish in Puget Sound.
6. Work with county Marine Resource Committees to increase citizen involvement in efforts to protect and restore rockfish in Puget Sound.
7. Coordinate communication efforts regarding rockfish with the Puget Sound Partnership, a coalition of citizens, governments, tribes, scientists and businesses working together to restore and protect Puget Sound.
8. Promote underwater viewing opportunities that rockfish populations provide in Puget Sound.

POLICY CATEGORY: ENHANCEMENT (Artificial Reef and Hatchery Production)

OBJECTIVE: Develop plans to:

1. Utilize hatchery production to assist in recovery of depleted rockfish populations consistent with natural production goals: and
2. Enhance habitat for key species of rockfish through the use of artificial habitat.

The intent of all enhancement techniques will be to assist in the conservation of rockfish resources in Puget Sound. The construction or use of enhancement techniques to provide or increase fishing opportunities will not be considered.

Both hatchery and artificial habitat activities will be conducted in accordance with existing agency policies.

Strategies

1. **Utilize the expertise of the National Marine Fisheries Service staff in western Washington to evaluate the potential of culture of individual species of rockfish.** These scientists are among the world experts in marine fish culture.
2. **Utilize technology to construct new habitat or modify existing habitat.** This new habitat would be used to mitigate for degraded or destroyed natural rockfish habitat and to increase the amount of habitat for rockfish.
3. **Seek to combine construction of new habitat with increasing opportunities for non-consumptive use of rockfish.** Attempt to combine efforts to increase habitat by focusing on areas suitable for divers as well.

Actions

1. Initiate action to culture depleted species focusing on yelloweye and canary rockfish.
2. Initiate research to evaluate the effectiveness of the release of cultured fish, including potential negative impacts on existing fish populations.
3. Review the permitting requirements to construct new habitats in Puget Sound.
4. Assemble an interagency group to develop site criteria for possible construction of new habitat.
5. Work with public groups to implement these activities and share the costs and work load.

Appendix 2. Definitions

The following are definitions of terms as used in the Puget Sound Rockfish Management Plan. They are presented here to prevent confusion with how these or similar terms are used in other efforts.

Artificial Production: The rearing and release of fish from an artificial culture setting such as a hatchery.

Biomass: the weight of a stock of fish. Often limited to the weight of the spawning population.

Bottomfish: A group of fishes that is closely associated with the bottom. Examples include rockfish, Pacific cod, greenling, lingcod, sharks, sculpins, soles and flounders.

Bycatch: Encounters of one species that is taken incidentally while fishing for another species. For example, a person may be fishing for Chinook salmon and incidentally catch a rockfish. This fish may or may not be retained by the angler

Catch: The total number of fish caught and retained by a fisher. These fish are landed on shore and are all dead. In this document "catch" means the same as "landed catch".

Catch-and-Release: A non-retention hook-and-line fishery.

Diversity: Variation among individuals in age, size, life history, or genetic characteristics.

Encountered: A rockfish that is captured by a commercial or recreational fishery. Encountered rockfish may be retained by the fisher or released back to the Sound. Released fish may be dead or alive.

Ecosystem services: Benefits provided to humans by rockfish. The benefits include, food, recreation, contributing to the health and diversity of Puget Sound, scientific discovery, and maintaining cultural values.

Groundfish: See bottomfish

Incidental catch: See bycatch

Landed Catch: The portion of the encountered rockfish which is brought to shore at the end of a fishing trip.

Marine Protected Area (MPA): An area with geographical boundaries defined by law or regulation within which fishing is prohibited or restricted. A MPA may have many purposes such as ecosystem protection, research, or recreation. A MPA does not have a predetermined ending date.

Maximum Sustainable Yield (MSY): The largest average (including released fish) that can be taken from a stock under existing environmental conditions.

Key Species: a species of rockfish identified as important by the WDFW. Key species may receive more intense monitoring, research, and protection than other species of rockfish in Puget Sound.

Natural Production: Fish that spawn or rear entirely in the natural environment. These fish may be the offspring of natural or hatchery production.

Natural Stock: Fish that are produced by spawning and rearing in their natural habitat, regardless of parentage.

Non-Treaty: All fishers except those with reserved rights identified in treaties.

Productivity: A stock's intrinsic rate of increase. The higher the productivity, the better the population will fill the habitat and the more resilient it will be to harvest and to survive other sources of mortality.

Released catch: Fish are returned to the sea by the angler. These fish may be dead or alive at the time of release. Fish may be released because retention is prohibited, the species is undesirable, or the individual fish is too small to be of interest.

Revised Code of Washington (RCW)- laws enacted by the Legislature and signed by the governor which direct the activities of the WDFW. Many of the laws affecting the agency are found in Chapter 77 of the Code.

Rockfish Recovery Area-(RRA)**:** A geographically defined area where fishing is prohibited or restricted by regulation and is designated to speed recovery of unhealthy stocks of rockfish. RRAs differ from Marine Protected Areas in that RRAs: 1) are designed and utilized solely to speed the rebuilding of unhealthy stocks of rockfish; and 2) once rockfish have recovered to healthy levels, RRAs will be dissolved.

Precautionary Approach: A management approach which acknowledges uncertainty and the need to exercise caution in the face of uncertainty.

Stock: A group of fish within a species, which is substantially reproductively isolated from other groups of the same species.

Target Species: The species a fisher is intending to catch during a fishing trip.

Wild: see Natural Stock.

WAC: Washington Administrative Code- a listing of rules enacted by state agencies to implement state laws (RCWs). WACs may be found at: http://apps.leg.wa.gov/wac/default.aspx.

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Appendix 4. List of Rockfish Species Found in Puget Sound

Source: Palsson *et al*. 2009

COMMON NAME	***SCIENTIFIC NAME***
Rougheye rockfish	*Sebastes aleutianus*
Pacific ocean perch	*Sebastes alutus*
Brown rockfish	*Sebastes auriculatus*
Redbanded rockfish	*Sebastes babcocki*
Silvergray rockfish	*Sebastes brevispinis*
Copper rockfish	*Sebastes caurinus*
Darkblotched rockfish	*Sebastes crameri*
Splitnose rockfish	*Sebastes diploproa*
Greenstriped rockfish	*Sebastes elongatus*
Puget Sound rockfish	*Sebastes emphaeus*
Widow rockfish	*Sebastes entomelas*
Yellowtail rockfish	*Sebastes flavidus*
Rosethorn rockfish	*Sebastes helvomaculatus*
Quillback rockfish	*Sebastes maliger*
Black rockfish	*Sebastes melanops*
Vermillion rockfish	*Sebastes miniatus*
Blue rockfish	*Sebastes mystinus*
China rockfish	*Sebastes nebulosus*
Tiger rockfish	*Sebastes nigrocinctus*
Bocaccio	*Sebastes paucispinis*
Canary rockfish	*Sebastes pinniger*
Redstripe rockfish	*Sebastes proriger*
Rosy rockfish	*Sebastes rosaceus*
Yelloweye rockfish	*Sebastes ruberrimus*
Stripetail rockfish	*Sebastes saxicola*
Halfbanded rockfish	Sebastes semicinctus
Sharpchin rockfish	*Sebastes zacentrus*
Shortspine thornyhead	*Sebastolobus alascanus*

Appendix 5. Environmental Checklist

ENVIRONMENTAL CHECKLIST
(WAC 197-11-960**)**

A. BACKGROUND

1. Name of proposed project, if applicable:

PUGET SOUND ROCKFISH CONSERVATION PLAN

2. Name of applicant:

WASHINGTON DEPARTMENT OF FISH & WILDLIFE

3. Address and phone number of applicant and contact person:

600 CAPITOL WAY N.

OLYMPIA, WA 98504

(360) 902-2725

4. Date checklist prepared:

AUGUST 7, 2009

5. Agency requesting checklist:

WASHINGTON DEPARTMENT OF FISH & WILDLIFE

6. Proposed timing or schedule (including phasing, if applicable):

PLAN ADOPTION PRIOR TO JANUARY 1, 2010

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. THE PROPOSAL IS A NON PROJECT PROPOSAL WHICH MAY BE FOLLOWED BY SITE SPECIFIC PROPOSALS TO RESTORE OR CREATE HABITAT FOR ROCKFISH IN PUGET SOUND. ANY SUCH PROPOSAL WOULD UNDERGO A SEPARATE SEPA REVIEW.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

PALSSON, W, T. TSOU, G. BARGMANN, R. BUCKLEY, J. WEST, M. MILLS, Y. CHENG AND R. PACUNSKI 2209 THE BIOLOGY AND ASSESSMENT OF ROCKFISHES IN PUGET SOUND. WASHINGTON DEPARTMENT OF FISH AND WILDLIFE DRAFT REPORT FPT-09-04

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. NOT APPLICABLE

10. List any government approvals or permits that will be needed for your proposal, if known.
APPROVAL OF PUGET SOUND ROCKFISH CONSERVATION PLAN AND FINAL EIS BY WASHINGTON DEPARTMENT OF FISH & WILDLIFE

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

THE PLAN ADDRESSES THE MANAGEMENT AND RESTORATION OF ROCKFISH IN ALL AREAS OF PUGET SOUND. THE GOAL OF THE PLAN IS TO RESTORE AND MAINTAIN THE ABUNDANCE, DIVERSITY, AND PRODUCTIVITY OF ROCKFISH AND THEIR HABITATS IN PUGET SOUND. CONSISTENT WITH THIS GOAL, THE DEPARTMENT OF FISH AND WILDLIFE (WDFW) WILL UTILIZE ROCKFISH TO PRODUCE SUSTAINABLE ECOSYSTEM BENEFITS.

TO ACHIEVE THIS GOAL, THE PLAN PROPOSES EIGHT DIFFERENT BUT INTERLOCKING POLICY ELEMENTS AS FOLLOWS:

- NATURAL PRODUCTION
- HABITAT
- FISHERY MANAGEMENT
- ECOSYSTEM EFFECTS
- EVALUATION MONITORING AND ADAPTIVE MANAGEMENT
- RESEARCH
- OUTREACH AND EDUCATION
- ENHANCEMENT

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans

required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

PUGET SOUND, INCLUDING THE STRAIT OF JUAN DE FUCA (EAST OF THE SEKIU RIVER), THE SAN JUAN ISLANDS, HOOD CANAL, ADMIRALTY INLET, THE WHIDBEY BASIN AND INNER PUGET SOUND SOUTH TO OLYMPIA. THE PLAN DIVIDES THE PROJECT AREA INTO TWO PARTS: 1) SOUTH OF PORT TOWNSEND AND 2) NORTH AND WEST OF PORT TOWNSEND

B. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other . . . . . .NOT APPLICABLE

b. What is the steepest slope on the site (approximate percent slope)? NOT APPLICABLE

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland. NOT APPLICABLE

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. NOT APPLICABLE

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill. NONE

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. NO

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings) NO CHANGE FROM EXISITNG LEVELS

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
NONE

2. **Air**

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known. NO CHANGE FROM EXISTING LEVELS.

b. Are there any offsite sources of emissions or odor that may affect your proposal? If so, generally describe. NONE

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
NONE

3. **Water**

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. YES, THE ENTIRE PUGET SOUND IS COVERED BY SALT WATER.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. NO

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
NONE

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. NONE

5) Does the proposal lie within a 100-year flood plain? If so, note location on the site plan. NOT APPLICABLE

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.
NONE

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known. NONE

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. NONE

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection

and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. NOT APPLICABLE

2) Could waste materials enter ground or surface waters? If so, generally describe. NO

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any: NONE

4. **Plants**

a. Check or circle types of vegetation found on the site:

— Deciduous tree: Alder, maple, aspen, other
— Evergreen tree: Fir, cedar, pine, other
— Shrubs
— Grass
— Pasture
— Crop or grain
— Wet soil plants: Cattail, buttercup, bullrush, skunk cabbage, other
X— Water plants: Water lily, eelgrass, milfoil, other
— Other types of vegetation

b. What kind and amount of vegetation will be removed or altered? NONE

c. List threatened or endangered species known to be on or near the site. NONE

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: NONE

5. **Animals**

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

Birds: Hawk, heron, eagle, songbirds,

other: . ALMOST ALL BIRD SPECIES FOUND IN WESTERN WASHINGTON ARE FOUND IN OR OVER PUGET SOUND. . . . . .

Mammals: Deer, bear, elk, beaver,

other: .SEALS, OTTERS AND WHALES. . . . . .

Fish: Bass, salmon, trout, herring, shellfish,

other: . . OVER 212 SPECIES OF FISH ARE KNOWN TO OCCUR IN PUGET SOUND AS WELL AS THOUSANDS OF SPECIES OF

INVERTEBRATES . . . . . .

b. List any threatened or endangered species known to be on or near the site.

COMMON NAME (STATUS[3])	**SCIENTIFIC NAME**	**POSSIBLE INTERACTION WITH ROCKFISH**
Southern Resident Killer Whale (E)	*Orcinus orca*	Rockfish are minor prey item
Humpback Whale(E. SE)	*Megaptera novaeangliae*	
Stellar Sea Lion (T,ST)	*Eumetopias jubatus*	Rockfish may be a minor prey item
Marbled murrelet(T,ST))	*Brachyramphus marmatus*	
Brown pelican (E,SE)	*Pelecanus occidentalis*	Minor competition for food
Chinook salmon (T)	*Oncorhynchus tshawytscha*	Rockfish are both prey and predators
Summer chum salmon (T)	*Oncorhynchus keta*	
Steelhead trout (T)	*Oncorhynchus mykiss*	
American white pelican (SE)	*Pelecanus erythrorhynchos*	Possible competition for food
Brandt's Cormorant (SC)	*Phalacrocorax penicillatus*	
Cassin's auklet (SC)	*Ptychoramphus aleuticus*	
Common mure (SC)	*Uria aalge*	
Black rockfish (SC)	*Sebastes melanops*	
Yelloweye rockfish (SC,PT)	*Sebastes ruberimmus*	
Bocaccio rockfish (SC, PE)	*Sebastes paucispinis*	
Brown rockfish (SC)	*Sebastes auriculatus*	
Canary rockfish (SC, PT)	*Sebastes pinninger*	
China rockfish SC)	*Sebastes nebulosus*	
Copper rockfish (SC)	*Sebastes caurinus*	
COMMON NAME (STATUS[4])	**SCIENTIFIC NAME**	**POSSIBLE INTERACTION WITH ROCKFISH**
Greenstriped rockfish (SC)	*Sebastes elongates*	
Pacific cod (SC)	*Gadus macocephalus*	Competition for food, predation, bycatch in rockfish fisheries
Pacific hake (SC)	*Merluccis productus*	Competition for food, predation, bycatch in rockfish fisheries
Pacific herring (SC)	*Clupea pallasi*	Rockfish prey on herring; herring prey on rockfish larvae
Quillback rockfish (SC)	*Sebastes maliger*	
Tiger rockfish (SC)	*Sebastes nigrocinctus*	
Walleye pollock (SC)	*Theragra chalcogramma*	Competition for food
Widow rockfish(SC)	*Sebastes entomelas*	
Yellowtail rockfish (SC)	*Sebastes flavidus*	

[3] E or T means listed an Endangered or Threatened under the federal Endangered Species Act, if preceded by a "P" it indicates that the listing status is potential; SE, ST, SC and SS means the species is listed on the Washington state Endangered, Threatened, Candidate or Sensitive list.

[4] E or T means listed an Endangered or Threatened under the federal Endangered Species Act, if preceded by a "P" it indicates that the listing status is potential; SE, ST, SC and SS means the species is listed on the Washington state Endangered, Threatened, Candidate or Sensitive list.

Gray Whale (SE)	*Eschrichtius robustus*	
Pacific harbor porpoise (SC)	*Phocoena phocoena*	
Northern abalone (SC)	*Haliotis kamschatkana*	
Olympia Oyster (SC)	*Ostrea conchaphila*	

c. Is the site part of a migration route? If so, explain.
PUGET SOUND IS USED FOR MIGRATION FOR JUVENILE SALMON ENTERING SALTWATER AND ALSO BY ADULT SALMON RETURNING TO NATAL STREAMS TO SPAWN. PUGET SOUND IS PART OF A MAJOR FLYWAY FOR MIGRATING BIRDS.

d. Proposed measures to preserve or enhance wildlife, if any:
PART OF THE PROPOSED PLAN IS TO DEVELOP RESTRICTIVE FISHING REGULATIONS WHICH WILL PROTECT FISH LIFE. ADDITIONALLY THE PLAN CONSIDERS THE ECOSYSTEM NEEDS OF AQUATIC LIFE SUCH AS FORAGE AND CREATES AREAS WHERE FISHING WILL NOT BE ALLOWED.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. NOT APPLICABLE

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. NO

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: NOT APPLICABLE

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. NONE

1) Describe special emergency services that might be required. NONE

2) Proposed measures to reduce or control environmental health hazards, if any: NOT APPLICABLE

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? NONE

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. NONE

3) Proposed measures to reduce or control noise impacts, if any: NOT APPLICABLE

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? NOT APPLICABLE

b. Has the site been used for agriculture? If so, describe. NOT APPLICABLE

c. Describe any structures on the site. NONE

d. Will any structures be demolished? If so, what? NONE

e. What is the current zoning classification of the site? NOT APPLICABLE

f. What is the current comprehensive plan designation of the site? NOT APPLICABLE

g. If applicable, what is the current shoreline master program designation of the site? NOT APPLICABLE

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

WAC 220-110-250
Saltwater habitats of special concern.

In the following saltwater habitats of special concern, or areas in close proximity with similar bed materials, specific restrictions regarding project type, design, location, and timing may apply as referenced in WAC 220-110-270 through 220-110-330.

(a) Surf smelt (Hypomesus pretiosus) spawning beds are located in the upper beach area in saltwater areas containing sand and/or gravel bed materials.

(b) Pacific sand lance (Ammodytes hexapterus) spawning beds are located in the upper beach area in saltwater areas containing sand and/or gravel bed materials.

(c) Rock sole (Lepidopsetta bilineata) spawning beds are located in the upper and middle beach area in saltwater areas containing sand and/or gravel bed materials.

(d) Pacific herring (Clupea harengus pallasi) spawning beds occur in lower beach areas and shallow subtidal areas in saltwater areas. These beds include eelgrass (Zostera spp) and other saltwater vegetation and/or other bed materials such as subtidal worm tubes.

(e) Rockfish (Sebastes spp) settlement and nursery areas are located in kelp beds, eelgrass (Zostera spp) beds, other saltwater vegetation, and other bed materials.

(f) Lingcod (Ophiodon elongatus) settlement and nursery areas are located in beach and subtidal areas with sand,

eelgrass (Zostera spp), subtidal worm tubes, and other bed materials.

(2) Juvenile salmonid (Family salmonidae) migration corridors, and rearing and feeding areas are ubiquitous throughout shallow nearshore saltwater areas of the state.

(3) The following vegetation is found in many saltwater areas and serves essential functions in the developmental life history of fish or shellfish:

(a) Eelgrass (Zostera spp);

(b) Kelp (Order laminariales);

(c) Intertidal wetland vascular plants (except noxious weeds).

i. Approximately how many people would reside or work in the completed project? NOT APPLIABLE

j. Approximately how many people would the completed project? NOT APPLIABLE

k. Proposed measures to avoid or reduce displacement impacts, if any: NOT APPLICABLE

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: NONE

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. NONE

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. NONE

c. Proposed measures to reduce or control housing impacts, if any: NOT APPLICABLE

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? NOT APPLICABLE

b. What views in the immediate vicinity would be altered or obstructed? NONE

c. Proposed measures to reduce or control aesthetic impacts, if any: NONE

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? NONE

b. Could light or glare from the finished project be a safety hazard or interfere with views? NO

c. What existing offsite sources of light or glare may affect your proposal? NONE

d. Proposed measures to reduce or control light and glare impacts, if any: NONE

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity? BOATING, FISHING, DIVING, PHOTOGRAPHY, BIRD WATCHING, WHALE WATCHING

b. Would the proposed project displace any existing recreational uses? If so, describe.

THE PLAN COULD CHANGE EXISTING RECREATIONAL FISHING ACTVITIES

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: CHANGES IN RECREATIONAL FISHING ACTVIITIES WOULD OCCUR ONLY AFTER PERIODS OF SCIENTIFIC STUDY AND PUBLIC COMMENT.

13. **Historic and cultural preservation**

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe. NOT APPLICABLE

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site. NOT APPLICABLE

c. Proposed measures to reduce or control impacts, if any: NONE

14. **Transportation**

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any. NOT APPLICABLE

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop? NOT APPLICABLE

c. How many parking spaces would the completed project have? How many would the project eliminate? NONE

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private). NONE

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. NOT APPLICABLE

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur. NOT APPLICABLE

g. Proposed measures to reduce or control transportation impacts, if any: NONE

15. **Public services**

a. Would the project result in an increased need for public services (for example: Fire protection, police protection, health care, schools, other)? If so, generally describe. NOT APPLICABLE

b. Proposed measures to reduce or control direct impacts on public services, if any. NONE

16. **Utilities**

a. Circle utilities currently available at the site: Electricity, natural gas, water, refuse

service, telephone, sanitary sewer, septic system, other. NOT APPLICABLE

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. NONE

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: . . . . . .

Date Submitted: . . . . . .

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

(do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise? THE PLAN MAY AFFECT RECREATIONALFISHING OPPORTUNITIES, CAUSING SMALL INCREASES OR DECREASES IN BOATING ACTIVITY AND ASSOCIATED EMISSIONS.

   Proposed measures to avoid or reduce such increases are: THE PLAN PROPOSES TO CREATE SUSTAINABLE FISHING OPPORTUNITES. ACHIEVEMENT OF THIS GOAL WILL PRODUCE MORE STABLE FISHERIES, MINIMIZING INTER ANNUAL CHANGES IN EMMISSIONS FROM FISHING VESSELS AND LIMITING THE GROWTH OF EMISSIONS

2. How would the proposal be likely to affect plants, animals, fish, or marine life? POSITIVE FOR FISH AND MARINE LIFE

   Proposed measures to protect or conserve plants, animals, fish, or marine life are: THE PLAN WILL PRODUCE MORE RESTRICTIVE FISHING REGULATIONS, CONSIDER ECOSYSTEM NEEDS OF MARINE LIFE, RESTORE DEGRADED HABITATS AND INCREASE AREAS WHERE FISHING IS NOT ALLOWED OR

GREATLY RESTRICTED

3. How would the proposal be likely to deplete energy or natural resources? THE PROPOSAL WILL HAVE NO EFFECT ON ENERGY USE AND PROVIDE POSITIVE BENEFITS TO NATURAL RESOURCES

   Proposed measures to protect or conserve energy and natural resources are: THE PLAN WILL PROTECT AND CONSERVE MARINE LIFE BY PRODUCING MORE RESTRICTIVE FISHING REGULATIONS, CONSIDERING ECOSYSTEM NEEDS OF MARINE LIFE, RESTORING DEGRADED HABITATS AND INCREASING AREAS WHERE FISHING IS NOT ALLOWED OR GREATLY RESTRICTED

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, flood plains, or prime farmlands? THE PROPOSAL WOULD BENEFIT THESE AREAS

   Proposed measures to protect such resources or to avoid or reduce impacts are: THE PROPOSAL WILL RESTORE DEGRADED HABITATS AND CREATE NO FISHING AREAS IN PUGET SOUND.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans? NO CHANGE IN SHORELINE USE IS ANTICIPATED

   Proposed measures to avoid or reduce shoreline and land use impacts are: NONE

6. How would the proposal be likely to increase demands on transportation or public services and utilities? NO CHANGE FROM EXISTING LEVELS

   Proposed measures to reduce or respond to such demand(s) are: NOT APPLICABLE

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment. NO KNOWN CONFLICTS