WRIA 19 Salmonid Restoration Plan: Executive Summary

INTRODUCTION

Statewide salmon recovery planning in Washington began in earnest in 1998, with the enactment of Engrossed Substitute House Bill 2496 (ESHB 2496), codified as Chapter 77.85 RCW, in response to the ESA-listing of thirteen salmon and steelhead evolutionarily significant units (ESUs) in Washington by National Marine Fisheries Service (NMFS) between 1992 and 1999. State salmon recovery planning was divided by NMFS into Salmon Recovery Domains, and by the State of Washington into Recovery Regions. WRIA 19 Salmon Recovery Planning falls outside of any NOAA Salmon Recovery Domain, but is included within Washington State's Puget Sound Recovery Region. The North Olympic Peninsula Lead Entity for Salmon (NOPLE) coordinates recovery planning within WRIA 19 and works closely with the Puget Sound Partnership.

This plan (Plan) recommends a series of restoration goals, strategies, and actions that can be implemented to help restore salmonids (genus *Oncorhynchus)*, which spawn and rear in freshwater habitat within WRIA 19.

Purpose of Plan

The purpose of this Plan is to serve as road map for salmonid recovery and restoration in WRIA 19. This Plan is needed to help organize, coordinate, and prioritize the myriad of possible recovery goals, strategies, and actions. The Plan will help ensure that restoration and recovery actions within WRIA 19 are scientifically sound, as well as effective and efficient.

Plan Organization

The Plan is divided into eight main chapters:

- Introduction (Chapter 1)
- Background (Chapter 2)
- Salmonid Resources (Chapter 3)
- Recovery Goals and Objectives (Chapter 4)
- Habitat Conditions and Limiting Factors (Chapter 5)
- Recent and Ongoing Conservation Efforts (Chapter 6)
- Recovery Strategy and Actions (Chapter 7)
- Restoration Actions (Chapter 8)

Chapter 2 includes a general overview of the WRIA 19 watershed including a summary of the physical setting and a description of subbasins, geology, and climate. Past and current land use within the watershed is described in here too.

Chapter 3 includes a detailed summary of each salmonid species' population status within WRIA 19. In addition, this chapter summarizes by subbasin, each species' population trend and status, fisheries and harvest impacts, and current and historical hatchery practices.

Chapter 4 includes the recovery goals and objectives for each salmonid species present within WRIA 19.
Chapter 5 includes a summary of habitat conditions and limiting factors for each of the ten subbasins within WRIA 19. A brief summary of recent and ongoing conservation efforts is included in Chapter 6.

Chapter 7 presents the WRIA 19 salmonid recovery strategy and includes a list detailed restoration actions.
Chapter 8 includes a discussion on Plan implementation, as well as a discussion on research, monitoring, and evaluation (RM&E).

BACKGROUND

Watershed Overview

Water Resource Inventory Area 19 drains the northwest tip of the Olympic Peninsula, encompassing waters emptying to the Strait of Juan de Fuca west of the Elwha River, to the tip of Cape Flattery. WRIA 19 contains 27 salmonid-bearing watersheds that drain directly into the Strait of Juan de Fuca. The largest subbasin within the watershed is the Hoko River, followed by the Lyre, Pysht, Sekiu, and Clallam Rivers.

The majority of WRIA 19 drains low elevation hills and mountains with maximum elevations ranging from 2,000 to 3,500 feet. The exception is the Lyre River subbasin where maximum elevations approach 5,500 feet and significant portion of the watershed is above an elevation of 2,500 feet. The Lyre River subbasin is the only subbasin within WRIA 19 that contains alpine meadows and seasonal snow fields.

The climate varies widely throughout WRIA 19, with higher annual precipitation to the west and at higher elevations. The climate as a whole can be characterized as temperate coastal-marine, with mild winters and cool summers. The majority of precipitation falls as rainfall from October through April. The eastern half watershed is much drier the western half of the watershed. For example, the Salt Creek subbasin receives 35-55 inches of precipitation annually (McHenry et al. 2004), whereas the Sekiu River subbasin receives 95-120 inches of precipitation annually (Lautz 2001). Subbasins such as the East and West Twin River and

Deep Creek have intermediate precipitation levels averaging 75 inches per year (Stoddard 2002).

Land Use

Historical Settlement

The area comprising WRIA 19 was ceded to the United States by the Makah Indian Tribe in the Treaty of Neah Bay in 1855 and by the Klallam Tribe in the Treaty of Point No Point in 1855. Year round and seasonal tribal villages existed at the mouths of several of the major streams (Salt and Deep creeks, Pysht River, Hoko River), as well as along Strait of Juan de Fuca at strategic beaches (Clallam Bay, Neah Bay) and points.

European settlement within the watershed began in the late-nineteenth century. By the late 1800s tannin extraction, logging, coal mining, and farming appear to have been the main economies of the Clallam Bay/Sekiu area. The introduction and extension of logging railroads arrived on the Western Olympic Peninsula around 1900 (Wright date unknown). Railroads and the advent of high lead logging opened new territory up to logging and aided in the formation of coastal communities like Port Crescent, Gettysburg, Twin, and Pysht.

Modern Landownership and Land Use

Ten landownership types exist within the watershed and they include the following: private, U.S. Forest Service (USFS), Washington State Department of Natural Resources (DNR), Olympic National Park (ONP), Indian Reservation, church, Port of Port Angeles, Clallam County, other Federal lands, other State lands, and easements/right of way.

Over 51 percent of the watershed is owned privately (51.4%). Public ownership including DNR (22.3%), ONP (11.6%), and the USFS (9%) comprise nearly 43% of the remaining land area. Less than 7% of the watershed is within the following ownership categories: Indian Reservation, County, other State land, other Federal land, easements/right of way, and miscellaneous. Landownership type varies significantly by watershed, for example, nearly 77 percent of the Pysht River subbasin is privately owned while less than 7% of the East Twin River subbasin is privately owned. Private land includes large industrial forest landowners and small forest, residential, and agricultural landowners.

Almost 76 percent of the watershed is classified as commercial forest land. The next highest land use type within the watershed is Olympic National Park (11.6%). The remaining 12.4 percent of the watershed area's land use is classified as one of the following land use types: rural, urban and industrial, Indian Reservation, other public lands, easements and right of ways, and other miscellaneous.

Timber Harvest and Forest Practices

Since commercial timberlands make up approximately 76 percent of the WRIA 19 land area, their management will play a significant role in species conservation and recovery. As described above in Section 2.2.2 over 96% of the

commercial forest land within the watershed is owned by DNR, USFS, and private landowners. Each of these landowners have unique habitat conservation plans (HCPs) that regulate forest management. Private forest landowners operate under the Washington State Forest Practices Habitat Conservation Plan (FPHCP), WDNR state lands harvests timber under the WDNR Habitat Conservation Plan, and the USFS manages their forest land under the Northwest Forest Management Plan.

Private Residential, Urban, and Industrial Land Use

Less than 8% of the WRIA 19 watershed area is zoned as rural (several different rural zoning classifications), urban, and industrial. Nearly 78 percent of the area zoned as rural, urban, and industrial is contained within the Salt Creek and WSI subbasins. In 2000, Clallam County developed a draft plan, "Salmon Habitat and Ecosystem Conservation Plan". The plan is intended to be Clallam County's ecosystem recovery strategy for ESA listed salmonids.

Makah Tribe- Makah Indian Reservation

Just less than 4% of the WRIA 19 watershed area is within the boundaries of the Makah Indian Reservation. The majority of land within the reservation is forested and managed similarly to land in Clallam County zoned as commercial forest land. Rural, urban, and industrial land use types are also present within the boundaries of the reservation. Tribal rules and ordinances regulate all land use activities within the rural, urban, and industrial areas of the reservation (excluding fee lands).

Olympic National Park

Almost 12 percent of the WRIA 19 watershed is within the boundaries of Olympic National Park (ONP). The Park protects 922,651 acres of land on the Olympic Peninsula. All of the Park land within the WRIA 19 watershed is located within the Lyre River subbasin.

SALMONID RESOURCES

WRIA 19 contains 5 distinct NMFS/USFWS ESUs and 19 WDFW stock complexes, as well as the endemic Lake Crescent Beardslee and Crescenti trout (rainbow and cutthroat subspecies, respectively). This complicates the process of summarizing status reviews, because various reviews combine and omit spawning populations to different degrees. Within the WRIA 19 watershed there are currently no ESA listed salmonid populations.

Chinook Salmon

In WRIA 19, Chinook spawning primarily occurs in the Hoko River. In recent years Chinook salmon have also been observed spawning in the Sekiu, Clallam, and Pysht Rivers. For the purposes of restoration planning Chinook salmon recovery and restoration projects should focus primarily on the Sekiu, Hoko, and Pysht rivers where historical populations were clearly present.

Within the Hoko River system, Chinook begin entering the estuary and lower river as early as late August and will continue entering the system through late October to early-November. Peak spawning in the Hoko River typically occurs in late October. The Hoko River Chinook population has a complex age structure with spawners returning as two through seven year-old fish (Haggerty et al. 2001).

Natural production of Hoko River Chinook has fluctuated significantly over the past 27 years, ranging from a maximum of 736 natural-origin recruits (NOR's) in 1989 to a low of 72 NOR's in 2005 (Haggerty et al. 2001a; 2001b; 2001c; MFM 2006). The number of natural-origin spawners averaged 240 fish from 1979 to 1984. Natural-origin Chinook spawning in the Hoko River during the period from 1988 through 1999 increased 97% over the period from 1979 through 1984. Chinook began to return from the supplementation program in 1985. The abundance trend shifted negative in 2000. Natural-origin Chinook spawning in the Hoko from 2000-2005 averaged only 288 adult Chinook.

Chum Salmon

Historically chum salmon spawning occurred in most WRIA 19 subbasins. The largest populations were likely in the Pysht and Lyre Rivers, followed by the Clallam, Hoko, and Sekiu Rivers. The Lyre River population has been described as being one of the premier chum salmon populations on the north Olympic Peninsula, supporting annual runs of about 10,000 fish (Goin 1990).

Long-term chum salmon population abundance data are lacking for most WSJF streams. The only subbasins with long-term data are the Pysht River and Deep Creek.

There are 26 years of escapement estimates available for trend analysis. During the ten year period from 1980-1989 escapement averaged 2,459 (median 2,230), from 1990-1999 escapement averaged 1,328 (median 1,076), and from 2000-2006 escapement averaged 1,279 ([median 896]; WDFW 1997; Unpublished WDFW data). These data indicate that the average escapement declined by approximately 48 percent between the first period (1980-1989) and the last period (2000-2006).

Coho Salmon

Coho salmon are the most widely distributed and abundant anadromous salmonids in WRIA 19. They spawn in nearly all of the accessible, low (0.1-3%) and moderate (3-8%) gradient streams draining into the Strait of Juan de Fuca. Within WRIA 19, the largest coho populations are found in the Hoko and Pysht Rivers. The smallest spawning populations are most typically found in the smallest subbasins (e.g., Village and Rasmussen Creeks).

Adult coho salmon begin entering WRIA 19 streams as early as September if flows permit. Generally October and November are the peak months for migration into WSJF streams. Coho salmon spawn from late-October through January (WDFW unpublished spawning ground survey database, 2007). Peak spawning typically occurs from late-November through mid-December.

Stock status and trends in abundance vary by production unit. For example, in Salt Creek coho salmon spawning escapement data collected by WDFW in their index survey reaches from 1984 through 2006 show a downward trend from 1984 through 2000, followed by an increasing trend from 2001 to 2006.

Other index reaches, such as those in the Hoko River show different population trends. These data show a clear, statistically significant (p=0.0015), positive trend from 1986 through 2002. The trend from 2002 to 2006 is severely negative and statistically significant (p=0.017).

Steelhead/Rainbow Trout

Steelhead trout are among the most widely distributed and abundant anadromous salmonids in WRIA 19. Steelhead trout populations within the Pacific Northwest are classified as either winter-run or summer-run populations. With the exception of the Lyre River, which includes both summer-run and winter-run steelhead, all other steelhead populations and/or spawning aggregations within the WRIA 19 watershed are classified as winter-run steelhead trout.

Historically, the largest steelhead trout populations were found in the Lyre, Pysht, and Hoko rivers. The Clallam and Sekiu rivers, as well as Deep Creek also supported significant steelhead populations. The smallest spawning populations or spawning aggregations are found in the tributaries to the WSI subbasin (e.g., Bullman and Rasmussen creeks).

Within the WRIA 19 watershed, adult steelhead begin entering stream and river systems in November and continue entering freshwater until May. Peak entry timing into the rivers occurs from December through March. Spawning takes place from December through mid-June with peak spawning occurring from late-February through mid-April (WDFW 2002).

Few spawning ground survey records exist prior to the 1980s for most WRIA 19 streams. Steelhead escapement estimates are based on WDFW spawning ground index reaches. These index reaches are present in most of subbasins (absent in the Lyre, Sekiu and WSI subbasins). The longest time series data are available in the Pysht River. Most subbasins have estimates from 1995 through 2006. In order to compare abundance in each of the individual subbasins, an index of Western Strait of Juan de Fuca subbasins was developed by summing the estimated escapement for each year in the following six subbasins: Salt Creek, East Twin River, West Twin River, Deep Creek, Pysht River, and Hoko River. The WSJF index has a negative trend but the trend is not statistically significant (p=0.143). Escapement in the index has ranged from a high of 1,988 (1999), to a low of 918 (2005), averaging 1,417.

RECOVERY GOALS AND OBJECTIVES

HABITAT CONDITIONS AND LIMITING FACTORS

The factors for decline of WRIA 19 salmonid populations are numerous and not entirely understood. Factors thought to have contributed to the decline of WRIA 19 salmonid populations include: loss of adequate quality and quantity of spawning and rearing habitat; over-exploitation; poor ocean conditions; and the interaction of these factors. In addition, reduced numbers of spawning salmon in WRIA 19 also resulted in less delivery of marine derived nutrients. Marine nutrients from decaying salmon carcasses have been documented to significantly increase lower trophic level productivity (Wipfli et al. 1998; Wipfli et al. 1999). Decreases in the number of spawning fish likely resulted in decreased salmonid productivity.

Little WRIA 19 specific analysis exists regarding fisheries and hatchery impacts and their influence on salmonid populations. However, over-fishing was likely a major factor for decline for some species within WRIA 19. Past hatchery practices may have also contributed to the decline of some species but no direct evidence of this is documented. A distinction must be made between factors for decline and factors that currently limit salmonid abundance and productivity (limiting factors), as they are not necessarily the same. Certain activities that may have contributed to the decline of some species may no longer operate to limit abundance or productivity.

Several limiting factors have been identified for WRIA 19 including the following:

- Floodplain development and alterations
- Loss of large woody debris
- Estuary and nearshore alterations
- Degraded water quality and high stream temperatures
- Barriers that block access to spawning and rearing habitat
- Conversion of riparian forests to non-forest uses
- Excess sedimentation, including fine sediment in spawning gravels
- Degraded riparian conditions (e.g., conversion from conifer to hardwood dominated riparian forests)
- Stream channelization and bank armoring
- Stream cleaning
- Channel destabilization and channel incision
- Loss of adequate quality and quantity of spawning gravel
- Increased peak flows
- Unauthorized water withdrawals and low flows

Sections 5.1 through 5.10 summarize habitat conditions and limiting factors within each of the ten WRIA 19 subbasins. A brief description of nearshore conditions and limiting factors across WRIA 19 is included below. In addition, a summary of stream adjacent nearshore and estuarine conditions is included within each of the ten subbasin summaries.

The WRIA 19 nearshore extends from the mouth Colville Creek, west to and including Cape Flattery. The WRIA 19 nearshore habitat, delineated by the physical features of tidal influence and light limitation, is generally defined as the area that extends from the upper end of tidal mixing to 30 meters (~98 feet) depth. The Puget Sound Nearshore

Ecosystem Restoration Project (PSNERP 2009) include uplands within 200 meters of the shoreline as part of the nearshore ecosystem (zone 1). Fresh et al. (2004) describe nearshore ecosystem boundaries as not easily defined because linkages in the system occur longitudinally, laterally, and vertically. Fresh et al. (2004) conclude that nearshore ecosystems should be viewed in three dimensions as a suite of overlapping ecosystems that vary in extent as a function of the different environmental and ecological linkages.

The nearshore within WRIA 19 offers greater than 130 linear kilometers of shoreline and is a critical component of the marine ecosystem. The WRIA 19 nearshore environment is an important migratory corridor and rearing environment for several ESA-listed ESUs including Puget Sound Chinook (Shaffer et al. 2010), Strait of Juan de Fuca/Hood Canal Summer Chum, Puget Sound Steelhead, and Columbia River Chinook . In addition, sea run cutthroat trout, bull trout (ESA listed), and pink, sockeye, chum, and coho salmon, as well as the forage fish are also known to utilize the nearshore and estuarine habitat within WRIA 19 (Shaffer et al 2008). Strait of Juan de Fuca nearshore habitat function including species, populations, and life history strategies of juvenile salmon and forage fish that use the nearshore, are not well understood (Shaffer et al 2008).

RECOVERY STRATEGIES AND ACTIONS

WRIA 19 contains 27 salmonid-bearing watersheds, comprising 19 distinct stocks (WDFW) and 5 ESUs (NMFS/FWS). Since none of these ESUs are listed, there are no ESU viability criteria for any of the stocks. There are relatively few individual landowners and a low human population density throughout most of the WRIA, which remains relatively undeveloped compared to other WRIAs closer to the metropolitan areas of the Puget Sound. Human population density increases around the towns of Clallam Bay, Joyce, and Neah Bay, and rural population density increases generally moving eastward toward Port Angeles, and along the lower mainstems of larger rivers in the watershed. WRIA 19 provides a unique opportunity for protection and restoration of biological and landscape processes that will support long-term salmonid survival and recovery.

Several scientific studies have illustrated that habitat conditions and aquatic ecosystem function are a result of the interaction between watershed controls, watershed processes, and land use. Scientists and resource managers have recognized that restoration planning that carefully integrates watershed and ecosystem processes is more likely to be successful at restoring depleted salmonid populations (Beechie et al. 2003). Our strategy focuses on the concepts presented in several salmonid habitat recovery planning documents and scientific studies (e.g., Beechie and Boulton 1999; Roni et al. 2002; Beechie et al. 2003; Roni et al. 2005; Stanley et al. 2005).

Our recovery strategy is based on the relationship between landscape processes and land use, the resulting habitat conditions, and the biological response. The various recovery strategies included in Sections 7.2.1 through 7.2.9 are based upon the

protection, restoration, and/or rehabilitation of critical processes, inputs, and habitat conditions associated with limiting factors affecting WRIA 19 salmonids. The recovery strategy addresses habitat, harvest, and hatchery factors affecting WRIA 19 salmonids.

Recovery plans and strategies that incorporate watershed processes and/or ecosystem recovery are more likely to result in the recovery of degraded habitat conditions and therefore improve the conditions and factors that limit salmonid populations. Recovery strategies should be based on the restoration of critical processes, inputs, and habitat conditions associated with identified limiting factors affecting salmonid populations.

The strategy incorporates a general hierarchical approach for prioritizing habitat restoration, protection, and enhancement activities with regard to habitat. This approach was adapted for conditions specific to each of the WRIA 19 subbasins. Within the WRIA 19 watershed, some limiting factors, habitat conditions, and life histories are shared among all subbasins, while others apply to some subbasins and not others. Also note that different species may also have different limiting factors, adding an additional layer of complexity to recovery and restoration strategy development.

All recovery strategies and actions fall within a hierarchal pyramid containing tiers that can be used to sequence and aid in prioritization of strategies and actions needed to restore processes, inputs, and conditions affecting salmonids within each of WRIA 19 subbasins.

GOALS, STRATEGIES, AND ACTIONS TO RESTORE AND PROTECT HABITAT FORMING PROCESSES AND CONDITIONS

During the development of this Plan the NOPLE TRG formed a technical workgroup composed of local fish biologists, watershed scientists, and other interested individuals. The purpose of the group was to help develop subbasin specific restoration goals, strategies, and actions. Goals, strategies, and actions were developed for nine subbasins within WRIA 19, these subbasins included: Salt Creek, Lyre River, Twin Rivers, Deep Creek, and Pysht, Clallam, Hoko and Sekiu Rivers, as well as the WSI subbasin. Within each subbasin eight watershed processes and/or habitat conditions were evaluated, they included the following:

- Estuary and nearshore processes and habitat conditions
- Habitat connectivity
- Biological processes
- Hydrologic processes
- Sediment processes
- Riparian and floodplain processes and conditions
- Habitat and LWD conditions
- Water quality conditions

At the subbasin scale the WRIA 19 technical team qualitatively evaluated the impairment status of each watershed process and/or habitat condition. Impairment ratings were categorized as one of the following: high, medium, low, unimpaired, or unknown. A recovery goal narrative was then developed for each watershed process/condition assessed. A unique recovery goal ID was then assigned to each recovery goal narrative. One or more recovery

strategy narratives were developed to address the recovery goal narrative for each watershed process and/or habitat condition. A unique recovery strategy ID was assigned to each recovery strategy narrative.

Restoration actions from previous reports and plans (e.g., Smith 2000), as well as newly developed actions were then associated with the primary strategy addressed by each of the actions. Some actions addressed multiple strategies, for multiple processes and/or conditions. Where strategies occurred but no actions were identified, new actions were proposed. It is important to note that the restoration actions identified within the Plan are voluntary. These actions are proposed for future consideration, and are not required or mandated as a result of being in the Plan.

Proposed restoration actions will need to be refined prior to implementation, as most actions are conceptual in nature. These actions were identified because they help address habitat, harvest, and hatchery factors that may limit WRIA 19 salmonids. The actions are intended to improve the viability and recovery of the different salmonid populations within WRIA 19. The recommended restoration and recovery actions were classified as one of the following: programmatic actions (PA), habitat restoration actions (HRA), and research, monitoring, and evaluation actions (RM&E).

Programmatic actions are part of a policy, program or process, as opposed to being specific projects or related to specific sites. They are generally part of a regulatory or planning process.

Habitat restoration actions include a broad suite of actions types including: LWD placement, riparian planting and fencing, culvert barrier removal, nearshore fill removal, conservation easements, etc... The most important aspect of long-term habitat restoration involves the restoration and protection of habitat forming processes. Often habitat restoration projects are focused primarily on restoring or enhancing habitat conditions. However, failure to protect and restore habitat forming processes across the WRIA 19 watershed is unlikely to result in long-term habitat improvements.

RM&E actions include all types of monitoring, research, and evaluation actions, from salmon abundance trend monitoring, to channel migration zone mapping and delineation, to effectiveness monitoring.

IMPLEMENTATION, RESEARCH, MONITORING, AND EVALUATION

Plan Implementation