
Executive Summary

A Shared Vision – Creating a Future for People and Fish

“We have an opportunity to do something extraordinary – to save a species from expiring, not only on our watch, but on the watch of our great grandchildren.”

King County Executive Ron Sims (Shared Strategy Summit 2005)

Across Puget Sound, leaders at all levels aspire for a future in which the Puget Sound region has demonstrated to the world that economic prosperity, more people and a healthy environment can co-exist. The many contributors to this draft Puget Sound Salmon Recovery Plan (the plan) hope that fifty years from now, their great-grandchildren will be able to say:

Our elders got it right. They listened to what the salmon were telling them. Anticipating the region’s growth, the choices they made in the early 2000’s and the hard work that followed, created the vibrant community we share today, where both people and nature thrive and the salmon are once again teeming in our rivers and streams.

The collective, overarching goal shared by the contributors to this plan is:

To recover self-sustaining, harvestable salmon runs in a manner that contributes to the overall health of Puget Sound and its watersheds and allows us to enjoy and use this precious resource in concert with our region’s economic vitality and prosperity.

Puget Sound was once home to more populations of Chinook salmon with a greater diversity of traits than we have today. There are currently 22 Chinook populations remaining. It is hard to know precisely, but scientists believe we have lost over 15 Chinook runs and most of those losses were runs that returned in the spring to their spawning grounds. Currently, Puget Sound Chinook salmon are at only 10% of historic numbers; in some river basins that goes down to 1% and this is during favorable ocean conditions.



Photo by Domonique Lewis

The long-term goal is to achieve self-sustaining levels of Puget Sound Chinook numbers, distribution and diversity. Plan contributors will strive to achieve this goal in the context of a rapidly growing human population; well over a million people are expected to settle around the Sound in the next fifteen years. That's the equivalent of adding a city the size of Portland with its accompanying infrastructure. In addition to the broad vision and goals for the overall region, each of the fourteen local planning areas across the Sound has its own set of qualitative and quantitative goals.

Since many of the actions to recover Chinook are also expected to help Coastal/Puget Sound bull trout, this draft plan also supports US Fish and Wildlife Service's stated goal for bull trout (USFWS, 2004): To ensure the long-term persistence of self-sustaining, complex interacting groups of bull trout distributed across the Coastal-Puget Sound Distinct Population Segment, so that the species can be delisted. Not only will bull trout benefit from this plan, it has become clear that many of our watershed's ecological processes (including those that shape the land, control water flow and content, and govern biological activity) have evolved with and depend on salmon. For this reason, there has been a growing consensus in the scientific community that salmon are a key species whose recovery will benefit the overall ecosystem health and biodiversity of the Puget Sound.

One Region, One Plan for Salmon Recovery

The Puget Sound community has a rich history of success in restoring its environment. Cleaning up Lake Washington in the 1960's, initiating recycling in the 1980's, creating the Mountains to Sound Greenway in the 1990s are just a few examples. Based on this history, the Shared Strategy for Puget Sound (Shared Strategy) was founded on the conviction that people in Puget Sound have the creativity, knowledge and resources to find lasting solutions to complex ecological, economic and community challenges.

The number of communities and governments that came together in Puget Sound under a Shared Strategy to save a species from extinction is unprecedented in the history of the Endangered Species Act. Shared Strategy leaders believe that issues as complex as salmon recovery that span urban and rural landscapes, multiple jurisdictions and involve actions affecting many sectors of a community cannot be satisfactorily solved by a single entity or point of view. So from the start, participants in the Shared Strategy salmon recovery initiative agreed to a voluntary, collaborative process involving federal, state, tribal and local governments, business representatives, the agricultural and forestry industries, conservation and environmental groups along with the local watershed planning areas to develop technically sound solutions that communities can embrace.

By the time of the listing as threatened in 1999 of Puget Sound Chinook, Coastal/Puget Sound bull trout and Hood Canal summer chum, many people had already been working for years to protect and restore salmon habitat, and improve harvest and hatchery management with conservation as well as harvest goals in mind. Rather than re-invent the wheel, state and regional leaders agreed that it made sense to build on efforts already underway in the fourteen local Puget Sound watersheds along with regional efforts for the marine waters of Puget Sound. In 2002, the Shared Strategy created a nonprofit organization to facilitate recovery plan development through a five-step process agreed to by over 200 participants. While both bull trout and Hood Canal summer chum have their own plans, the strategies and actions identified in those plans and this Puget Sound salmon recovery plan are synergistic and expected to provide benefits to all three listed species.

Most recovery plans are typically written by the federal agencies responsible for administering the Endangered Species Act (ESA). Leaders in Puget Sound took a different path because they wanted more assurance the plan would be implemented.

They believed that involving local people in the development of the plan would increase the commitment to implement it and restore our salmon runs. In this case, the National Oceanic and Atmospheric Administration-Fisheries (NOAA) and the U.S. Fish and Wildlife Service (USFWS), endorsed the Shared Strategy approach and were active participants in the collaborative process to develop this plan.

Under the Endangered Species Act (ESA), a recovery plan must have quantitative recovery criteria and goals, identify threats to survival, site specific management strategies and actions necessary to address the threats, cost estimates of the actions, and a schedule for implementation. A monitoring and adaptive management program should also be included. In addition to the general requirements, this plan was directed by the recovery criteria developed by the group of scientists appointed by NOAA Fisheries, the Puget Sound Technical Recovery Team (TRT). The scientists believe the Puget Sound Evolutionarily Significant Unit (ESU) of Chinook will have a negligible risk of extinction if:

- All watersheds improve from current conditions, resulting in improving status for the fish.
- At least two to four Chinook populations in each of five bio-geographical regions of Puget Sound attain a low risk status over the long-term.
- At least one or more populations from major diversity groups historically present in each of the five Puget Sound regions attain a low risk status.

This plan meets the ESA recovery plan requirements under section 4(f) and if implemented in a timely fashion will meet the criteria recommended by the scientists.

This plan's primary strengths rest upon three factors: 1) the needs of fish and people are addressed together; 2) the plan is built on the foundation of the fourteen local watershed planning areas across Puget Sound with a tailored

approach for recovery based on local characteristics and conditions; and 3) although this plan focuses on Chinook recovery, it is done with the whole ecosystem in mind and the environmental and biological processes that create a healthy place for the salmon. Over 137 species of birds, mammals, amphibians and reptiles depend on salmon for one or more stages of their life, so they too will benefit from the protection and restoration actions to recover salmon.

The contributors to this plan believe that the Shared Strategy's collaborative approach and partnership with local communities created a better and more sustainable plan than might otherwise have been developed. The plan's contributors understand that this type of approach, particularly the tailoring at the local watershed level, will need to continue and expand dramatically in many communities during the implementation phase to build commitments to action, continue to solve problems together, and increase the likelihood of achieving the Puget Sound community's vision and goals.

Building upon a Legacy of Success

"Hope is believing despite the evidence and then watching the evidence change."

Jim Wallis

Based on the history of success in Puget Sound, Shared Strategy participants gained confidence that they can accomplish seemingly difficult tasks. This confidence allowed them to base the plan on several key assumptions. These assumptions are fundamental to salmon recovery and the region's prosperity. To make the assumptions come true, leaders from all sectors and communities must step up as their predecessors did to make the tough decisions and search for innovative solutions.

The key assumptions are:

More People and More Salmon: Perhaps the most far-reaching assumption of this plan is that



Photo by Dan Kowalski

this region can accommodate human population growth and recover salmon runs at the same time. Over a million more people are projected to live in Puget Sound in the next 15 years. During this same period, the Recovery Plan aspires to add many more salmon, on the order of a 20% increase. Achieving the salmon goals will require protecting existing habitats and building more homes for salmon (habitat restoration) as we build more homes for people. This plan provides the blueprint for how we can accomplish such a Herculean task.

There Still Are Enough Fish and Habitats to Build on For Recovery: Another fundamental assumption of this plan is that the Puget Sound region still has sufficient Chinook populations left to achieve recovery in the long-term. The 22 populations left in Puget Sound represent significant reduction in diversity from the over 30 populations believed to have existed in the past. All remaining populations are important. Some

What does the term “Recovery” mean?

“A regaining of something lost; a return to health; a regaining of balance, etc.”

Webster’s New World Dictionary

are temporarily stable at low levels and others are still in decline. Scientists contributing to this plan believe we must act quickly to protect remaining populations and to restore the productivity of all Puget Sound watersheds and marine waters. While science doesn’t have the answers to all the tough questions, there is enough information to act now. Delaying or weakly stepping into implementation will diminish our options and opportunities to achieve recovery.

Science Can Help Us Make Wise Policy

Decisions: This plan was developed with a strong partnership between scientists and policy makers at local and regional levels. The intent behind such a partnership is to make the best decisions to achieve a future that supports people and the environment. This plan is based on years of scientific observation, testing of hypotheses, multiple lines of evidence, monitoring and learning. The policy and technical elements in this plan incorporate current scientific knowledge about how to recover salmon. This plan relies upon the continuation of a strong interface between science and policy as new scientific information through a robust adaptive management and monitoring program comes to bear on future policy decisions.

Inclusive, transparent collaborative processes create better and more sustainable results: At the start of the Shared Strategy salmon recovery initiative, participants agreed to a voluntary, collaborative process. Collaborative processes have their limitations too, sometimes justly criticized for taking too long and succumbing to the lowest common denominator. However, if done right, they still offer the best opportunity for finding creative solutions that address multiple interests. When people with

a stake in the outcome have a say in the decisions, they are more likely to implement them.

“Citizens are turning to these collaborative processes with increased frequency in the West as they realize that in many cases they are the only path out of gridlock...the real virtue of democracy is that it is a school. In it we learn how to manage the public aspects of our lives, and thus, unlike other systems of government, it is progressive—we can actually get better at it as time goes on.”

*William D. Ruckelshaus
(from Restoring Trust in Government,
or Get in the Boat and Row, 1-13-04)*

Local Communities are the Essence of

Success: A fundamental assumption of this plan is that local watershed efforts are the engine that will lead the region to recovery. This is because many groups had already been working for years before the listing to improve conditions for salmon in their local river basins. Each local watershed area has unique assets in terms of technical ability, partnerships and regulatory frameworks; this plan tailors recovery strategies and actions to the political, cultural, economic, and ecosystem needs of individual watersheds across the Sound. These groups know the most about what is needed and what will work best both technically and politically in their local areas.



Photo by Dominique Lewis

This recovery plan provides a scientifically-based, practical and cost-effective guide for restoring and protecting salmon runs across Puget Sound. Through this plan, the people living and working in Puget Sound hope to secure a future with healthy watersheds, plentiful fish, strong communities and a viable economy.

Both Protection and Restoration of the Ecosystem will be Necessary

The plan recognizes the dynamic and evolving nature of salmon recovery. It should be read and understood as a living document. The plan calls for a combination of protection and restoration actions as well as integrated harvest, hatchery and habitat management approaches.

“Puget Sound is like a large water bucket, full of habitat and life. Habitat losses are the holes in the bucket, and many small holes can eventually drain it. Restoration is the process of plugging the holes while protection is to prevent new holes from being formed, allowing the bucket to fill once again through natural processes.”

Jacques White, The Nature Conservancy

In the face of increased human population growth (projected at 1.4 million people by 2020) and the impact of ongoing land use activities, the ability to recover Chinook salmon can only occur through a combination of habitat restoration and protection. Today’s remaining Chinook populations depend on existing quality and quantity of salmon habitat in the Sound’s fresh and marine waters. Any further reductions in habitat quality and quantity will require more restoration to achieve recovery goals. In other words, if the ‘Puget Sound bucket’ keeps on getting new holes, even while we plug old holes, we won’t get very far toward achieving recovery goals. And eventually, given how ecosystems work, there can come a point when there are so many holes that the system can no



Photo by Dan Kowalski

longer be restored. Protection is needed at the individual habitat site as well as at the ecosystem scale to ensure the processes that create habitat continue to function.

This recovery plan proposes substantial increases in the abundance, productivity, spatial distribution and diversity of existing Chinook populations to recover their health and ensure their long-term sustainability. The Puget Sound Technical Recovery Team (PSTRT) identified protection of existing and functioning habitat as most important in their technical guidance to watersheds (PSTRT, 2002). Protection is a more certain strategy than restoration because we know that untrammled habitats are more likely to support species. In contrast, restoration approaches are relatively untested, especially at large scales. Unless we protect what we have, habitat will continue to degrade and restoration activities may not gain enough ground to achieve recovery goals.

In their local plans, watersheds identified the various regulatory, conservation, incentive and educational programs in their areas to protect salmon

habitats and the processes that create them. The regional protection strategy in the plan discusses existing protection mechanisms, both voluntary and regulatory. It points out that this region has preserved ecological function on huge tracts of land that are designated as national and state wilderness areas, parks and forest lands, especially in the upper elevations of Puget Sound watersheds. State and local governments have also developed and refined their regulatory programs since the 1970's to address impacts from land development on the ecosystem (The Growth Management Act, The Shorelines Management Act, The Water Resources Act, and the Forest Practices Act as amended in 2002). These combined with the State Hydraulics Code and local government regulatory programs have improved many land and water use practices over the last several decades.

One protection element that is often overlooked is the contribution by private citizens as land stewards. There are still many areas in Puget Sound along streams, rivers and marine shores

that support salmon due in significant part to the care and action of these individuals. Many of these folks have a strong ethic for preserving both private property rights and taking responsibility for caring for their land; a responsibility they take seriously and often pass on from one generation to the next. Understanding these citizens' interests and concerns is a critical component of a successful protection strategy.

"Property owners have a lot at stake when it comes to protecting salmon in Puget Sound and we feel like we should be part of the process, but the only way we're going to get the biggest advantage is if government works closely together, cooperatively with property owners. The big stick of regulation will not take us where we want to go. Salmon are very important in our lives and so are property rights, and the long lived American dream of home ownership needs protecting."

*Vivian Henderson, Executive Director
Kitsap Alliance of Property Owners*

The plan includes significant proposals to beef up incentive-based protection programs. These programs recognize and increase good land stewardship and salmon conservation efforts by private property owners, farmers and foresters. They also help preserve working farm and forest lands-land uses which, if managed with environmental conservation goals in mind, tend to be better for fish than more developed human land uses.

What is not clear is how these different tools (voluntary and regulatory) combine to provide the level of protection needed for salmon recovery—that is, what are the expected results for fish from these programs? Not knowing the degree to which protection mechanisms are effective is a key weakness of this strategy. This is especially true given that scientists identified the protection of existing high-quality habitat as an immediate short-term need to preserve options and increase the chance

of success. The plan calls for improving the certainty of results of the various protection efforts by conducting an analysis of the effects of existing programs on habitats and fish, then implementing changes based on the findings.

It's clear from the region's experience with Growth Management and environmental regulations that these are highly controversial issues. Finding the appropriate balance for using all the available protection tools, both voluntary and regulatory, may be one of the greatest challenges in securing the protection needed. Cumulative actions by many people in a watershed can add up to significant impacts. Protecting private property rights must be balanced with the need to protect public resources. Both are important. A dialogue that begins to bridge the needs of private property owners with the needs of the public resources, and moves beyond the mostly polarized responses of recent times, would help interested parties find solutions not otherwise apparent.

Top Ten Actions Needed for Salmon

Although each watershed area has its own individualized, tailored plan, there are common types of actions that all watersheds included in their chapters. These actions are related to the threats or limiting factors affecting salmon. The magnitude of each factor varies by watershed, as well as how they propose to address it and how they measure success. For this reason it is difficult to compare detailed actions and results across watersheds, but the list of actions below summarizes the common set of factors, why they are important to salmon, and how people also benefit from restoring or protecting the values described.

This plan advocates taking an ecosystem approach to recovery. This means that the physical and biological factors that create fish habitat must be addressed. Among the physical and chemical processes basic to habitat formation and salmon persistence are floods and droughts, sediment transport, heat and light transfers, nutrient cycling,

water chemistry, riparian dynamics and woody debris recruitment and floodplain dynamics. Important salmon biological processes in salmon that depend on habitat dynamics include migration, adaptation, the complex energy transfers of the food chain, and the metabolism of the fish.

The structural diversity in streams, estuaries and marine waters that enabled salmon to thrive was built over centuries by the complex interaction of light, water, soil, vegetation, and nutrient cycles. Salmon evolved to stream conditions that had disturbances varying by days, decades and centuries. Human activities modified these constant cycles of change by increasing the frequency of disturbance, altering the magnitude of disruption, and thereby affected the ability of the stream channel to respond. It is not just a matter of how we protect and restore the water environment, it is also essential to manage how we alter the land and streams in the whole watershed to protect and rehabilitate the natural processes.

In addition to habitat actions, harvest and hatchery actions must build on existing processes for co-managing salmon fisheries and adjust over time to allow recovery to occur. The key to this plan's success will be the adaptive management and monitoring program at both local and regional levels to make sure that the proposals have the desired effect.

The actions listed below are not in any priority order and the examples following the descriptions are meant to be illustrative not comprehensive—all watersheds with independent spawning populations have proposals for these items to some degree. Four planning areas (South Sound, East Kitsap, Whidbey/Camano, and San Juan) without independent spawning populations focus primarily on land use and fresh and salt-water issues related to the nearshore and marine waters surrounding their shores. The ten common actions are:

- 1. Estuaries** — the biological change salmon must undergo to swim from fresh to saltwater and back again is immense. Estuaries and river deltas are the transition zone that enables this

change to occur. They are also a rich source of food, provide places to hide from predators, give young salmon a safe harbor to grow strong for their ocean migrations, and are a key part of the migratory corridor salmon use to travel in and out of the rivers.

The loss of estuarine functions across Puget Sound has been dramatic over the last two hundred years. These same areas so critical to salmon also support productive farmlands, bustling ports, major cities, private shoreline residences and industrial complexes. Restoring estuarine areas near population centers, such as in Everett, can provide people a special opportunity to experience and enjoy a respite from urban living by having a natural wildlife environment in close proximity to work or home. Examples of estuarine restoration include reconnecting large blind tidal channels and sloughs isolated behind dikes, and improving connectivity between channels, sloughs, and marshes that provide rearing habitat for juvenile salmon, filter water, and absorb flood level flows.

Examples of proposed actions to address this issue:

- The majority of these actions are planned for public and tribal lands. In cases where local plans identified restoration or protection needs along private property, the plans recognize the need to work in collaboration with land owners. Estuarine restoration and protection actions in six areas will provide almost 6,000 acres of estuarine habitat.
- In the Nisqually basin, as one specific example, the goal is to restore or protect 80% of the historic estuary area. In the next twelve years, the watershed plans to restore 800 acres (100 of which is on tribal land and the rest is in the Wildlife Refuge).
- The Snohomish watershed includes proposals to protect 1,483 acres of existing critical estuarine habitat, and gain 1,237 acres of

tidal marsh habitat through restoration and acquisition. The plan recommends restoring the habitat on existing public lands first, where habitat gains will be highest and where existing projects can be expanded. Achieving the goal of 2,720 acres would almost double the available estuarine habitat in this watershed.

2. Floodplain areas — historically floodplain areas contained wetlands, side and braided channels, and oxbow lakes. Floodplains perform a variety of functions and in the process prove valuable to both humans and fish and wildlife species. Important functions include: flood water storage, water quality maintenance, fish and wildlife habitat, and recreation/open space.

Under natural conditions, when rivers reached high volumes, water overflows the bank and spills into the floodplain, preventing catastrophic flooding events downstream and providing safe places for young fish to wait out the flood. Dikes, levees and other actions to control lower river reaches have significantly reduced these nourishing places for juvenile salmon to feed and grow. As riverbanks were armored to protect property for agricultural, residential or industrial purposes, these important habitats were disconnected from the river. Levee setbacks, dike breaching and other restoration actions will reconnect these habitats and by replicating the natural hydrological functions of a floodplain, will also help control flooding on people's properties.

Examples of proposed actions to address this issue:

- The Nooksack watershed plans to establish channel migration zones across which the river has been known to meander in the last 100 years. Once delineated and approved by the Whatcom County Council and Washington Department of Ecology, the channel migration zones will be incorporated into the County's Shoreline Management Program and the

Comprehensive Flood Hazard Management Plan. These zones will provide physical and biological processes for fish and also protect important human infrastructures. This work is already underway and is expected to be complete by early 2006.

- The Puyallup/White River basin plans to set back 1300 feet of levees at Old Soldiers Home near the city of Orting and will restore 67 acres of floodplain to the river. Additional side channels will be recreated in the lower river near Fife and Tacoma.

3. Riparian Areas — trees and shrubs alongside streams, rivers and marine beaches are important for salmon for a variety of reasons. Riparian vegetation helps support insects that are food for salmon, provides cover from predators, and keeps water temperatures cool. Tree roots stabilize stream banks and create habitat structure in the stream. Decaying trees form log jams that provide cover and help create pool and side channel refuges for young salmon, away from high velocity flows and predators.

In most watersheds, riparian buffers have decreased in area due to clearing land to support various land uses such as agriculture, forestry, road building, and residential and urban development. Such loss impairs a river's flows and impacts habitat from the higher elevations to the estuary and out to the marine waters of the Sound. People too can benefit from keeping or restoring riparian habitat: root systems maintain bank stability and prevent erosion on property, trees and shrubs filter out chemicals from upriver sources, help control floods and provide habitat for other wildlife enjoyed by humans.

Examples of proposed actions to address this issue:

- The Stillaguamish watershed has just over half (52%) of their riparian areas remaining, mostly in the middle and upper parts of the



Photo by Dominique Lewis

basin. Along the lower reaches, only 16% of the area still has riparian vegetation. The Stillaguamish plan calls for restoring 400 acres of riparian buffers in the next ten years with the ultimate long-term goal (~50 years) of restoring 7,600 acres.

- As a direct result of implementing their recovery plan, the Nisqually watershed has already protected over 67% of mainstem Nisqually River riparian habitat. The goal is to acquire, protect or restore habitat values on 90% of 84 miles of shore lands along the mainstem.

4. Water quantity – it may be obvious to say that salmon need water. What is often less obvious is that both too much water (i.e. floods) and too little water can be problems for the fish. Low flows are generally related to water withdrawals for agricultural irrigation, drinking water and other human uses. Low flows can be exacerbated in years of low snow

pack or rain. Flows affect habitat processes and functions throughout a river system from the upper reaches and down through the estuary and nearshore.

High water flow can be hazardous to salmon at all life stages. This condition can result in eggs being covered by silt and other materials, can cause eggs to wash out of the gravel, move juveniles downstream too quickly, and make it too difficult for spawners to return upstream.

Low water can isolate eggs and juveniles in pools whose temperatures increase while the dissolved oxygen content decreases, and also causes them to be more susceptible to predation. Low water makes it difficult or impossible for out-migrating juveniles and in-migrating spawners to reach their destinations.

Scientists agree that instream flows need to remain at the top of any salmon recovery agenda, even while they also agree that more research is necessary to know what salmon need in terms of flows. More information is also needed to understand more about the current causes of flow problems. The overall plan for water quantity is in three parts: a) set instream flows, b) achieve flows, and c) conduct needed research to design suites of actions aimed at maintaining instream flows at watershed scales.

Examples of proposed actions to address this issue:

- People in the Dungeness River basin have been working for over ten years to address the chronic low flow problems there. The Agricultural Water Users Association and Jamestown S’Klallam Tribe obtained federal and state funding to improve irrigation infrastructure and conveyance efficiency. In the last five years, these actions have helped reduce the amount of water used for irrigation by one third, leaving more water in the river at times when salmon most need it. Additional conser-

vation projects to improve summer flows are proposed in the Dungeness plan.

- In two of the most urban watersheds, King County's Comprehensive Plan and Regional Wastewater Service Plan both support the use of reclaimed water to help meet the region's diverse water supply needs. A specific goal is to use reclaimed water to assist the region in balancing needs of the environment and people. In 2004, King County used or distributed 268 million gallons of reclaimed water in place of drawing new potable water. Through substituting reclaimed water for potable water in operations at its two wastewater treatment plants alone, King County is leaving approximately 700,000 gallons of water per day in streams and rivers. This represents only a fraction of the potential of reclaimed water to benefit instream flows for salmon in the region, and King County is embarking on a regional water supply plan to bring a larger supply of reclaimed water to the region.

5. Water quality/pollution — Both people and salmon depend on clean water to survive and many of the local salmon recovery chapters recognize the importance of water quality. Pollution can come from point sources and non-point sources. Point sources of pollution include industrial discharges, sewage treatment plants, and drainage system discharge.

Non-point source pollution is considered to be any water pollution without a distinct source. Non-point pollution can include fecal coliform bacteria, pesticides, sediments, and excess nutrients. Sources of this pollution include runoff from agriculture, forestry, rooftops, paved streets, highways, and parking lots as well as hard grassy surfaces like lawns and playing fields.

Non-point source pollution is a major cause of water pollution in Washington and poses a major health and economic threat. In general,

untreated stormwater is unsafe for people and for fish. It contains toxic metals, organic compounds, and bacterial and viral pathogens. Virtually all of our urban embankments, creeks, streams, and rivers are harmed by urban stormwater, making it the leading contributor to water quality pollution of urban waterways.

Pollutants from non-point and point sources can also end up trapped in sediments in our rivers and marine areas. Exposure to contaminated marine sediments also pose significant health risks to juvenile salmon and other marine species, including favorite seafood such as shellfish enjoyed by humans.

Examples of proposed actions to address this issue:

- In Commencement Bay (Puyallup/White watershed), on the St. Paul Waterway, private companies, the Port of Tacoma, tribes, NOAA, EPA and the City of Tacoma are cleaning contamination from past releases of hazardous substances and creating 17 acres of new intertidal habitat. Along the NE shore between the mouth of the Hylebos Waterway and Brownes Point, the Washington Department of Natural Resources will restore 8.3 acres of state-owned aquatic lands.

- In the Green/Duwamish watershed, five miles of the lower stretch of the Duwamish River are designated as a superfund site and scheduled for sediment clean-up and restoration; 10 acres of intertidal habitat have already been restored.

- One example of how the plan connects and integrates with existing programs is the City of Bellevue's comprehensive stormwater management program — one of the first stormwater utilities in the nation. The program protects the water quality and habitat of over 60 miles of streams, 800 acres of wetlands, and three small lakes. In addition to operating and maintaining the storm drainage system,

Bellevue assures that privately owned and operated systems are properly functioning and also provides private residential drainage advice, educational programs such as Stream Team, and 24-hour emergency response for flooding and water quality incidents. Property acquisition and construction of capital investment projects reduce flooding, manage flows, stabilize stream banks, and improve culverts for fish passage.

6. Fish access — Several major dams block access to historic Chinook salmon spawning and rearing habitat in Puget Sound. In addition, other blockages for water diversion, road culverts, and small hydro development also exist throughout the Sound. Some tributary barriers such as culverts may not block access for Chinook spawning and rearing specifically (since Chinook primarily use mainstem reaches); yet they may still generate downstream impacts to mainstem river areas by interrupting sediment transport, and large woody debris recruitment and transport. Physical barriers also alter stream flow which increases salmon mortality in several ways — migration can be delayed by insufficient flows or habitat blockages; loss of usable habitat due to dewatering; stranding of fish resulting from rapid flow fluctuations; and juvenile fish becoming entrained from high velocity waters at poorly screened diversions. Reduced flows also diminish fish habitat by decreasing recruitment of new spawning gravels, and allow the encroachment of non-native vegetation into spawning and rearing areas.

Examples of proposed actions to address this issue:

- The most significant passage barrier restoration in terms of sheer magnitude is the removal of the Glines Canyon and Elwha dams on the Elwha River. Dam removal actions are scheduled to begin in October, 2008. The removal of the two dams is the single most important step in restoring the Elwha Chinook population and will restore anadromous fish access to the upper watershed, allow for the natural habitat forming processes to occur through the accumulation and deposition of sediment and wood to the lower watershed and nearshore, and restore natural flow and temperature regimes to the river.
- In the Nooksack watershed, the Middle Fork Diversion Dam limits access to 16 miles of spawning and rearing habitat for the North Fork (NF) Chinook population. Removing this dam is expected to increase the NF population abundance by 30.8%, increase productivity by 12.1% and increase the diversity index by 47.6% (based on EDT analysis and estimates of future habitat use).



Photo by Eileen Palmer for the Hood Canal Salmon Enhancement Group

7. Puget Sound shoreline and marine areas

(nearshore) — All of the above factors covered so far also affect the saltwater environment along the shorelines on either side of river mouths and out to about 30 feet of the Sound. Scientists now understand that the estuaries, Puget Sound, and the ocean have to be treated together with freshwater environments as one interconnected system that must be protected and restored. Salmon populations mix in these environments and the fish depend on each part of the ecosystem to function successfully for their survival.

The marine shorelines have changed significantly over the last two hundred years affecting the natural processes that created and maintained key salmon and marine life habitat. A significant portion of shoreline trees and vegetation has been removed, which once provided shade and habitat for insects eaten by juvenile fish. Approximately thirty-three percent of Puget Sound shorelines have been filled and armored by concrete or rocks, mostly to protect single family homes. There are over 3,500 docks and piers, 29,000 small boat slips, and 700 large ship slips. These structures change how the ecosystem functions. Combined, these changes affect migration corridors, transition of the fish from fresh to salt water, their eating habitats, and their ability to forage and seek refuge from predators.

Examples of proposed actions to address this issue:

- In East Kitsap, the City of Bainbridge Island passed an ordinance restricting dock construction to protect the nearshore ecosystem in a specific part of the watershed.
- Both Island and San Juan counties still have a significant amount of functioning nearshore habitat. For example, to date only 25% of Island County's and 5% of San Juan County's shorelines have been hardened. Both of these watersheds are focusing their initial efforts

on protecting the valuable resources they still have. Protection efforts focus on marine riparian areas, forage fish spawning beaches, eelgrass meadows, features which support sediment transport and high quality freshwater inputs, and habitat connectivity.

8. Harvest management — Harvest management strategies that would ensure the return of a portion of the salmon runs to their home spawning grounds have been implemented for thousands of years in the Pacific Northwest. Until the mid-19th century, aboriginal people spread their harvest patterns across different locations and times, sometimes using weekly closure periods to pass salmon upstream. These measures, combined with pristine habitat, allowed salmon runs to flourish over many millennia.

The combination of accelerated habitat loss and modification, and the advent of industrial fishing methods, in the late 19th century resulted in an almost immediate decline in salmon abundance. Harvest can negatively impact salmon populations through direct mortality, and also through selectively reducing the size and age at which individuals reproduce. Because harvest occurs late in the life cycle of the salmon, the risk of over-fishing has a direct and potentially substantial effect on the population that is left to return home and reproduce (NRC, 1996).

Harvest is important to the Puget Sound region culturally and economically. The salmon themselves are inherently productive; and when populations are healthy, they can sustain harvest without jeopardizing their ability to sustain themselves.

Today's harvest management objectives emphasize bolstering the survival and recovery of the wild salmon populations. The overall harvest management strategy is to ensure that fishery-related mortality will

not impede the rebuilding of natural Puget Sound Chinook salmon populations, while maintaining consistency with treaty-reserved fishing rights and international agreements. The Harvest Management Component of the Comprehensive Chinook Management Plan (PSTT and WDFW, 2004) sets limits on annual fishery-related mortality through the establishment of harvest rate ceilings and thresholds of low Chinook abundance that trigger additional conservation measures. Harvest limits for Canadian and Alaskan fisheries occurring on Puget Sound fish are established through the Pacific Salmon Treaty.

Examples of proposed actions to address this issue:

- In the Snohomish basin, there is currently no fishery (tribal, commercial or recreational) that targets wild Skykomish or Snoqualmie Chinook. Harvest rates on Chinook from the Snohomish basin have been reduced to 20-30% which represents fish caught incidentally during mixed stock fisheries that target other species and hatchery Chinook. These reduced harvest rates have coincided with increased numbers of fish that return to spawn, indicating that such strategies are consistent with improving salmon population status. The current goal of harvest management is to maintain fishing rates low enough (24%) so that wild Chinook can take advantage of the protected and restored habitat. Over time, this will allow the populations to expand. In addition, controls on the timing and location of fisheries targeted toward hatchery fish are designed to help reduce the incidental harvest of wild fish.
- In the Nooksack watershed, current exploitation rates from all fisheries have been reduced to at or below 20% since 1996. Working with NOAA Fisheries, the tribes and state will continue to develop an exploitation rate that can be used to equitably adjust fisheries to meet the recovery objectives of the two listed Chinook populations. This approach is espe-

cially important for the Nooksack populations whose numbers are very low and whose fish are caught in local, Canadian and Alaskan fisheries. The Pacific Salmon Treaty which guides the international harvest expires in 2008, and will be open for new considerations.

9. Hatchery management – The artificial propagation of salmon in Puget Sound began with a hatchery on the Baker River in 1896. Hatcheries were traditionally operated for two main purposes—to mitigate for the reduction of salmon runs due to the construction of dams and other habitat loss, and to increase the number of fish available for harvest.

The science and practice of hatchery operation has advanced significantly over the past 100 years, but hatchery intervention into salmon runs has created long term genetic and evolutionary consequences that may never be fully mended. Some hatchery programs today still seek to provide opportunity for fishers where the negative consequences of artificial propagation can be reduced and isolated. Many other hatchery programs are now also used as tools to bolster the remaining salmon populations and to help maintain them as they rebuild to self-sustaining and harvestable levels. Hatcheries alone cannot achieve this goal, and it is widely recognized that they must operate hand-in-hand with habitat restoration if future salmon are to find a home.

Long term awareness of issues such as loss of fitness and genetic diversity, ecological impacts to naturally spawning populations through predation and competition, disease transfer, and the habitat disruption of the facilities themselves have led to a number of hatchery reform efforts in recent decades.

The Puget Sound and Coastal Washington Hatchery Reform Project was launched in 2000 by the U.S. Congress and created an independent review panel, the Hatchery Scientific Review Group. The Project reviewed all Puget

Sound hatchery programs, made recommendations for reform, created scientific tools to help implement recommendations, and created principles to make hatchery reform operational and ongoing. It also provided funding for related studies, hatchery operational changes, and some funding for modifications to facilities where appropriate.

In 2004, WDFW and Puget Sound treaty tribes completed the hatchery component of the Comprehensive Chinook Resource Management Plan (RMP), building upon other assessments submitted to NMFS in response to the listing of Puget Sound Chinook under the Endangered Species Act. The Hatchery RMP contains 42 specific Hatchery Genetic Management Plans designed to limit adverse impacts to threatened populations of salmon from hatchery programs and operations. This is part of an existing NEPA/EIS review.

Examples of proposed actions to address this issue:

- The Nooksack chapter identifies two main hatchery strategies to protect and restore the South Fork Chinook population. The first is a rebuilding program (Skookum Supplementation Program) to maintain this population's genetic diversity by increasing its abundance. The second is to reduce the number of hatchery strays into the South Fork. Actions include improving the Lummi Bay facility to attract returning hatchery fish, maintaining or reducing late-run Chinook releases in the lower river, and investigating and implementing alternate release strategies to minimize straying potential.
- The Dungeness Chinook population is at critically low abundance levels. In response, the watershed has had a captive brood program since 1992 to bolster Chinook production. Adult Chinook returns in recent years indicate that the captive brood program has been successful in increasing adult returns-escapement

has averaged 575 spawners in the three-year period from 2001-2003. These higher returns will now accommodate implementing a conventional Chinook brood stock program. The new program is intended to maintain the higher adult return rates until the habitat can support a naturally sustainable Chinook population.

10. H-Integration — Salmon recovery faces enormous challenges in tying together actions across all watersheds, jurisdictions and decision-making forums affecting the Puget Sound Chinook Evolutionarily Significant Unit (ESU). The major factors that affect the abundance, productivity, spatial structure and diversity of salmon populations are often lumped into the "H Factors" of harvest, hatcheries and habitat (including hydropower).

Each of these factors independently affects the status of salmon populations, but they also have cumulative and synergistic effects throughout the salmon life cycle. The achievement of viability at the population and ESU level depends on the concerted effort of all three factors working together, not canceling each other out, and adjusting over time as population conditions change.

Examples of proposed actions to address this issue:

- The Snohomish basin has a comprehensive H-Integration strategy; strategies and actions in each of the H factors are identified for the four VSP parameters (abundance, productivity, spatial structure, and diversity). In the near-term, reduced harvest will help rebuild run sizes as substantial habitat improvements are made. Hatchery management will allow migration above hatchery weirs to provide additional habitat for larger numbers of adult returns, increasing spatial structure. As the plan is implemented, harvest, hatchery and habitat actions will be monitored and their underlying hypotheses tested. Adaptive management will

ensure appropriate sequencing, consistency among strategies, and efficiency.

- The Stillaguamish watershed plans to monitor the status of both of their Chinook populations. Consistent negative trends in abundance will trigger short-term harvest and hatchery modifications; these can be adjusted quickly and show immediate responses. 10-year habitat actions combined with the existing harvest and hatchery management actions are modeled to produce roughly a 30% increase in the fish populations.

Timeframe for Success

“Salmon recovery is a symbol for Washington’s future because it is a story of people learning to live with nature. We have the ability to save some of the world’s greatest salmon runs, it is in our control. The question is whether we will do what we need to do fast enough...”

*Joan Crooks, Executive Director,
Washington Environmental Council.*

The plan lays out long-term recovery goals and strategies, but its primary focus is on the next ten years of actions to place this region on a path toward recovery. This is because the ultimate success of the plan depends upon the various authorities and responsible parties stepping up to commit to implement the strategies and actions described in the plan. A ten-year timeframe is a reasonable period of time to ask for commitments and begin to see progress and results. Significant results in this period will hopefully demonstrate to future leaders and decision-makers in years eleven and beyond why they should continue to support recovery activities.

Although this plan meets the ESA recovery plan requirements and if implemented will improve conditions for the salmon, it does not claim to

have all the answers nor to solve all the chronic problems and threats affecting the species. It does however identify the threats and issues that must be addressed, identifies at least preliminary approaches for dealing with them, and has a schedule for making progress on those issues for which there are no easy answers. It also lays out the framework for a monitoring and adaptive management program with details to be developed through the summer and fall of 2005 in time for the federal register notice and public review process.

Each local planning area used a different process to develop their plans—some used extensive multi-stakeholder community decision processes, some had one or two lead entities or co-managers write portions of their plan. As expected, the chapters vary in terms of their level of detail, how they address issues of habitat, harvest and hatcheries, and how they are organized. The regional elements of the plan, especially the regional strategies and adaptive management chapters, pick up where watershed chapters leave off; they include items that need both a regional and local approach to increase the certainty of achieving ESU recovery goals.

Shared Strategy leaders are committed to continue to build the needed commitments throughout the rest of 2005 and beyond to implement the first ten years of actions. If implemented, strategies and actions in this plan will put the region on a significant path toward recovering the Puget Sound Chinook ESU.

What will this plan cost?

“...one of the things in terms of salmon recovery, and being smart about conservation is that you engage folks that live here in dialogue.... Starting at the grassroots, with people living in their neighborhoods and their communities, along the Cedar, in Bear Creek around Lake Washington...We found they were ready to respond, that they did care about this place and the more they learned about

what was happening to salmon the more they wanted to step up and do something about it.”

Larry Phillips Chair King County Council (D)

“As Larry saysif citizens are with you and they understand what is going on, than that is what empowers people who have the responsibility for deciding how much money to spend and where to spend it, that empowers them to go ahead and say yes we can do this... but you wouldn't get anywhere with out the citizens with you.”

Louise Miller, former King Councilmember (R)

The watershed and regional strategies and actions combined comprise a thoughtful, practical and cost-effective plan that will lead to tangible, visible results. Watersheds identified ten-year priority actions and cost estimates, assumed to be the period 2006-2015. In addition to the watershed-specific work to identify and estimate costs for priority actions, the Shared Strategy staff developed estimates for three programs that span multiple watersheds: hatchery improvements, nearshore and marine habitat protection and restoration, and incentive programs aimed at conservation on private farms and small forest parcels.

Based on the estimates, making significant progress toward achieving recovery in the next ten years will require a doubling of the effort from an average of \$60M/year currently to \$120M/year. Of the total watershed and regional costs, 85% is projected to be needed for capital projects--largely habitat-related--and the remaining 15% is proposed for key non-capital activities such as adaptive management and monitoring.

The financing strategy is to maximize existing funding sources, and draw on additional existing sources that could be, but have not been, used for salmon recovery priorities (e.g. mitigation, federal farm bill, public and private grant programs). If these sources fall short of goals, the strategy is to

explore alternative sources or change the scope or pace of recovery plan implementation.

This funding level will support significant progress toward recovery based on local watershed scientific work and the TRT's regional recovery criteria. Based on the assumptions in the finance strategy, it will do so at a cost that can reasonably be borne by the governments and taxpayers of the region without tax increases. It does not, however, fund the entire suite of priorities on which the watersheds based their estimates.

The financing strategy's concepts, principles and approach were recently supported and affirmed by a Leadership Group composed of city and county elected officials from throughout the Puget Sound region, government agency representatives, tribes, conservation organizations, and private industry.

Who will make this plan a reality?

“...without everyone making a change we will not be successful.”

*Alison Studley,
Skagit Fisheries Enhancement Group*

The contributors to this plan wish to create a future in which both people and salmon co-exist and thrive. They know that salmon recovery is a long-term prospect. Achieving recovery involves coordinating and integrating many parts such as harvest and hatchery management and habitat restoration and protection. It requires building community support and leadership commitments to implement plan actions.

Many people and organizations need to work together in a coordinated way over time to succeed. Meanwhile, scientists must continue to research and learn more about salmon and their needs and the ecosystems which they share with other species, including humans. In the future, new opportunities may open up for adding to recovery actions that may not be available or apparent today.

All this is to say that salmon recovery has to be viewed as a dynamic and evolving initiative.

All the people and groups who were involved in the development of the watershed chapters and regional strategies, and who are already working on salmon recovery, will also be called upon to help implement the plan. Many are already committed to do their part, and many others are expected to add their commitments in the next six months. Successful implementation will require leadership and action on the part of the following groups — they are being asked to:

- Farmers and forest land owners — Implement state and federal laws, increase conservation and salmon habitat restoration efforts through voluntary action and use of existing and improved incentive-based programs.
- State and tribal co-managers — Continue individual efforts related to harvest and hatchery management in concert with recovery goals, and increase assistance to watersheds to integrate hatchery, harvest and habitat actions.
- Tribes — Help implement local watershed plan actions and participate in local forums to continue to share information and problem solve as issues related to implementation and adaptive management arise.
- City and county governments — Enforce and update existing environmental laws using watershed information as Best Available Science; continue contributing funds for the implementation phase of recovery; and help broaden public and legislative awareness and support.
- State government — Implement programs in concert with plan goals and strategies such as for water quantity and quality, and forest management. Continue to fund capital improvements and support for watershed groups.
- Federal government — Continue supporting the Pacific Salmon Fund; provide visible leadership support for salmon recovery efforts; negotiate international fishing agreements; and address marine water issues consistent with the goals and strategies of this plan.
- Scientists — address technical uncertainties through the adaptive management and monitoring program at both local and regional scales.
- Conservation groups such as the Cascade Land Conservancy, The Nature Conservancy and the Trust for Public Land — Coordinate, land conservation and protection actions to complement other protection tools consistent with local salmon habitat protection priorities.
- Environmental organizations — Continue to support the best use of science in governmental programs and regulations while increasing support for incentives to landowners.
- Regional Fisheries Enhancement Groups and other voluntary, citizen-based salmon programs — Continue to galvanize citizen interest in voluntary programs, increase assistance in monitoring and measuring results.
- Citizens and private property owners — Continue stewarding property to protect financial investments and contribute to the public good; implement salmon-friendly practices; participate in the watershed processes to implement the local plans for both protecting property rights and public resources.
- Businesses — use salmon-friendly building and development practices; work with local communities to continue to seek solutions that meet both economic and environmental goals.

A Call to Action

“If humanity can tap its capacity for caring and creativity, if humanity taps a resolve equal to the salmon’s drive to return to their native waters then the question can humans and salmon coexist can be answered.”

*Dan Kowalski,
Film Maker and Commercial Fisherman*

The many people who put their hearts and souls into developing their local recovery chapters and the regional strategies in this plan hope that their efforts inspire dialogue and action around the following questions:

- What sort of neighbors will we be to salmon in the future?
- How can we have more people and more salmon in this region?
- What more is needed to increase people’s confidence, commitment to and hope for the future of this region-one in which both people and salmon co-exist?
- What evidence do we need to see to know that we are succeeding?
- How can we focus people’s energy on continuing to seek and find solutions?

“My tribe has not fished for Skagit Spring Chinook for over 30 years. I hope some Memorial Day in the future I can stop at my farmer friend Dave Hedlin’s home, and trade stories about who caught the biggest fish for the family dinner.”

Brian Cladoosby, Chairman, Swinomish Tribe.
