

## **An Innovative Strategy for Recovery Planning**

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Over the past several decades, populations of salmon and steelhead throughout the Pacific Northwest and California have declined to dangerously low levels. In 1991, the National Marine Fisheries Service (NMFS) began a comprehensive review of the status of salmon and steelhead throughout Washington, Oregon, Idaho, and California. NMFS identified 52 Evolutionarily Significant Units (ESUs)<sup>1</sup> of West Coast salmon and steelhead. Twenty-six of those ESUs now have been listed as endangered or threatened under the U. S. Endangered Species Act. In addition, it is estimated that scores of historic populations are now extinct. These population declines and extinctions are the result of numerous habitat-affecting activities (such as economic development, resource extraction and other land uses), harvest practices, hatchery production, and other factors. Human actions that depress abundance also may have caused salmon populations to be more susceptible to natural environmental fluctuations such as poor ocean conditions and drought.

State and Federal agencies, local and regional governments, and private organizations have responded to this conservation crisis by developing programs and implementing regulatory tools to help protect and restore salmon and their habitats. All of these programs together provide important protections, but a piecemeal approach to recovery is not sufficient to bring back the salmon. Comprehensive recovery plans are needed to provide a framework for addressing problems across entire ESUs and for prioritizing among all of the actions necessary for recovering listed salmon. To address this need, the NMFS is engaged in two main approaches designed to meet the technical and policy challenges associated with recovery planning: (1) establishing multi-stakeholder Technical Recovery Teams, and (2) participating in regional policy forums designed to foster participation from diverse interests in developing a recovery plan. In this paper we briefly describe each of these two approaches. We provide an example of how these approaches are being applied in Puget Sound, WA to illustrate what we believe is a strategic process to design and implement a recovery plan for listed salmon.

### ***Technical Recovery Teams***

NMFS' Technical Recovery Teams are made up of NMFS technical staff, and tribal, state, local, and academic biologists. NMFS policy staff attend Technical Recovery Team meetings to facilitate framing of recovery planning issues at the science/policy interface. The jurisdiction of each Technical Recovery Team encompasses a large

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<sup>1</sup> An ESU is a reproductively isolated and unique group of fish within a species; for legal purposes under the Endangered Species Act, listed ESUs are treated as distinct species.

geographic region containing 3-7 listed ESUs (each team covers 1 of the colored domains depicted in Figure 1). The team's charge in each region is to develop biologically based criteria that must be met in order for each ESU to be de-listed. These viability criteria describe the biological characteristics of healthy salmon populations and ESUs, and they can be used in watershed planning to gauge the magnitude of effort required to achieve recovery. The Recovery Teams also are asked to provide technical guidance pertaining to the effects of habitat, harvest, and hatchery management-related actions on biological goals. NMFS recognizes that the technical underpinnings of viability criteria and the action-effects analyses must be clearly documented and biologically defensible. To that end, all products from the Technical Recovery Teams undergo peer review, and the content of technical work is overseen by the NMFS-appointed Recovery Science Review Panel. The Review Panel is made up of an esteemed group of 6 National Academy-level scientists, and it meets 3 times annually to review NMFS technical approaches and conclusions as they pertain to recovery planning.

A third role envisioned for the Technical Recovery Teams is to work with a policy group overseeing recovery planning within its geographic region to translate technical results in a form that is understandable and that can motivate salmon recovery efforts in the region. This role is deceptively challenging—scientists and policy staff typically speak different languages and can initially resent the “extra” time needed to educate one another about their viewpoints. Notwithstanding these challenges, the Technical Recovery Team in Puget Sound has been working closely with the regional policy group, meeting at least once monthly for the past 2 years. The Recovery Team has found that interacting with policy-makers has reordered our priorities for technical analyses, and has lengthened the timeframes for completing technical products. Team members feel that these adjustments to our work plan and presentation of results ultimately will be for the better. We recognize that political, social and logistical constraints on recovery solutions are powerful drivers when a recovery plan is being designed-- in the end, policy makers and staff are our best hope for incorporating hard-won points of scientific agreement into recovery solutions.

### ***A Puget Sound example: brief overview of the biological context***

The geographic extent of listed salmon in Puget Sound extends from the Elwha River on the Olympic Peninsula east into central and southern Puget Sound and north to the border between Washington State and British Columbia, Canada (Fig. 2). Listed anadromous salmonids in the Puget Sound region are chinook and Hood Canal summer chum salmon (under NMFS' jurisdiction) and bull trout (under the jurisdiction of U.S. Fish and Wildlife Service). Most of the technical work NMFS has conducted with the policy group in Puget Sound pertains to chinook salmon, so we will restrict our example here to chinook. The Puget Sound Technical Recovery Team has divided the ESU into 22 populations of chinook—these populations are groups of fish in major watersheds whose population dynamics are relatively independent of each other. The colored polygons in Figure 2 depict the 22 populations, and these are the units for which preliminary viability analyses have been completed. The viability analyses completed by the Technical

Recovery Team represent the abundance and productivity of salmon needed to ensure that a population has a negligible risk of extinction within 100 years. These viability targets are now being released to watershed planning groups in Puget Sound to focus and motivate their recovery planning efforts through a process we describe in the next section.

### ***A Shared Strategy for salmon recovery in Puget Sound***

The regional policy group that has been involved in recovery planning in Puget Sound since 2000 is called the Shared Strategy. In response to the Federal listing in 1999 and a deep interest in salmon, local leaders created a collaborative effort to recover salmon. In May 2002, a nonprofit organization--the Puget Sound Salmon Forum--was established to work with federal, state, local and tribal governments as well as watershed groups to build consensus for how to recover salmon and craft a recovery plan. The Puget Sound region encompasses over 15 major river systems, a large marine ecosystem, 12 counties, 16 Native American tribes, over 100 cities (including Seattle), and a diverse landscape of forests, farms, rural, and urban areas.

Federal, tribal, state, and local leaders are not new to the salmon crisis. Over the past two decades, in response to dwindling populations and a commitment to sustainable fisheries, treaty Indian tribes and Washington state have worked together to reduce harvest of Puget Sound salmon by as much as 90 percent on some runs. Local governments have also made strides to protect salmon through land use, storm water, and growth management authorities. More recently, spurred by the Endangered Species Act listings and new legal requirements, local governments have begun to work with other stakeholders in their watersheds to develop comprehensive plans that meet the needs of people and salmon. As the complexity and number of processes increase, and more levels of government and private landowners launch salmon-related initiatives, recovery efforts are missing important opportunities for collaboration and increased efficiency; risking redundancy of effort, confusion, and erosion of public support.

The Shared Strategy for Puget Sound Salmon Recovery is a five-step planning process involving ultimately several thousand people from all levels of government and the private sector to develop a recovery plan. It will integrate for the first time efforts in salmon habitat, harvest and hatchery management. The main objectives of the plan and its implementation are:

- The recovery and maintenance of an abundance of naturally spawning salmon at self-sustaining, harvestable levels;
- A broad distribution of naturally spawning salmon across the Puget Sound region;
- Diversity of salmon at levels consistent with natural evolutionary patterns; and
- Recovery of salmon in a manner that supports other social interests of the region.

To achieve the plan's objectives, the Shared Strategy has designed a 5-step planning process expected to take 3 years:

1. Develop an outline for the recovery plan and assess how current efforts can support salmon recovery;
2. Develop population viability targets for each population and initial criteria for regional (ESU-wide) recovery;
3. Evaluate actions in harvest, habitat and hatchery management needed to achieve viability targets;
4. Develop regional scenarios for recovery; and
5. Finalize goals, actions and commitments for each population and the region.

Puget Sound salmon recovery leaders believe that a strategy is needed to link the individual efforts of many existing organizations to protect and restore salmon runs. NMFS and U.S. Fish and Wildlife Service are responsible for developing a recovery plan for Federally listed Puget Sound salmon and bull trout, respectively. NMFS and USFWS also have a trust responsibility to the tribes. The Services believe the Shared Strategy is both an effective process for developing a recovery plan and an efficient means to involve those essential to its success. They are committed to participating as full partners so long as the Endangered Species Act is satisfied and the process and its results are consistent with treaty rights and the federal trust responsibility to tribes. As co-managers, treaty Indian tribes are committed to the return of salmon stocks to a level that meets treaty rights. At the same time, each participant in the Shared Strategy understands that this collaborative effort is not intended to diminish, expand, or define the rights of any participant.

The Shared Strategy links local governments, watershed groups, and others to the critical process of identifying **how to achieve** recovery goals established by Federal, state and tribal agencies. By establishing a forum to discuss on-the-ground watershed and marine waters efforts and important policy initiatives, the Strategy is designed to motivate local watershed group involvement in identifying actions consistent with achieving salmon recovery. For example, the Washington State Department of Fish & Wildlife (WDFW) and Puget Sound tribes, as co-managers of salmon fisheries, are working to develop goals for all Puget Sound salmon. The Shared Strategy integrates NMFS' Technical Recovery Team and tribal and state goal setting processes so that watershed-planning groups can work to design recovery actions that achieve a common set of goals for salmon.

An example of the information presently being communicated to watershed groups in Puget Sound as part of Step 2 of the Shared Strategy process is included (Appendix 1). The Tables depict spawner and juvenile salmon abundance targets for viability under different assumptions about population productivity, and are based on a combination of Technical Recovery Team and co-manager viability analyses. Also included in the Appendix is a 2-page overview document that reminds watershed groups of the purpose of the Shared Strategy and what is expected of watershed planning groups in developing suites of actions that will achieve salmon targets in their watershed.

A successful Shared Strategy must establish a collaborative process to identify the best means to achieve recovery goals once established. The Strategy does this by encouraging local governments, watershed and marine waters groups, and private sector representatives to work together with tribal, state, and federal agencies to develop a recovery plan for Puget Sound. Progress thus far has been promising—Step 2 is complete and the communication of goals to watersheds that will initiate Step 3 is underway. We feel hopeful that a combination of (1) regional leadership from Federal, tribal and state entities clearly expressing goals, and (2) local initiative from watershed groups to design habitat actions that can be integrated with harvest and hatchery management plans to achieve their watershed goals will be a recipe for success in designing a plan that works to recover salmon. Motivating the people who live and work in the watersheds to recover salmon is critical to the success of our efforts and addressing the requirements of the Endangered Species Act.

Figure 1. Map of geographic regions in the Pacific Northwest and California for which NMFS has identified Technical Recovery Teams to address listed Evolutionarily Significant Units (ESUs) of Pacific salmonids. Each recovery-planning domain contains 3-7 listed ESUs.

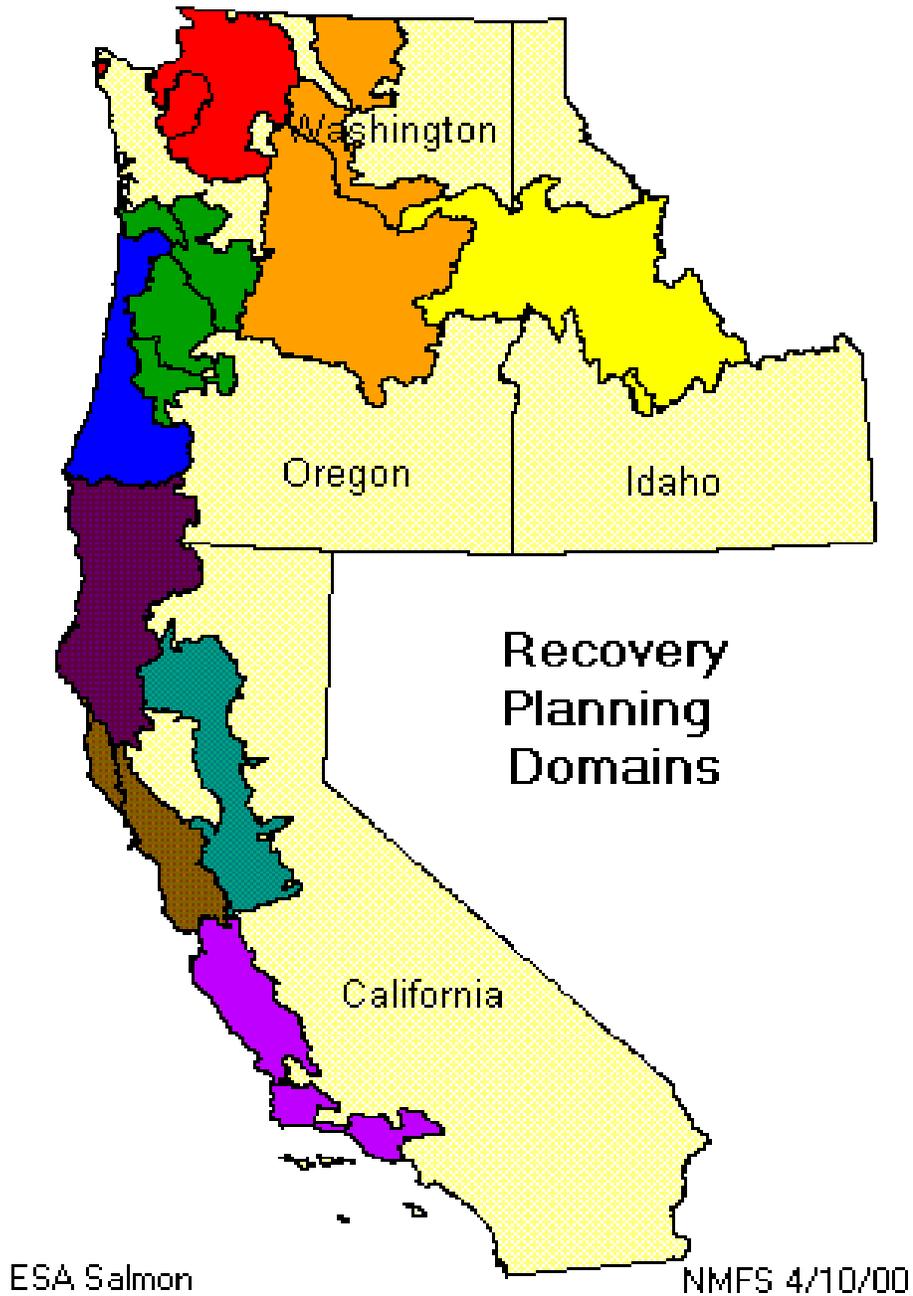
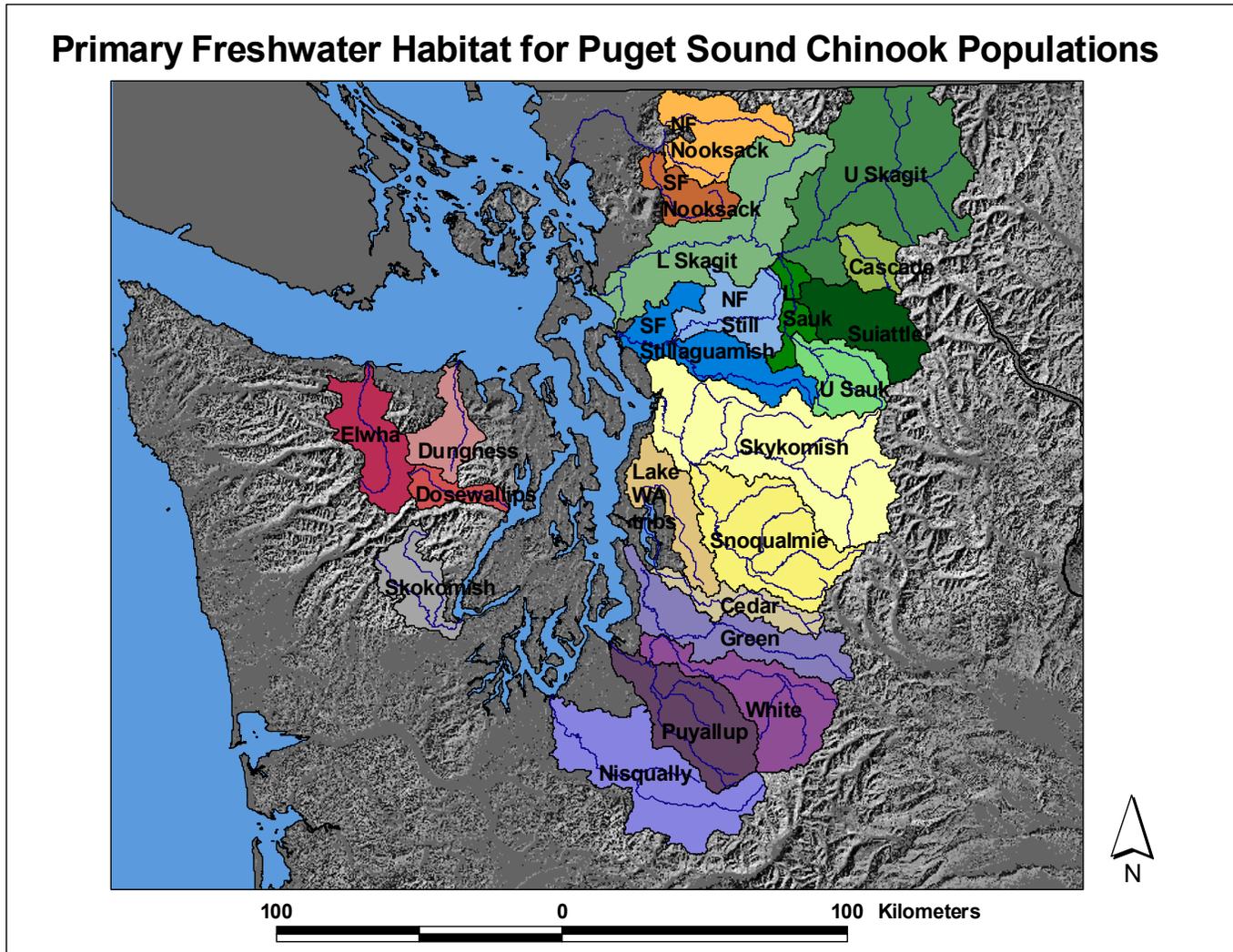


Figure 2. Independent populations of chinook salmon identified by the Technical Recovery Team in the Puget Sound chinook Evolutionarily Significant Unit (ESU).



Appendix 1. Communication packet provided to watershed groups in Puget Sound as part of the Shared Strategy to recover salmon (packet distributed in mid-May, 2002). The packet includes a 2-page description of the Shared Strategy process and 2 tables depicting population viability targets derived from technical analyses conducted by NMFS' Technical Recovery Team and the state and tribal co-managers in Washington State.

Table 1: Chinook Spawner Abundance Planning Targets & Ranges for Puget Sound Region

(The numbers are presented for the populations for which the analysis has been completed. State and tribal biologists are still developing the numbers for the populations that are blank.)

Population	Mean spawner abundance for 1996-2000	Low productivity <sup>2</sup>		High productivity <sup>3</sup>
		Planning Range for Abundance	Planning targets for abundance (w/productivity in parentheses)	
NF Nooksack	120	16,000 – 26,000 (1.0)	16,000 (1.0)	3,800 (3.4)
SF Nooksack	200	9,100 – 13,000 (1.0)	9,100 (1.0)	2,000 (3.6)
Lower Skagit	2,300	16,000 – 22,000 (1.0)	16,000 (1.0)	3,900 (3.0)
Upper Skagit	8,920	17,000 – 35,000 (1.0)	26,000 (1.0)	5,380 (3.8)
Upper Cascade	330	1,200 – 1,700 (1.0)	1,200 (1.0)	290 (3.0)
Lower Sauk	660	5,600 – 7,800 (1.0)	5,600 (1.0)	1,400 (3.0)
Upper Sauk	370	3,000 – 4,200 (1.0)	3,030 (1.0)	750 (3.0)
Suiattle	420	600 – 800 (1.0)	610 (1.0)	160 (2.8)
NF Stillaguamish	660	18,000 – 24,000 (1.0)	18,000 (1.0)	4,000 (3.4)
SF Stillaguamish	240	15,000 – 20,000 (1.0)	15,000 (1.0)	3,600 (3.3)
Skykomish	1,700	17,000 – 51,000 (1.0)	39,000 (1.0)	8,700 (3.4)
Snoqualmie	1,200	17,000 – 33,000 (1.0)	25,000 (1.0)	5,500 (3.6)
NL Washington	194*			
Cedar	398*			
Green	7,191*			
White	329*			
Puyallup	2,400	17,000 – 33,000 (1.0)	18,000 (1.0)	5,300 (2.3)
Nisqually	890	13,000 – 17,000 (1.0)	13,000 (1.0)	3,400 (3.0)
Skokomish	1,500*			
Dosewallips	No data yet	3,000 – 4,700 (1.0)		
Dungeness	123*	4,700 – 8,100 (1.0)		
Elwha	1,319*			

\* Represents spawner escapement 1987-2001.

<sup>2</sup> The low productivity number in both the range and the target represents one adult fish return per spawner, also called the equilibrium point of 1:1 (recruits per spawner).

<sup>3</sup> The high productivity number represents the number of spawners at the point where the population provides the highest sustainable yield for every spawner. The productivity ratio is in parentheses for each population and represents the relationship of recruits per spawner (e.g., 3.8:1 for Upper Skagit)

Table 2: Chinook Juvenile Migrants Planning Targets for Puget Sound Region

Groups working at the watershed level have requested that planning targets be expressed as the number of juvenile freshwater outmigrants needed to allow the population to persist over time. Co-manager (state and tribes) analysis provides an estimate of the number of juvenile migrants required to maintain population viability under recently observed adverse estuarine and marine conditions. The numbers are presented for the populations for which the analysis has been completed. State and tribal biologists are still developing the numbers for the populations that are blank.

Population	Current recent averages of juveniles	Number of juvenile migrants	
		Low productivity	High productivity
NF Nooksack	30,000	830,000	590,000
SF Nooksack	18,000	260,000	190,000
Lower Skagit			
Upper Skagit			
Upper Cascade			
Lower Sauk			
Upper Sauk			
Suiattle			
NF Stillaguamish	110,000	790,000	580,000
SF Stillaguamish	63,000	1,200,000	860,000
Skykomish	350,000	3,600,000	2,000,000
Snoqualmie	230,000	2,100,000	1,300,000
NL Washington			
Cedar			
Green			
White			
Puyallup	550,000	1,500,000	900,000
Nisqually	290,000	1,000,000	730,000
Skokomish			
Dosewallips			
Dungeness			
Elwha			

# Shared Strategy: A 5-step voluntary & collaborative process to develop a recovery plan for salmon in Puget Sound

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## Chinook Planning Targets and Ranges

A key step of the Shared Strategy is the development of recovery planning ranges and targets (interim recovery goals) for the 22 individual chinook fish populations in Puget Sound. Ranges and targets will also be provided for bull trout and Hood Canal summer chum. The ranges and targets are provided here primarily to give a sense of the magnitude of the effort necessary to return chinook populations to recovered, harvestable levels. The ranges and targets also provide a common measurement for recovery planning that can be used by habitat, hatchery, and harvest managers to guide the identification and evaluation of recovery actions. These ranges and targets can facilitate discussion across watersheds as well as within habitat, harvest and hatchery programs to determine the level of recovery necessary to meet local and regional interests plus evaluate the most effective manner to achieve the long-term sustainability of fish at harvestable levels.

**Factors for Recovery** – The Shared Strategy goal for recovery is self-sustaining populations of salmon at harvestable levels. In order to achieve sustaining populations, four interrelated factors are critical; **abundance** of fish at various life stages, **productivity** of individual populations (number of returning adults produced by the parent spawner), **spatial distribution** of fish and habitats, and **diversity** of different life traits (run timing, age structure, size, etc.) These four factors need to work together to support the health of individual populations and the whole species in Puget Sound. Current planning ranges and targets address abundance and productivity. The attached tables help illustrate the fundamental relationship between abundance and productivity factors (e.g., improving and maintaining productivity may temper the need for higher spawner abundance). Spatial distribution and diversity will be addressed later in the process and will be tailored to the characteristics of individual populations at the watershed level. Desired outcomes for spatial distribution and diversity may lead to the revision of abundance and productivity targets and ranges as the complete picture of chinook goals becomes clearer.

**Planning Ranges and Targets** – The planning range, as determined by several technical models, provides a broad estimate of the abundance needed for a population to be viable over time. The ranges are large because of the variation in environmental conditions and uncertainty in historical information. The planning target provides a more specific measure within the range that is helpful for evaluating recovery actions in habitat, harvest, and hatcheries. The target predicts the abundance and productivity of a salmon population based on a fully functioning estuary, improved freshwater conditions, restored access to blocked habitats, and poor ocean conditions.

It is important to remember that each of these numbers represents different points along the same population performance curve and that the planning target is the curve itself, not any one specific number of spawners or migrants.

**Magnitude of change** – The planning ranges and targets were developed by scientists and policy staff over a number of months. Fully understanding how they were developed can be accomplished through more detailed briefings from Shared Strategy staff and participating

scientists. The most important message to draw from the target and range is the magnitude of change from current conditions that is necessary to support self-sustaining populations. Current spawner abundance is provided in Table 1 to help illuminate the magnitude of change needed. Step 3 involves the Shared Strategy – and all of its collaborative partners – working with individual watersheds to understand the planning ranges and targets for their populations and the magnitude of change that will be needed in all life stages of the salmon population to move along the path toward recovery. Identifying changes to habitat, hatchery, and harvest actions that help achieve this magnitude of change is the essence of Step 3.

**What to do with the planning targets** – Local governments, watershed groups, and marine groups are asked to work with the state, tribes, and federal Services to identify the actions necessary to attain the planning targets and reach consensus on how to implement those actions. This could be accomplished by first examining how existing and planned efforts in your watershed help move towards achievement of the planning targets. Following this initial assessment of current (or planned) efforts, it will then be possible to see where additional changes may be necessary to achieve the targets.

For example, if current plans call for changes and improvements to habitat conditions that will increase salmon production from 800 fish to 2,000 fish, but the planning target is 3,000 fish, what additional changes could be proposed to gain this increase in fish? Restored estuary? Protected riparian habitat? Harvest restrictions? Increased hatchery production? All of these actions have important implications for the people living and working in the watershed. The advantage of working at the watershed level is that this is where it will be possible to consider those critical social, economic, and cultural implications as well as the biological needs of the fish that are unique to each watershed.

For more information about planning targets – and what to do with them – for your watershed, please contact Carol MacIlroy, Watershed Specialist, Puget Sound Salmon Forum (206.447.3336).