

INTRODUCTION

The Hatchery Reform Project

The Puget Sound and Coastal Washington Hatchery Reform Project is a systematic, science-driven redesign of hatcheries to meet two new goals:

1. Helping to recover and conserve naturally spawning populations.
2. Supporting sustainable fisheries.

The Project was created by Congress in 2000 with the support of Representative Norm Dicks (D-Wash), Senator Patty Murray (D-Wash), Washington Governor Gary Locke and former U.S. Senator Slade Gorton.

Role of Hatcheries in Washington State

There are approximately 100 hatchery facilities in Puget Sound and coastal Washington operated by the Washington State Department of Fish and Wildlife (WDFW), Puget Sound and coastal Indian Tribes and Nations, and the U.S. Fish and Wildlife Service (USFWS). In operation for decades, most hatcheries were built to produce fish for harvest, compensating for declines in naturally spawning salmon populations. Hatcheries are very important to the North Pacific sports and commercial fishing economy. They also play an important role in meeting tribal treaty harvest obligations.

Hatcheries have generally been successful at fulfilling these purposes. However, they have also been identified as one of the factors responsible for the depletion of naturally spawning salmon stocks. Some facilities have created stresses for naturally spawning fish, kept smolts from getting downstream and spawning fish from getting upstream, and lowered water quality. Physical and genetic interactions between naturally spawning and hatchery fish may have weakened natural stocks. Hatchery management decisions have often been piecemeal, not system-wide.

Hatchery Reform: A New Direction

As part of the federal Endangered Species Act (ESA) recovery process for several Puget Sound and Coastal salmon and steelhead stocks, state, tribal and federal managers of Washington's salmon and steelhead resources must ensure that their hatcheries do not present a risk to listed species. But the managers are going beyond merely complying with ESA directives that hatcheries be operated to minimize risks to endangered fish. The new approach is to reform hatchery programs to provide benefits to the process of recovering naturally spawning salmon and providing sustainable fisheries. The managers have established a Hatchery Reform Coordinating Committee (Coordinating Committee) to work together on implementation of this reform effort. The Northwest

Indian Fisheries Commission (NWIFC), WDFW, USFWS, NMFS, Long Live the Kings (LLTK) and the Congressional Hatchery Science Advisory Team are all represented on this committee.

The Hatchery Scientific Review Group

The Hatchery Scientific Review Group (Scientific Group) is the independent scientific panel established by Congress to evaluate hatchery reform programs in Puget Sound and coastal Washington. The objective of the Scientific Group is to assemble, organize and apply the best available scientific information to provide guidance to policy makers who are implementing hatchery reform.

The Scientific Group is composed of five independent scientists (selected from a pool of candidates nominated by the American Fisheries Society) and four agency scientists designated by WDFW, NWIFC, NMFS and USFWS. The nine scientists serving on the Scientific Group have a broad range of experiences. Their scientific disciplines range from biology, genetics, ecology, fisheries, fish culture, fish pathology, and biometrics to other disciplines. Members include:

- John Barr, NWIFC (Vice Chair)
- Lee Blankenship, WDFW (Vice Chair)
- Donald Campton, PhD, USFWS
- Trevor Evelyn, PhD, Department of Fisheries and Oceans Canada (retired)
- Conrad Mahnken, PhD, NMFS Manchester
- Lars Moberg, PhD, Moberg Biometrics (Chair)
- Robert Piper, USFWS, Bozeman, MT (retired)
- Lisa Seeb, PhD, Alaska Dept. of Fish & Game
- William Smoker, PhD, University of Alaska

The third party facilitator specified by Congress is Long Live the Kings (LLTK), a private, nonprofit organization whose mission is to restore wild salmon to the waters of the Pacific Northwest. LLTK's role includes providing facilitation and staff support to the scientific panel and the Coordinating Committee; and helping the managers communicate hatchery reform progress to Congress, state legislators, stakeholder groups and the public. LLTK was also invited to serve on the Coordinating Committee.

Applying a Scientific Approach to Hatchery Management

The Scientific Group has developed: 1) a scientific framework to inform its decision making and recommendations; 2) a process that assesses benefits and risks associated with specific actions and choices in hatchery management; 3) hatchery operational guidelines to implement reform at each facility; 4) a research program to fill information gaps (to date, the Scientific Group has funded two rounds of research on hatchery and rearing environments, physiology and disease, ecological and genetic interactions between

hatchery and wild salmonids, and marine environments); and 5) monitoring and evaluation criteria to determine the success of hatchery programs and gather data for research.

Hatchery Reform Tools

- Scientific Framework
- Research Program
- Benefit/Risk Assessment Process
- Hatchery Operational Guidelines
- Monitoring and Evaluation Criteria

The Scientific Group and Coordinating Committee agreed that it is important to evaluate hatchery programs in the context of the watersheds in which they operate and the goals set forth by the managers. For this reason, they divided Puget Sound and the coast into ten regions, devising an opportunity to make region-by-region recommendations based on: 1) regional management goals for conservation, harvest and other purposes; 2) stock status (biological significance and population viability); 3) habitat status (current and future); and 4) the particulars of each hatchery program.

This document summarizes the recommendations developed by the Scientific Group upon reviewing the first three regions during 2001. Recommendations on the remaining seven regions will be added as they are reviewed in 2002 and 2003. The full recommendations and all other Hatchery Reform Project-related publications (including the Scientific Group's review tools and a description of the process used to apply them) are available on the project's Web site (www.lltk.org/hatcheryreform.html) or by contacting Long Live the Kings at (206) 382-9555.

Regions to be Reviewed:

Eastern Straits
Stillaguamish/Snohomish Rivers
Nooksack/Samish Rivers
Grays Harbor
Willapa Bay

South Sound
Skagit River Basin
Central Sound
North Coast
Hood Canal

AREA-WIDE RECOMMENDATIONS

This section includes reform measures that apply to the entire Puget Sound and coastal Washington area. For more specific and detailed information on area-wide recommendations, go to www.lltk.org/hatcheryreform.html.

Take a Regional Approach to Managing Hatchery Programs

The Scientific Group and the managers have agreed that evaluating hatchery programs in the context of the regions and watersheds in which they operate and the goals set for them by the managers is vital to the success of the process. This same regional approach will be essential to the implementation of hatchery reform.

Operate Hatcheries within the Context of Their Ecosystems

The benefits and risks of hatcheries can only be evaluated in a complete manner in the context of their ecosystems. The current and future status of these ecosystems, including the status of naturally spawning stocks and the environment, will determine the potential for success and the limitations on any hatchery program.

Take into Account Both Freshwater and Marine Carrying Capacity in Sizing Hatchery Programs

There seems to be reduced capacity to support hatchery and naturally spawning salmonids over the past decade in certain regions of Puget Sound and the coast. Because of the scientific uncertainty involved, hatchery production should not be increased until managers have a better understanding of the factors controlling survival. Closure of certain unproductive hatcheries and reduced production at other hatcheries may benefit the quality and survival of both naturally spawning and hatchery fish.

Measure Success in Terms of Contribution to Harvest and Conservation Goals

In the past, hatchery programs too often have been evaluated on the basis of the number of fish released. More appropriate measures of success include fish quality, harvest opportunity and adults returning to reproduce and sustain the stock. In the future, hatcheries may also be evaluated on the basis of their contribution to the ecosystem as a whole.

Emphasize Quality, Not Quantity, in Fish Releases

It is important that some measure of the quality, rather than simply the quantity, of fish released from hatcheries be measured and evaluated in a regional context.

Incorporate Flexibility into Hatchery Design and Operation

Hatchery facilities should be designed and operated in such a way that they are able to respond relatively easy to changes in harvest and conservation goals and priorities, ocean carrying capacity, stock status, freshwater habitat conditions, and the myriad other factors that will alter current policies and programs. Programs must also be able to respond to uncertainty and risk.

Evaluate Hatchery Programs Regularly to Ensure Accountability for Success

Hatchery reform will require expanded monitoring and evaluation (M&E), with some level of commonality and standardization across Puget Sound and coastal Washington. Each region of Puget Sound and the coast will need to develop its own M&E program consistent with the goals and programs of that region.

Develop a System of Wild Steelhead Management Zones

The Scientific Group recommends an entirely new approach to managing steelhead. The managers should develop a system of “wild steelhead management zones” for each region in Puget Sound and coastal Washington, where streams are not planted with hatchery fish and are instead managed for native stocks.

Use In-Basin Rearing and Locally-Adapted Broodstocks

Some hatchery programs, for lack of adequate facilities and/or proper escapement management, require the importation and movement of eggs and juveniles into and out of the region. The managers should use in-basin rearing and locally adapted broodstocks.

Take Eggs Over the Natural Period of Adult Return

Certain life history traits can be lost in hatchery stocks (for example, the failure to spread hatchery egg take over the natural period of adult return can result in a shift in spawn timing). To assure long-term sustainability, the managers should adopt and implement policies that conserve or recover natural life history traits.

Develop Spawning Protocols to Maximize Effective Population Size

The mating of hatchery fish should strive to achieve two principal objectives: 1) maximize the genetic effective number of breeders; and 2) ensure that every selected adult has an equal opportunity to produce progeny. This is particularly critical in conservation programs, where populations are small or have experienced significant declines.

REGIONAL REVIEWS

This section provides examples of the recommendations developed by the Scientific Group upon reviewing the first three regions during 2001. These reviews were conducted via in-region meetings and supported by a collaborative information gathering and sharing process among the management agencies and the scientists. The reviews included a consideration of each regional hatchery program's effects on all other hatchery and naturally spawning salmonid stocks. For the complete reviews and specific recommendations for these regions, please visit www.lltk.org/hatcheryreform.html or contact LLTK at (206) 382-9555.

1. Eastern Straits

This region includes the eastern portion of the Strait of Juan de Fuca, from Point Wilson to the Hoko River. Twelve hatchery programs were reviewed in this region, with 60 specific reforms recommended.

There are major restoration efforts being planned in this region's two large watersheds (dam removal/watershed restoration on the Elwha River, habitat restoration at the mouth of the Dungeness River). Historically, the Elwha River boasted one of the most magnificent and genetically distinct runs of chinook on the Pacific coast. Remnants still return, bumping their noses against the base of first dam. What happens to an endangered run of chinook when a dam is removed and a hundred years' sediment cascades downstream? The hatcheries on this river system will play a central role in protecting and restoring this run, until the habitat is ready to support them again.

Federal, state and tribal managers in this region must determine how best to do this. The regional review process has helped them answer questions about how long the fish should be reared in captivity; and when and where their progeny should be released to re-establish a naturally spawning population.

2. South Sound

This region includes the portion of Puget Sound south of the Tacoma Narrows. Sixteen hatchery programs were reviewed in this region, with 64 specific reforms recommended.

With the exception of the Nisqually River and Delta—where ambitious habitat restoration efforts are underway—habitat in the South Sound region is less likely to be the focus of large-scale restoration activities in the coming years than habitat in the Eastern Straits. The managers designated this region a harvest management zone, as part of their post-Boldt Decision efforts to provide adequate fishing opportunities for the Puyallup, Nisqually and Squaxin Island tribes, all of which have “usual and accustomed” fishing areas here. It includes several old Washington Department of Wildlife trout facilities

not suited to salmon production and therefore has been managed based on a series of inter-basin stock transfers.

At its height, this region was releasing up to ten million smolts per year (around ten percent of the total releases in Puget Sound and coastal Washington). Despite increased production, returns have declined. The scientists strongly recommend an analysis of the carrying capacity of the Sound and that production be capped or decreased in this region until more certainty is established.

3. Stillaguamish/Snohomish

This region includes the watersheds contained by the Stillaguamish and Snohomish rivers and Tulalip Bay. Sixteen hatchery programs were reviewed in this region, with 94 specific reforms recommended.

Habitat in the Stillaguamish River system has been heavily altered and compromised by land use activities such as logging, diking, housing development and dairy farming. Population growth could result in a watershed once rural in character becoming urbanized. The Skykomish features relatively undisturbed habitat. While the Snoqualmie is wild-like above North Bend, in rural, eastern King County it has been affected by agriculture and development. When the Skykomish and Snoqualmie join and form the Snohomish, the effects of development are even clearer.

The Tulalip Tribes operate a successful terminal harvest program in Tulalip Bay, meaning that all returning fish are targeted by the Tribes and non-Indian sports fishers. The Scientific Group emphasized the importance of determining whether a significant number of these fish are straying to other regional streams and presenting risks to naturally-spawning salmon.

Another distinguishing characteristic of this region is its popular steelhead sport fishery. Unfortunately, steelhead in Washington state have been subject to decades of indiscriminate stock transfers without proper consideration of genetic or ecological concerns. Accordingly, this region is one where the Scientific Group's "wild steelhead management zones" concept (see Area-Wide Recommendations above) was a particular focus of the recommendations.

CONCLUSION

It is important to note that the recommendations contained in the report are based upon current goals and the best scientific information available at the time the reviews were conducted. In keeping with the tenets of adaptive management, it will be necessary to review and adapt these recommendations as new scientific information arises and/or goals change. The report also focuses primarily on issues that need to be addressed and recommends changes that need to be made. It should not be read as a complete review listing every positive attribute alongside those that need to be changed. The Scientific Group has been very impressed by the diligence—and frequently the ingenuity—with which the state and tribal staffs carry out their programs, and with their dedication to the resource.