

# Okanogan Subbasin

## I. Introduction

Various processes are underway within the Columbia Basin that direct hatchery program implementation. The listing of certain populations of fish under the ESA has also dictated hatchery program modifications and reform.

Some of the principal processes are:

*Federal:*

### Hatchery and Genetic Management Plans:

The Hatchery and Genetic Management Plan (HGMP) process was initiated to identify offsite mitigation opportunities associated with operation of the Federal Columbia River Power System. The HGMP process is designed to describe existing propagation programs, identify necessary or recommended modifications of those programs, and help achieve consistency of those programs with the Endangered Species Act. The HGMP process only addresses anadromous salmon and steelhead programs.

Hatchery and Genetic Management Plans are described in the final [salmon and steelhead 4\(d\) rule](#) (July 10, 2000; 65 FR 42422) as a mechanism for addressing the take of certain listed species that may occur as a result of artificial propagation activities. NOAA Fisheries will use the information provided by HGMPs in evaluating impacts on anadromous salmon and steelhead listed under the ESA. In certain situations, the HGMPs will apply to the evaluation and issuance of section 10 take permits. Completed HGMPs may also be used for regional fish production and management planning by federal, state, and tribal resource managers.

The primary goal of the HGMP process is to devise biologically-based artificial propagation management strategies that ensure the conservation and recovery of listed Evolutionarily Significant Units (ESUs). The HGMP process also seeks to document and implement hatchery reform in the Columbia Basin. Much of the initial work on the HGMP process was coordinated and combined with efforts to complete the Artificial Production Review and Evaluation (APRE – see below)) analysis, which looked at the same sorts of information.

### Artificial Production Review and Evaluation (APRE)

The APRE process seeks to document progress toward hatchery reform in the Columbia Basin. The NPCC used consultants and representatives of the Columbia Basin fishery managers to analyze existing programs and recommend reforms; a draft report that will go to the Council and the region has been prepared. The APRE process includes both anadromous and non-anadromous fish in its analysis.

## Pacific Coastal Salmon Recovery Fund

The Pacific Coastal Salmon Recovery Fund (PCSRF) was established in FY2000 to provide grants to the states and tribes to assist state, tribal and local salmon conservation and recovery efforts. The PCSRF was requested by the governors of the states of Washington, Oregon, California and Alaska in response to Endangered Species Act (ESA) listings of West Coast salmon and steelhead populations. The PCSRF supplements existing state, tribal and federal programs to foster development of federal-state-tribal-local partnerships in salmon recovery and conservation; promotes efficiencies and effectiveness in recovery efforts through enhanced sharing and pooling of capabilities, expertise and information. The goal of the Pacific Coastal Salmon Recovery Fund is to make significant contributions to the conservation, restoration, and sustainability of Pacific salmon and their habitat.

The PCSRF's enhancement objective is: *To conduct activities that enhance depressed stocks of wild anadromous salmonids through hatchery supplementation, reduction in fishing effort on depressed wild stocks, or enhancement of Pacific salmon fisheries on healthy stocks in Alaska. This includes supplementation and salmon fishery enhancements.*

## US v. OR

United States v Oregon, originally a combination of two cases, Sohappy v. Smith and U.S. v. Oregon, legally upheld the Columbia River treaty tribes reserved fishing rights. Specifically the decision acknowledged the treaty tribes reserved rights to fish at "all usual and accustomed" places whether on or off the reservation, and were furthermore entitled to a "fair and equitable share" of the resource. Although the Sohappy case was closed in 1978, U.S. v. Oregon remains under the federal court's continuing jurisdiction serving to protect the tribes treaty reserved fishing rights. This case is tied closely to U.S. v. Washington, which among other things defined "fair and equitable share" as 50 percent of all the harvestable fish destined for the tribes' traditional fishing places, and established the tribes as co-managers of the resource.

In 1988, under the authority of U.S. v. Oregon, the states of Washington, Oregon and Idaho, federal fishery agencies, and the treaty tribes agreed to the Columbia River Fish Management Plan (CRFMP), which was a detailed harvest and fish production process. There are no financial encumbrances tied to the process. Rather, the fish production section reflects current production levels for harvest management and recovery purposes, since up to 90% of the Columbia River harvest occurs on artificially produced fish. This Plan expired in 1998, and has had subsequent annual rollover of portions in which agreement has been reached. However, a newly negotiated CRFMP is forthcoming.

Hatchery production programs in the upper Columbia sub-basins are included in the management plans created by the fishery co-managers identified in the treaty fishing rights case *United States v Oregon*. The parties to *U.S. v Oregon* include the four Columbia River Treaty Tribes – Yakama Nation, Warm Springs, Umatilla, and Nez Perce tribes, NOAA-Fisheries, U.S. Fish and Wildlife Service, and the states of Oregon, Washington, and Idaho. The Shoshone-Bannock Tribe is admitted as a party for purposes of production and harvest in the upper Snake River only. These parties jointly develop harvest sharing and hatchery management plans that are

entered as orders of the court that are binding on the parties. The “relevant co-managers” described in the *U.S. v Oregon* management plans are, for the mid-Columbia sub-basins, the federal parties, Yakama Nation, and Washington Department of Fish and Wildlife.

Hatchery programs are viewed by some tribes as partial compensation for voluntary restrictions to treaty fisheries imposed by the tribe to assist in rebuilding upriver populations of naturally-spawning salmonids. Because treaty and non-treaty fisheries are restricted on the basis of natural stock abundance, the tribal priority is to use hatcheries in a manner that supplements natural spawning and increases average population productivity. Perspectives on the appropriate use of hatchery-origin fish for supplementation vary between federal, state, and tribal fish co-managers. Federal and, to a lesser degree, state co-managers place a higher priority on managing the genetic risks of hatchery supplementation of natural populations, while the tribe sees the demographic threats of habitat loss and degradation as the greater risk to natural populations. In general, however, all parties agree that hatcheries can and should be operated as integral components of natural populations where the survival benefits of the hatchery can result in a significant increase in net population productivity.

#### ESA

Current ESA Section 10 Permits for listed summer steelhead (Permit #1395); listed spring chinook (Permit #1196) and non-listed anadromous fish (Permit # 1347) also direct artificial production activities associated with the habitat conservation plans. Douglas PUD, Chelan PUD and WDFW are co-permittees, therefore provisions within the permits and associated Biological Opinions are incorporated into the hatchery programs undertaken in the HCP's.

#### *State:*

The state, along with the federal government have various forums in which they are active. All have some role in determining or balancing artificial production programs, as well as the ones that follow under “other”. Essentially no specific action would occur until the action is determined to be warranted in the already established processes.

#### *Other:*

##### FERC processes:

Under current settlement agreements and stipulations, the three mid-Columbia PUDs pay for the operation of hatchery programs within the Columbia Cascade Province. These programs determine the levels of hatchery production needed to mitigate for the construction and continued operation of the PUD dams.

##### Habitat Conservation Plans:

In 2002, habitat conservation plans (HCPs) were signed by Douglas and Chelan PUDs, WDFW, USFWS, NOAA Fisheries, and the Colville Confederated Tribes. The overriding goal of the

HCPs are to achieve no-net impact<sup>1</sup> on anadromous salmonids as they pass Wells (Douglas PUD), Rocky Reach, and Rock Island (Chelan PUD) dams. One of the main objectives of the hatchery component of NNI is to provide species specific hatchery programs that may include contributing to the rebuilding and recovery of naturally reproducing populations in their native habitats, while maintaining genetic and ecologic integrity, and supporting harvest.

**Biological Assessment and Management Plan:**

The biological assessment and management plan (BAMP) was developed by parties negotiating the HCPs in the late 1990s. The BAMP was developed to document guidelines and recommendations on methods to determine hatchery production levels and evaluation programs. It is used within the HCP as a guiding document for the hatchery programs.

*All of these processes affect the hatchery programs within the Upper Columbia Basin in one way or another.*

**Historic and current programs and facilities**

**Historic programs**

Other than two releases of sockeye as part of the Grand Coulee Fish Maintenance Project, anadromous fish releases began in the Okanogan Basin in the early 1960s, when steelhead were released into the Similkameen River as part of a state program (Chapman et al. 1994). Periodic releases of steelhead have been made since the 1960s (and regularly since the early 1990s) into Omak Creek, and regularly since 1966 into the mainstem Okanogan River as mitigation for the operation of Wells Dam, which is funded by Douglas PUD. A small number of “catchable” trout were also released into the Okanogan; once in the 1940s, and then three more times in the 1970s. Since the early 1990s, summer/fall Chinook have been released in the Similkameen River.

**Current program overview:**

Currently, there are releases of summer/fall Chinook, steelhead, and experimental programs for spring Chinook and sockeye (in Canada).

Table 1. Current artificial anadromous fish production in the Okanogan Subbasin.

<b>Fish Species</b>	<b>Facility</b>	<b>Funding Source</b>	<b>Production level goals</b>
Spring Chinook	Omak Creek, Ellisford Pond	BPA, CCT	30,000-150,000 (current production is dependent on availability of Carson-stock eggs)
Steelhead	Wells hatchery, Omak Cr.	DPUD	100,000

<sup>1</sup> NNI refers to achieving a virtual 100% survival of anadromous salmonids as they pass the mainstem projects. This is achieved through 91% survival of adults and juveniles (or 93% for juveniles) passing the projects, and 7% compensation through hatchery programs and 2% contribution through a tributary fund, which will fund projects to improve salmonid habitat in the tributaries.

Summer Chinook	CPUD	Similkameen rearing pond	576,000
Sockeye	none	Douglas PUD	To compensate for __ smolts, DPUD has funded a cooperative water flow effort in the Okanogan River upstream from Lake Osoyoos, which has increased survival of incubating sockeye.
Coho	n/a	n/a	n/a

***State and other programs***

Summer/Fall Chinook: Artificial propagation of summer Chinook was initiated in 1989 through a mitigation agreement with Chelan and Douglas PUDs. The program is intended to mitigate for the loss of summer Chinook from the operations of Wells, Rocky Reach, and Rock Island dams (WDFW 1999). This program also provides surplus fish for recreational and tribal ceremonial and subsistence fisheries.

Spring Chinook: Spring Chinook were extirpated from the Okanogan River before the 1930s due to excessive harvest in the lower Columbia River, and habitat destruction in Canadian waters and tributaries of the Okanogan River in the U.S. (Craig and Suomela 1931; Fish and Hanavan 1948). There has never been a formal mitigation program for spring Chinook in the Okanogan River.

Currently, spring Chinook are artificially propagated and released in the Okanogan subbasin through a cooperative agreement between NOAA Fisheries, USFWS, CCT, and WDFW, as an interim, segregated harvest program to support tribal ceremonial and subsistence fishing and provide information for a proposed, long-term integrated recovery program.

Steelhead: Wells Hatchery is funded by Douglas PUD and operated by WDFW as mitigation for passage mortalities at Wells Dam. Steelhead are artificially propagated and released in the Okanogan subbasin as an integrated harvest program. The Colville Tribes have also initiated a local broodstock program and will be starting a kelt reconditioning program to create a comprehensive integrated recovery program through funding by BPA.

Release numbers and locations of Wells Hatchery stock steelhead have varied considerably over the past 12 years. In the lower Similkameen River, releases have varied from 37,500 to 82,415 since 1992 (APRE 2003b). Releases elsewhere in the Okanogan subbasin, primarily Omak and Salmon Creeks, has varied from 30,000 to 160,756 since 1992 (APRE 2003a). Current releases of Wells Hatchery stock steelhead are planned at 50,000 into the lower Similkameen River and 50,000 at other locations in the Okanogan subbasin.

Coho: There never has been an artificial propagation program for coho salmon in the Okanogan subbasin, and none are proposed at this time, but may be in the future.

Sockeye: Sockeye salmon were to be propagated in the subbasin as part of the authorized mitigation program for Grand Coulee Dam. However, while there were two releases of sockeye

into Lake Osoyoos during the GCFMP, the sockeye hatchery was not constructed. A short-term sockeye propagation program was initiated in the 1990s at Cassimer Bar Hatchery, but suspended after only a few years as success was questionable and the direction of mitigation was shifted to habitat improvement in Canadian waters.

Currently, a program funded by Douglas PUD for compensation of sockeye passage losses at Wells Dam, coordinates water releases in the upper Okanogan River, which has increased egg and fry survival of sockeye.

### Facilities Description:

#### *Summer/fall Chinook*

This propagation program is operated as an integrated harvest program to mitigate for the effects of the three PUD dams. Adult summer Chinook are collected at the Wells Dam trap, held at Eastbank Hatchery located on the Columbia River at Rocky Reach Dam, north of Wenatchee. All spawning, incubation and early rearing occur at Eastbank Hatchery. In October, the fingerling Chinook are transported to Similkameen Pond, located at river mile 3.1 on the Similkameen River. Here the fish are acclimated through the winter until their release in April of the following year. In 2004, 100,000 of the program's 576,000 smolt release were reared at the Bonaparte Pond, located at river mile 56 on the Okanogan River, with the intent of dispersing subsequent spawning of returning adults in historical habitats. This program may continue in the future if facility modifications are made to reduce over-winter mortality.

#### *Spring Chinook*

Two spring Chinook programs have been initiated in the Okanogan subbasin on an interim, informal basis. In Omak Creek, an integrated recovery program is underway to reintroduce spring Chinook in this historical habitat. The program was initiated in 2001 with scatter planting of 40,000 yearling spring Chinook in Omak Creek, below Mission Falls. These fish were of Carson stock origin reared at Winthrop NFH. These releases continued in 2002 with a scatter planting of 48,000 Carson stock Chinook from Leavenworth NFH. In 2003, 35,000 spring Chinook from Leavenworth NFH were again released in Omak Creek, but were first acclimated at the newly constructed St. Mary's Mission Acclimation Pond. All 45,000 Chinook scheduled for release in 2004 were lost when the new acclimation pond's pump failed. These releases are intended to test the capability of Omak Creek and the Okanogan River to again support spring Chinook.

In the Okanogan River, a segregated harvest program was initiated in 2001 with the acclimation of 254,000 Carson stock spring Chinook in Ellisforde Pond for release in April 2002. These fish were from Winthrop NFH and were surplus to management needs in the Methow subbasin. Releases of 100,000 spring Chinook from Leavenworth NFH were made in 2003 (from Bonaparte Pond) and 2004 (again from Ellisforde Pond). The first returns from these fish are expected in 2005 as four-year-olds. The objective of these fish is to test the capability of the Okanogan River to support spring Chinook migration and to provide a tribal ceremonial and subsistence fishery. No spawning of these fish in the Okanogan River is desired.

### *Steelhead*

Wells Hatchery is located adjacent to Wells Dam at river mile 535 of the Columbia River. The hatchery production destined for the Okanogan is currently operated as an integrated recovery program, contributing to the conservation of the population, but also providing some harvest opportunity. Broodstock is collected from the west bank fish ladder at Wells Dam and from volunteer returns to the Hatchery, held to maturity and spawned at the Hatchery. Two mating categories are used, wild x hatchery crosses and hatchery x hatchery crosses (APRE 2003a). The latter crosses have been released in the Okanogan subbasin, however, plans are now to release H x W crosses in the Okanogan whenever possible. Juvenile steelhead are reared to yearlings, then transported to the Okanogan subbasin where they are scatter planted in the Similkameen River (50,000), Omak Creek, Salmon Creek, and the Okanogan River (50,000) in late April to mid May.

In 2003, the Colville Tribes initiated a local broodstock program, collecting steelhead returning to Omak Creek. Eggs are incubated and subsequent fingerlings and pre-smolts reared at Colville Trout Hatchery, river mile 542 of the Columbia River. The integrated recovery program is planned to release 20,000 smolts in April or May of each year (NMFS 2003).

### Genetic Integrity of Populations

#### *Summer/fall Chinook*

The Okanogan subbasin population of summer/fall Chinook is a fully integrated between the natural and hatchery origin fish. “There are no known genotypic, phenotypic, or behavior differences between the hatchery stocks and natural stocks in the target area” (WDFW 1999). The Okanogan and Methow populations have been managed as a single entity with a common hatchery broodstock.

The later-arriving component of the Okanogan summer/fall Chinook population has been severely depressed due to mortalities imposed by passage through nine mainstem dams, higher harvest rates on these fish in lower river fall Chinook fisheries, and the lack of artificial propagation. This component of the run is proposed by intensive propagation to restore its abundance (CCT 2004a).

#### *Spring Chinook*

There currently is no natural spring Chinook population in the Okanogan subbasin.

### *Steelhead*

Current steelhead populations originated from a mix of indigenous upper Columbia Basin stocks intercepted during the GCFMP of the 1930s and 1940s, and potential resident fish. The Wells Hatchery stock was initiated in the 1960s from naturally spawning populations migrating past Priest Rapids Dam. The genetic background of the stock is therefore from a mix of populations. The stock is considered highly domesticated from years of broodstock collection at the hatchery and the low level of natural-origin fish available for inclusion in the broodstock. With about 81% of the natural spawning escapement consisting of hatchery-origin fish and the Okanogan

subbasin receiving progeny of H x H crosses, the natural populations have been substantially affected by the Wells Hatchery program.

The new conservation programs initiated by the Colville Tribes and further efforts of WDFW at the hatchery to incorporate different matings (HxW, etc.) are intended to improve the viability and adaptability of steelhead in the Okanogan (and other) subbasin.

## **II. Program Goals and Objectives**

### *Summer/fall Chinook*

The goal of the Similkameen Pond program is "...to mitigate for the loss of summer Chinook salmon adults that would have been produced in the region in the absence of Wells, Rocky Reach, and Rock Island hydroelectric projects" (WDFW 1999). To this end, the mitigation agreement requires the production and release of 576,000 yearling summer Chinook in the Okanogan subbasin. Performance objectives and performance indicators have been established for the program (WDFW 1999) that addresses program benefits and risks.

### *Spring Chinook*

The goal of the integrated recovery program in Omak Creek is to restore a natural spawning population of spring Chinook in historical habitats that contributed to the fisheries of the Confederated Tribes of the Colville Reservation. This program would also assist, longer-term in the recovery of endangered Upper Columbia River Spring Chinook when Carson stock is replaced with Methow Composite stock. Phase I of this program is intended to return 200- 700 adults to the subbasin to allow assessment of survival parameters and suitability of habitat.

The goal of the segregated harvest program is to mitigate for the loss of spring Chinook due to the construction of Grand Coulee, Chief Joseph, Wells, Rocky Reach, Rock Island, Wanapum, Priest Rapids, McNary, John Day, The Dalles, and Bonneville Dams. The fish will be managed for tribal ceremonial and subsistence fisheries and recreational angling. The Phase I of this program is intended to return 400 – 1,400 adults to the Okanogan River for tribal and recreational harvest. These fish will also be used to test the feasibility of live-capture, selective fishing gears the Colville Tribes intend to deploy for subsistence fishing.

### *Steelhead*

The goal of the Wells Hatchery program in the Okanogan subbasin is to contribute to the conservation and recovery of steelhead while providing for recreational and tribal harvest when compatible with recovery.

From brood year 1981 through brood year 1996, smolt-to-adult survival for Wells Hatchery stock has ranged from 0.29% to 7.54 %, with a median survival of 0.92% and a mean survival of 1.63 % (WDFW 2002).



## Proposed programs

### *Summer/fall Chinook*

The Colville Tribes are proposing the construction of Chief Joseph Dam Hatchery and the use of 2 new acclimation ponds on the Okanogan River to increase the abundance, distribution and diversity of the propagation program for summer/fall Chinook in the Okanogan subbasin. The Colville Tribes (CCT 2004a, and Wolf and Wagner, 2004) have proposed to increase production levels of summer/fall Chinook to increase the abundance, diversity, and distribution of the naturally spawning population and provide a more stable base for tribal ceremonial and subsistence fishing and recreational angling. The proposed program would initially release an additional 400,000 yearling summer/fall Chinook from a new acclimation site proposed near river mile 49, and 700,000 yearling and sub-yearling Chinook from a new acclimation pond at the mouth of Omak Creek (river mile 32). The broodstock for these releases would constitute the later-arriving Chinook that are not included in the current propagation program.

This subbasin plan supports the premise that salmon (bull trout and steelhead) recovery is a race between the time a population or group of populations will be extirpated and the time habitat to support those populations can be recovered. Whether supplementation is appropriate for a population depends on the anticipated time to extirpation compared to the time required for habitat recovery. Supplementation should be considered appropriate if a population would be extirpated before habitat could be recovered, and, if the habitat could be recovered in the extended period, that supplementation could provide. Given this line of reason, and a vision reflective of the unmitigated history of losses caused by hydropower, agricultural and industrial development in the main stem, valley bottom, and tributary areas across our trust lands, the Colville Tribes conclude that the current state-of-affairs for fish populations and their ecosystems in the Okanogan unequivocally corresponds to this fundamental premise.

It is reasonable to argue that no other region in the Columbia Basin exemplifies the need for strategic, comprehensive, and substantive actions more poignantly or literally than the combined territory of the Okanogan River Basin<sup>2</sup>, the Columbia Cascade Province, and the Upper Columbia ESU. The effort to reestablish viable native fish populations and sustainable natural production habitats in this region will fail without cumulative (positive) effects derived from habitat improvement and protection, implementation of appropriate harvest rates, reductions in mortality associated with hydropower operations and facilities, and (in combination with), the effective and judicious use of artificial production.

The Chief Joseph Hatchery Conceptual Plan and its monitoring components will provide guidance for performance standards in the following categories:

- Legal Standards
- Conservation Standards

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<sup>2</sup> Hereinafter referred to in sum as the Okanogan subbasin including Omak and Salmon Creeks, those portions of the Similkameen below Enloe dam, and Canadian areas comprising the main stem Okanogan, McIntyre, Inkaneep, and Shingle Creeks, Osoyoos, Vaseux, Skaha Lakes, Lake Okanogan and their major tributaries having present or historical anadromous use.

- Life History Characteristics
- Genetic Characteristics
- Research Activities
- Operation of Artificial Production facilities
- Socio-economic effectiveness
- Harvest Standards
- Non-target population impacts
- Target population production
- Target population long-term fitness

Also, in 2001, the Colville Tribes submitted a monitoring plan to the Northwest (then the...[P]ower Planning Council) Power and Conservation Council and Bonneville that included the US/Canada Okanogan/Okanagan and the Similkameen River basins. This plan has been strongly endorsed in 2001 by the ISRP as a “model” for the entire Columbia Basin and is used extensively by reference in the Pacific Northwest Aquatic Monitoring Partnership’s “Guidance to Subbasin Planners.” The Baseline Monitoring and Evaluation Program (the Baseline M&E), is now collecting data on many, but not all, of the performance indicators for this program. Consequently, and as part of the Master Planning process, the Colville Tribes have prepared a complimentary monitoring plan to describe, in general, the scope of efforts and range of supplementary information needed to detect and report overall production program performance as described in HGMPs

These integrated efforts will begin to provide essential information on habitat conditions, capacity and fish populations, beginning in 2004. The information derived will then be used to detect the effectiveness (or lack thereof) of the hatchery production and supplementation and the integrated harvest and recovery programs as each element comes on line. This will allow the co-managers to operate all facilities in a manner consistent with efforts to detect the trends and effectiveness between and among other subbasins, ESUs, and across a broader group of “H’s” and planning processes. Previously unattained levels of cost-effectiveness, standardization of performance metrics and crosscut data and communications management, represent the by-products and benefits of this coordinated approach.

The current escapement goal for summer/fall Chinook in the Okanogan and Methow rivers is 3,500 fish past Wells Dam. The Colville Tribes have proposed to expand this escapement initially by 1,200 later-arriving summer/fall Chinook in the Okanogan subbasin. The Colville Tribes, in their draft Okanogan River Summer/Fall Chinook HGMP, are proposing an expanded management program to increase the escapement of summer/fall Chinook throughout their historical range in the Okanogan River by employing habitat enhancement and an expanded and diversified propagation program. The ultimate management goal will need to be derived from monitoring and evaluating the significant new program. The goal will need to include both increased escapement and stable harvestable surpluses for tribal and recreational fisheries.

#### *Spring Chinook*

The Colville Tribes are seeking an extension of the interim programs described above until a larger and more formal program can be initiated. The Colville Tribes are seeking a program that

would initially release 200,000 Carson stock spring Chinook from Ellisforde Pond and 50,000 from St. Mary's Mission Pond. Eggs for this program would be collected at Leavenworth NFH then incubated and reared at Willard NFH prior to transfer to the two acclimation ponds in October (CCT, 2004b). The current HGMP and the integrated hatchery program described in detail above for summer/fall Chinook also applies to spring Chinook, and is envisioned as a future program by the Colville Tribes.

Thus, the Colville Tribes have proposed in their Okanogan River Spring Chinook HGMP to initiate a significant reintroduction effort. This would begin using Carson stock in an integrated recovery program followed by a transition to endangered Upper Columbia River Spring Chinook from the Methow subbasin upon its availability. The Colville Tribes are also proposing an initial isolated harvest program using Carson stock Chinook to be converted later to an integrated harvest program upon the availability of Methow subbasin fish. The HGMP's recovery goal is to restore spring Chinook in their historical tributary habitats, including eventually in Canadian waters. Enumerating a recovery goal at this time is premature until the Colville proposals are approved.

#### *Steelhead*

The Colville Tribes have initiated preparation of an Okanogan River Steelhead HGMP. The goal of the program will be to restore endangered steelhead in their historical habitats and create harvestable surpluses for tribal ceremonial and subsistence fisheries and for recreational harvest. Recovery of steelhead will require a mix of habitat restoration actions in tributary streams and artificial propagation. The later will include initiating a local Okanogan River broodstock to replace the homogenized, domesticated stock at Wells Hatchery and a kelt reconditioning program. Enumerating a recovery goal at this time is premature until the Colville Tribes' HGMP has been completed and implementation approved.

The objective of the new local broodstock project is to release 20,000 yearlings in Omak Creek starting in 2004. At that time, Wells Hatchery steelhead will no longer be released in Omak Creek.

The Colville Tribes will also soon be initiating a kelt recondition project in Omak Creek as part of a research experiment to compare the relative reproductive success of natural-origin, hatchery-origin, and reconditioned kelts in producing offspring.

The Colville Tribes are initiating development of a comprehensive HGMP for future management of steelhead in the Okanogan subbasin, working directly with WDFW and other fishery co-managers. Objectives for future management will include recovery of the population and provisions for tribal ceremonial and subsistence harvest and recreational angling that is consistent with recovery

#### *Sockeye & Coho*

There have never been nor are there any longer artificial propagation programs for sockeye or coho salmon in the Okanogan subbasin. Rehabilitation of the sockeye population in the Okanogan subbasin is currently being pursued through habitat rehabilitation efforts largely in Canada. First Nations in Canada, in coordination with the Colville Tribes, have also initiated an

artificial propagation program to increase fry production in lake waters and a reintroduction of sockeye into Skaha Lake. This program is now progressing into the implementation and monitoring phase. The Colville Tribes may soon propose a coho salmon reintroduction program for the Okanogan River. At that time, an HGMP will be prepared.

### Relationship Between Artificial and Natural Populations

#### *Summer/fall Chinook*

The current propagation program uses broodstock collected at Wells Dam from mid July through August 28<sup>th</sup>, a combination of Chinook destined for the Okanogan and Methow rivers (and perhaps Columbia River). The Similkameen Pond program has successfully increased the abundance of the naturally spawning Chinook as evidenced by the high proportion of hatchery fish in the spawning population. The resulting population of hatchery-origin and natural-origin fish is fully integrated.

It appears that the Similkameen program has been essential in maintaining at least the short-term health of the summer/fall Chinook population in the Okanogan subbasin. [note – this is speculative, and if it is just dam based – then why has the Wenatchee late-run population been increasing over the last 40 years?] As with almost all supplemented populations of salmon, however, what is not known is the relative reproductive success of these hatchery-origin fish compared to the natural-origin Chinook in producing offspring.

Historically, natural Okanogan summer/fall Chinook have displayed a dominate sub-yearling or ocean-type life history strategy with juvenile fish entering the ocean in their first year. More recently, biologists have been documenting that many natural-origin adults are the result of a yearling or reservoir reared life history, apparently over-wintering in the Columbia River reservoirs prior to entering the ocean (J. Sneva, WDFW, pers. Comm.). However, the presence of the reservoir reared pattern became apparent well before demographic changes could have taken place through the summer Chinook supplementation yearling programs. And in fact, the reservoir rearing could be an environmental adaptation for summer Chinook in the impounded Columbia River system. The Similkameen Pond propagation program releases yearling smolts that have been shown in other summer/fall Chinook programs to survive at much higher rates than sub-yearling releases. The effect of yearling releases on the long-term health of the population is not known.

A second variation of the artificial propagation program relative to the natural population is the timing of broodstock collection. All broodstock collected for the hatchery program is done from mid-July through August 28<sup>th</sup>, although summer/fall Chinook continue to migrate past Wells Dam into November. This truncated collection period was initiated to avoid including stray fall Chinook from lower river programs in the broodstock. This straying problem has since been eliminated, because Turtle Rock no longer uses Priest Rapids Hatchery fall Chinook, but rather uses summer Chinook collected at Wells Hatchery.

The expanded propagation program proposed by the Colville Tribes (CCT 2004) has been designed to enhance the qualities of the current Similkameen Pond program. Adult Chinook

would be collected in or near the Okanogan River to create a fully localized broodstock of fish adapted to the Okanogan River. Broodstock would include the later-arriving population component (September to early November) that are believed to spawn in the lower river reaches, later in the fall. The added numbers of juvenile fish would be acclimated at two new sites in the mid and lower Okanogan River (Riverside and Omak) to seed these underutilized, historical habitats. And also, about 40% of the juvenile releases at Omak would be sub-yearling fish, the natural life history, to monitor their success relative to the yearling hatchery releases and the natural-origin migrants.

#### *Spring Chinook*

Spring Chinook salmon were extirpated from the Okanogan subbasin so there is no natural population. Carson stock spring Chinook have been used as eggs and are readily available from the Wenatchee subbasin and the stock has performed relatively successfully in the Columbia Cascade Province when artificially propagated. The Colville Tribes have proposed to use Carson stock until a surplus of ESA-listed Methow Composite stock is available from Winthrop NFH and Methow State Hatchery that can be introduced into the Okanogan subbasin as an experimental population under the terms of the ESA (CCT 2004b).

#### *Steelhead*

Steelhead populations are currently listed as endangered in the Columbia Cascade Province with natural cohort replacement rates prior to 1995 thought to be 0.3 or less for the various populations. The Okanogan subbasin has been a low priority for steelhead recovery efforts. At one time, NOAA Fisheries concluded that, "Current habitat conditions are not conducive to steelhead in the Okanogan River subbasin." Further, the Wells Hatchery releases destined for the Okanogan subbasin are from hatchery x hatchery crosses which would be expected to have the least success in natural reproduction. WDFW's spawning ground objective for the listed ESU has been 6,000. However, the Okanogan subbasin was not included in this objective.

With recent habitat improvements in Omak and Salmon creeks, natural reproduction of steelhead in the Okanogan subbasin has been increasing. In 2002, 39 steelhead redds were observed in two miles of reference reaches and natural-origin steelhead fry were abundant (Fisher 2003a). In 2003, 21 steelhead redds were observed in the same reaches. Fry were again abundant in some reaches, but not others due to a kill resulting from an accidental dumping of fire retardant (Fisher 2003b). Also in 2003, six steelhead redds were observed in Salmon Creek following an experimental release of water by the Okanogan Irrigation District. Subsequently, fry production was observed (Fisher 2003c). Further demonstrating the improved status of natural-origin steelhead in the Okanogan subbasin, with issuance of Section 10 (a)(1)(A) Permit 1395 to WDFW in October of 2003, NOAA Fisheries designated mortality limitations to natural-origin steelhead in the Okanogan River with runs up to 600 natural-origin fish.

#### Internal and External Consistency of Program to Purpose

##### *Summer/fall Chinook*

The Similkameen Pond program has been operated consistently with the planned objective of managing the Okanogan and Methow summer/fall Chinook as a single population. Actions that

need to be undertaken in the Okanogan subbasin to improve the consistency of the existing program include:

1. Develop a local Okanogan broodstock, separate from the Methow population.
2. Propagate the entire summer/fall Chinook run, including fish arriving in September, October, and November.
3. Propagate and evaluate the benefits and costs of releasing the natural sub-yearling type juvenile in addition to the yearling smolts.
4. Continue to disperse acclimated hatchery releases throughout the full range of historical habitat.
5. Develop harvest strategies that manage for the proportion of hatchery-origin fish in the spawning population to optimize the population's viability.

#### *Spring Chinook*

The programs are too new to evaluate internal or external consistency. A key external risk that must be evaluated is the extent, if any, to which the Carson-stock spring Chinook stray to the Methow subbasin and spawn with ESA-listed Chinook of the Upper Columbia River Spring Chinook ESU or survive through the summer in the Okanogan River and spawn with summer/fall Chinook. Management actions will be taken to minimize these risks.

#### *Steelhead*

The current steelhead program in the Okanogan subbasin is going through a substantial change. Additional planning and execution via a new HGMP will be required to direct a holistic and consistent program. Actions that need to be undertaken in the Okanogan subbasin to improve the consistency of the existing program include:

1. Implement new acclimation sites for Wells Hatchery stock steelhead in the Okanogan subbasin that will provide ongoing conservation and fishery benefits, but not conflict with the new local broodstock and kelt reconditioning programs being developed in Omak Creek.
2. Transition from the aggregate, domesticated Wells Hatchery stock to an entire Okanogan subbasin program supported by local broodstock.
3. Implement a steelhead marking program that will support, yet differentiate the Wells Hatchery stock and Omak Creek programs.
4. Expand the local broodstock and kelt reconditioning programs from a base of Omak Creek to programs appropriate for the entire Okanogan subbasin.
5. Adjust proposed programs based on results of planned research in Omak Creek to evaluate the relative reproductive success of hatchery-origin, natural-origin, and reconditioned kelt steelhead.

### **III. Program Operations**

#### *Summer/fall Chinook*

To implement the current Similkameen Pond program, broodstock are collected at the Wells Dam east ladder trap from mid-July through August 28<sup>th</sup> then immediately transported to

Eastbank Hatchery for holding and maturing. For both the Okanogan and Methow programs, 556 Chinook are taken with equal numbers of males and females. In taking broodstock, there is no protocol for selecting for or against any particular trait. The program has specific protocols that ensure broodstock collection does not adversely affect natural spawning goals (WDFW 1999).

Adults are primarily spawned from late September through late October. A 1:1 mating scheme is employed. Eggs are placed in Heath stack incubators. Ponding of swim-up fry occurs after accumulation of about 1,700 temperature units from early May through June. About 85% of fertilized eggs survive to fry ponding. Rearing of juveniles is performed in raceways following loading densities of 6 lbs./gpm and 0.75 lbs./cu. ft. (WDFW 1999).

Fish health and disease are continuously monitored (10-15 times) by professionals in compliance with standard fish health policy standards. BKD is the primary disease of concern.

In October, fingerlings are transferred from Eastbank Hatchery to Similkameen Pond where they are reared for 6 months through the winter until release in early April. The objective for smolts is 576,000 at 10 fpp. All smolts are adipose fin clipped and coded wire tagged for identification.

Okanogan summer/fall Chinook contribute in various amounts to fisheries along the West Coast from S.E. Alaska to the Columbia River. Prior to recent harvest restrictions implemented due to widespread listings of salmon species pursuant to the Endangered Species Act, summer Chinook were harvested at high rates in ocean fisheries of Alaska and British Columbia. With the increased runs of the past three years, recreational fishing and tribal treaty fisheries in the Columbia River have enjoyed increased harvests. In the past two years, recreational fishing in the Okanogan River has resumed. The Okanogan summer/fall Chinook provide the Colville Tribes' with their last remaining ceremonial and subsistence fishery of any magnitude. Average Tribal harvests have been consistently below 1,000 fish until the past few years when harvest has exceeded 3,000 Chinook.

### *Spring Chinook*

Broodstock collection, mating, egg incubation, and early rearing of the spring Chinook released in the Okanogan subbasin is performed at Leavenworth NFH, the operations of which can be viewed in the appended Okanogan River Spring Chinook HGMP (CCT 2004b) or sought in that facility's HGMP or the Wenatchee Subbasin Plan.

In October of each year the fingerling spring Chinook are transported to St. Mary's Mission Pond on Omak Creek and Ellisforde Pond on the Okanogan River. Ellisforde Pond is an open-air pond, is 225' x 90' x 6' deep, and has 121,500 cubic feet of useable rearing volume. The Pond's water is supplied by six pumps, each delivering 5 cfs from the Okanogan River. The pond is located on the left bank of the Okanogan River at river mile 62, near the community of Ellisforde. St Mary's Mission Pond is 72' x 12' x 4' and served with gravity flow from Omak Creek and from a well. Either water source can provide the necessary 550 gpm water supply. The Chinook are fed a restricted diet through the winter months followed by increased feeding

and accelerated growth prior to their April release. The size objective for these Chinook is 15 fpp.

### *Steelhead*

Steelhead broodstock for the Wells Hatchery stock program are collected in the west ladder of Wells Dam and from volunteer returns to the Hatchery. Fish are collected from throughout the run starting in August and into the following spring. To supply sufficient steelhead for all subbasins in the upper Columbia, 420 steelhead are collected for broodstock. Wild-origin fish have made up 5-12% of the broodstock. Fish are spawned in the spring as they ripen. Steelhead matings for the program are W x W, H x W, and H x H, with the latter destined for the Okanogan subbasin.

For the new local broodstock program, the 10 - 16 adult fish required for broodstock are collected at a weir and trap located at approximately river mile 0.5 in Omak Creek near its confluence with the Okanogan River. The trap is operated from March until early May. Collected steelhead are transported to Cassimer Bar Hatchery for holding. Hatchery-origin broodstock may be returned to Omak Creek if natural-origin steelhead are later trapped in order to meet broodstock protocols. Broodstock are examined weekly for ripeness and accordingly spawned. The mating preference is W x W crosses and secondarily H x W crosses.

At Cassimer Bar Hatchery, eggs are incubated in vertical Heath trays. Green egg to eyed egg survival is expected to be about 80%. Upon hatching and button-up, fry are transferred to modified Capillano troughs (63 cu. ft). Steelhead are reared in the troughs until July or when they reach 400/lb, when they are transferred to outside raceways (Golder 2002). Fingerlings are marked using elastomer-type tags. Due to water and space limitations at Cassimer Bar Hatchery, final rearing of the steelhead occurs at Colville Trout Hatchery.

Steelhead are reared to a size of 10 to 15 fish per pound and then scatter-planted in Omak Creek prior to mid-April. Any production above the 20,000 smolt objective will be planted into other Okanogan River tributaries (e.g. Tunk or Bonaparte creeks).

### Program Success

#### *Summer/fall Chinook*

The Similkameen Pond program has been operated consistently with the planned objective of managing the Okanogan and Methow summer/fall Chinook as a single population. The program has been successful in maintaining at least minimum numbers of spawning fish through years of poor freshwater and marine survival. In more recent years, the program has supported revitalized recreational and tribal fisheries throughout the Columbia River. Recent dispersal of production to Bonaparte Pond should improve the program contribution to population diversity in the Okanogan Basin.

The propagation of summer Chinook in the Okanogan subbasin was initiated with the 1989 brood year and a subsequent release of 352,600 yearling smolts in 1991. Since that time, releases have varied about the 576,000 program objective (WDFW 1999). Through 2003, all



releases were made from Similkameen Pond. However, this has resulted in excessive use of the spawning habitat in the Similkameen and upper Okanogan rivers while other historical habitats are under utilized. In 2004, 100,000 of the Chinook historically released from Similkameen Pond may be released from Bonaparte Pond. If successful, this release may be increased to 200,000 yearlings (depending on modifications to the pond – see above).

The summer/fall Chinook destined for the Okanogan River has recently experienced a substantial increase. From runs of under 5,000 fish passing Wells Dam, returns since 2001 have ranged from about 40,000 to 69,000 adults. The proportion of hatchery-origin fish in the naturally spawning population is substantial ranging from just under 50% in the lower runs of recent years to over 70% in the last few larger runs.

The smolt-to-adult return rate for the Similkameen rearing pond has averaged 0.74 for brood years 1989 through 1997, ranging from 0.001-2.11.

#### *Spring Chinook*

Adults are not expected to start returning until May or June of 2005. Therefore no measurements of program success are available. Performance standards and indicators have been developed for the program and will be the basis for a monitoring and evaluation program.

Rearing in the new acclimation ponds has not been without mishap, however. At St Mary's Mission Pond, 10,000 fish were lost just prior to release. In 2004, all 45,000 fish were lost when the gravity water supply iced up and the auxiliary pump failed.

#### *Steelhead*

From brood year 1981 through brood year 1996, smolt-to-adult survival for Wells Hatchery stock has ranged from 0.29% to 7.54 %, with a median survival of 0.92% and a mean survival of 1.63 % (WDFW 2002).

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