HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Winthrop National Fish Hatchery Leavenworth Hatchery Complex
Species or Hatchery Stock:	Summer Steelhead *(Oncorhynchus mykiss)*
Agency/Operator:	U. S. Fish and Wildlife Service (USFWS)
Watershed and Region:	Methow River, tributary to the Columbia River, Washington State
Date Submitted:	
Date Last Updated:	August, 2005

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.
Winthrop National Fish Hatchery (WNFH)

1.2) Species and population (or stock) under propagation, and ESA status.
Wells Dam/Hatchery stock of summer steelhead (SST), listed.

1.3) Responsible organization and individuals

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:
Involved parties include those associated with the Columbia River Fish Management Plan and the *U.S. v. Oregon* court decision.

1.4) Funding source, staffing level, and annual hatchery program operational costs.
Winthrop NFH is funded by the Bureau of Reclamation (BOR) at about $284,000 annually, and is staffed by 5 FTE's. Fish marking, evaluation, and fish health programs are not included in the above operational costs. Other USFWS offices, funded by the BOR, conduct these programs.

1.5) Location(s) of hatchery and associated facilities.
Winthrop NFH is part of the Leavenworth Complex, which also includes Leavenworth and Entiat NFH's. Winthrop NFH is located about ½ mile west of Winthrop, WA on the Methow River, 50.4 river miles (rm) above its confluence with the Columbia River. Fish released from and those returning to WNFH must travel about 524 Columbia rms and negotiate passage through nine Columbia River hydroelectric dams.

1.6) Type of program.
Mitigation

1.7) Purpose (Goal) of program.
The original purpose of this program was to mitigate for Grand Coulee Dam. In 1995, the small

summer steelhead program at Leavenworth NFH was moved to the Winthrop facility. At that time, SST were not listed. Since their listing in 1997, the program has moved towards aiding in the recovery of this stock.

1.8) Justification for the program.
The hatchery was originally authorized through the Grand Coulee Fish Maintenance Project in 1937 and again by the Mitchell Act in 1938. Winthrop NFH is one of three mid-Columbia hatcheries constructed by the BOR as mitigation for the Grand Coulee Dam-Columbia Basin Project. The current goal of the program is the restoration of the listed Methow River stock, while maintaining its mitigation responsibilities. □

1.9, 1.10) List of program "Performance Standards and Indicators".
Performance Indicators are designated as "Risk assessment" (R) or "Benefits" (B).

Legal Mandates:
Performance Standard (1): Program contributes to mitigation requirements as stated in the Columbia River Fish Management Plan and the *U.S. v. Oregon* decision.

Indicator (a): **(B)** Number of fish released by program, returning, or caught, as applicable to given mitigation requirements.

Performance Standard (2): Program addresses ESA responsibilities.

Indicator (a): **(R)** ESA consultations under Section 7 and 10 have been completed. A Biological Opinion (Permit # 1300) has been issued to the facility. Modifications to existing BA's are done in a timely manner.

Conservation of Wild/Naturally Spawning Populations:
Performance Standard (3): Artificial propagation program contributes to an increasing number of spawners returning to natural spawning areas.

Indicator (a): **(B)** Annual number of spawners on spawning grounds, by age.

Indicator (b): **(B)** Spawner-recruit ratios.

Indicator (c): **(B)** Annual number of redds in selected natural production index areas.

Performance Standard (4): Releases are sufficiently marked to allow statistically significant evaluation of program contribution to natural production, and to evaluate effects of the program on the local natural population, where feasible.

Indicator (a): **(R)** Marking rates and type of mark.

Indicator (b): **(R)** Number of marks and estimated total proportion of this population in juvenile dispersal and in adults on natural spawning grounds.

Life History Characteristics:
Performance Standard (5): Annual release numbers do not exceed estimated basin-wide and local habitat capacity, including spawning, freshwater rearing, migration corridor, and estuarine and near-shore rearing.

Indicator (a): **(R)** Carrying capacity criteria for basin-wide and local habitat, including method of calculation.

Indicator (b): **(R)** Annual release numbers from all programs in basin and subbasin, including size and life-stage at release, and length of acclimation, by program.

Indicator (c): **(R)** Location of releases and natural rearing areas.

Indicator (d): **(R)** Timing of hatchery releases, compared to natural populations.

Genetic Characteristics:
Performance Standard (6): Juveniles are released on-station, or after sufficient acclimation to maximize homing ability to intended return locations.

Indicator (a): **(R)** Location of juvenile releases.

Indicator (b): **(R)** Length of acclimation period.

Indicator (c): **(R)** Release type, whether forced, volitional, or direct stream release.

Performance Standard (7): Juveniles are released at fully smolted stage.

Indicator (a): **(R)** Level of smoltification at release, compared to a regional smoltification index (when developed). Release type, whether forced, volitional, or direct stream release.

Research Activities:
Performance Standard (8): The artificial production program uses standard scientific procedures to evaluate various aspects of artificial propagation.

Indicator (a): **(R)** Scientifically based experimental design, with measurable objectives and hypotheses.

Operation of Artificial Production Facilities:
Performance Standard (9): Artificial production facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols such as those described by IHOT, PNFHPC, the co-managers of Washington Fish Health Policy, INAD, and MDFWP.

Indicator (a): **(R)** Annual reports indicating level of compliance with applicable standards and criteria.

Performance Standard (10): Effluent from artificial production facility will not detrimentally affect natural populations.

Indicator (a): **(R)** Discharged water quality compared to applicable water quality standards and guidelines, such as those described or required by NPDES, IHOT, PNFHPC, and Co-managers of Washington Fish Health Policy tribal water quality plans, including those relating to temperature, nutrient loading, chemicals, etc.

Performance Standard (11): Water withdrawals and instream water diversion structures for artificial production facility operation will not prevent access to natural spawning areas, affect spawning behavior of natural populations, or impact juvenile rearing environment.

Indicator (a): **(R)** Water withdrawals compared to applicable passage criteria.

Indicator (b): **(R)** Water withdrawals compared to NMFS, USFWS, and WDFW juvenile screening criteria.

Indicator (c): **(R)** Number of adult fish aggregating and/or spawning immediately below water intake point.

Indicator (d): **(R)** Number of adult fish passing water intake point.

Indicator (e): **(R)** Proportion of diversion of total stream flow between intake and outfall.

Performance Standard (12): Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens.

Indicator (a): **(R)** Certification of juvenile fish health immediately prior to release, including pathogens present and their virulence.

Indicator (b): **(R)** Juvenile densities during artificial rearing.

Performance Standard (13): Predation by artificially produced fish on naturally produced fish does not significantly reduce numbers of natural fish.

Indicator (a): **(R)** Size at, and time of, release of juvenile fish, compared to size and timing of natural fish present.

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish). Winthrop NFH does not collect adults for this program. Eyed eggs are received from WDFW/Wells Dam Hatchery.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

Table 1. Current proposed annual release numbers for SST at Winthrop NFH.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling		
Yearling	Methow River	100,000

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

All hatchery reared SST released from WNFH are adipose fin-clipped. This, coupled with the fact that no adults are collected at Winthrop NFH, makes it impossible at this time to answer this question, as no survival data is available.

1.13) Date program started (years in operation), or is expected to start.

The current SST program began in 1995.

1.14) Expected duration of program.

Ongoing

1.15) Watersheds targeted by program.

Methow River Basin (WRIA 48). Returning adults of WNFH origin are expected to return to the Methow Basin only, although some may be harvested in Columbia River and ocean fisheries.

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

1.16.1 Brief Overview of Key Issues

A portion of the issues stated below were presented by entities other than the USFWS, and therefore are not necessarily the opinion of the management entity.

Steelhead eggs for the program are obtained from adults collected at Wells Dam (Columbia River) by WDFW. These eggs are typically from the mating of two hatchery origin adults, which causes concern. A current issue is whether steelhead adults should be collected at Winthrop NFH for the program. This action would support the development of a local brood source for the Methow Basin. This program would also enhance recovery of this species if it shifted to acclimating the smolts in an upper-basin acclimation site where they would be released volitionally and subsequently return to sites in the basin as adults (instead of the hatchery).

1.16.2 Potential Alterations to the Current Program

The potential alterations presented are in draft form and are not necessarily endorsed by the

management entity, as mitigation responsibilities may override the desire to implement the alternative.

Alternate 1: Develop a local broodstock by utilizing adults returning to WNFH (Methow River) instead of those captured at Wells Dam on the Columbia River. Currently, all steelhead released into the Methow Basin come from adults collected on the mainstem Columbia River. For the past several years, numerous steelhead adults (hatchery and wild) returned to and spawned in the channel that connects the adult collection ladder (WNFH) to the Methow River. A portion of these adults could be secured and spawned at WNFH to replace those taken at Wells Dam. Those taken at Wells Dam could potentially be destined for areas other than the Methow River, therefore hindering the success of developing a local Methow stock. This action would reduce risks involved with "homogenizing" stocks in the upper Columbia Basin, but could potentially lead to further domestication of the broodstock if insufficient wild fish were not captured.

Alternate 2: Incorporate "natural origin" adults into the broodstock. Natural origin adults (NOR) could potentially be captured from tributary traps within the Methow Basin, or an increased number of NOR adults could be collected at Wells Dam. Another option, which is tied to Alternative 1, is to secure brood from the adults spawning in the hatchery's channel. Concern has been expressed over using only hatchery origin adults for the program. With the inclusion of naturally produced adults, the overall fitness of this stock should increase. Expectations for the 2004 brood are to use hatchery/wild adult crosses as opposed to the current hatchery/hatchery adults used for brood.

1.16.3 Potential Reforms and Investments

The potential reforms and investments stated below are in draft form, presented for further discussion, and do not represent final decisions by the management entities.

Reform/Investment 1: Obtain/secure an acclimation site in the upper-basin (above WNFH) for acclimation and release of steelhead smolts. This investment/reform would alleviate concerns over the current "concrete to concrete" program. By releasing the smolts into a section of river where natural spawning already occurs, genetic and ecological risk's involved with a traditional hatchery to hatchery program would decrease. A potential obstacle to this reform is securing adults from the Methow River for the program (adults would no longer return to the hatchery). This reform would reduce risks to the natural population and could potentially increase survival. Estimated costs are in the range $$$.

For reference:

$	<$50,000
$$	$50,000 to $99,000
$$$	$100,000 to $499,000
$$$$	$500,000 to $999,000
$$$$$	$1,000,000 to $4,999,000
$$$$$$	$5,000,000 and over

SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS. (USFWS ESA-Listed Salmonid Species and Non-Salmonid Species are addressed in Addendum A)

2.1) List all ESA permits or authorizations in hand for the hatchery program.

USFWS # 1-9-99-I-112 (bull trout).
NMFS # 1118 (steelhead and spring Chinook).
NMFS # 1300 (extension of # 1118).
NMFS # 1119 (research).

2.2) Provide descriptions, status, and projected take actions and levels for NMFS ESA-listed natural populations in the target area.

2.2.1) Description of NMFS ESA-listed salmonid population(s) affected by the program.

Spring Chinook salmon (SCS)

Adult spring Chinook destined for the upper-Columbia Basin enter the Columbia River beginning in March and reach peak abundance (in lower river) in April and early May (Chapman et al. 1995). Spring Chinook enter the mainstem portions of tributaries from late-April to July. Spawning occurs from late-July through September, usually peaking in mid to late August (Chapman et al. 1995).

Data from post-spawn adults collected and sampled in mid-Columbia tributaries, 1986 to 1993, shows that on average, 5% of males return at age 3, 58% at age 4, and 37% at age5. Female averages are 58% at age 4, and 42% return at age 5 (Chapman et al. 1995). On the spawning grounds, Chapman et al. (1995), indicated that females may dominate the males in numbers, but state that the ratio may be closer to 1:1. This is because there is a greater likelihood of recovering females on the spawning grounds than males (Chapman et al. 1994).

Wild juvenile spring Chinook salmon originating in the upper-Columbia Basin emigrate towards the ocean during their second year. Average size at emigration (April and May) ranges from about 91.8mm to 100.5mm (averages from three emigration studies) (Chapman et al. 1995).

From 1985 to 1993, the average 10^{th}, 50^{th}, and 90^{th} percentile passage at Rock Island Dam was April 21^{st}, May 10^{th}, and June 3^{rd} respectively (Chapman et al, 1995). Although these percentages are strongly influenced by releases from Leavenworth NFH, Chapman et al. (1995) believe that the naturally produced migrants have a run timing similar to the hatchery component.

Summer Steelhead (SST)

Steelhead destined for the upper-Columbia region enter the Columbia River between May and September (WDF et al. 1990). They pass Rock Island Dam from July through the following May. All steelhead spawn in the spring regardless of when they enter the

Columbia River.

Spawning grounds are not surveyed for steelhead because the adults generally spawn over a 4 to 5 month period coinciding with the spring run-off when water visibility is low and discharge high (Chapman et al. 1994). Spawning is believed to take place between March and June, but has been observed as late as July (Chapman et al. 1994).

Females make up about 65% of adults sampled at Wells Dam; of smolts sampled at Rock Island Dam in 1988, 63% were female (Chapman et al. 1994).

Howell et al. (1985) reported age estimates from creel surveys in the Wenatchee River from the late 1970s to the early 1980s. Scale samples from these surveys were used for age determination. In the Wenatchee River, they report naturally produced steelhead of five different age classes (2.1, 2.2, 2.3, 3.1, and 3.2), with the largest percentage in the 2.1 class. The "European Method" was used for age determination where the first digit represents the number of winters spent in freshwater, and the second digit indicates the number of winters in saltwater.

Migrating steelhead smolts captured at Rock Island Dam average 163 to 188 mm. Adults returning after one year average 59 to 64 cm, whereas those spending two years at sea average 67 to 76 cm when returning to freshwater. Between 1986 and 1993, wild adults of both sexes combined, averaged 66.5 cm (Chapman et al. 1994).

- **Identify the NMFS ESA-listed population(s) that will be directly affected by the program.**

Methow Basin summer steelhead.

- Identify the NMFS ESA-listed population(s) that may be incidentally affected by the program.

UCR steelhead and Methow Basin spring Chinook salmon.

2.2.2) Status of NMFS ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.

NMFS determined that the annual rate of population change for the UCR spring Chinook and summer steelhead ESU is less than 0.9, and decreasing in abundance at a rate of at least 10% per year. These populations are at dire risk, with only small fractions of their already depressed populations expected to persist through the next 24 years under current conditions (NMFS 2001). Therefore, UCR spring Chinook and summer steelhead are considered at a "critical population threshold."

- **Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**

See below

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.
See below

- **Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.**

Table 2. Number of steelhead passing Wells Dam and estimates of natural component, 1990 to 2001. (www.fpc.org - 12/02).

Year	Total Adults	# of Natural Origin Adults	Year	Total Adults	# of Natural Origin Adults
1990	3,819	Not available	1996	4,127	Not available
1991	7,715	Not available	1997	4,107	Not available
1992	7,073	Not available	1998	2,668	314
1993	2,400	Not available	1999	3,557	603
1994	2,183	Not available	2000	6,280	1,787
1995	945	Not available	2001	18,483	8,381

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of NMFS listed fish in the target area, and provide estimated annual levels of take

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.
Since WNFH does not collect adults for this program, no take is expected. Eggs are transferred to WNFH from brood taken by WDFW at Wells Dam.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.
Please see above

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).
See Table 1 in appendix and above.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this

plan for the program.
No "take" is expected; therefore no plan is in place.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.
The Columbia River Fish Management Plan *(US v. Oregon)* directs the operation/production of this facility.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.
Original Authorities

- Grand Coulee Dam Project, 49 Stat. 1028, 08/30/1935
- Grand Coulee Fish Maintenance Project, 04/03/1937
- Mitchell Act, 52 Stat. 345, 05/11/1938
- Columbia Basin Project Act, 57 Stat. 14, 03/10/1943
- Mitchell Act (amended), 60 Stat. 923, 08/14/1946
- Fish and Wildlife Coordination Act, 60 Stat. 1080, 08/14/1946

Description of Roles/Responsibilities/Authorities Beyond Those Initially Authorized

- Treaty with the Walla Walla, Cayuse, Umatilla Tribes, 06/09/1855
- Treaty with the Yakama, 06/09/1855
- Treaty with the Nez Perce, 06/11/1855
- Treaty with the Tribes of Middle Oregon, 06/25/1855
- Executive Order (Treaty with Bands of Colville), 04/08/1872
- U.S. v. Oregon (Sohappy v. Smith, "Belloni decision", Case 899), 07/08/1969
- Endangered Species Act of 1973, 87 Stat.884, 12/28/1973
- Salmon and Steelhead Conservation and Enhancement Act, 94 Stat. 3299, 12/22/1980
- Pacific Salmon Treaty Act of 1985 (U.S./Canada Pacific Salmon Treaty), Public Law 99-5, 16 U.S.C. 3631, 03/15/1985

3.3) Relationship to harvest objectives.
Although the ESA status of this stock should preclude any harvest, some adult steelhead may be incidentally taken in Columbia River fisheries.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.
Fisheries that could potentially benefit from the program:

- Marine sport and commercial
- Columbia River gill net and freshwater net
- Columbia River and freshwater sport
- Treaty ceremonial and tribal harvest

Since steelhead are not specifically targeted in the commercial or tribal fishery, few adult steelhead of WNFH origin would be expected to be harvested.

3.4) Relationship to habitat protection and recovery strategies.

As previously mentioned, WNFH is a mitigation facility constructed to compensate for the loss of spawning and rearing habitat due to the construction of Grand Coulee Dam.

The following was taken directly from the Draft Methow Subbasin summary (CBFWA 2002).

A central limitation to building self-sustaining populations of anadromous fish in the Methow Subbasin is the high smolt and adult mortalities incurred at the nine hydropower facilities that lie downstream from the Methow's confluence with the Columbia River. These mortalities severely reduce the number of naturally produced adults that return to spawn and reseed available habitat within the Methow Subbasin.

Within the Methow Subbasin, habitat types, habitat conditions, and land uses vary primarily according to topography, climate, relative ease of access, and duration of human activity. Extreme winter temperatures, particularly in the watershed's upper reaches, play an important role in limiting potential salmonid productivity within the basin.

Over the course of the last century, a number of human induced physical changes have redefined the quality and quantity and terrestrial habitat found in the mid and lower reaches of the Methow Subbasin. Most significant among these changes is habitat fragmentation compounded by degradation in overall habitat quality; the result of historic and current agricultural practices, timber management, mismanaged grazing, mining, and commercial and residential development activities.

An additional crucial factor affecting habitat quality in the Methow Subbasin is water quantity. Numerous streams and creeks throughout the Methow watershed are prone to naturally occurring seasonal low flows and occasional dewatering. Those natural flows and instances of dewatering have been compounded in some cases by irrigation withdrawals and by agricultural water use inefficiencies in some Methow tributaries.

3.5) Ecological interactions.

Table 3. Expected fish species present in Methow River.

Salmonid Species	Scientific Name	Non-salmonid Species	Scientific Name
Spring Chinook salmon	*Oncorhynchus tshawytscha*	Longnose dace	*Rhinichthys cataractae*

Summer Chinook salmon	*O. tshawytscha*	Mottled sculpin	*Cottus bairdi*
Sockeye salmon	*O. nerka*	Largescale sucker	*Catostomus macrocheilus*
Coho salmon	*O. kisutch*	Bridgelip sucker	*C. columbianus*
Summer steelhead	*O. mykiss*	Pacific lamprey	*Entosphenus tridentatus*
Westslope cutthroat trout	*O. clarki lewisi*	Northern pikeminnow	*Ptychocheilus oregonensis*
Redband trout	*O. mykiss gairdneri*	Redside shiner	*Richardsonius balteatus*
Bull trout	*Salvelinus confluentus*		
Brook trout	*S. fontinalis*		
Mountain whitefish	*Prosopium williamsoni*		

Juvenile Releases

Competition:

When hatchery-origin salmonids are released into the Methow River the potential exists for intra- and inter-specific competition with natural-origin juvenile salmonids, including listed spring Chinook salmon and steelhead (NMFS 2001). Listed wild spring Chinook and steelhead are present year-round in Upper Columbia River region tributary and mainstem areas. Spring Chinook fry emerge from the gravel in late winter or early spring at an average size of approximately 30 mm fl, with most fry immediately moving downstream to mainstem tributary areas for rearing (NMFS 2001). Upper Columbia River spring Chinook salmon migrating seaward as yearling fish between April and June, average 87 to 127 mm fl (NMFS 2001). Steelhead fry egress from late spring through August at a size of 30 to 33 mm fl (NMFS 2001). The fry disperse to downstream areas in late summer and fall. Upper Columbia River steelhead emigrate seaward as age 2+ (43.2%) or 3+ (46.4%) smolts (Peven, 1990) during April and May at an average size of 163 to 188 mm (Chapman et al. 1994).

Direct competition for food and space between hatchery and natural fish may occur in spawning and/or rearing areas, the migration corridor, and ocean habitat. SIWG (1983) reported a high risk of ecological resource competition between hatchery and natural steelhead juveniles where they overlap in freshwater occurrence. These impacts are assumed to be greatest in the spawning and nursery areas and points of highest fish density (release areas) and to diminish as hatchery smolts disperse (MCMCP 1997). Release of hatchery smolts that are physiologically ready to migrate is expected to minimize competitive interactions, as they should quickly migrate out of the spawning and rearing areas (NMFS 1995). Competition continues to occur at some unknown, but probably lower level as smolts move downstream through the migration corridor (MCMCP 1997).

Rearing and release strategies are designed to limit the amount of ecological interactions occurring between hatchery and naturally produced fish. Fish are reared to sufficient size that smoltification occurs within nearly the entire population, which reduces retention time in the streams after release (Bugert et al. 1991). Hatchery produced smolts emigrate seaward soon after release, minimizing the potential for competition with wild fish (Steward and Bjornn 1990). Witty et al. (1995) state they did not find any literature or

data to demonstrate functional relationship between numbers of juvenile migrants moving through reservoirs and impacts on smolt survival attributable to competition.

Large hatchery steelhead release concentrations may cause displacement of rearing wild steelhead juveniles from occupied stream areas, leading to abandonment of advantageous feeding areas, or premature out-migration. Pearsons et al. (1994) reported displacement of wild juvenile rainbow trout from discrete sections of streams by hatchery steelhead released into an upper Yakima River tributary, but no large-scale displacements of trout were detected. They noted that these behavioral interactions between hatchery-reared steelhead did not appear to have a significant impact on the trout populations examined, however, and that the population abundance of wild salmonids did not appear to have been negatively affected by releases of hatchery steelhead. Volitionally releasing steelhead smolts from Winthrop NFH will help decrease density dependant effects on wild fish, such as niche displacement and "pulling" leading to premature migration.

Predation:

Hatchery fish may prey upon natural fish. Due to their location, size, and time of emergence, newly emerged Chinook salmon fry are likely to be the most vulnerable to predation by hatchery-released fish (USFWS 1994). Emigration out of hatchery release areas and foraging inefficiency of newly released hatchery smolts may minimize the degree of predation (USFWS 1994). SIWG (1984) reported that there is an unknown risk of predation by hatchery steelhead on wild steelhead juveniles where they interact in freshwater migrational areas. The group also noted that predation may be greatest when large numbers of hatchery smolts encounter newly emerged fry or fingerlings, or when hatchery fish are large relative to wild fish. Due to their location in the upper portions of the drainages and later time of emergence (late spring through August (MCMCP 1997)), wild steelhead fry are not likely to be vulnerable to predation by hatchery smolts.

Hatchery steelhead released at WNFH in April may encounter emigrating spring Chinook and steelhead smolts in the action area during the hatchery fish release and downstream migration period. Predation by hatchery fish on listed spring Chinook and steelhead smolts commingling with hatchery fish during seaward emigration is unlikely, given the similar size of hatchery salmon and wild spring Chinook, and the generally larger size of emigrating wild steelhead smolts (NMFS 2001). The hatchery releases may pose indirect predation risks to the wild fish in Basin reaches where hatchery fish are densely distributed and commingled with wild fish, however, by attracting avian or fish predators (NMFS 2001).

Residualism:

Spring Chinook, summer Chinook, sockeye, and coho salmon released from hatcheries as yearling smolts do not have the same potential to residualize as steelhead (NMFS 2001). Standardization of the life history of these salmon species by producing yearling smolts differs from the variability in growth and advent of smoltification evident in wild fish populations. The hatchery production strategies designed to release uniform sized smolt groups limit the likelihood for residualization of the salmon released (NMFS 2001).

Hatchery-reared salmon and steelhead released into spawning and rearing areas of natural species may fail to emigrate (residualize), and may negatively interact with natural fish (MCMCP 1997). Pearsons et al. (1994), state that residual hatchery steelhead predation on wild salmonids may be a concern regarding the health of wild steelhead populations. The rate of steelhead residualism is thought to average 5 to 10% of the number released (NMFS 1995). Hatchery releases are timed to mimic the outmigration of naturally produced salmon to further reduce potential residuals.

Transmission of Disease or Parasites:

The potential for WNFH fish to transmit diseases and parasites to listed salmonids is unknown, but thought to be low. Service fish health biologists routinely assess the health of steelhead propagated at WNFH. At least once per month, biologists sub-sample ponds to determine Bacterial Kidney Disease (BKD) levels, overall fish health, parasites, and the possible occurrence of other viral or bacterial infections. Under Service fish health policy, fish at WNFH must be destroyed and their remains buried if they are diagnosed with viral diseases not endemic to the country or that threaten the continued existence of fish populations. Parasites are not prevalent among WNFH fish.

Migration Corridor:

Hatchery salmon smolts released from Upper Columbia River hatcheries may encounter listed Columbia and Snake river basin salmon and steelhead juveniles during migration in the mainstem Columbia River and the estuary (NMFS 2001). Spatial and temporal interaction between hatchery-released smolts and listed salmon and steelhead juveniles may lead to several types of adverse affects on the listed natural populations: predation, competition, behavioral alteration, and disease transmittal.

There is likely a low risk of predation by Upper Columbia River hatchery steelhead smolts on listed Chinook salmon, sockeye, and steelhead juveniles due to low spatial and temporal overlap with fish of a susceptible size in the migration corridor. Listed Lower Columbia River chum salmon may be susceptible to predation by yearling Chinook salmon in the lower Columbia River and estuary (NMFS 2001). SIWG (1984) indicated a high risk that predation by this species (and others) would have negative effects on the productivity of chum salmon. Chum are thought to emigrate predominately in March, which may separate them from Upper Columbia region hatchery steelhead, which are released in April. The duration of time that chum salmon inhabit the Columbia River estuary is unknown, as is the risk of predation on the commingled wild fish (NMFS 2001).

Potential impacts of competition on listed fish in the migration corridor likely diminish as hatchery smolts disperse from the hatchery release locations and become less concentrated. Food resource competition may continue to occur at an unknown, but likely lower level as smolts move downstream through the migration corridor (NMFS 2001). NMFS (1996) previously determined that no adverse competition effects on co-occurring listed salmon in the migration corridor would result from the release of hatchery smolts that begin migration immediately seaward after release. The release of migration-ready smolts limits the duration of interaction with wild salmonids in the

migration corridor.

Release of only smolts from WNFH will minimize temporal overlap between hatchery-released salmon and listed natural fish in the Columbia River mainstem. Releases of hatchery salmon smolts coincident with managed releases of water from dams (water budget releases) will help accelerate migration of hatchery-released salmon, further reducing spatial and temporal overlaps with wild fish (NMFS 2001).

Additional compliance with fish disease control and minimization policies and guidelines (IHOT 1995), significantly decreases the likelihood for transfer of disease from hatchery salmon to listed wild salmonids during the seaward emigration period in the mainstem river (NMFS 2001).

Returning Adults

The possibility is thought to be low that adult steelhead returning to the upper Columbia region will adversely impact listed "wild" salmonids. No steelhead adults are collected at Winthrop NFH. The returning adults of WNFH origin are expected to spawn naturally to aid in the recovery of this species.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

WNFH has withdrawn up to 75% (up to 50 cfs) of its water supply from the Methow River (Foghorn Dam) and 25% from ground water supply. This figure (50 cfs) represents about 3% of the mean annual discharge of 1,592 cfs (Mullan et al. 1992). Due to fish health considerations, WNFH is reducing its use of Methow River water which should further lessen its impact to UCR listed salmonids. The area affected by this action (from withdrawal to return) is about 2100m in length. Foghorn Dam Fish Ladder and Intake was completed in 1996. The inlet to the intake area has fish exclusion racks designed by NMFS personnel. About ¼ mile below the initial intake on the Foghorn Ditch is the WDFW, Methow Fish Hatchery intake. Below the WDFW hatchery (about 150 yards) on the Foghorn ditch is a gate and fish bypass channel. No screens here, but the gate opens from the bottom of the ditch and the bypass channel spills over a concrete weir. The bypass channel leads back to the Methow River. About ¼ mile below the bypass is the WNFH intake. The intake has a trash rack at the ditch leading to the screen chamber. The screen chamber consists of a 10 ft. diameter rotary screen built and maintained by the WDFW screen shop in Yakima, WA. The WDFW maintenance crew periodically checks to ensure that there are no entryways larger than 3/32" that lead to the hatchery intake pipe. All fish entering the screen chamber are spilled into a concrete trough leading to a bypass channel, which leads back to the Methow River.

Table 4. Winthrop NFH Water Certificates.

Certificate #	Source	Purpose/use	Priority Date	Amount
7209-A	Groundwater. Infiltration gallery and well	Fish propagation	04/06/1967	1500 gpm, 2400 af/yr

7509 - A	Groundwater. Infiltration gallery and well	Fish propagation, operation and maintenance of hatchery	02/17/1971	1500 gpm, 2400 af/yr
3203	Spring Branch Springs	Irrigation with supplemental use for operation of hatchery	07/23/1891	10 cfs
848	Methow River Original Certificate 201, Certificate of Change	Originally for production of hydropower, later changed to fish propagation	01/10/1922 04/20/1942	50 cfs 50 cfs

Water quality data for the Methow River are in Attachment 1.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

As stated in the previous section, the intake and water delivery systems are in compliance with NMFS criteria. This, coupled with the fact that the facility complies with NPDES standards, should reduce impacts to listed stocks in the basin.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Collection of adults for this program is conducted by WDFW at Wells Dam. Please refer to their BA (dated 6/12/02) and subsequent permit (permit # 1094) for information.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Steelhead are transferred to Winthrop NFH as eyed eggs. Eggs are bagged, then placed in coolers prior to the approximately one-hour trip to the hatchery.

5.3) Broodstock holding and spawning facilities.

Not applicable – see 5.1.

5.4) Incubation facilities.

Eyed eggs are received from Wells Dam SFH in January or February. After enumeration, the eyed eggs are placed in Marisource stack-type incubators. Each tray is loaded with a maximum of 6,000 eggs and water flow is maintained at 2 to 5 gpm. Water source is 100% ground water throughout incubation and temperatures are constant at 47 to 49° F. Formalin treatments are not necessary during incubation.

5.5) Rearing facilities.

Steelhead start out in rectangular tanks (89 cubic feet) inside the hatchery building. When a maximum Density Index (DI) of 0.20 lbs/cu.ft./in. is reached, the fish are split into additional tanks and eventually moved to outside Foster-Lucas ponds. The DI is maintained at or below 0.20 lbs/cu.ft./in. throughout the rearing cycle.

5.6) Acclimation/release facilities.
Steelhead are reared on 100% ground water until they reach a size of approximately 10 fish/lb the following winter. At this time they are moved to the final rearing and acclimation ponds, which are 12' x 100' raceways, supplied with a mixture of ground and surface water. The percentage of surface water is gradually increased through release time in mid-April. Release is volitional over notched dam boards and through an underground pipe system, which empties at the base of the collection ladder.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.
A plugged inflow spray-arm led to the loss of about 20,000 fingerling SST in 1995. The blockage was caused by a dead rainbow trout that entered the water system through the surface water intake. A new rotary fish screen has since replaced the old screen system.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.
The hatchery is staffed full-time, eight hours per day. Two employees live in residential quarters on hatchery grounds. The hatchery has a centrally located low-water alarm, which is connected to an automatic dialer. If the dialer fails, a paging system engages and contacts employees up to five miles away. A low water level switch also triggers a horn alarm to alert employees. If power is lost to the facility, a back-up generator engages automatically to restore power.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.
Not applicable – see 5.1.

6.2) Supporting information.

6.2.1) History.
Not applicable – see 5.1.

6.2.2) Annual size.
Not applicable – see 5.1.

6.2.3) Past and proposed level of natural fish in broodstock.
Not applicable – see 5.1.

6.2.4) Genetic or ecological differences.
Not applicable – see 5.1.

6.2.5) Reasons for choosing.
Not applicable – see 5.1.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

Not applicable – see 5.1.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Not applicable – see 5.1.

7.2) Collection or sampling design.

Not applicable – see 5.1.

7.3) Identity.

Not applicable – see 5.1.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

Not applicable – see 5.1.

7.4.2) Not applicable – see 5.1.

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Not applicable – see 5.1.

7.6) Fish transportation and holding methods.

Not applicable – see 5.1.

7.7) Describe fish health maintenance and sanitation procedures applied.

Not applicable – see 5.1.

7.8) Disposition of carcasses.

Not applicable – see 5.1.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Not applicable – see 5.1.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.
Not applicable – see 5.1.

8.2) Males.
Not applicable – see 5.1.

8.3) Fertilization.
Not applicable – see 5.1.

8.4) Cryopreserved gametes.
Not applicable – see 5.1.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.
Not applicable – see 5.1.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.
Survival goals for green egg to fry and fry to smolt have not been determined (IHOT 1995).

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Table 5. Number of eggs received and survival rates to ponding, 1995 to 2002.

Year	Eyed Eggs Received	Survival Rate to Ponding (%)
1995	115,000	97.9
1996	99,947 juveniles received	Not applicable
1997	0	Not applicable
1998	137,500	99.2
1999	120,168	98.1
2000	109,126	96.9
2001	155,743	98.9
2002	125,000	98.9

9.1.2) Cause for, and disposition of surplus egg takes.
Not applicable – see 5.1.

9.1.3) Loading densities applied during incubation.

Egg size averages 4,250 eggs/lb. Standard incubator flows are 2 to 5 gpm and are loaded at 5,000 to 6,000 eggs per incubation tray (Heath type).

9.1.4) Incubation conditions.
All steelhead eggs are incubated on 100% ground water. This water source is free of silt, does not create fungus problems, and provides constant temperatures in the 47 to 50F range during incubation. Dissolved oxygen (DO) is relatively constant at 9ppm on the inflow and not less than 8ppm at the outflow. It is not necessary to use formalin during incubation since *saprolegnia* fungus or silt has not been a problem.

9.1.5) Ponding.
Steelhead are fully buttoned-up at about 1,000 Daily Temperature Units (DTU) and are ponded-out at this time. Swim-up fry average 1.0 to 1.1 inches (2,300 to 2,600 fish/lb). Ponding is forced as trays are removed from the Heath stacks and transferred to appropriate shallow concrete troughs. Density indices are kept below 0.25 lbs/cu.ft./inch during early rearing.

9.1.6) Fish health maintenance and monitoring.
Same as 9.1.4 for fungus control. No cases of disease have occurred with the steelhead during early life stages. Egg mortalities are removed by hand at the eyed stage or by mechanical egg sorting machine in instances where mortality is higher than normal (>5%).

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.
Same as 9.1.4.

9.2) <u>Rearing</u>:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available..

Table 6. Percent survival estimates for juvenile SST, WNFH, 1995 to 2002.

Brood Year	Fry to Fingerling (%)	Fingerling to Smolt (%)
1995	72 (water supply failure)	99.8
1996	NA (received as fingerlings)	99.9
1997	NA (no SST received this year)	NA
1998	97.8	97.2
1999	94.8	99.1
2000	99.2	99.3
2001	97.2	97.7
2002	98.7	NA

9.2.2) Density and loading criteria (goals and actual levels).
Density indices have been successful at or below the goal of 0.25 lbs/cu.ft./inch (DI) for early rearing (fry stage) and 0.20 for latter rearing (fingerling to smolt stage).

9.2.3) Fish rearing conditions
All steelhead are reared on 100% ground water for the first year, if possible. Dissolved oxygen is periodically measured with a calibrated YSI digital meter and probe, and is normally 9 to 10ppm at the inflow and 8 to 9ppm at the outflow of all rearing units. Surface water is mixed with ground water during the last 5 to 6 months of rearing, gradually increasing the percentage of surface water until release. The DO of surface water is normally at or near saturation at the given temperature. Thermographs are constantly monitoring temperature of the water sources and weekly temperatures are also taken at each group of rearing units. Ground water temperatures are quite constant with a small range of 47 to 52F. Surface water temperatures are directly affected by air temperatures and can vary significantly during each day and throughout the differing seasons. Temperatures can range from as low as 33 F in December to as high as 67 F in August. Total gas pressure has only been measured when suspected super saturation problems occur. A Weiss saturometer was used during a gas bubble disease incident that occurred during low well levels. This created cavitation problems with the well pump and was producing total gas pressures 105 to 108 percent saturation. These problems have caused only very minor mortality. The few gas saturation problems that have occurred here have been solved by strategies such as adding screens to increase spray and nitrogen dissipation and shutting pumps down periodically to allow the wells to recharge for a number of days.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Table 7. Monthly table reflecting average program performance from broodyears 1995 to 2000.

Date (end of month)	Mean Length (mm)	Mean Weight (g)	Mean Cond. (K)	Ave Growth (mm)
March 31	29	0.22	0.89	Start
April 30	39	0.51	0.88	9.48
May 31	46	0.92	0.90	6.84
June 30	57	1.83	0.96	11.34
July 31	69	3.39	1.01	12.49
August 31	86	6.38	1.00	16.48
September 30	103	11.08	0.99	17.41
October 31	119	17.22	1.00	15.86
November 30	136	24.80	0.98	16.81
December 31	151	34.11	0.99	15.38

January 31	167	45.49	0.97	16.04
February 28	176	53.62	0.99	8.51
March 31	191	68.94	1.00	14.84
April 30	199	74.71	0.95	8.45
May 31	201	75.23	0.87	1.97

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Fish are generally checked for fat content on a monthly basis. A scale of 1 to 5 is used to quantify visceral fat levels, 1 is the minimum and 5 is an excessive fat level. Fat content generally begins to increase from a 1 or 2 level in the summer, to a 3 or 4 level in the fall as days become shorter and water temperatures drop. Cold-water temperatures, from use of river water in the winter, generally maintain these moderate fat levels throughout the winter. Feed levels are increased in the spring in order to put fish on a positive growth rate prior to release.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Table 8. Average program performance, feeding and food conversion,Winthrop NFH.

Month	Ave. lbs. of Feed/100K Fish	Ave. % Body Weight	Ave. Conversion	Ave. #/lb.	Ave. Temperature (F)
April	49	1.5	0.8	895	47.0
May	133	2.1	0.9	671	47.6
June	201	1.9	1.1	292	48.0
July	285	1.3	0.8	146	51.0
August	610	1.4	1.0	76	52.0
September	944	1.3	1.1	45	52.0
October	1,236	1.1	1.0	29	49.8
November	1,700	1.1	1.0	19	47.9
December	1,975	0.9	0.9	14	45.9
January	2,498	0.8	1.0	10	44.8
February	2,033	0.6	1.1	9	43.0
March	3,274	0.7	1.0	7	46.0
April	4,133	1.1	2.0	6	46.6

BioOregon semi-moist feeds are used throughout the rearing cycle of SST at WNFH.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures. Disease monitoring is accomplished by daily visual observations by hatchery staff and twice monthly monitoring by fish health biologists/pathologists from the Olympia Fish Health Center (OFHC). Any abnormal situation observed by hatchery staff is called to the attention of the OFHC, which performs diagnostic and confirmatory clinical tests before recommending appropriate treatments. Treatment procedures may include environmental manipulation to control stresses and enhance the fish's natural ability to recover from infectious agents and/or appropriate chemicals or antibiotics. Antibiotics and chemicals that are registered for fish disease treatments are applied as per labeled instructions. Other therapeutic drugs and chemicals may be applied through appropriate INAD permits or by allowable extra-label prescription by staff Veterinary Medical Officer or local Veterinarian. All test records and results are on file at the Olympia Fish Health Center.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable. Beginning in 1999, we began monitoring steelhead smoltification in an effort to determine how size may relate to this. We take length, weight, and stage of smoltification data weekly. This starts one week prior to the start of release and throughout the smoltification/volitional release window near the end of May. Fish are checked using a protocol developed by WDFW. Fish are anaesthetized (100 fish/sample), and length and weight measurements are taken and recorded. Fish are placed in one of four groups depending on the level of smolting. Levels are: 1=smolt, 2=transitional, 3=parr, and 4=precocious. This protocol gives us the ability to look at peak smoltification, which usually correlates with peak migration. It also gives us a good idea when most of the fish that are going to smolt have left the pond.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program. Steelhead are reared using conventional hatchery methods. This includes starting in tanks, graduating to Foster-Lucas ponds (FL) and finally to 12 x 100 raceways for final rearing until the volitional release begins. To the best extent, we are providing simulated natural cover for these fish during all stages. The start tanks are partially covered with camouflage netting, and the outdoor FL's and raceways are almost completely covered with this netting. During winter periods with heavy snow, we are forced to remove the netting but a majority of the time they are well covered. The fish better utilize all areas of the ponds, dispersing far more naturally while the covers are in place.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation. Since this program is lead by WDFW and we receive the eyed eggs from them, our influence on potential adverse genetic effects is minimal. However, through our rearing strategy, we attempt to minimize the extent to which we may negatively influence these fish genetically. The rearing program is arranged to achieve smoltification in the spring following the fry stage. With this rapid growth, feeding is carefully controlled to avoid excessive variation is sizes and at the same time reach a size range at which maximum smoltification will occur.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Table 9. Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs	0			
Unfed Fry	0			
Fry	0			
Fingerling	0			
Yearling	100,000	5 to 7	April 10 – May 20	Methow River

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: Methow River (WRIA 48)
Release point: rkm 81
Major watershed: Columbia River
Basin or Region: Upper Columbia Basin

10.3) Table 10. Actual numbers and sizes of fish released by age class through the program.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1996							141,798	6.2
1997							104,098	5.1
1998							NA	NA
1999							112,908	6.8
2000							98,831	5.5
2001							150,488	5.8
Average							121,625	5.9

10.4) Actual dates of release and description of release protocols.

Table 11. Release dates, how, what stage, and where released, WNFH.

Migration Year	Release Date	Type Release	Life Stage	Release Site
1997	April 23	Forced	Yearling/smolt	Methow River at Winthrop
1998	NA			
1999	April 14 – May 22	Volitional/ Remaining trucked and forced	Yearling/smolt	Methow River at Winthrop, and Methow River at rm 8
2000	April 10 – May 22	Volitional/ Remaining forced	Yearling/smolt	Methow River at Winthrop
2001	April 11 – April 30	Volitional/ Remaining forced	Yearling/smolt	Methow River at Winthrop

2002	April 15 – April 30	Volitional/ Remaining forced	Yearling/smolt	Methow River at Winthrop

Previous to migration year 1999, a specific date was chosen based on the start of bypass operations at downstream hydroelectric projects. The last three years, the option was given to release volitionally during a window of opportunity (increasing flows and turbidity) while bypass operations are in place.

10.5) Fish transportation procedures, if applicable.

Steelhead are generally not transported off station for release. However, if significant numbers of fish remain at the end of the volitional release period, they are transported downriver to mile eight at Effy Bridge. Washington Department of Fish and Wildlife has the most convenient fish hauling trucks and would likely be involved in any fish transportation. These trucks are set up with oxygen tanks and aerators. Truck tanks are loaded at 0.3 to 0.5 pounds of fish per gallon of water. Transport time to release sites is under one hour.

10.6) Acclimation procedures.

At this time, all acclimation occurs at Winthrop NFH. Fish are reared on 100% ground water for the first 10 months of the 14-month rearing cycle, if possible. River water is gradually introduced during the 10^{th} or 11^{th} month of rearing. The percentage of river water is gradually increased each month to a final mixture of about 80% river water and 20% ground water.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

As part of the WDFW recovery effort for listed steelhead, many hatchery steelhead are being crossed with wild steelhead (HxW). The progeny of these HxW crosses will not be marked with an adipose clip. Only the progeny of hatchery fish crossed with hatchery fish (HxH) must be marked with an adipose clip. Current marking is 100% adipose fin-clip.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

WDFW has varying release goals for the Methow River watershed. This occasionally calls for us to accommodate them by raising fish surplus to our planned production. The current plan for listed steelhead surplus to our production goal, allows for out-planting of fish to tributary streams as needed by WDFW.

10.9) Fish health certification procedures applied pre-release.

Sixty fish from all juvenile lots are sampled and tested for reportable bacterial and viral pathogens with methods that meet or exceed all national, international, IHOT or co-manager requirements. Semi-monthly monitoring of juveniles for parasites, gill, internal organ and overall condition continues until release.

10.10) Emergency release procedures in response to flooding or water system failure.

Emergency releases would occur only when no other choice is available. National Marine Fisheries Service must be contacted within 24 hours after the release. Listed spring Chinook salmon are the preferred fish to be released first, followed by listed summer steelhead.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

All releases of steelhead start when fish are beginning to smolt in early to mid-April and continue through a volitional release window of roughly five weeks. Volitional releases are normally timed to start with rising river levels which helps move fish out of the system swiftly. Steelhead released from this facility normally move out in 24 hours following a release. During release year 2001, the Yakama Tribe was operating a fish trap nine miles downriver. The trap was inundated with steelhead smolts within 12 hours of the start of the volitional release, confirming rapid downstream migration. Very few residual fish, generally less than a dozen, are observed at the hatchery outfall for any length of time following a release.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Legal Mandates

Performance Indicator 1a:

- Ensure, when possible, that production numbers meet those negotiated through *U.S. v. Oregon.*

Performance Indicator 2a:

- ESA consultations under Section 7 and 10 have been submitted and accepted. Modifications to existing BA's are completed to cover any program changes.

Conservation of Wild/Naturally Spawning Populations

Performance Indicators 3a – 3c and 4a and 4b:

- Estimate contribution to natural spawning through dam counts and redd surveys, when possible.
- Develop a distinguishing mark for this stock, if feasible, to aid in the evaluation process.

Life History Characteristics

Performance Indicators 5a – 5d:

- Release numbers do not exceed mitigated requirement or level stated in hatchery BiOp.
- No listed juveniles released outside of the Methow Basin.
- Ensure release dates coincide with wild fish migration timing.
- Smolts are volitionally released during or just prior to smoltification, which promotes a rapid migration.

Genetic Characteristics

Performance Indicators 6a – 7a:

- Juveniles are volitionally released directly from the hatchery to promote homing back to the facility and/or basin.
- Estimate optimal release time using historical emigration data, hatchery records, and the smoltification assessment protocol.
- Continue to obtain and utilize eggs from adults taken throughout the entire spectrum of the run as per WDFW protocol used at Wells Dam.

Research Activities

Performance Indicator 8a:

- Promote and conduct experiments as stated in the 2001 NMFS BiOp, when feasible. Study designs are peer reviewed when applicable.

Operation of Artificial Production Facilities

Performance Indicators 9a – 13a:

- Produce annual reports indicating level of compliance with applicable standards and criteria.
- Effluent is monitored weekly to ensure compliance with NPDES guidelines.
- Conduct monthly fish health monitoring and a pre-release examination. Adherence to regional fish health protocols is strictly maintained.
- Ensure rearing densities are within designated ranges.
- Release juveniles at size ranges as stated in IHOT, 1995.
- Water delivery system is in compliance with applicable standards.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.
Current funding fully supports the evaluation program as is. The BOR has been supportive of funding, as necessary.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Conduct monitoring and evaluation program in accordance with guidelines presented in the Biological Opinion covering this facility.

SECTION 12. RESEARCH

Currently, no research is conducted on steelhead.

12.1) Objective or purpose.

NA

12.2) Cooperating and funding agencies.

NA

12.3) Principle investigator or project supervisor and staff.
NA

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.
NA

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.
NA

12.6) Dates or time period in which research activity occurs.
NA

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.
NA

12.8) Expected type and effects of take and potential for injury or mortality.
NA

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).
NA

12.10) Alternative methods to achieve project objectives.
NA

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.
NA

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.
None, as no adverse effects are foreseen.

SECTION 13. ATTACHMENTS AND CITATIONS

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SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief.

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: summer steelhead	**ESU/Population: UCR – Wells Dam/Hatchery**	**Activity: Hatchery production**		
Location of hatchery activity: Winthrop NFH	**Dates of activity: Ongoing**	**Hatchery program operator: USFWS**		
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)	<5000 (5%)	<5000 (5%)		
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.