

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Prosser Upriver Bright Fall Chinook Production Program
Species or Hatchery Stock	Fall Chinook (<i>Oncorhynchus tshawytscha</i>)
Agency/Operator	Yakama Nation
Watershed and Region	Yakima River Subbasin/Columbia Plateau Province
Date Submitted	August 26, 2004
Date Last Updated	July 7, 2005

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Section 1: General Program Description

1.1 Name of hatchery or program.

1 Prosser Upriver Bright Fall Chinook Production Program (including Marion Drain production)

1.2 Species and population (or stock) under propagation, and ESA status.

1 Fall Chinook (*Oncorhynchus tshawytscha*)

9 ESA Status: Not listed and not a candidate for listing

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.

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Co-operators	Role
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Yakama Tribe	Receives production for restoration program funded by BPA Fish & Wildlife Program Funds
U.S. Bureau of Reclamation	Owner of facility land; and minor funding entity for facility upgrades and public education
U.S. Fish and Wildlife Service	Little White Salmon/Willard NFH Complex and Fish Pathology Monitoring and Analyses
National Marine Fisheries Service	Funding Entity/Administration via Mitchell Act Funds
Washington Department of Fish & Wildlife	Co-Manager
Bonneville Power Administration	Funding Entity- Administrator
U.S. Army Corps of Engineers	Funding Entity- Administrator via John Day mitigation
Northwest Power and Conservation Council (NPCC)	Makes Fish and Wildlife Program decisions under the Northwest Power Act

1.4 Funding source, staffing level, and annual hatchery program operational costs.

Funding Sources	
Mitchell Act / U.S. Army Corps of Engineers (John Day mitigation)	
Bonneville Power Administration	
Yakama Nation	
U.S. Bureau of Reclamation (Funds for facility improvements, public education, in-kind land contribution)	

Operational Information	Number
Full time equivalent staff	11
Annual operating cost (dollars)	1,141,042

Comments:

The URB fall chinook production program in the Yakima Basin is funded through John Day mitigation, the Mitchell Act, and the Bonneville Power Administration. John Day mitigation funds are used to culture the LWS fish up to being transferred to the Yakima Basin. Mitchell Act funds are used for final rearing and acclimation at the Yakima Hatchery. Bonneville Power Administration funds are used to culture the in-basin Yakima and Marion Drain stocks.

The program includes: 9 scientific technicians and 2 management biologists for Marion Drain and Prosser Hatcheries. This operational information is applicable to three separate programs: Prosser fall chinook, Marion Drain fall chinook, and Yakima Basin (Upper Yakima and Naches) coho programs.

LITTLE WHITE SALMON/WILLARD NFH COMPLEX

13 full-time

Annual Operating Dollars

1) Prosser Hatchery Program= \$54,200 (USACE Off-Station Release Budget)

2) Little White Salmon/Willard NFH Complex is \$1.14M for all programs.

Reviewer Comments:

Data source:

Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002. Blodgett, J. APRE Part 2 Interview, 18 December 2002. Fiander, W. Yakama Nation. Personal Communication. 12 May 2003.

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	Yakima River and Little White Salmon NFH
Broodstock collection location (stream, Rkm, subbasin)	Chandler Canal (Water diversion system upstream of and off right bank at Prosser Dam) and Prosser Dam- Right Bank Fish Ladder, Rkm 75.1, Yakima Subbasin; Little White Salmon NFH/Little White Salmon/Rkm 2.0/Little White Salmon; and Marion Drain fishwheel, ~Rkm 132.9, Yakima Subbasin.
Adult holding location (stream,	Prosser Hatchery (Off river of the Yakima River ~0.75 miles downstream of Prosser Dam , Rkm 75.1,

RKm, subbasin)	Yakima Subbasin; Little White Salmon NFH/Little White Salmon/RKm 2.0/Little White Salmon; and Marion Drain Hatchery, ~RKm 132.9, Yakima Subbasin.
Spawning location (stream, RKm, subbasin)	Prosser Hatchery (Off river of the Yakima River ~0.75 miles downstream of Prosser Dam , RKm 75.16 Yakima Subbasin; Little White Salmon NFH/Little White Salmon/RKm 2.0/Little White Salmon; and Marion Drain, ~RKm 132.9, Yakima Subbasin.
Incubation location (facility name, stream, RKm, subbasin)	Prosser Hatchery (Off river of the Yakima River ~0.75 miles downstream of Prosser Dam , RKm 75.16, Yakima Subbasin; Little White Salmon NFH/Little White Salmon/RKm 2.0/Little White Salmon; and Marion Drain, ~RKm 132.9, Yakima Subbasin.
Rearing location (facility name, stream, RKm, subbasin)	Prosser Hatchery (Off river of the Yakima River ~0.75 miles downstream of Prosser Dam , RKm 75.1, Yakima Subbasin; Little White Salmon NFH/Little White Salmon/RKm 2.0/Little White Salmon; and Marion Drain, ~RKm 132.9, Yakima Subbasin.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

1.6 Type of program.

[8](#) Integrated harvest

Comments:

The Yakima fall chinook program originated strictly as a mitigation program to mitigate for activities within the Columbia River Basin that have decreased salmonid populations. Upriver production was designed to mitigate for the loss of Tribal harvest opportunity as a result of reduced natural fall chinook runs above Bonneville Dam. Since 1997, after being adopted into the YKFP, the program has evolved into a supplementation program, while still having mitigation responsibilities under *United States versus Oregon* and the Columbia River Fish Management Plan.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

1.7 Purpose (Goal) of program.

[9](#) The purpose of this hatchery program is to provide harvest, to contribute to conservation/recovery and research and education.

[10](#) The purpose of the program is mitigation for hydro impacts.

Comments:

The goal for Yakima fall chinook salmon is to supplement and enhance the two existing stocks of Yakima fall chinook, while preserving the stock characteristics and fitness of targeted stocks and keeping adverse impacts on non-target taxa within prescribed limits. 'Enhancement' is defined in terms of natural production, and the project will be deemed a success if it results in a significant increase in the number of naturally spawned recruits, and meets objectives for genetics, harvest, and ecological interactions.

These are the program objectives as stated in the Yakima Fall Chinook Planning Status Report (PSR) for the YKFP (attached).

Natural Production

1) Optimize natural production of fall chinook with respect to abundance and distribution.

2) Use supplementation as described by RASP (1991) (i.e., to increase natural production of Yakima fall chinook and increase harvest opportunities, while keeping genetic and ecological impacts within acceptable limits) to provide scientific benefits to the region.

Ecological Interactions

1) Keep adverse impacts of fall chinook supplementation on non-target taxa of concern (NTTOC) within prescribed limits.

2) Limit losses of wild and hatchery smolts to native and exotic predators to levels that do not significantly limit the scope for increase in natural production.

Genetic

1) Minimize genetic risks as described by Busack and Currens (1995) (extinction, loss of within-population variability, loss of between-population variability, and domestication selection) to Marion Drain and mainstem stocks.

Harvest

1) Increase harvest opportunities for all fishers consistent with the requirements of genetic, natural production, and experimentation objectives.

Experimentation

1) Use supplementation as described by RASP (1991) (i.e., to increase natural production of Yakima fall chinook and increase harvest opportunities, while keeping genetic and ecological impacts within acceptable limits) to provide scientific benefits to the region.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

1.8 Justification for the program.

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- Hatchery fish accessible to fisheries because some of the fish produced are differentially marked to enable selective harvest.
- Hatchery fish accessible to fisheries because the fish produced are available in sufficient number to the fisheries (location, time, gear) that are intended to benefit from the program (i.e. to meet the harvest goals).

Comments:

The United States versus Oregon Columbia River Fish Management Plan states a short-term production goal for the Yakima Basin as a release of 1.7 million Upriver Bright Stock fall chinook from the Little White Salmon Hatchery. The long-term production goal for the Yakima Basin is stated as the construction of a Yakima Hatchery with capacity for production of 3.0 million Upriver Bright fall chinook. As noted above this is part of mitigation for the lost natural production of tens of thousands of adult spawners due to flooding of mainstem habitat from construction of John Day Dam.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002. U.S. v OR Technical Advisory Committee, 1996 All Species Review Chapter 3, August 4, 1997.

1.9 List of program "Performance Standards".

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The program adheres to the following fish culture guideline(s) and standard(s):

IHOT
PNFHPC
tribal

Comments:

A more in depth discussion of the monitoring and evaluation plan used to address performance question of the fall chinook program are found in the draft Yakima Fall Chinook, Planning Status Report (YKFP, 1998). Program performance indicators are centered on the NPPC's definition of supplementation developed by the Regional Assessment of Supplementation Programs (RASP): "Supplementation is the use of artificial propagation in an attempt to maintain or increase natural production while maintaining the long term fitness of the target population, and keeping the ecological and genetic impacts on nontarget populations within specified biological limits" (RASP 1992).

The four main performance indicator categories are natural production, harvest, genetics, and ecological interactions. Some of these performance indicators are being implemented during the feasibility phase, while others need further refinement on how to implement or require additional monitoring facilities.

All YKFP monitoring and evaluation activities for the fall chinook program are being designed to address the following performance issues:

Supplementation Issues

How is YKFP fall chinook supplementation performing in terms of:

- 1) Increasing natural production.
- 2) Increasing harvest opportunity.
- 3) Limiting genetic impacts to target and nontarget populations.
- 4) Limiting ecological impacts to nontarget populations.

Relative Hatchery Survival Comparisons

How do fish reared under various hatchery treatment(s) compare with wild fish (and possibly each other) in terms of:

- 5) Juvenile survival and associated traits.
- 6) Adult returns to fishery and spawning grounds.
- 7) Reproductive performance and associated traits.
- 8) Juvenile ecological interactions with wild fish (a comparison if two hatchery treatments are used, a straightforward evaluation if one.).

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

1.10 List of program "Performance Indicators", designated by "benefits" and "risks".

Performance Indicators Addressing Benefits		
Indicator	Performance Standard	Indicator is Monitored
Total number of fish harvested in tribal fisheries targeting this program.	Program contributes to fulfilling tribal trust responsibility mandates and treaty rights, as described in U.S. v. Oregon management agreements	U.S. v OR TAC and YN monitoring
Number of fish released by program, returning, or caught, as applicable to given mitigation requirements.	Program contributes to mitigation requirements.	U.S. v OR TAC and YN monitoring
Annual number of fish produced by this program caught in all fisheries, including estimates of fish released and associated incidental mortalities, by fishery.	Fish produced for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding overharvest of non-target species.	U.S. v OR TAC and YN monitoring documents total harvest of URBs in fisheries; proportion Yakima would need to be derived from available information such as release numbers, dam counts, etc.
Annual escapements of natural populations that are affected by fisheries targeting program fish.		YN and WDFW conduct annual redd counts of naturally spawning fall chinook in the Yakima Basin
Annual number of spawners on spawning grounds, by age.	Artificial propagation program contributes to an increasing number of spawners returning to natural spawning areas.	YN and WDFW estimate Yakima River run size from Prosser dam count, harvest, and redd count data. Age composition can be estimated from Prosser Denil passage and Prosser hatchery broodstock scale sampling.
Annual number of redds in selected natural production index areas.		YN and WDFW conduct annual redd counts of naturally spawning fall chinook in the Yakima Basin

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Performance Indicators Addressing Risks		
Indicator	Performance Standard	Indicator is Monitored
Marking rate by mark type for each release group.	Release groups are sufficiently marked in a manner consistent with information needs and protocols to enable determination of impacts to natural- and hatchery-origin fish in fisheries.	Yes, marking rates for each mark group are documented. However, due to the large number of releases, associated marking costs, and tribal policies relative to mass marking and selective fisheries, mark numbers may not be sufficient to derive actual rates of harvest in fisheries from mark recapture estimates. Marking rates are sufficient to determine relative survival differences between accelerated, conventional, and Marion Drain rearing groups.
Temporal distribution of broodstock collection, and of naturally produced population at point of collection.	Fish collected for broodstock are taken throughout the return or spawning period in proportions approximating the timing and age distribution of the population	Marion Drain broodstock are taken representatively from throughout the run using a fishwheel operation in the Drain. Prosser hatchery broodstock are taken

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	from which broodstock is taken.	from fish which are trapped in the Chandler Canal – the run timing of these fish is uncertain, but it is assumed that these fish accumulate in the canal throughout the duration of the run.
Age composition of broodstock collected, and of naturally produced population at point of collection.		Scale samples are taken from all brood collected for age composition.
Number of spawners of natural origin removed for broodstock.	Broodstock collection does not significantly reduce potential juvenile production in natural rearing areas.	Since mark rates are well below 100% (see above), proportion of Hatchery- and natural-origin fish used for brood is unknown.
Number and origin of spawners migrating to natural spawning areas.		Number (but not origin) of spawners is known (see above).
Number of eggs or juveniles placed in natural rearing areas.		Fish are generally released directly from the Prosser and Marion Drain hatcheries. Annual seine surveys are conducted in natural juvenile rearing areas.
Life history characteristics	Life history characteristics of the natural population do not change as a result of this artificial production program.	The following characteristics are monitored on an annual basis: Juvenile migration timing (at Chandler), juvenile size at outmigration (hatchery release and seining operations), adult return timing (at Prosser), adult return age and sex composition and size at return (Prosser Denil and brood sampling), Spawn timing and distribution (comprehensive spawner surveys), fecundity and egg size (hatchery spawn sampling)
Carrying capacity criteria for basin-wide and local habitat, including method of calculation.	Annual release numbers do not exceed estimated basin-wide and local habitat capacity, including spawning, freshwater rearing, migration corridor, and estuarine and nearshore rearing.	Yakima Basin carrying capacity determined using EDT model analysis.
Annual release numbers from all programs in basin and subbasin, including size and life-stage at release, and length of acclimation, by program.		YN documents these data.
Location of releases and natural rearing areas.		YN documents these data.
Timing of hatchery releases, compared to natural populations.		Timing of hatchery releases (generally below Prosser Dam) is known. Timing of wild/natural and Marion Drain releases determined from Chandler juvenile trap monitoring.
Genetic profiles of naturally produced adults, as developed at program's outset (e.g. through DNA or allozyme procedures) and compared to genetic profiles developed each generation.	Patterns of genetic variation within and among natural populations do not change significantly as a result of artificial production.	This is not presently a program priority. However, DNA samples could be taken from fish at the Prosser Denil and during spawning if sufficient funding were made available.
Total number of natural spawners reaching the collection facility.	Collection of broodstock does not adversely impact the genetic diversity of the naturally spawning population.	Hatchery and natural origin returns are unknown (see above).
Total number of spawners estimated to pass the collection facility to spawning areas, compared to minimum effective population size (when established) required for those natural populations.		Total number of natural spawners is estimated (see above); minimum effective population size could be determined using EDT model analysis.
Timing of collection compared to overall run timing.		See above.
The ratio of observed and/or estimated total numbers of artificially produced fish on natural spawning grounds, to total number of naturally produced fish, for each significant spawning area.	Artificially produced origin adults in natural production areas do not exceed appropriate proportion of the total natural spawning population.	Hatchery and natural origin returns are unknown (see above).
Observed and estimated total numbers of naturally produced and artificially produced adults passing a counting station close to natural spawning areas.		Hatchery and natural origin returns are unknown (see above).
Location of juvenile releases.	Juveniles are released on-station, or after sufficient acclimation to maximize	Fish are released on-station from Prosser and Marion Drain facilities.

	homing ability to intended return locations.	
Length of acclimation period.		Fish are reared to and released as subyearlings
Release type, whether forced, volitional, or direct stream release.		Volitional release.
Level of smoltification at release, compared to a regional smoltification index (when developed). Release type, whether forced, volitional, or direct stream release.	Juveniles are released at fully smolted stage.	Volitional release as pre-smolt subyearlings.
Number of adults available for broodstock (moving geometric mean, based on number of ages at return for this species).	The number of adults returning to the hatchery that exceeds broodstock needs is declining.	Prosser dam counts should provide an index with which to make this determination.
Scientifically based experimental design, with measurable objectives and hypotheses.	The artificial production program uses standard scientific procedures to evaluate various aspects of artificial propagation.	The fall chinook program is currently evaluating the effects of conventional versus accelerated rearing on smolt-to-smolt and smolt-to-adult survival. See http://www.efw.bpa.gov/searchpublications/YKFP M&E annual report for latest year's results .
Monitoring and evaluation framework including detailed time line.	The artificial propagation program is monitored and evaluated on an appropriate schedule and scale to address progress toward achieving the experimental objective and evaluate beneficial and adverse effects on natural populations.	Monitoring and evaluation framework is being developed as part of the Master Plan for this species.
Annual and final reports.		See http://www.efw.bpa.gov/searchpublications/YKFP M&E annual report for latest year's results .
Annual reports indicating level of compliance with applicable standards and criteria.	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.	See http://www.efw.bpa.gov/searchpublications/Lower Yakima O&M annual report for latest year's results
Discharge 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.	Effluent from artificial production facility will not detrimentally affect natural populations.	See http://www.efw.bpa.gov/searchpublications/Lower Yakima O&M annual report for latest year's results
Water withdrawals compared to applicable passage criteria.	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.	See http://www.efw.bpa.gov/searchpublications/Lower Yakima O&M annual report for latest year's results for all performance indicators for this standard.
Water withdrawals compared to NMFS, USFWS, and WDFW juvenile screening criteria		
Number of adult fish aggregating and/or spawning immediately below water intake point.		
Number of adult fish passing water intake point.		
Proportion of diversion of total stream flow between intake and outfall.		
Certification of juvenile fish health immediately prior to release, including pathogens present and their virulence.	Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens.	USFWS fish health professionals sample and certify all releases.
Number and location(s) of carcasses or other products	Any distribution of carcasses or other	See

distributed for nutrient enrichment.	products for nutrient enhancement is accomplished in compliance with appropriate disease control regulations and guidelines, including state, tribal, and federal carcass distribution guidelines.	http://www.efw.bpa.gov/searchpublications/ Lower Yakima O&M annual report for latest year's results for all performance indicators for this standard.
Statement of compliance with applicable regulations and guidelines.		
Spatial and temporal spawning distribution of natural population above and below weir/trap, currently and compared to historic distribution.	Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally produced population.	Derived from spawner survey (temporal and spatial) and Prosser Dam counts (temporal).
Mortality rates in trap.	Weir/trap operations do not result in significant stress, injury, or mortality in natural populations.	Mortality rates are documented.
Prespawning mortality rates of trapped fish in hatchery or after release.		Mortality rates are documented.
Size at, and time of, release of juvenile fish, compared to size and timing of natural fish present.	Predation by artificially produced fish on naturally produced fish does not significantly reduce numbers of natural fish.	These data are available for analysis (see above).
Total cost of program operation.	Cost of program operation does not exceed the net economic value of fisheries in dollars per fish for all fisheries targeting this population.	See 1.4 above.
Sum of ex-vessel value of commercial catch adjusted appropriately, appropriate monetary value of recreational effort, and other fishery related financial benefits.		This calculation will be difficult to do accurately since these fish are harvested in marine fisheries from Alaska possibly as far south as Northern California and inland to Prosser Dam and as expressed above, the proportion of Yakima fish in the total URB harvest in these fisheries can only be roughly estimated.
Total cost of program operation.	Juvenile production costs are comparable to or less than other regional programs designed for similar objectives.	See 1.4 above.
Average total cost of activities with similar objectives.		
Number of adult fish available for tribal ceremonial use.	Non-monetary societal benefits for which the program is designed are achieved.	YN documents this use.
Recreational fishery angler days, length of seasons, and number of licenses purchased.		See relevant U.S. v OR TAC and WDFW documentation.

Comments:

See also Sections 1.7-1.9 above.

Data source:

1.11.1 Proposed annual broodstock collection level (maximum number of adult fish).

Due to the configuration and operation of the Chandler irrigation canal (Rkm 75.6), a number of returning fall chinook are stranded in this canal every year. The Yakama Nation has an annual program whereby stranded fish in the canal are collected using beach seines and used for production at the Prosser hatchery. The number of fish collected can vary from about one hundred to over five hundred depending on annual returns and conditions. Fish for Marion Drain hatchery are collected from a fishwheel in the drain. Collections are generally fewer than about 25 fish per year.

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GENERAL DESCRIPTION OF YAKIMA FALL CHINOOK PROGRAM

Broodstock Capture: Prosser Dam and Chandler Canal (Yakima NORs), Marion Drain fishwheel, Little White Salmon (out-of-basin).

Broodstock Holding to Maturity: Prosser Hatchery, Marion Drain Hatchery, and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Fish Spawning: Prosser Hatchery, Marion Drain Hatchery, and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Incubation: Prosser Hatchery, Marion Drain Hatchery, and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Initial Rearing: Prosser Hatchery, Marion Drain Hatchery, and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Final Rearing and Acclimation: Prosser Hatchery (for Yakima Basin and Little White Salmon stocks) and Marion Drain Hatchery.

ADDITIONAL PROSSER HATCHERY FALL CHINOOK PROGRAM INFORMATION

Broodstock: Broodstock are collected from Yakima fall chinook that drop back into Chandler Canal waterway. The US Bureau of Reclamation (owner/operator of Chandler Canal) de-water the canal, and adults are seined, discriminated for biometric data, and a portion of the adults are retained for program broodstock. The remaining adults are transported upstream and released in the Yakima river in the vicinity of Mabton and Granger. Marion Drain broodstock are captured in a fishwheel operated in the drain. Program broodstock are placed in stainless steel-vinyl line raceway (20X5X3) for holding/maturation.

Incubation: Adults are spawned, gametes are mixed, and green eggs randomly are placed in deep troughs with perforated plate cells (10 cells per deep trough) at 60000 eggs per cell. At eyed stage, egg groups are checked for pathogens/picked for dead eggs, and placed in trays/vertical stacks (16 trays per stack) at 5000 eyed eggs per tray.

Rearing and Acclimation: Emergent fry are randomly mixed in stainless steel-vinyl line raceways and raised to ~65 fpp. Subyearlings are volitionally released from the raceways on-site over a two week, in two groups (April 20 and May 20); and at the end of each volitional released period, remaining fish are forced out of the ponds into Yakima River.

Data source:

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

Age Class	Maximum Number	Size (ffp)	Release Date	Location			
				Stream	Release Point (Rkm)	Major Watershed	Ecoprovince
Eggs							
Unfed Fry							
Fry							
Fingerling	2020000	65-90	April and May	Yakima River	75.6	Yakima	Columbia Plateau
Yearling							

Comments:

The US vs OR production goal is an out-of-basin release of 1.7 million Little White Salmon (LWS) fall chinook. There is no long-term, defined production goal at this time for the Yakima and Marion Drain stocks. Under the immediate feasibility study to meet experimental needs the Yakima and Marion Drain smolt production goals are 320,000 fish and 50,000 fish, respectively.

Table 1 summarizes the historic releases of hatchery fall chinook smolts made in the Yakima between 1983 and 1996, after which the program was modified to incorporate Yakima and Marion Drain NORs in the broodstock collection.

Table 1. Summary statistics, LWS hatchery fall chinook smolt releases in the Yakima Subbasin, 1983 - 96.

Year	Hatchery Plants Above Prosser		Hatchery Plants Below Prosser		Hat. Smolt Survival To Prosser, Pen Reared Fish Only (%)	Hat. Smolt Survival To Prosser, Direct Releases Only (%)	Catch Rate In Oceanic And Columbia River Fisheries (% Of No. Tagged Fish Released)
	No.	% Clipped	No.	% Clipped			
1983	0	N. A.	323,796	0	N. A.	N. A.	NO DATA
1984	105,097 (Sunnyside Dam)	100 (98.8% tagged)	479,556 (84.6% Horn, 15.4% Prosser)	21.5 (all Horn; 99,522 tagged)	N. A.	27.1	.09%
1985	100,655 (Sunnyside Dam)	100 (100% tagged)	1,763,500 (52.4% Horn, 47.6% Prosser)	6.1 (all Prosser, all tagged)	N. A.	15.7	PROSS = .09% SUNNY = 0.0%

1986	97,460 (Sunnyside Dam)	100 (96.1% tagged)	1,547,700 (53.2% Horn, 46.8% Prosser)	6.5 (all Prosser, all tagged)	N. A.	32.2	PROSS = .03% SUNNY = 0.0%
1987	196,980 (Sunnyside Dam)	100 (100% tagged)	872,609 (all Prosser)	22.6 (all Prosser, all tagged)	N. A.	44.4	PROSS = .15% SUNNY = .09%
1988	444,795 (55.3% Wapato net pens, 44.7% Sunnyside Dam)	100 (100% tagged)	1,375,888 (all Prosser)	14.5 (all Prosser, 95.6% tagged)	22.6	6.7	PENS = .001% PROSS = .005% SUNNY = 0.0%
1989	540,198 (63% Wapato net pens, 37% Sunnyside Dam)	90.6 (85% Wapato fish clipped and tagged; 100% Sunnyside fish clipped and tagged)	1,430,316 (24% Horn, 76% Prosser)	14.0 (18.4% Prosser fish clipped and tagged; 0% Horn fish clipped and tagged)	18.5	8.7	PENS = .001% SUNNY & WAPATO = .0005%
1990	679,714 (70.6% Wapato net pens, 29.4% Sunnyside Dam)	45.6 (39.9% Sunnyside fish clipped and tagged; 50% Wapato fish clipped, 48% Wapato fish clipped and tagged)	880,344 (all Prosser)	9.2 (9.2% Prosser fish clipped and tagged)	38.0	33.9	PENS = .05% PROSS & SUNNY = .05%
1991	478,916 (Wapato net pens); 1,152,829 (Roza WW #3)	100% Wapato fish clipped and tagged; all of the Roza WW#3 fish were ventral clipped, but none were tagged.	0	N/A	35.0	31.4	PENS = .04%
1992	0	N/A	0	N/A	N/A	N/A	No Data
1993	165,428 Frontage Rd.	98.5% tagged, 100% clipped	582,731 Prosser ?	98.5% tagged, 100% clipped	N/A	5.5	.005%
1994	0	N/A	1,703,892 Prosser Hatch.	11.6%	N/A	N/A	.001%
1995	0	N/A	1,694,188 Prosser Hatch.	11.7%	N/A	N/A	NO DATA
1996	0	N/A	1,885,504 Prosser Hatch.	10.6%	N/A	N/A	NO DATA

Table 2 reflects the current status of the fall chinook program with respect to release numbers and release location.

Table 2. Yakima Fall Chinook Release Summary, 1997-2005.

Release Yr.	LWS NFH	Prosser	Marion	Edler	Stiles	TOTAL
1997	1,694,861					1,694,861
1998	1,695,399					1,695,399
1999	1,690,000	192,000				1,882,000
2000	1,695,037	306,000	16,000			2,017,037
2001	1,699,136	427,753	12,000			2,138,889
2002	1,704,348	286,158	4,000			1,994,506
2003	1,771,129	365,409	18,000			2,154,538
2004	1,748,200	561,385	52,223			2,361,808

2005	1,700,000	466,000	41,000	75,000	38,890	2,320,890
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Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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

Return Year	Marion Drain Redd Counts	Total Catch (all ages)	Natural Escapement		Hatchery Spawning	
			NoRs	HoRs	NoRs	HoRs
Goal						
1991	42			971		
1992	39			1,612		
1993	34			1,065		
1994	29			1,520		
1995	34			1,322		
1996	26			1,392		
1997	16			1,120	8	
1998	22			1,148	69	107
1999	24	34		1,896	17	85
2000		327		2,293	40	130
2001	34	1,000		4,311	84	56
2002	51	2,300		6,241	183	84
2003	86	1,463		4,875	181	46
2004	100			2,947		

33

Comments:

1. Yakima River harvest in years prior to 1999 was likely at or near zero. However, fall chinook are also harvested in marine fisheries from Alaska south into Oregon and northern California, and in Columbia River fisheries from the mouth to the Hanford Reach.

2. HoR escapement is Prosser count only. This is a combination of natural- and hatchery-origin fish. It represents only a portion of natural spawners as YN and WDFW staff estimate that 50-70% of fall Chinook spawning in the Yakima River occurs below Prosser Dam.

3. NoR and HoR spawning numbers are the estimated number of unmarked (NoR) and marked (HoR) fish used for broodstock based on unmarked/marked composition either in the brood collection or at the Prosser denil trap. However, since hatchery-origin releases are not 100% marked these data likely do not present an accurate portrayal of the composition of Prosser hatchery broodstock for these years.

Data source:

B. Bosch/YN, Prosser Count, Harvest, and Prosser Hatchery data files, 5/12/03.

Status and Goals of Stocks and Habitats

Brood Year	NoRs		HoRs		Combined (HoRs + NoRs)	
	Smolt to Adult Survival(%)	Recruits per Spawner	Smolt to Adult Survival(%)	Recruits per Spawner	Smolt to Adult Survival(%)	Recruits per Spawner
Goal	nya	nya	nya	nya	nya	nya
1995	nya	nya	0.4605	nya	nya	nya

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1996	nya	nya	0.3097	nya	nya	nya
1997	nya	nya	nya	nya	nya	nya
1998	nya	nya	0.0532	nya	nya	nya
1999	nya	nya	nya	nya	nya	nya

Comments:

HoR SAR data from CWT data for Prosser Hatchery Late Fall Chinook releases; 1996-1998 data are incomplete.

Since a large number of hatchery-origin releases are unmarked, and since a large number of fall Chinook are known to spawn below Prosser dam but there are limited data available as to the estimated number (and mark-status) of spawners below Prosser in any given year, it is difficult to complete a table such as this from available data. YN and WDFW staff will work to organize available data and necessary assumptions during the subbasin planning process so that such a table can be produced in the future- Bill Bosch, 5/12/03.

Data source:

SAR Estimates for Annual Coded Wire Tag Missing Production Groups, Columbia River Dart Data Website, University of Washington, 18 March 2003.

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

[7](#) The first year of operation for this hatchery was 1994.

Comments:

Yakima Upriver Bright Program: 1983

Prosser Hatchery Fall Chinook Component: 1994; Marion Drain component: 1997.

The program started in 1983 with the first release 324,000 Little White Salmon hatchery smolts. In 1997 the program was adopted into the YKFP.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

1.14 Expected duration of program.

[149](#) The program is expected to end when goals can be met by other means not requiring artificial production.

Comments:

This is an ongoing supplementation program designed to augment both natural production and, tribal and sport harvest.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

1.15 Watersheds targeted by program.

[1](#) Yakima River Subbasin/Columbia Plateau Province

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

[18](#)

The hatchery program is a part of a strategy to meet conservation and/or harvest goals for the target stock. The tables below indicate what the short- and long-term goals are for the stock in terms of stock status (biological significance and viability), habitat and harvest. The letters in the table indicate High, Medium, or Low levels for the respective attributes. Changes in these levels from current status indicate expected outcomes for the hatchery program and other strategies (including habitat protection and restoration).

	Biological Significance	Viability	Habitat
Current Status	M	M	L

Short-term Goal	M	M	L
Long-term Goal	M	H	M

This table shows current status and goals for harvest opportunity. **H** implies harvest opportunity every year, **M** opportunity most years, **L** some years, and **N** no opportunity.

Fishery type	Location of Fishery					
	Marine	L. Columbia	Zone 6	U. Columbia	Subbasin	
Commercial	Current Status	H	H	H	na	N
	Short-term Goal	H	H	H	na	L
	Long-term Goal	H	H	H	na	M
Ceremonial	Current Status	na	na	H	na	H
	Short-term Goal	na	na	H	na	H
	Long-term Goal	na	na	H	na	H
Subsistence	Current Status	na	na	H	na	H
	Short-term Goal	na	na	H	na	H
	Long-term Goal	na	na	H	na	H
Recreational	Current Status	H	H	H	H	M
	Short-term Goal	H	H	H	H	H
	Long-term Goal	H	H	H	H	H
Catch and Release	Current Status	na	na	na	na	na
	Short-term Goal	na	na	na	na	na

19
20
21
22
23

Comments:

The following is from 2003 HGMP provincial meetings:

1.16.1 Brief Overview of key issues

The primary goals for this program are harvest augmentation and supplementation. Local broodstock are collected from adults returning to Prosser Dam and held at the Prosser Hatchery, where they are spawned, incubated and reared. Imported broodstock are collected and held at Little White Salmon National Fish Hatchery where spawning, incubation and early rearing also occur, final rearing of these fish is at Prosser Hatchery. All smolts are currently released from the acclimation ponds at Prosser Facility – just below the Prosser dam (main juvenile and adult monitoring facility in the Yakima basin).

Key issues are:

1. Success is difficult to monitor for both smolt survival and adult returns (YN-Fast). It was hoped that Horn Rapids Dam would serve as a monitoring and broodstock collection site but the dam is not configured correctly at present to allow for either. However, monitoring for redd counts is currently being developed.
2. Capturing representative, local brood.

1.16.2 Potential alternatives to the current program

1. Do not attempt augmentation/supplementation
2. Try direct release (WDFW-Schuck)
3. Spread out releases to better spawning areas of lower river (YN-Fast)
4. Improve the water quality conditions of the Lower Yakima (YN_Fast)
- 5 Transport eggs collected from in-basin brood to Little White Salmon for rearing (YN- Fast).
6. Increase release numbers.

1.16.3 Potential reforms and investments

1. Develop more acclimation sites at better spawning areas (YN_Fast)
2. Modify Horn Rapids for monitoring and brood collection (YN-Fast)

Data source:

Section 2: Program Effects on ESA-Listed Salmonid Populations

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

150 The program has the following permits or authorizations: YKFP projects have been operating under a "BPA Letter" dated 4/6/01 from Robert Beraud to Rob

Jones which states that NMFS has no concern that YKFP activities would violate 7d rules. An electronic copy of the letter is not available but could be mailed via U.S. mail if desired. In addition, the BPA environmental coordinator for the YKFP has prepared NEPA documents which cover all the environmental aspects of the project, including ESA coverages. Copies of this documentation are available from Patricia R. Smith, BPA, 800-282-3713 (prsmith@bpa.gov).

Comments:

Data source:

2.2.1 Descriptions, status and projected take actions and levels for ESA-listed natural populations in the target area.

[145](#)

Yakima summer steelhead (mid-Columbia ESU)
Bull trout (Columbia River Distinct Population Segment)

[32](#)

Listed stocks may be directly affected by competition, predation, disease transfer from hatchery releases, adult trapping and broodstock collection operations, and/or juvenile trapping and sampling operations.

The following ESA listed natural salmonid populations occur in the subbasin where the program fish are released:

ESA listed stock	Viability	Habitat
Upper Yakima Steelhead-Natural	L	L
Satus Steelhead-Natural	L	L
Toppenish Steelhead-Natural	L	L
Naches Steelhead-Natural	L	L
Bull Trout- Natural	nya	nya
H, M and L refer to high, medium and low ratings, low implying critical and high healthy.		

Comments: The program has the following permits or authorizations: YKFP projects have been operating under a "BPA Letter" dated 4/6/01 from Robert Beraud to Rob Jones which states that NMFS has no concern that YKFP activities would violate 7d rules. An electronic copy of the letter is not available but could be mailed via U.S. mail if desired. In addition, the BPA environmental coordinator for the YKFP has prepared NEPA documents which cover all the environmental aspects of the project, including ESA coverages. Copies of this documentation are available from Patricia R. Smith, BPA, 800-282-3713 (prsmith@bpa.gov).

Data source:

<http://nwr.noaa.gov/> <http://endangered.fws.gov/>

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

Please see section 2.2.2 of the Yakima Basin Steelhead HGMP for the most recent available spawning escapement estimates for steelhead.

Bull Trout- Natural

There are no established "escapement" numbers for Yakima Basin bull trout. There is no fishery for bull trout. There are no hatchery bull trout in the Yakima basin. In the excel spreadsheet table (attached to the Yakima steelhead HGMP) is a summary of bull trout redd counts in the Yakima basin (by stream and total) for all years that WDFW has been monitoring. Jeff Thomas (USFWS, jthomas@pn.usbr.gov, (509) 575-5848) is very familiar with this table and may have additional information or interpretations from the draft recovery plan.

Comments:

Please see Yakima Basin steelhead HGMP and Yakima Basin steelhead recovery plan (draft due in August 2005) for further information.

Data source:

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

Yakima Basin fall chinook: Hatchery activities assessed include broodstock collection and transfer to and release from acclimation sites. M&E activities include: spawner surveys, PIT and radio tagging, juvenile and adult trapping and sampling operations, electroshocking, etc. See also Section 3.5 below.

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ESU/Population	Mid-Columbia ESU, Yakima wild/natural steelhead
Activity	Prosser adult trap monitoring and broodstock collection operation
Location of hatchery activity	Prosser Adult Facility (right bank denil ladder and trap), Yakima River, 75.6 Rkm
Dates of activity	Approximately Sept. 1 – November 30 annually
Hatchery Program Operator	Joe Blodgett, YN

Comments:

The program has the following permits or authorizations: YKFP projects have been operating under a "BPA Letter" dated 4/6/01 from Robert Beraud to Rob Jones which states that NMFS has no concern that YKFP activities would violate 7d rules. An electronic copy of the letter is not available but could be mailed via U.S. mail if desired. In addition, the BPA environmental coordinator for the YKFP has prepared NEPA documents which cover all the environmental aspects of the project, including ESA coverages. Copies of this documentation are available from Patricia R. Smith, BPA, 800-282-3713 (prsmith@bpa.gov).

Data source:

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.

Comments:

A Yakima Basin steelhead recovery plan is presently being developed as part of the Subbasin Planning Process. A draft document is expected to be available for public review in August of 2005. Yakima Basin fall chinook production activities will be consistent with this recovery plan.

Data source:

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

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Document Title	Type
Treaty of 1855. Asserted the right of the Yakama Nation to "take fish at all usual and accustomed fishing areas". Federal courts have held that this right means more than the right of Indians to hang a net in an empty river (<i>Washington v Washington State Commercial Passenger Fishing Vessel Association, 1979</i>).	Supreme law of the land
<i>United States versus Oregon</i> Columbia River Fish Management Plan. Appendix B of the CRFMP	Federal Court Order

describes provisions for moving fall chinook production to upriver areas. See 1.8 above.	
<i>US v Washington</i>	Federal Court Order
Northwest Power and Conservation Council (NPCC), Fish and Wildlife Program.	Northwest Power Act
Mitchell Act annual Congressional Appropriations language. The primary purpose of the Mitchell Act is to mitigate for fishery losses due to hydroelectric development in the Columbia River Basin. Congress has recognized that it is appropriate to mitigate these losses in upriver areas where the losses occurred.	Mitchell Act
<i>WY-KAN-USH-MI WA-KISH-WIT</i>	Columbia River Anadromous Fish Restoration Plan of the Columbia River Tribes
Yakama Nation and US Bureau Reclamation Prosser Hatchery Agreement	MOU
Yakama Nation and US Fish & Wildlife Service Fish Health Agreement	MOU

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

3.3 Relationship to harvest objectives.

See Section 1.7 for overall program objectives. In-Basin harvest data were presented in Section 1.12 above. The 2000 recreational harvest rate in the Yakima mainstem was approximately 5.4%, which is the highest since the sport fishery began in 1998. The unofficial maximum sport harvest rate is 10% of the estimated return.

[157](#)

Out-of-basin harvest rates have not been estimated specifically for Yakima hatchery fish, but the total ocean and freshwater adult equivalent harvest rates for Upriver Bright fall chinook for return years 1989-1996 ranged from 33% to 73%

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

3.4 Relationship to habitat protection and recovery strategies.

YN, state, federal, local (irrigation districts) entities are working together to improve habitat and water resources in the Yakima Subbasin, by overcoming major inhibiting factors to the recovery of fall chinook populations.

Major inhibiting factors to fall chinook production are:

- 1) Sublethal to lethal water temperatures typically by June below Prosser Dam (RM 47).
- 2) Low flow conditions (especially in poor water years) between Prosser Dam and the Chandler power plant outfall.
- 3) Predation by birds (especially in poor water years), and both native and exotic piscivorous fish (especially smallmouth bass).
- 4) Loss of structurally complex rearing habitat.
- 5) Excessive sediments from irrigation drains (though this is being slowly addressed in recent years) in major spawning areas.
- 6) Smolt mortality associated with predation in the vicinity of bypass outfalls at Wapato, Sunnyside and Prosser Dams, and a number of smaller Yakima Basin dams (e.g., Marion Drain re-use diversion, Columbia and Richland Ditches at Horn Rapids Dam).
- 7) Adult mortality associated with mainstem Columbia dams.
- 8) Smolt mortalities associated with traversing mainstem Columbia dams and impoundments.

[158](#)

Comments:

In recent years the DOE and the Roza-Sunnyside irrigation districts have made a concerted effort to reduce the amount of TDS through project return drains or pipes. Most notably is Granger Drain, where turbidity levels have dropped from around 400 NTU's to 25-30 in 2000. This effort is being applied elsewhere in the basin to improve drain water quality.

The BOR is currently exploring a the feasibility of eliminating the Chandler Canal irrigation withdrawal at Prosser Dam with a "pump exchange" using Columbia River water to improve instream flows in this reach.

The YN and WDFW through the YKFP is investigating the impact of smallmouth bass, pikeminnow, and bird predation on salmonid smolts in the Yakima Basin.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

3.5 Ecological interactions.

The following species co-occur to a significant degree with the program fish in either freshwater or early marine life stages.

- Steelhead
- Chum
- Sockeye
- Coho
- Chinook
- Bull Trout

[159](#)

Comments:

(1) negatively impact program

Smallmouth bass and gulls concentrating at the fish bypass outfalls and dams appear to be the two predators having the most impact on fall chinook parr and smolts.

(2) be negatively impacted by program

At this time no negative impact by the hatchery fall chinook program has been identified.

(3) positively impact program

Results from the YKFP indirect predation study have shown that fall chinook smolt survival is positively correlated to both the total smolt (all salmonids) and total hatchery smolt (all salmonids) density at Prosser.

(4) be positively impacted by program

No benefits to other salmonid species have been identified. Generally, fall chinook smolts outmigrate after the peak outmigrations of spring chinook, coho and steelhead.

This stock of fall chinook appears to be well suited for this river and is probably providing food for scavenging wildlife and raptors, as well as providing nutrient enhancement that could increase the productivity of the watershed.

Data source:

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.

The following statements describe the adult holding, incubation, and/or rearing water source:

[12](#)

- The water source is gravity flow.
- The water source is pumped.
- The water source is specific-pathogen free.

- Water is available from multiple sources.
- The water source is accessible to anadromous fish.
- Water is from the natal stream for the cultured stock.
- The water used results in natural water temperature profiles that provide optimum maturation, gamete development, and hatching/emergence timing similar to that of the naturally produced stock.
- Incubation water can be heated or chilled to approximate natural water temperature profiles.
- Rearing water has a chemical profile significantly different from natural stream conditions to provide adequate imprinting of hatchery fish and minimize the attraction of naturally produced fish into the hatchery.
- The hatchery operates to allow all migrating species of all ages to by-pass or pass through hatchery related structures.
- Adequate flows are maintained to provide unimpeded passage of adults and juveniles in the by-pass reach created by hatchery water withdrawals.
- The water used meets or exceeds the recommended Integrated Hatchery Operations Team (IHOT) water quality guidelines for temperature.
- The water used meets or exceeds the recommended Integrated Hatchery Operations Team (IHOT) water quality guidelines for ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc
- The water supply is protected by flow alarms at the intake(s).
- The water supply is protected by flow and/or pond level alarms at the holding pond(s).
- The water supply is protected by back-up power generation.
- Hatchery intake screening complies with Integrated Hatchery Operations Team (IHOT) and National Marine Fisheries Service facility guidelines.

Comments:

Above information applies to Prosser Hatchery. Prosser Hatchery has the ability to use 30 cfs Yakima River water, and has three wells that contribute 3200 gallons per minute. The river water supply is used from March through July for juvenile fish rearing and September through January for adult broodstock. The surface water is gravity flow from Chandler Canal behind the fish screens. One well is used from September through April to incubate eggs. The well is capable of pumping 800 gallons per minute. The other two wells are used all year to rear juvenile salmon and adult steelhead kelts. Each well is able to pump 1,200 gallons per minute. The well water is constant 57 degrees, and the surface water temperature changes with the seasons.

Marion Drain has the ability to pump approximately 800 gallons per minute surface water directly from Marion Drain and has two wells for egg incubation and fry rearing. One well pumps 80 gallons per minute and another 300 gallons per minute. The surface water is used all year for fall Chinook and some trout/sturgeon rearing. The two wells are used from September through March for egg incubation and fry rearing. The well water is 58 degrees and the surface water changes with seasons.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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.

[15](#) The production from this facility falls below the minimum production requirement for an NPDES permit, but the facility operates in compliance with state or federal regulations for discharge. The intake for the surface water is behind the USBOR fish screens in Chandler canal which should be in compliance with all guidelines for juvenile fish. The wells are 160 feet deep so no screening is necessary.

Comments:

Above information applies to Prosser Hatchery. Marion Drain: The surface water pump station is fitted with meshed screen adequate to keep all sizes of fish from the pumps. The effluent is piped about 10 feet above the stream. Derive additional information from LWS/Willard NFH Complex manager.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

Section 5. Facilities

5.1 Broodstock collection facilities (or methods).

[16](#) Brookstock for this program is collected:

- from wild/natural and hatchery-origin return by net.

188

Ponds (number)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
1	Vinyl line Raceway	22000	150	50	4	1100

Comments:

Fish are seined and collected from Chandler Canal in area of trash rack.

Above information applies to Prosser Hatchery.

Derive additional information for program adult collection from LWS/Willard NFH Complex manager.

The Prosser Hatchery consists of the following: Office, workshop, spawning shed, three adult/juvenile ponds, an incubation room, seven raceways (start tanks), 16 raceways, four circular tanks, steelhead kelt, collection raceways, chiller, backup electrical generator, freezer.

Yakima Stock - Most fall chinook broodstock are collected out of Chandler Canal when the BOR dewateres it in the fall. A small number of fish are collected at the Prosser Dam steep-pass ladder. Broodstock are trucked (300 yards) to the holding ponds.

Marion Drain Stock- A fish-wheel is operated in Marion Drain to collect fall chinook broodstock. Broodstock are trucked 8 miles to the Marion Drain hatchery raceway(s). The Marion Drain hatchery is separate and unique from the Prosser Hatchery. All fish collected in Marion Drain are spawned at, and their progeny reared and released from the Marion Drain facility.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

Comments:

Prosser and Marion Drain: Adult fish are transported in either a 400 gallon tank placed on the back of a pick up truck, or a three compartment 1500 gallon tank on a flatbed. Both are designed to safely haul fish equipped with oxygen and aeration system. Juvenile fish are released on-site (Prosser or Marion Drain) into the Yakima River.

LWS/Willard NFH Complex: Derive transport equipment information from complex manager.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

5.3 Broodstock holding and spawning facilities.

16

Spawning for this program takes place at the Prosser Hatchery, Rkm 75.6.

34

Integrated Hatchery Operations Team (IHOT) adult holding guidelines followed for adult holding, density, water quality, alarm systems and predator control measures to provide the necessary security for the broodstock.

188

Ponds (number)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
1	Vinyl line Raceway	22000	150	50	4	1100

Comments:

Fish are seined and collected from Chandler Canal in area of trash rack.

Above information applies to Prosser Hatchery.

Derive additional information for program adult collection from LWS/Willard NFH Complex manager.

Yakima Stock - Fall chinook broodstock are held and spawned at the Prosser Hatchery. One plastic lined pond (150 ft by 150 ft) is used to hold the broodstock. All adults are held in the pond until ready to be spawned. Fish are spawned in the spawning shed. The unfertilized gametes are taken to the incubation room where eggs are fertilized.

Marion Drain Stock- Fall chinook broodstock are held and spawned at the Marion Drain Hatchery. A single raised, raceway (22 ft by 5 ft) is used to hold adult broodstock until spawned. All adults are held in the pond until ready to be spawned. Fish are spawned in the spawning shed. The unfertilized gametes are taken to the incubation room where eggs are fertilized.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

5.4 Incubation facilities.

[189](#)

Incubator Type	Units (number)	Flow (gpm)	Volume (cu.ft.)	Loading-Eyeing (eggs/unit)	Loading-Hatching (eggs/unit)
Deep Trough with perforated plates (10 cells per trough)- Prosser Hatchery	5	5	nya	60000 per cell	nya
Vertical Stack (16 trays/stack)- Prosser Hatchery	15 stacks	5	nya	nya	5000
Vertical Stack (Green- Eyed @ Little White Salmon NFH)	36 stacks	3	nya	8000	nya

Comments:

Yakima Stock - Prosser Hatchery has four deep troughs used for initial incubation (to eyed-stage) and 15 (16 trays/stack) vertical stacks (Heath trays) used for final incubation to hatch-out.

Marion Drain Stock- Marion Drain Hatchery has two deep troughs used for initial incubation (to eyed-stage) and 1 (16 trays/stack) vertical stack (Heath trays) used for final incubation to hatch-out.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

5.5 Rearing facilities.

[190](#)

Ponds (number)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)	Maximum Flow Index	Maximum Density Index
16	Stainless Wall with Vinyl Line Raceways	3375	75	15	3	750	nya	0.75

Comments:

Above information applies to Prosser Hatchery.

Derive additional information from Little White Salmon/Willard NFH Complex.

Yakima Stock – Fry are ponded at 1,100 fpp from the vertical stacks into the three upper, outside raceways. When the parr reach 500 fpp they are transferred to the four lower, outside raceways.

Marion Drain Stock - The buttoned-up fry are transferred into one circular tank (6 ft diameter). At 500 fpp parr are transferred into a single raceway (5 ft by 22 ft) where they remain through acclimate and release.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

5.6 Acclimation/release facilities.

[190](#)

Ponds (number)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)	Maximum Flow Index	Maximum Density Index
16	Stainless Wall with Vinyl Line Raceways	3375	75	15	3	750	nya	0.75

Comments:

Above information applies to Prosser Hatchery.

Derive additional information from Little White Salmon/Willard NFH Complex.

Yakima Stock - When the parr reach 150 fpp they are transferred to the larger, portable raceways where they will be released. Parr will be released directly into the river on-site at 65 fpp.

Marion Drain Stock- See Rearing Section above. Smolts are released directly into the drain at (approximately RM 14) at 65 fpp.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

5.7 Describe operational difficulties or disasters that led to significant fish mortality.

[160](#)

Since the Upriver Bright Fall Chinook program has been at Little White Salmon there has been only one significant fish loss. This occurred in January, 1998 due to equipment/ operational errors in a new mixing box supplying spring water to the nursery. The error unfortunately led to the asphyxiation of 3,198,321 fall Chinook sack-fry still in the incubators. Operation procedures have been modified and an additional alarm probe has been installed to prevent future incidents.

None for YN Facilities

Comments:**Data source:**

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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.

[70](#)

Fish are not reared in multiple facilities or with redundant systems to reduce the risk of catastrophic loss.

[78](#)

The facility is sited so as to minimize the risk of catastrophic fish loss from flooding.

[79](#)

Staff is notified of emergency situations at the facility.

[80](#)

The facility is continuously staffed to assure the security of fish stocks on-site.

Comments:

Prosser Hatchery= Yes. Most of time, but experienced flooding in 1996. No fish loss, but were released into the river early.

LWS/Willard NFH= Yes

Prosser Hatchery: Staff members are on-site 24/7 during critical phases of the program, and the facility is enclosed in chain linked fence, and periodic patrols of law enforcement (local and tribal) maintain a security envelope of facility.

LWS/Willard NFH Complex: Manager lives on-site.

Data source:

Section 6. Broodstock Origin and Identity

6.1 Source.

[17](#) The broodstock chosen represents natural populations native or adapted to the watersheds in which hatchery fish will be released.

Comments:

Based on an electrophoretic analysis of allozyme samples collected from spawning fish in Marion Drain and the mainstem near Benton City in 1989 and 1990, Busack et al (1991) concluded that there were two genetically distinct stocks in the basin: the Marion Drain stock and the 'mainstem stock'. Subsequent analyses of allozymes from fish collected in the mainstem above Prosser Dam were indistinguishable from the Benton City samples. Therefore, all mainstem spawners appear to belong to the same genetic group, which is indistinguishable from Hanford reach URB's. The Marion Drain stock, which genetically resembles Snake River fall chinook and Deschutes River (OR) fall chinook more than URB's, appears to occur only in Marion Drain. It should be noted that the YN program has released from 400,000 to 1.7 million fall chinook smolts of URB stock throughout the lower half of the Yakima mainstem since 1983.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

6.2.1 History.

[183](#)

Broodstock Source	Origin	Year(s) Used	
		Begin	End

Comments:

Until 1997 Little White Salmon National Fish Hatchery was the sole broodstock source used in the Yakima Basin through the release of 1.7 million smolts. Beginning in 1997 to present Yakima (either Yakima or Marion Drain stock) basin spawners were incorporated into the overall broodstock collection.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

6.2.2 Annual size.

[22](#) It is unknown whether the program collects sufficient numbers of donors from the natural stock to minimize founder effects.

[28](#) More than 10% of the broodstock is derived from wild fish each year.

Comments:

Broodstock is collected from adults returning to Prosser Dam/Chandler Canal area, and these fish are derivatives of introduced stocks from outside of the subbasin.

Broodstock is randomly collected over the adult run entry pattern.

Yakima Stock- Broodstock are almost entirely collected from Chandler Canal in November using beach seines. This is an interim collection site/method. For several years now the canal has been routinely dewatered in the late fall to remove salmon and steelhead entrained into the canal. Before 1997 these fish were released back into the river. Now the fall chinook are being utilized for broodstock. The Prosser steep-pass ladder, originally designed for broodstock collection, is hardly used by fall chinook (but works well for coho and steelhead), thus in the interim Prosser Hatchery is dependent upon fall chinook entrained into the canal to meet their broodstock collection goal. Fish are randomly captured from the canal in that no purposeful selection criteria used. However, females that are ripe (dripping eggs) are taken, knowing that if released into the river their chances of spawning successful are minimal. Fish after being seined are placed into individual PVC tubes, carried up the bank, and placed into the hatchery truck. The fish are then transported (less than ¼-mile) and released into the adult holding pond. Any steelhead captured (very few if any steelhead are typically entrained into the canal) are handled similarly as fall chinook and released back into the river at the Prosser boat ramp located in the forebay approximately ½-mile upstream of the dam.

The program objective is to produce a self-sustaining natural population greater than 1000 fish per generation. The program guidelines set forth annual number of broodstock required for the program to meet this objective.

It is assumed that more than 10% of the broodstock are from naturally produced fish; but the current adult population cannot be discriminated between

hatchery and naturally produced fish since fish have not been 100% marked.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

6.2.3 Past and proposed level of natural fish in the broodstock.

[33](#) See Sections 1.11.1 and 1.12.

Comments:

Data source:

6.2.4 Genetic or ecological differences.

[19](#) The broodstock chosen displays morphological and life history traits similar to the natural population.

Comments:

Broodstock is derived from adults returning (naturally produced fish of hatchery origin and hatchery fish) to Yakima River. These fish have attributes of the natural upper river bright stock.

Little White Salmon hatchery fall chinook were chosen to start this program because they were an URB fall chinook stock. The Yakima stock is similarly an URB stock. Priest Rapids, an URB stock, though geographically close to the Yakima Basin, were not available as they were dedicated to another mitigation program. Bonneville (Oregon) was the only other source of URB fall chinook, but ruled out because of concerns with disease transfer issues across state lines.

In accordance with the program goal of supplementing the natural population, Yakima and Marion Drain NORs were selected as broodstock. One program objective is to ultimately meet the entire smolt production goal using Yakima and Marion Drain broodstock. Because electrophoretic analysis has indicated a genotype difference between the Yakima mainstem and Marion Drain populations both populations are being supplemented with like kind NOR broodstock. There are also phenotypic differences between these two stocks with respect to age class structure of the spawning populations and dates of fry emergence.

There are no known differences between LWS and Yakima stocks. Given the release history of LWS fish into the basin dating back to 1983, one would expect similar genotypic and phenotypic traits between these two stocks. In addition, the LWS, Yakima and Marion Drain stocks are all URB stocks. There are, however, some known differences between Marion Drain and Yakima stocks. The genotypic differences were briefly discussed in Section 6.1. Phenotypic differences are, 1) the Marion Drain spawner population appears to have an unusually high jack component. The mean fish per redd ratio (for 2 years of data) was 9.3. The exact fish per redd ratio for the Yakima stock is unknown, but is thought to be in the normal 2.5 fish per redd range. Marion Drain fry merge beginning in early February due to the warmer groundwater influence, compared with mid-April for the Yakima stock. As a result, Marion Drain juveniles are thought to initiate smolt outmigration past CJMF earlier than Yakima smolts.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

6.2.5 Reasons for choosing.

[18](#) The native stock has been extirpated, however the broodstock chosen is likely to adapt to the system based on life history and evolutionary history.

[21](#) The broodstock chosen has the desired life history traits to meet harvest goals.

Comments:

Little White Salmon hatchery fall chinook were chosen to start this program because they were an URB fall chinook stock. The Yakima stock is similarly an URB stock. Priest Rapids, an URB stock, though geographically close to the Yakima Basin, were not available as they were dedicated to another mitigation program. Bonneville (Oregon) was the only other source of URB fall chinook, but ruled out because of concerns with disease transfer issues across state lines.

In accordance with the program goal of supplementing the natural population, Yakima and Marion Drain NORs were selected as broodstock. One program objective is to ultimately meet the entire smolt production goal using Yakima and Marion Drain broodstock. Because electrophoretic analysis has indicated a genotype difference between the Yakima mainstem and Marion Drain populations both populations are being supplemented with like kind NOR

broodstock. There are also phenotypic differences between these two stocks with respect to age class structure of the spawning populations and dates of fry emergence

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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.

The following procedures are in place that maintain broodstock collection within programmed levels:

[161](#)

- The collection plan for natural origin adults is in place that prevents collection of surplus fish

Comments:

See also earlier discussion in this section.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

Section 7. Broodstock Collection

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

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
Planned	nya	nya	nya	nya	nya
1990	990	670	nya	nya	nya
1991	1090	781	5	nya	nya
1992	1149	747	150	nya	nya
1993	1398	1354	36	nya	nya
1994	1335	1281	26	nya	nya
1995	1350	1312	31	nya	nya
1996	1149	1117	26	nya	nya
1997	960	957	6	nya	nya
1998	1811	1660	75	nya	nya
1999	1081	1008	17	nya	nya
2000	1252	1163	89	nya	nya

[191](#)

Comments:

Above information applies to LWS/Willard Complex Fall Chinook Component

Prosser Hatchery Component

See section 1.12 for Prosser Hatchery brood collections. Marion Drain collections:

Year	# female	# male
1998	2	6

1999	7	25
2000	3	9
2001	4	7
2002	8	15

The US vs OR production goal is an out-of-basin release of 1.7 million Little White Salmon (LWS) fall chinook. There is no long-term, defined production goal at this time for the Yakima and Marion Drain stocks. Under the immediate feasibility study to meet experimental needs the Yakima and Marion Drain smolt production goals are 320,000 fish and 50,000 fish, respectively.

The in-basin collection goal is 50% female and 50% males.

Both in-basin hatcheries collect adults, while the LWS fish are transferred in as pre-smolts.

Data source:

Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

7.2 Collection or sampling design

- Broodstock collected from wild/natural and hatchery-origin return by net.

Representative samples of the population are collected with respect to size, age, sex ratio, run and spawn timing, and other traits important to long-term fitness.

More than 10% of the broodstock is derived from wild fish each year.

Comments:

Yakima Stock- Broodstock is collected from adults returning to Prosser Dam/Chandler Canal area, and these fish are derivatives of introduced stocks from outside of the subbasin. Broodstock are nearly exclusively collected from Chandler Canal in November using beach seines. This is an interim collection site/method. For several years now the canal has been routinely dewatered in the late fall to remove salmon and steelhead entrained into the canal. Before 1997 these fish were released back into the river. Now the fall chinook are being utilized for broodstock. The Prosser steep-pass ladder, originally designed for broodstock collection, is hardly used by fall chinook (but works well for coho and steelhead), thus in the interim Prosser Hatchery is dependent upon fall chinook entrained into the canal to meet their broodstock collection goal. Fish are randomly captured from the canal in that no purposeful selection criteria used. However, females that are ripe (dripping eggs) are taken, knowing that if released into the river their chances of spawning successful are minimal. Fish after being seined are placed into individual PVC tubes, carried up the bank, and placed into the hatchery truck. The fish are then transported (less than ¼-mile) and released into the adult holding pond. Any steelhead captured (very few if any steelhead are typically entrained into the canal) are handled similarly as fall chinook and released back into the river at the Prosser boat ramp located in the forebay approximately ½-mile upstream of the dam.

Marion Drain Stock- Broodstock are collected using a fish wheel located in the drain at RM 6.2. The fish wheel is operated and manned 24 hours a day. Fish are transported from the fish wheel using individual PVC tubes and placed in the waiting hatchery truck. Fish are transported about 8 miles to the hatchery, where they are released into the holding raceway. All fish collected are taken for broodstock. No known selection biases are associated with the fish wheel, but this remains a point of further research. No steelhead have been collected in the fish wheel in the three years of its operation.

YN broodstock collection guidelines and protocols specified random selection of adults over the run entry pattern, and should improve the probability of survival for the entire population.

The program objective is to produce a self-sustaining natural population greater than 1000 fish per generation. The program guidelines set forth annual number of broodstock required for the program to meet this objective.

It is assumed that more than 10% of the broodstock are from naturally produced fish; but the current adult population cannot be discriminated between hatchery and naturally produced fish since fish have not been 100% marked.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

7.3 Identity.

- [100](#) Marking techniques are used to distinguish among hatchery population segments.
- [101](#) 100% of the hatchery fish are NOT marked so they can be distinguished from the natural population.
- [102](#) Marked fish can be identified using non-lethal means.
- [106](#) Wild fish make up approximately 10% of the broodstock for this program.

Comments:

The Yakima broodstock collection is based on adipose and ventral fin clips used to externally mark the fish for experimental and non-experimental reasons. To date, adults taken from Chandler Canal have predominately been clipped indicating their identity to the Yakima Hatchery. A small portion of the broodstock are adipose present fish, which means the fish is either of NORs or HORs origin. Presently these fish are not identified as to origin based on scale analysis. There is a chance that a Marion Drain origin fish could be one of these adipose present broodstock, however, the probability is thought to be very low. Most of the adipose present fish are likely to be Yakima hatchery fish originally released from the Yakima Hatchery.

To evaluate the Yakima Hatchery accelerated and non-accelerated smolt release groups, 162K fish are ventral clipped (left and right) from each group. Additionally, 2,000 fish are PIT tagged, and 1,000 are PIT tagged from the Marion Drain release.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

7.4 Proposed number to be collected:

- [198](#) **7.4.1 Program goal (assuming 1:1 sex ratio for adults):**
- [191](#) **7.4.2 Broodstock collection levels for the last twelve years (e.g. 1990-2001), or for most recent years available.**

See Section 7.1 above.

Comments:

Data source:

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

The following procedures are in place that maintain broodstock collection within programmed levels:

- [161](#)
 - The collection plan for natural origin adults is in place that prevents collection of surplus fish.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

7.6 Fish transportation and holding methods.

Equipment Type	Capacity (gallons)	Supplemental Oxygen (y/n)	Temperature Control (y/n)	Normal Transit Time (minutes)	Chemical(s) Used	Dosage (ppm)
Adult Transfer Tanker Truck-Prosser Hatchery	700	Y	N	5	Light dose MS	nya
Ponds (number)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)

1	Vinyl line Raceway	22000	150	50	4	1100
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[33](#) Broodstock is collected and held in a manner that results in less than 10% prespawning mortality.

Comments:

LWS/Willard NFH Complex: Derive transport equipment information from complex manager.

Broodstock are held for spawning in holding ponds or raceways until ready for spawning. Fish are checked weekly for ripeness and spawned. A formalin drip is applied weekly into the holding ponds to treat for fungus on the gills and any open wounds. This and data in above tables apply to Prosser Hatchery. Derive additional information from Little White Salmon/Willard NFH Complex.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

7.7 Describe fish health maintenance and sanitation procedures applied.

[98](#) "Fish transfers into the subbasin are inspected and accompanied by notifications as described in IHOT and PNFHPC guidelines.

[32](#) Integrated Hatchery Operations Team (IHOT), Pacific Northwest Fish Health Protection committee (PNFHPC), state or tribal guidelines are followed for broodstock fish health inspection, transfer of eggs or adults and broodstock holding and disposal of carcasses.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

7.8 Disposition of carcasses.

[32](#) Integrated Hatchery Operations Team (IHOT), Pacific Northwest Fish Health Protection committee (PNFHPC), state or tribal guidelines are followed for broodstock fish health inspection, transfer of eggs or adults and broodstock holding and disposal of carcasses.

[103](#) Hatchery adults are distributed by staff within the subbasin to provide ecological benefits.

Comments:

Prosser Hatchery: Carcasses are distributed into subbasin waters in vicinity of the facility.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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.

[32](#) Integrated Hatchery Operations Team (IHOT), Pacific Northwest Fish Health Protection committee (PNFHPC), state or tribal guidelines are followed for broodstock fish health inspection, transfer of eggs or adults and broodstock holding and disposal of carcasses.

Comments:

The primary objective of the program is the restoration/recovery of a natural spawning population using hatchery and hatchery/natural derivatives.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

Section 8. Mating

8.1 Selection method.

[35](#) Males and females available on a given day are mated randomly.

Comments:

Prosser Hatchery: Ripe fish on a weekly basis are randomly spawned using three males and females at a time. No directed selection of which males are spawned with females or visa versa.

LWS/Willard NFH: Fish are sorted over a one to two day period with ripe females being spawned and green females sent back to the ponds until 100% of the fish have been checked. Enough male fish are sent back to the pond with the green females to ensure a 1:1 spawning ratio. The eggs collected during this sorting process are called an egg-take. Male spawners are randomly selected during the egg-take with up to five percent of males used being jacks.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

8.2 Males.

[38](#) Precocious males are used as a set percentage or in proportion to their contribution to the adult run.

[37](#) Back-up males are used in the spawning protocol.

Comments:

Prosser Hatchery: Jacks are collected in proportion to contributions during broodstock acquisition intervals @ ~1:5 per interval. Jacks are incorporated into the mating scheme in a random fashion. Back up males are not used in the classical sense.

LWS/Willard NFH: Up to five percent of males used are jacks. The number of jacks spawned on a given day is subjectively defined by hatchery staff up to the five percent maximum and is dependent on availability and ripeness. During low escapement years, males have been re-used on an as-needed basis to maximize the total number of females available to spawn. In low escapement years, it is better to spawn the available females (and not lose that genetic material), than discard them. Under these conditions, reusing male fish does not compromise the genetic diversity of the hatchery stocks. It was determined that, in all instances, a minimum escapement need had been met to maintain genetic diversity, although some male fish had to be reused to achieve production goals.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

8.3 Fertilization.

[36](#) Gametes are pooled prior to fertilization.

[11](#) IHOT PNFHPC tribal guidelines are followed for culture practices for this program.

[40](#) Disinfection procedures that prevent pathogen transmission between stocks of fish are implemented during spawning.

Comments:

At Prosser Hatchery, three males in a cup and three females in a bucket are fertilized. Males and females are selected randomly. Since fewer fish are available at Marion Drain, 2 males selected at random are spawned per female.

Per IHOT and U.S. Fish & Wildlife guidelines.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

8.4 Cryopreserved gametes.

162 Cryopreserved gametes are not used.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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.

35 Males and females available on a given day are mated randomly.

36 Gametes are pooled prior to fertilization.

37 Back-up males are used in the spawning protocol.

38 Precocious males are used as a set percentage or in proportion to their contribution to the adult run.

Comments:

See above comments in section 8.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

Section 9. Incubation and Rearing.

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

Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)	Egg Survival Performance Std.	Fry-fingerling Survival (%)	Rearing Survival Performance Std.	Fingerling-Smolt Survival (%)
1990	5295939	90.6	nya	nya	nya	nya	nya
1991	5332182	93.0	nya	nya	nya	nya	nya
1992	5640292	93.0	nya	nya	nya	nya	nya
1993	6675395	93.0	nya	nya	nya	nya	nya
1994	6390236	89.2	nya	nya	nya	nya	nya
1995	6331790	92.3	nya	nya	nya	nya	nya
1996	5352726	88.7	nya	nya	nya	nya	nya
1997	4584966	86.2	nya	nya	nya	nya	nya
1998	4461450 *	88.5	nya	nya	nya	nya	nya
1999	4931822	89.3	nya	nya	nya	nya	nya
2000	5962075	89.2	nya	nya	nya	nya	nya
2001	4192595	90.9	nya	nya	nya	nya	nya

Comments:

*1998 Eggtake number does not include 4,084,800 green eggs shipped to other facilities.

Above information applies to LWS/Willard Complex Fall Chinook Component

Prosser Hatchery Component: The egg-take has ranged from 50K to 320K since broodstock collection was initiated in 1997. The egg-take goal is 350K. The rearing protocol allows for an egg-to-smolt survival rate of 85%. The unwritten egg-to-ponding survival goal is 90%. We have experienced a 92% survival in both hatcheries.

192

10.3.1) Average fecundity

Mean fecundity is 4,932 and 4,611 eggs/female, respectively, for the Prosser and Marion Drain hatcheries.

10.3.2) Survival

a) Collection to spawning: 99%.

b) Green eggs to eyed eggs: 95%.

c) Eyed eggs to release: 90%.

d) Release to adult, to include contribution to:

(i) harvest- Based on multiple year's of CWT recoveries, 53% of the hatchery fish are taken in the Zone 6 Tribal fishery and another 46% in the Coastal sport and commercial fisheries from Alaska to Oregon. The first in-basin sport fishery in recent decades occurred in 1998. The highest harvest rate observed occurred in 2000, at 5.4% (takes into account fish spawning below Prosser Dam; above Prosser Dam the sport harvest rate was about 1.8%).

(ii) hatchery brood stock- For data compiled through 1996, the mean smolt at release-to-adult survival rate was 0.04-0.06%, but 0.2% based on the CJMF smolt-to-adult survival rate (suggests a high initial loss immediately after release).

Based on the 2000 run size of about 2,000 fish past Prosser Dam the broodstock collection comprised 12% of the total escapement past Prosser Dam.

(iii) natural spawning- For data compiled through 1996, the estimated smolt-to-adult survival rate is 1% for the above Prosser Dam population.

The spawning escapement past Prosser Dam was about 86% of the total run (~2,000 fish) in 2000.

Data source:

Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.1.2 Cause for, and disposition of surplus egg takes.

- [163](#) Prosser Hatchery: None
LWS/Willard complex: Extra eggs may be taken to safeguard against potential incubation losses. Excess eggs are buried on-station.
- [48](#) Families are NOT incubated individually.
- [59](#) No culling of juveniles occurs.
- [44](#) 0 (eggs are never culled)

Comments:

Culling for dead and disease eggs only

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.1.3 Loading densities applied during incubation.

- [51](#) Integrated Hatchery Operations Team (IHOT) species-specific incubation recommendations were followed for water quality, flows, temperature and substrate.
- [47](#) Families within spawning groups are mixed randomly at ponding so that unintentional rearing differences affect families equally.
- [42](#) Eggs are incubated under conditions that result in equal survival of all segments of the population to ponding.

Comments:

Prosser Hatchery: Vertical Stack incubators= yes
Yakima Stock - 5,000 eggs per tray (Heath). Egg size is not currently recorded.
Marion Drain Stock - 5,000 eggs per tray (Heath). Egg size is not currently recorded.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.1.4 Incubation conditions.

- [49](#) Incubation takes place in home stream water.
- [50](#) The program does NOT use water sources that result in hatching/emergence timing similar to that of the naturally produced population.
- [51](#) Integrated Hatchery Operations Team (IHOT) species-specific incubation recommendations were followed for water quality, flows, temperature and substrate.
- [53](#) Eggs are NOT monitored to determine fertilization efficiency and embryonic development.
- [42](#) Eggs are incubated under conditions that result in equal survival of all segments of the population to ponding.
- [47](#) Families within spawning groups are mixed randomly at ponding so that unintentional rearing differences affect families equally.
- [48](#) Families are NOT incubated individually.
- [43](#) Incubation conditions are manipulated as to synchronize ponding of fry.

Comments:

Incubation water is an on-site shallow well source that is probably recharged from sources similar to the Chandler Canal/Yakima surface water.

At Prosser Hatchery, temperature is controlled to mimic natural conditions. Dissolved Oxygen is measured weekly and typically ranges from 8-12 ppm. No monitoring of the effluent water occurs.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.1.5 Ponding.

The procedures used for determining when fry are ponded include:

- [55](#)
 - Fry are ponded based on visual inspection of the amount of yolk remaining

- [46](#) Eggs are NOT incubated in a manner that allows volitional ponding of fry.

Comments:

Fry are ponded at nearly 100% button up. This occurs at approximately 1,700 TUs. The approximate fork length is 37mm at ponding. Ponding takes places around January 22 for accelerated treatment and February 13 for the conventional treatment group.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.1.6 Fish health maintenance and monitoring.

- [52](#) Disinfection procedures are implemented during incubation that prevent pathogen transmission between stocks of fish on site.
- [53](#) Eggs are not monitored when needed to determine fertilization efficiency and embryonic development.
- [54](#) Following eye-up stage, eggs are inventoried, and dead or undeveloped eggs removed and disposed of as described in the disease control guidelines.
- [56](#) Dead or culled eggs are discarded in a manner that prevents transmission to receiving watershed.

Comments:

No atypical health issues have been experienced during incubation. No formal fish health screenings occur during incubation. However, adult broodstock are screened for routine bacteria and viruses at the time of spawning by USFWS.

Per IHOT and U.S.Fish & Wildlife Fish Health and Pathology Guidelines.

Prosser Hatchery: Dead or diseased eggs thrown into dumpster.

LWS/Willard Complex: According to the USFWS fish health policy in 713 FW.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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.

[47](#) Families within spawning groups are mixed randomly at ponding so that unintentional rearing differences affect families equally.

[49](#) Incubation takes place in home stream water.

[50](#) The program does NOT use water sources that result in hatching/emergence timing similar to that of the naturally produced population.

[51](#) Integrated Hatchery Operations Team (IHOT) species-specific incubation recommendations were followed for water quality, flows, temperature and substrate.

[52](#) Disinfection procedures are implemented during incubation that prevent pathogen transmission between stocks of fish on site.

[56](#) Dead or culled eggs are discarded in a manner that prevents transmission to receiving watershed.

[61](#) Families are NOT culled to minimize family size variation.

Comments:

See previous comments in this section.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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 (1990-2001), or for years dependable data are available.

[192](#) See 9.1.1.

Comments:

Data source:

Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.2.2 Density and loading criteria (goals and actual levels).

[71](#) The juvenile rearing density and loading guidelines used at the facility are based on: standardized agency guidelines and staff experience (e.g. trial and error).

[72](#) IHOT standards are followed for: water quality, alarm systems, predator control measures to provide the necessary security for the cultured stock, loading and density.

Comments:

Above answers apply to Prosser Hatchery production component.

The rearing density criteria for both hatcheries are 0.75 lb fish per cubic foot of rearing space.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.2.3 Fish rearing conditions.

- [66](#) The program does NOT use a diet and growth regime that mimics the natural seasonal growth patterns.
- [67](#) Settleable solids, unused feed and feces are removed periodically to ensure proper cleanliness of rearing containers.
- [72](#) IHOT standards are followed for: water quality, alarm systems, predator control measures to provide the necessary security for the cultured stock, loading and density.
- [71](#) The juvenile rearing density and loading guidelines used at the facility are based on standardized agency guidelines and staff experience (e.g. trial and error).

Comments:

Rearing containers are cleaned daily. Rearing containers are treated according to the Agency Disinfection and Sanitation Guidelines. Above answers apply to Prosser Hatchery production component.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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.

[194](#)

Rearing Period	Length (mm)	Weight (fpp)	Condition Factor	Growth Rate	Hepatosomatic Index	Body Moisture Content
March	51.7	491	nya	0.87	nya	nya
April	62.2	229.9	nya	0.90	nya	nya
May	78.2	115.6	nya	0.67	nya	nya
June	83.3	82.2	0.000346	0.85	nya	nya

Comments:

Above information applies to LWS/Willard Complex Fall Chinook Component (BY 2001 fish reared at LWS NFH).

Prosser Hatchery: No length information is recorded. Weight is recorded regularly in terms of fpp throughout the rearing period. Growth rate and energy reserve information is monitored by the USFWS through their routine fish health checks.

Data source:

Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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

[64](#)

- Feeding rates are followed so that fish size is within 10% of program goal each year.
- Feed is stored under proper conditions as described by IHOT guidelines.

[65](#)

The correct amount and type of food is provided to achieve the desired growth rate and condition factors for the species and life stages being reared.

[66](#)

The program does NOT use a diet and growth regime that mimics the natural seasonal growth patterns.

Comments:

Above answers apply to Prosser Hatchery component. Prosser Hatchery: Growth rate and energy reserve information is monitored by the USFWS through their routine fish health checks.

Both hatchery facilities use Moore Clark dry pellets appropriate to size of fish being fed. Fry are fed at 5% of their body weight, and fingerlings and psmolts 2-5%. Food conversion rates range from 1.0-1.3.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little

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).

- Feeding rates are followed so that fish size is within 10% of program goal each year.
- Feed is stored under proper conditions as described by IHOT guidelines.

64

65

The correct amount and type of food is provided to achieve the desired growth rate and condition factors for the species and life stages being reared.

195

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
nya	Bio Moist Starter	nya	nya	nya	nya
nya	Bio Moist Grower	nya	nya	nya	nya
nya	Moore Clark	nya	nya	nya	nya

Comments:

Above answers apply to Prosser Hatchery component.

Both hatchery facilities use Moore Clark dry pellets appropriate to size of fish being fed.

Rearing Phase @ Little White Salmon NFH: The fish are fed BioMoist starter, grower and feed following manufacturer recommendations (generally between 3.5% and 1.0% of body weight per day). They are fed between two and nine times daily depending on fish size. Overall conversions are around 1.0.

Rearing phase @ Prosser Hatchery: Hatchery facility use Moore Clark dry pellets appropriate to size of fish being fed. Fry are fed at 5% of their body weight, and fingerlings and presmolts 2-5%. Food conversion rates range from 1.0-1.3.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.2.7 Fish health monitoring, disease treatment, and sanitation procedures.

62

IHOT fish health guidelines are followed to prevent transmission between lots of fish on site or transmission or amplification to or within the watershed.

63

Vaccines are NOT used, whenever possible, to minimize the use of antimicrobial compounds.

71

The juvenile rearing density and loading guidelines used at the facility are based on standardized agency guidelines and staff experience (e.g. trial and error).

Comments:

Vaccines are not used in this program. Juveniles are screened monthly for routine bacteria, viruses and parasites by USFWS.

According to USFWS procedures and guidelines in 713 FW, and IHOT.

Above answers apply to Prosser Hatchery production component.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

9.2.8 Smolt development indices (e.g. gill ATPase activity), if applicable.

87

The migratory state of the release population is determined by volitional release.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

9.2.9 Indicate the use of "natural" rearing methods as applied in the program.

- [68](#) The program attempts to better mimic the natural rearing environment by reducing rearing density below agency or other guidelines) and rearing under natural water temperature.
- [69](#) Fish produced are qualitatively similar to natural fish in fpp and length, morphology, behavior, physiological status and health.
- [84](#) Fish are released at sizes similar to natural fish of the same life stage and species.
- [88](#) Fish are NOT released in a manner that simulates natural seasonal migration patterns.

Comments:

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 such that smoltification occurs within nearly the entire population, which will reduce retention in the streams after release. Rearing on parent river water or acclimation for several weeks to parent river water is done to ensure strong homing to the hatchery, thus reducing the stray rate to natural populations.

Guided by the experimental design for the Prosser Hatchery program, the accelerated growth fish are released near April 22, and the non-accelerated fish the end of May. These are both non-volitional, direct releases from the hatchery. The one exception to these release dates occurs if extremely poor smolt survival conditions (i.e., high water temperatures and predation) are expected or are occurring.

The Marion Drain smolts are released at the end of March directly from the hatchery. Fish are volitionally released over a two week period and forced out of the rearing units at the end of the two week period, during the natural outmigration window.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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.

- [72](#) IHOT standards are followed for: water quality, alarm systems, predator control measures to provide the necessary security for the cultured stock, loading and density.
- [80](#) The facility is continuously staffed to assure the security of fish stocks on-site.
- [84](#) Fish are released at sizes similar to natural fish of the same life stage and species.
- [88](#) Fish are NOT released in a manner that simulates natural seasonal migration patterns.
- [98](#) "Fish transfers into the subbasin are inspected and accompanied by notifications as described in IHOT and PNFHPC guidelines.
- [76](#) Fish inventory data accurately reflect rearing vessel population abundance with 10%.
- [86](#) Volitional release is practiced during natural out-migration timing.
- [96](#) Fish are released in the same subbasin as the final rearing facility.

Comments:

See preceding responses to section 9 questions.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

Section 10. Release

10.1 Proposed fish release levels.

Comments:

See Section 1.11.2.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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

Fish are released in the same subbasin as the final rearing facility.

Yakima Stock- Fish are released directly from the Prosser Hatchery located at RM 46.8 into the Yakima mainstem.

[96](#)

Little White Salmon Stock- Fish are released directly from the Prosser Hatchery located at RM 46.8 into the Yakima mainstem.

Marion Drain Stock- Fish are released directly from the Marion Drain Hatchery into the drain located at approximately RM 8.

Comments:

Prosser Hatchery is located on the left bank of the Yakima River at RM 46.8 (latitude 46° 12' 51.36" N, longitude 119° 45' 42.53" W). Marion Drain Hatchery is located on the left bank of Marion Drain at RM 14.1 (latitude 46° 20' 17.60" N, longitude 120° 28' 45.38" W).

Broodstock Capture:

Prosser Dam and Chandler Canal (Yakima NORs), Marion Drain fish wheel (Marion Drain NORs), Little White Salmon (out-of-basin).

Broodstock Holding to Maturity:

Prosser Hatchery, Marion Hatchery (for Yakima Basin broodstock), and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Fish Spawning, Incubation, Rearing:

Spawning: Prosser Hatchery, Marion Hatchery (for Yakima Basin broodstock), and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Incubation: Prosser Hatchery, Marion Hatchery (for Yakima Basin broodstock), and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Initial Rearing: Prosser Hatchery, Marion Hatchery (for Yakima Basin broodstock), and Little White Salmon Nation Fish Hatchery (out-of-basin stock).

Final Rearing and Acclimation: Prosser Hatchery and Marion Hatchery (for Yakima Basin and Little White Salmon stocks).

See also section 1.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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

Release Year	Eggs/Unfed Fry Release			Fry Release			Fingerling Release			Yearling Release		
	Number	Date (MM/DD)	Avg Size (fpp)	Number	Date (MM/DD)	Avg size (fpp)	Number	Date (MM/DD)	Avg Size (fpp)	Number	Date (MM/DD)	Avg Size (fpp)
1999	na	na	na	na	na	na	192000	*4/26 and 5/25-6/4	60	na	na	na
2000	na	na	na	na	na	na	306000	*4/10-4/20 and 5/25	55	na	na	na
2001	na	na	na	na	na	na	439753	*4/12-4/13, 4/19-4/20, and 5/16-5/17	55	na	na	na
2002	na	na	na	na	na	na	147079	*4/15/16-5/17	74	na	na	na
Avg	na	na	na	na	na	na				na	na	na

[196](#)

Comments: Above are Little White Releases. For Prosser Hatchery:

*1999 Subyearling Releases

113000 fish @ 60 fpp released on 4/26
79000 fish @ 60 fpp released during period 5/25-6/4

*2000 Subyearling Releases
148 fish @ 55 fpp released during period 4/10-4/20
158000 fish @ 55 fpp released on 5/25

*2001 Subyearling Releases
12000 fish @ 60 fpp released during period 4/12-4/13
189915 fish @ 50 fpp released during period 4/19-4/20
237838 fish @ 64 fpp released during period 5/16-5/17

*2002 Subyearling Releases
143079 fish @ 74.7 fpp released during period 4/16-4/17
4000 fish @ 65 fpp released on 4/15

Data source:

Fish Passage Center (APRE Site) Website.

10.4 Actual dates of release and description of release protocols.

- [84](#) Fish are released at sizes similar to natural fish of the same life stage and species.
- [85](#) Fish are released at a time, size, location, and in a manner that achieves harvest goals for the stock.
- [86](#) Volitional release during natural out-migration timing is practiced.
- [88](#) Fish are NOT released in a manner that simulates natural seasonal migration patterns.
- [90](#) Fish are released at an optimum time and size that has been determined by survival studies from another facility.
- [91](#) Fish are released at a time and size specified in an established juvenile production goal.
- [92](#) The carrying capacity of the subbasin has NOT been taken into consideration in sizing this program.
- [87](#) The migratory state of the release population is determined by volitional release.

Comments:

Fish are volitionally released over a two week period and forced out of the rearing units at the end of the two week period, during the natural outmigration window. Exception is April early release.

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 such that smoltification occurs within nearly the entire population, which will reduce retention in the streams after release. Rearing on parent river water or acclimation for several weeks to parent river water is done to ensure strong homing to the hatchery, thus reducing the stray rate to natural populations.

Guided by the experimental design for the Prosser Hatchery program, the accelerated growth fish are released near April 22, and the non-accelerated fish the end of May. These are both non-volitional, direct releases from the hatchery. The one exception to these release dates occurs if extremely poor smolt survival conditions (i.e., high water temperatures and predation) are expected or are occurring.

The Marion Drain smolts are released the end of March directly from the hatchery. Fish are volitionally released over a two week period and forced out of the rearing units at the end of the two week period, during the natural outmigration window.

The program specifies release times and sizes for fish.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

10.5 Fish transportation procedures, if applicable.

- [96](#) Fish are released in the same subbasin as the final rearing facility.

[187](#)

Equipment Type	Capacity (gallons)	Supplemental Oxygen (y/n)	Temperature Control (y/n)	Normal Transit Time (minutes)	Chemical(s) Used	Dosage (ppm)
Adult Transfer Tanker Truck-Prosser Hatchery	700	Y	N	5	Light dose MS	nya

Comments:

LWS/Willard NFH Complex: Derive transport equipment information from complex manager.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

10.6 Acclimation procedures (*methods applied and length of time*).

[166](#)

All fish reared at Prosser (or transported to Prosser from Little White for final rearing) or Marion Drain are released on-site from the respective hatchery. Two week volitional release period, and then fish are forced out of the rearing/acclimation systems. Program fish are released during two periods, early release in April and late release in May.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

[100](#)

Marking techniques are used to distinguish among hatchery population segments.

[101](#)

100% of the hatchery fish are NOT marked so they can be distinguished from the natural population.

[102](#)

Marked fish can be identified using non-lethal means.

Comments:

The Yakima broodstock collection is based on adipose and ventral fin clips used to externally mark the fish for experimental and non-experimental reasons. To date, adults taken from Chandler Canal have predominately been clipped indicating their identity to the Yakima Hatchery. A small portion of the broodstock are adipose present fish, which means the fish is either of NORs or HORs origin. Presently these fish are not identified as to origin based on scale analysis. There is a chance that a Marion Drain origin fish could be one of these adipose present broodstock, however, the probability is thought to be very low. Most of the adipose present fish are likely to be Yakima hatchery fish originally released from the Yakima Hatchery.

To evaluate the Yakima Hatchery accelerated and non-accelerated smolt release groups, 162K fish are ventral clipped (left and right) from each group. Additionally, 2,000 fish are PIT tagged, and 1,000 are PIT tagged from the Marion Drain release.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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

[167](#)

Smolt/juveniles= No surpluses in the Program: All fish reared and acclimated to smolt phase are released.

Prosser Hatchery: None

[163](#)

LWS/Willard complex: Extra eggs may be taken to safeguard against potential incubation losses. Excess eggs are buried on-station.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

10.9 Fish health certification procedures applied pre-release.

[97](#)

All fish are examined for the presence of "reportable pathogens" as defined in the PNFHPC disease control guidelines, within 3 weeks prior to release.

[98](#) Fish transfers into the subbasin are inspected and accompanied by notifications as described in IHOT and PNFHPC guidelines.

Comments:

Per examination of USFWS pathologist.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

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

[168](#) Pull screens and boards, and allow fish to exit the facility volitionally.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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.

[84](#) Fish are released at sizes similar to natural fish of the same life stage and species.

[86](#) Volitional release during natural out-migration timing is practiced.

[88](#) Fish are NOT released in a manner that simulates natural seasonal migration patterns.

[91](#) Fish are released at a time and size specified in an established juvenile production goal.

[104](#) The percent of the naturally spawning population in the subbasin that consists of adults from the program is >30% (greater than thirty percent).
The percent of hatchery fish spawning in the wild is estimated by:

- [105](#)
- Annual stream surveys (e.g. carcasses)
 - Escapement data from a weir or dam

[94](#) Fish are released within the historic range for that stock.

[93](#) The carrying capacity of the subbasin was taken into account when determining the number of fish to be released.

Comments:

See preceding responses to Section 10 questions.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002. Hatchery and Genetic Management Plan for Upriver Bright Fall Chinook Program. Little White/Willard NFH Complex. 07 October 2002.

Section 11. Monitoring and Evaluation of Performance Indicators

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

The following is a list of monitoring and evaluation activities being conducted under the YKFP for the fall chinook supplementation program.

1) Enumeration of adults (hatchery and natural) past Prosser Dam.

[144](#) 2) Enumeration of the total smolt outmigration (natural and hatchery) at the CJMF. Other parameters recorded are outmigration timing, size, and detection of PIT-tagged fish at CJMF and mainstem dams.

3) Evaluation of the temporal and spatial distribution of the naturally produced juveniles in three of the main spawning/rearing areas- Benton, Granger and

Toppenish-Wapato. In addition, body size and relative abundance through time is recorded.

4) Monitor fall chinook outmigrants from Marion Drain. This includes recording of timing and fish size.

5) Continuous monitoring of water temperature is done at selected mainstem and drain sites. This data is used to examine growth rates and outmigrant timing with respect to water temperature.

6) The survival differences between the accelerated and non-accelerated hatchery treatments are being evaluated. To make this evaluation a comparison in smolt-to-smolt and smolt-to-adult survival rates is being done.

7) The incidence of fall chinook predation by pikeminnows, smallmouth bass and avian predators is being conducted.

Comments:

See also 1.10.

Data source:

11.1.2 Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

[146](#) BPA Fish & Wildlife Program funding available for Yakima Fisheries Project M&E activities.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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.

[147](#) There is currently no ongoing monitoring and evaluation activities associated with genetic profiling. Additional information beyond what has been previously done (Busack, 1991) is not required to carryout existing M&E activities.

Comments:

Assessment of ecological effects of fall chinook production activities will be addressed in Master Plan which is in development.

Data source:

Section 12. Research

12.1 Objective or purpose.

The fall chinook program is currently in its feasibility phase. Two culturing treatments- accelerated and non-accelerated growth are being evaluated for hatchery-released fish. The known thermal/predation issues in the lower Yakima River occurring in late spring when fall chinook typically smolt is the rationale for this research. The hypothesis is that accelerated growth smolts will outmigrate sooner than the non-accelerated fish and thus experience a higher smolt-to-smolt survival rate through the Yakima River.

[169](#) Life history research is being conducted on the natural population in the Yakima mainstem and Marion Drain. The focus is on describing their growth rate, relative spatial distribution. A rotary trap is operated in Marion Drain to learn the juvenile outmigration timing, duration spent in the drain, growth rates, and survival to CJMF.

Supporting research on the YKFP predation and indirect predation studies are providing information on the impacts of predation upon the natural and hatchery fall chinook smolts.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

12.2 Cooperating and funding agencies.

Yakama Nation (Co-Manager)

Washington Department of Fish & Wildlife (Co-Manager)

[170.](#)

Bonneville Power Administration (Funding entity for YKFP Project)

U.S. Fish & Wildlife Service (Little White Salmon NFH production and tagging)

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

12.3 Principle investigator or project supervisor and staff.

Dr. David Fast (YKFP Research Manager, Yakama Nation Fisheries)

Melinda Davis (biologist, Yakama Nation Fisheries)

Joe Blodgett (Prosser Hatchery complex manager, Yakama Nation Fisheries)

[171.](#)

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

See Section 2.

[172.](#)

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

The hatchery accelerated and non-accelerated treatment study being conducted at Prosser requires that a portion of these fish be PIT tagged, as well as, CWT tagged to evaluate differences in smolt-to-smolt and smolt-to-adult survivals. The PIT tagging is conducted at the Prosser hatchery, and the CWT tagging at LWNFH prior to being transported to the Prosser Hatchery.

[173.](#)

Beach seines are used to sample naturally produced fall chinook for the life history study. Fish are anesthetized using MS-222, measured and weighted, and released on site after recovery.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

12.6 Dates or time periods in which research activity occurs.

[174](#)

Research activities for all field activities begin in February and end in late June after the fall chinook smolt outmigration is over.

The marking activities associated with the hatchery fish is completed the previous fall prior to release.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

[175](#)

As stated previously, both Yakima and Marion Drain broodstock are transported from their respective collection site to their respective hatchery holding ponding using the Yakama Nation hatchery truck. The transportation duration for Prosser is a few minutes, and Marion Drain about 15 minutes.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

[176](#)

The program has the following permits or authorizations: YKFP projects have been operating under a "BPA Letter" dated 4/6/01 from Robert Beraud to Rob Jones which states that NMFS has no concern that YKFP activities would violate 7d rules. An electronic copy of the letter is not available but could be mailed via U.S. mail if desired. In addition, the BPA environmental coordinator for the YKFP has prepared NEPA documents which cover all the environmental aspects of the project, including ESA coverages. Copies of this documentation are available from Patricia R. Smith, BPA, 800-282-3713 (prsmith@bpa.gov).

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

Comments:

The program has the following permits or authorizations: YKFP projects have been operating under a "BPA Letter" dated 4/6/01 from Robert Beraud to Rob Jones which states that NMFS has no concern that YKFP activities would violate 7d rules. An electronic copy of the letter is not available but could be mailed via U.S. mail if desired. In addition, the BPA environmental coordinator for the YKFP has prepared NEPA documents which cover all the environmental aspects of the project, including ESA coverages. Copies of this documentation are available from Patricia R. Smith, BPA, 800-282-3713 (prsmith@bpa.gov).

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

12.10 Alternative methods to achieve project objectives.

[177](#)

There is no viable alternative for the either Prosser or Marion Drain fall chinook research programs.

Comments:

See also section 1.16.

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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

[178](#)

The program has the following permits or authorizations: YKFP projects have been operating under a "BPA Letter" dated 4/6/01 from Robert Beraud to Rob Jones which states that NMFS has no concern that YKFP activities would violate 7d rules. An electronic copy of the letter is not available but could be mailed via U.S. mail if desired. In addition, the BPA environmental coordinator for the YKFP has prepared NEPA documents which cover all the environmental aspects of the project, including ESA coverages. Copies of this documentation are available from Patricia R. Smith, BPA, 800-282-3713 (prsmith@bpa.gov).

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

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.

[179](#)

Agency guidelines and protocols will be strictly followed for the use of anaesthetics (application/recovery, water temperature, DO), any listed fish species will be discriminated and immediately placed in a recovery vessel, and returned to the Yakima River.

Comments:

Data source:

Blodgett, J. APRE Part 2 Interview, 18 December 2002.

Section 13. Attachments and Citations

13.1 Attachments and Citations

[197](#)

Comments:

YAKIMA FALL CHINOOK SALMON, Planning Status Report, Draft February 1998 (attached). [C:\Data\ykfp\FallChinook\Fall_PSR_draft.doc](#)

Data source:

Section 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

14.1 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. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by _____ Date: _____
