HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Klickitat Upriver Bright (URB) Fall Chinook
Species or Hatchery Stock	Chinook Salmon (*Oncorhynchus tshawytscha*)
Agency/Operator	Washington Department Fish and Wildlife
Watershed and Region	Klickitat Subbasin/Columbia Gorge Province
Date Submitted	-
Date Last Updated	January 18, 2005

Section 1: General Program Description

1.1 Name of hatchery or program.

Klickitat URB Fall Chinook

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

Upriver Bright Fall Chinook Salmon (*Oncorhynchus tshawytscha*)

ESA Status: Not listed and not a candidate for listing

1.3 Responsible organization and individuals.

Name (and title):	Richard Johnson
	Washougal-Skamania Hatcheries Complex Manager
Agency or Tribe:	Washington Department Fish and Wildlife
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Co-operators	Role
Yakama Tribe	Technician
Grant County PUD	Funding, facility maintenance - mitigation for Priest Rapids and Wanapum Dams
	John Day Dam mitigation

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

Funding Sources
Mitchell Act

Operational Information	Number
Full time equivalent staff	5
Annual operating cost (dollars)	$144,000.00

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	Priest Rapids URB
Broodstock collection location (stream, RKm, subbasin)	Priest Rapids Hatchery Trap - located in the hatchery outfall channel emptying into the mainstem Columbia River (WRIA 36-0001), Washington at Rkm 662; and (secondarily, if necessary) Priest Rapids Dam ladder trap (same approximate location), on the mainstem Columbia River.
Adult holding location (stream, RKm, subbasin)	Priest Rapids Hatchery – located on the mainstem Columbia River (WRIA 36-0001), Washington at Rkm 662.
Spawning location (stream, RKm, subbasin)	Priest Rapids Hatchery. Columbia River, 662 Rkm, Columbia Lower Middle
Incubation location (facility name, stream, RKm, subbasin)	Priest Rapids Hatchery (transfers to Umatilla and Klickitat hatcheries). Klickitat River Hatchery/RKm 70. Klickitat Hatchery, 68, Klickitat
Rearing location (facility name, stream, RKm, subbasin)	Klickitat River Hatchery/RKm 70. Klickitat Hatchery, 68, Klickitat

1.6 Type of program.

Isolated Harvest – (Mid and Lower Columbia River)

1.7 Purpose (Goal) of program.

Mitigation - The primary goal of URB chinook production released from Klickitat Hatchery is to replace losses of wild URB chinook contributions to Treaty Indian, and non-Indian sport and commercial fisheries due to federal hydropower and habitat degradation in the Columbia River Basin. The URB chinook production from Klickitat and Priest Rapids Hatchery contributes significantly to ocean, Columbia River commercial and recreational fisheries, and Treaty Indian fisheries in Zone 6 of the Columbia River. Approximately 500 eyed eggs also go to Region Co-ops for education purposes.

1.8 Justification for the program.

The program will be operated to provide fish for harvest while minimizing adverse affects on listed fish. Hatchery salmon and steelhead are released into the Klickitat River as part of mitigation for hydroelectric impacts and litigation as a result of U.S. vs. Oregon.

In order to minimize harvest affects in the Klckitat River on listed fish, WDFW submits a Fisheries Management and Evaluation Plan (FMEP) to regulate recreational fisheries in the Mid-Columbia River (MCR) Washington State Salmon Recovery Region. A final draft (March 7, 2003) has been submitted to NOAA for approval and is still in process. The objectives of the WDFW Fishery Management Evaluation Plan (FMEP) are based on the WDFW Wild Salmonid Policy (WDFW 1997). This policy states that harvest rates will be managed so that 1) spawners are abundant enough to utilize all available habitats, 2) numbers and distribution of locally adapted spawning populations will not decrease, 3) genetic diversity within populations is maintained or increased, 4) natural ecosystem processes are maintained or restored, and 5) sustainable surplus production, above levels needed to utilize all available habitats and provide for local adaptation, genetic diversity, and ecosystem processes, will be managed to support fishing opportunities (WDFW

1997). In addition, fisheries will be designed to ensure adult size, run timing, distribution of migrating and spawning populations, and age at maturity remains the same between fished and unfished populations. By complying with this policy, fishery impacts to listed chinook and steelhead in the MCMA will be managed to promote the recovery of these species, and at rates that will not jeopardize their survival or recovery.

This area is used by listed steelhead in the Middle Columbia River Steelhead ESU for spawning, rearing, and migration. The WDFW uses gear, timing, and harvest regulations to optimize harvest of targeted fish and minimize impacts to listed fish. If WDFW determines through monitoring activities that risks are unacceptable to listed stocks, timing, area, and gear restrictions will be adjusted. The WDFW has developed conservative measures to protect both juvenile and adult fish. Methods to reduce encounters and mortality of listed fish include: Closed fisheries in important habitats. For example, the Klickitat River is closed to all WDFW-regulated fisheries upstream of the Yakama Nation boundary and all tributaries to Mill Creek are closed to fishing to protect wild steelhead.

In order to minimize impact on listed fish by Klickitat Hatchery facilities in operation of the URB program, the following Risk Aversion are included in this HGMP:

Table 1. Risk aversion measures for the Klickitat URB program.

Potential Hazard	**HGMP Reference**	**Risk Aversion Measures**
Water Withdrawal	4.2	Water rights are formalized thru trust water right S4-*07272 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.
Intake Screening	4.2	WDFW has requested funding for future scoping, design, and construction work of a new river intake system to meet NOAA compliance (Mitchell Act Intake and Screening Assessment 2002).
Effluent Discharge	4.2	This facility operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) administered by the Washington Department of Ecology (DOE) - WAG 13-5002.
Broodstock Collection & Adult Passage	7.9	Listed fish are not collected. The hatchery weir and associated intake facilities need repairs to provide compliant passage.
Disease Transmission	7.9, see also 10.11	Fish Health Policy in the Columbia Basin. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (Genetic Policy Chapter 5, IHOT 1995).
Competition & Predation	See also 2.2.3, 10.11	Current risk aversions and future considerations are being reviewed and evaluated for further minimizing impacts to listed fish.

1.9 List of program "Performance Standards".

See section 1.10 below.

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

1.10.1 Benefits:

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
hatchery operations support Columbia Agt. Plan *(US v Oregon)*, production and ctives	Contribute to a meaningful harvest for sport, tribal and commercial fisheries. Achieve a 10-year average of .3384% smolt-to-adult survival (range .001% - .7247%) that does not include escapement.	Survival and contribution to fisheries will be estimated for each brood year released. Work with co-managers to manage adult fish returning in excess of broodstock need.
Maintain outreach to enhance public understanding, participation and support of Washington Department of Fish & Wildlife (WDFW) hatchery programs	Provide information about agency programs to internal and external audiences. For example, local schools and special interest groups tour the facility to better understand hatchery operations. Off station efforts may include festivals, classroom participation, stream adoptions and fairs.	Evaluate use and/or exposure of program materials and exhibits as they help support goals of the information and education program. Record on-station organized education and outreach events.
Program contributes to fulfilling tribal trust responsibility mandates and treaty rights	Follow pertinent laws, agreements, policies and executive and judicial orders on consultation and coordination with Native American tribal governments	Participate in annual coordination meetings between the co-managers to identify and report on issues of interest, coordinate management, and review programs (FBD process).
Implement measures for broodstock management to maintain integrity and genetic diversity Maintain effective population size.	A minimum of 500 adults are collected throughout the spawning run in proportion to timing, age and sex composition of return (Preist Rapids Hatchery)	Annual run timing, age and sex composition and return timing data are collected. Adhere to WDFW spawning guidelines. (WDFW 1983)
Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish	(650,000 – 16.25% Ad+CWT) for evaluation and straying purposes	Returning fish are sampled throughout their return for length, sex, and mark
Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens. Follow Co-managers Fish Health Disease Policy (1998).	Necropsies of fish to assess health, nutritional status, and culture conditions	WDFW Fish Health Section inspect adult broodstock yearly for pathogens at Washougal and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, WDFW's Fish Health Section recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as deemed necessary A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams for pathogens and parasites.	1 to 6 weeks prior to transfer or release, fish are examined in accordance with the Co-managers Fish Health Policy
	Inspection of adult broodstock for pathogens and parasites.	At spawning, lots of 60 adult broodstock are examined for pathogens
	Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites.	Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to Co-managers Fish Health Disease Policy.

1.10.2 Risks:

Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Minimize impacts and/or interactions to ESA listed fish	Hatchery operations comply with all state and federal regulations. Hatchery juveniles are raised to smolt-size (60.0 fish/lb) and released from the hatchery at a time that fosters rapid migration downstream. 16.25 % has been determined as a n amount to identify them from naturally produced fish and monitor straying	As identified in the HGMP: Monitor size, number, date of release and CWT mark quality.
Artificial production facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including IHOT, Co-managers Fish Health Policy and drug usage mandates from the Federal Food and Drug Administration	Hatchery goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stocks and to produce healthy smolts that will contribute to the goals of this facility.	Pathologists from WDFW's Fish Health Section monitor program monthly. Exams performed at each life stage may include tests for virus, bacteria, parasites and/or pathological changes, as needed
Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring	NPDES permit compliance WDFW water right permit compliance	Flow and discharge reported in monthly NPDES reports.
Water withdrawals and in stream water diversion structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.	Hatchery intake structures meet state and federal guidelines where located in fish bearing streams.	Barrier and intake structure compliance assessed and needed fixes are prioritized.
Hatchery operations comply with ESA responsibilities	WDFW completes an HGMP and is issued a federal and state permit when applicable.	Identified in HGMP and Biological Opinion for hatchery operations.
Harvest of hatchery-produced fish minimizes impact to wild populations	Harvest is regulated to meet appropriate biological assessment criteria. Mass mark juvenile hatchery fish prior to release to enable state agencies to implement selective fisheries.	Harvests are monitored by agencies and tribes to provide up to date information.

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

This program is a portion of the 13,500,000 eggs taken at Priest Rapids Hatchery for upriver bright Chinook programs. The annual hatchery adult collection goal at Priest Rapids Hatchery for the program is 5,580 at a 1:1 male to female ratio. Klickitat Hatchery receives 4,500,000 eyed eggs for this program.

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

Age Class	Max. No.	Size (ffp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Fingerling	4,000,000 FBD	60.0 - 80.0	June/July	Klickitat	RKm 70.0	Klickitat	Columbia Gorge

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

Smolt to adult survival rates for URB from Priest Rapids Hatchey fall chinook have been estimated to range from 0.29 % to 2.44 % (smolt to adult overall survival estimates for brood years 1983-87 from IHOT 1995). In comparison, from 1995 – 1999, SARs for Klickitat URB have averaged .3384% and ranged from a low of .0099% in 1995 to a high .7247 in 1999 (WDFW RMIS).

This stock is not managed to provide escapement to the Klickitat Hatchery. Klickitat Hatchery traps for spring Chinook but the ladder and trap facilites are closed before fall Chinook arrive in the area

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

The Klickitat Hatchery was completed in 1952 and fall supplementation efforts have been on-going since that time. Beginning in 1986, Klickitat Hatchery production switched from the earlier tule stock to an upriver bright (URB) fall chinook

1.14 Expected duration of program.

On-going program. On June 2, 2003, a Memorandum of Understanding (MOU) was completed that describes the proposed transfer of ownership and operational responsibility of the Klickitat Hatchery and the Lyle Falls and Castile Falls fishways from the WDFW to the Confederated Tribes and Bands of the Yakama Nation (YN). Overall goal is to maintain the Klickitat fall chinook program at current levels for harvest augmentation for the future (Klickitat Subbasin Anadromous Fishery Master Plan 2004).

1.15 Watersheds targeted by program.

The targeted watershed is the Columbia River mainstem below the Klickitat River Subbasin.

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

1.16.1) Brief Overview of Key Issues:

The fall Chinook supplementation program started in the early 1950's. Mitchell Act funded via NMFS/NOAA for the purpose of mitigation for the lost fish production associated with hydroelectric system development in the region. The program is authorized under the Columbia River Fisheries Development Program, Columbia River Fish Management Plan and U.S.vs.Oregon and the parties to this program, plan and court case are therefore involved in short and long-term planning.

The URB fall Chinook program is important as a source of fish for tribal mitigation programs. The goal is to provide production to sustain tribal Zone 6 fisheries, sport and tribal fisheries for fall Chinook at the mouth of the Klickitat River, in-river sport fisheries, and mixed stock ocean fisheries. Inefficient water supply for adult holding has precluded trapping of any local broodstock and has not been managed to provide adequate escapement to Klickitat Hatchery. Broodstock eggs utilized for this program have been Snake River and Priest Rapids stock, most recent years Priest Rapids stock has been utilized. The risk of out of basin broodstock may stray into the Snake River system. 25% of the total release of 4 million fish from Klickitat Hatchery receives an adipose clip+coded wire tag marking combination to allow for assessment of brood year fishery contribution and survival rates of fish released from Klickitat Hatchery. BY ’96 stray rates increased to the point that NMFS/NOAA decided that tagging a larger portion of the releases from Klickitat Hatchery was needed to distinguish strays at Lower Granite Dam trap. Releases are as

follows BY '97 -50%, BY '98 -'00 -100%, BY '01 – 50%, BY '02 – 25% mark combinations of adipose clip+coded wire tag, and blank wire tag.

By the end of 2004, the Klickitat Hatchery and facilities will be transferred to the Yakima/Klickitat Fisheries Project (YKFP or Project) which is a supplementation project designated by the Northwest Power Planning Council's (NWPPC) as the principal means of protecting, mitigating, and enhancing the anadromous fish populations in the Yakima and Klickitat subbasins. The Klickitat portion of the Project's production and research activities will be brought on-line in stages. The first phase included the supplementation of Klickitat spring chinook and steelhead. The proposal is designed to address future activities including operation and maintenance of Lyle Falls Facility (broodstock collection, video monitoring); Castile Falls Fishway; and the Klickitat Hatchery for spawning, incubation, rearing, and acclimation/release of spring chinook and steelhead.

1.16.2) Potential Alternatives to the Current Program

Alternative 1: Develop a local broodstock and eventually eliminate Priest Rapids stock from Klickitat River. This would involve trapping in the lower river at Lyle Falls, transporting to the Klickitat Hatchery for holding and spawning. Overall goal of the Klickitat Subbasin Anadromous Fishery Master Plan is to maintain the Klickitat fall chinook program for harvest augmentation for the future with 50% of the production released from a lower river site.

1.16.3) Potential Reforms and Investments

Reform/Investment 1: In order to develop a local broodstock, 2 new holding ponds will have to be constructed at the hatchery. Lyle Falls trap would need to be constructed.

Section 2: Program Effects on ESA-Listed Salmonid Populations

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

Statewide Section 6 consultation with USFWS for interactions with Bull Trout, and concurrent with this HGMP to satisfy Section 7 consultations: WDFW is writing HGMP's to cover all stock/programs produced at Klickitat including; fall Chinook, spring Chinook, summer steelhead, and on station coho.

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

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

ESA listed stock	Viability	Habitat
Summer Steelhead-Natural	L	L
Winter Steelhead-Natural	L	L
H, M and L refer to high, medium and low ratings, low implying critical and high healthy.		

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

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

Identify the ESA-listed population(s) that will be directly affected by the program
No NMFS ESA listed populations will be directly affected by this program. This broodstock was not considered part of the ESU by WDFW and USFWS, nor essential for recovery (Crawford 1998, Hillwig 1998). This stock originates from populations not considered to be part of the Lower Columbia River chinook salmon ESU.

Identify the ESA-listed population(s) that may be incidentally affected by the program
Middle Columbia River Steelhead March 19, 1998; 64 FR 14508, Threatened.

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

Middle Columbia River Steelhead March 19, 1998; 64 FR 14508, Threatened. Within the Middle Columbia River Steelhead ESU, hatchery STHD stocks from outside the ESU are imported and released into the White Salmon (Skamania Hatchery winter and summer steelhead), Klickitat (Skamania Hatchery winter and summer steelhead) and Walla Walla (Lyons Ferry), The BRT concluded that the Middle Columbia steelhead ESU is not presently in danger of extinction, but reached no conclusion regarding its likelihood of becoming endangered in the foreseeable future. All BRT members felt special concern for the status of this ESU and concluded that NMFS should carefully evaluate conservation measures affecting this ESU and continue monitoring its status.

The current status of summer and winter run steelhead in the Klickitat River is not known. These runs are believed to be native to the system. Lack of funding and the inherent difficulty conducting population surveys in this river contribute to the current lack of knowledge. The Yakama Nation (YN) has conducted population surveys in the Klickitat River to gather information on steelhead; they've conducted spawning ground surveys in a limited number of tributaries in the basin and operated a couple of downstream smolt traps. The YN estimated an annual escapement of 260 steelhead per year based on spawning ground survey data collected

from 1996 to 2000 (NMFS 2000). These spawning ground surveys cover less than 50 percent of the available spawning habitat for steelhead in the Klickitat River basin (B. Sharp, YN, pers. comm.). Results from the smolt traps are insufficient to make any productivity conclusions. The trap placements in the river were not effective for catching fish. The YN is currently relocating the smolt traps to more efficient trapping locations (MCRM FMEP 2003).

NMFS has developed an interim abundance target of 3,600 steelhead including winter and summer stocks for the Klickitat River system (NMFS 2002a).

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.

Describe hatchery activities: The following activities listed below are identified as general hatchery actions that are identified in the ESA Section 7 Consultation "Biological Opinion on Artificial Propagation in the Columbia River Basin" (March 29, 1999).

Broodstock Program

Broodstock Collection: Broodstock are not collected for this program and the trapping facility is not opened during the fall Chinook run. No take tables are submitted with this HGMP.

Genetic introgression: Fall chinook are not indigenous to the Klickitat basin due to the barrier at Lyle Falls to chinook during the low water conditions that generally prevail in late summer and early fall (Bryant 1949). Subsequent tule releases from 1952 – 1985 were discontinued when Klickitat Hatchery switched to an upriver bright (URB) fall Chinook in 1986. Chinook natural spawners assumed to be summer and fall Chinook were sampled for genetic analysis annually from 1991 to 1994 were relatively similar genetically to "URB" populations in various mid- and up-river hatcheries and in Hanford Reach and they were closely associated with URB populations at Bonneville and Little White Salmon hatcheries and in the Yakima River Marshall 2000). Since 1986, production of early-fall or tule chinook has been entirely natural, although comprised primarily of hatchery strays.

Rearing Program

Operation of Hatchery Facilities: Water rights are formalized thru trust water right S4-*07272 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports. Intake structures were designed and constructed to specifications at the time the Klickitat facility was constructed. The Mitchell Act Intake and Screening Assessment (2002) has identified design and alternatives needed to get existing structures in compliant including intake screens and velocity sweeps which are not in compliant with NOAA fish screening standards. From the assessment, WDFW has been requesting funding for future scoping, design, and construction work of a new intake system. This facility operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE). WAG 13-5002. Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE.

Discharges from the cleaning treatment system are monitored as follows: *Total Suspended Solids (TSS)*C1 to 2 times per month on composite effluent,maximum effluent and influent samples. *Settleable Solids (SS)*C 1 to 2 times per week on effluent and influent samples. *In-hatchery Water Temperature* - daily maximum and minimum readings. Indirect take for listed species is unknown from operation of the hatchery facility.

Disease: Outbreaks in the hatchery may cause significant adult, egg, or juvenile mortality. Over

the years, rearing densities, disease prevention and fish health monitoring have greatly improved the health of the programs at Klickitat Hatchery. Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1994) chapter 5 have been instrumental in reducing disease outbreaks. Fish are planted and transferred after a fish health specialist has determined the population health. Indirect take from disease are unknown.

Release Program

Hatchery Production/Density-Dependent Effects: 4.00 million fall Chinook are released annually. The Columbia River hatchery production ceiling, called for in the Proposed Recovery Plan for Snake River Salmon of approximately 197.4 million fish (1994 release levels), has been incorporated by NOAA-Fisheries into their recent hatchery biological opinions to address potential mainstem corridor and ocean effects, as well as other potential ecological effects from hatchery fish. Although hatchery releases occur throughout the year, approximately 80 percent occur from April to June (NMFS 1999) and Columbia River out-migration occurs primarily from April through August. The total number of hatchery fish released in the Columbia River basin has declined by about 26 percent since 1994 (NMFS 1999), reducing potential ecological interactions throughout the basin.

Competition: Salmon and steelhead feed actively during their downstream migration (Becker 1973; Muir and Emmelt 1988; Sager and Glova 1988) and if they do not migrate they can compete with wild fish. Studies and monitoring programs on many systems throughout Washington indicate that salmon and steelhead smolts released from hatchery programs migrate rapidly downstream. Once reaching the Columbia River, fish appear to travel quickly. Median Travel Time of subyearling chinook, on the mainstem Columbia River, from McNary to Bonneville Dam was estimated to average 8.0 days (29.2 RKm/d) during the years 1997 to 2003 (Memo- Michele DeHart to Bill Tweit (WDFW), 2003). In a study designed to define the migrational characteristics of chinook salmon, coho salmon, and steelhead trout in the Columbia River estuary, Dawley et al (1984), found the average migration rates for subyearling chinook, yearling chinook, and coho salmon and steelhead, were 22, 18, 17, and 35 RKm/d respectively. PIT tagging studies (Bumgarner et al, 2000) have indicated that URB releases from Ringold Springs moved past McNary Dam within the first two weeks (mean travel days – 14) after volitional release, with some of these fish reaching The Bonneville Dam (320 RKm downstream) in two weeks.

Predation (Freshwater): WDFW is unaware of any studies that have been empirically estimated the predation risks to listed species posed by the Klickitat releases. In the absence of site-specific empirical information, the identification of risk factors can be a useful tool for reviewing hatchery programs while monitoring and research programs are developed and implemented.

Predation Risk Factors:

Environmental Characteristics: These characteristics can influence the level of predation (see SIWG 1984 for a review) with risk greatest in small systems during periods of low flow and high clarity. The Klickitat River system is large and one of the longest undammed rivers in the Northwest approximately 95 miles in length. Glacially fed, flows are high in mid-summer with glacial till reducing visibility. Yearly flows range from a low of approximately 500-800 cfs in early fall to a high of 2000-5000 cfs in the winter and during runoff (USGS Real Time Data 2004).

Dates of Releases: The release date can influence the likelihood that listed species are encountered. This program is released starting in mid-June and can last into July with release date dependent on the size of the fish. Outmigration time for Chinook can last from March to August so the program avoids much of the early emigration of listed Chinook in the LCR.

Relative Body Size: Salmonid predators were thought to be able to prey on fish up to approximately 1/3 of their length (USFWS 1994), although coho salmon have been observed to consume juvenile chinook salmon of up to 46% of their total length in aquarium environments (Pearsons et al. 1998). The "33% of body length" criterion for evaluating the potential risk of predation in the natural environment has been used by NOAA Fisheries and the USFWS in a number of biological assessments and opinions (c.f., USFWS 1994; NMFS 2002). WDFW believes that a careful review of the Pearson and Fritts (1999) study supports the continued use of the "33% of body length criterion" until further data for this system can be collected.

Release Location and Release Type: The likelihood of predation may also be affected by the location and type of release. Other factors being equal, the risk of predation may increase with the length of time that involves co-mingling. In the freshwater environment, this is likely to be affected by distribution of the listed species in the watershed, the location of the release and the speed at which fish released from the program migrate.

We have provided in this section a summary of empirical information of competition and predation interactions that may be relevant to the fall chinook to the Klickitat River.

Potential Klickitat River URB predation and competition effects on listed salmonids: The proposed annual production goal for this program is 4.0 million fish. Releases are targeted at 75 fpp (82 mm fl) although the average size released has been 67.5 fpp (85 mm fl since 1995).. At larger released sizes of 67 fpp (85 mm fl), potential predation on listed fish if encountered would be on fish of 28 mm fl and smaller. Stock characteristics of listed fish in the area are generally unknown, although wild winter steelhead fry in the Cowlitz River found to be approximately 27 mm fl (pers. Comn. Tipping 2004). In the Lower Columbia ESU, in Abernathy Creek on the Lower Columbia, smolt monitoring indicates that listed Chinook in March and April range from 30 -36 mm fl (pers. Comm. Hanratty 2004). Newly emerged listed chum fry from the Lower Columbia emigrated immediately to marine areas, and range in size from 32- 41 mm (Salo 1991).

Fish have been reared and volitionally released from two large acclimation ponds at Klickitat Hatchery with the program released at a time, condition factor, size and life history that indicates fish will be actively smolting and emigrating from the system which will reduce competition with listed fish. Once reaching the Columbia River mainstem, fish can migrate at significant rates. URB PIT tag research from Ringold Springs (located approximately 150 miles upstream of the Klickitat River) on fish passing NcNary, John Day, and Bonneville Dams have indicated Chinook migration rates URB fall Chinook released at 50/fpp ranged from 8 – 15 miles daily. Studies also indicated increased size of fingerling smolts also was a factor in migration speed and staff manages the program to raise fish as large as possible within the 60-80 fish/lb range.

Indirect take from predation and competition is unknown.

Residualism: To maximize smolting characteristics and minimize residualism, WDFW adheres to a combination of acclimation, volitional release strategies, size, and time guidelines. Studies on other fingerling Chinook releases such as the Spring Creek tule fall Chinook releases (The Bonneville Dam Hatchery at RM 146) are not known to residualize in the Columbia River. Available out-migrant sampling information indicated a rapid exit of Spring Creek tule fall Chinook from the hatchery. Indirect take from residualism is unknown.

Migration Corridor/Ocean: The Columbia River hatchery production ceiling, called for in the Proposed Recovery Plan for Snake River Salmon of approximately 197.4 million fish (1994 release levels), has been incorporated by NOAA-Fisheries into their recent hatchery biological opinions to address potential mainstem corridor and ocean effects, as well as other potential ecological effects from hatchery fish. Although hatchery releases occur throughout the year, approximately 80 percent occur from April to June (NMFS 1999) and Columbia River mainstem

out-migration occurs primarily from April through August. It is unknown to what extent listed fish are available both behaviorally or spatially on the migration corridor. Once in the main stem, Witty et al. (1995) has concluded that predation by hatchery production on wild salmonids does not significantly impact naturally produced fish survival in the Columbia River migration corridor. In a study designed to define the migrational characteristics of chinook salmon, coho salmon, and steelhead trout in the Columbia River estuary, Dawley et al (1984), found the average migration rates for subyearling chinook, yearling chinook, and coho salmon and steelhead, were 22, 18, 17, and 35 RKm/d respectively. There appear to be no studies demonstrating that large numbers of Columbia system smolts emigrating to the ocean affect the survival rates of juveniles in the ocean in part because of the dynamics of fish rearing conditions in the ocean.

Associated monitoring and evaluation and research programs: The WDFW received funding to install and operate a fish trap on the number 5 fishway at Lyle Falls, located at RM 2.2 on the Klickitat River. The fish trap will be installed in the spring of 2003 and operated for two fiscal year ending in 2005. This trap will provide WDFW with much needed data on escapement of salmon and steelhead into the Klickitat River. These data will provide the beginning of a database WDFW will use for fisheries management. The Yakama Nation (YN) conducts annual spawning ground surveys in index streams in the Klickitat River basin and operates two smolt traps to determine productivity. However, the spawning ground surveys cover less than 50 percent of the available spawning habitat in the basin and the efficiency of the smolt traps is not optimal (B. Sharp YN, pers. comm.). The YN is expanding the spawning ground surveys to cover more of the basin and relocating the smolt traps to more productive trapping locations. Data are not available to accurately estimate annual escapement or basin productivity. Scientific protocols are followed to limit impact on these activities.

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

This program does not trap or handle listed fish for this program.

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

Any mortality from this operation or other Klickitat Hatchery operations basis would be communicated to Fish program staff for additional guidance. For other listed species, if significant numbers of wild salmonids are observed impacted by this operation, then staff would inform the WDFW District Biologist who would communicate concerns to NOAA staff.

Section 3: Relationship of Program to Other Management Objectives

3.1 Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the *NPPC Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

The current program is consistent with and aligned with the following plans and policies:

Yakima/Klickitat Fisheries Project (YKFP or Project) - Encompasses both the Yakima and Klickitat subbasins. It is the only major project in the Northwest Power Planning Council's (NWPPC) Fish and Wildlife Program that covers two major subbasins, each within a separate province. Since inception, the Yakama Nation (YN) has managed Project operations in both subbasins as one undertaking. By consolidating management for both basins into a single management unit, the YN has ensured Project efficiency at all levels. As necessitated by the NWPPC's provincial proposal format, this proposal "unbundles" Project operation and maintenance activities. It covers the Klickitat subbasin only. The YKFP is a supplementation project designated by the Northwest Power Planning Council's (NWPPC) as the principal means of protecting, mitigating, and enhancing the anadromous fish populations in the Yakima and Klickitat subbasins.

Klickitat Subbasin Anadromous Fishery Master Plan -Prepared by Yakama Nation in cooperation with Washington Department of Fish and Wildlife, April 2004. This master plan addresses proposed facilities, production protocols, monitoring and evaluation, and habitat improvements needed to manage spring and fall chinook salmon, coho salmon, and winter and summer steelhead in the Klickitat subbasin through 2010.

U.S. v Oregon and the Columbia River Fish Management Plan (CRFMP)

Hatchery plans documented in WDFW's yearly Future Brood Document (FBD)

WDFW hatchery programs in the Columbia system adhere to a number of guidelines, policies and pemit requirements in order to operate. These constraints are designed to limit adverse effects on cultured fish, wild fish and the environment that might result from hatchery practices. Following is a list of guidelines, policies and permit requirements that govern WDFW Columbia hatchery operations:

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagrated salmon (Hershberger and Iwamoto 1981). Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995).

Spawning Guidelines for Washington Department of Fisheries Hatcheries. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be use to maintain genetic variability within the hatchery populations (Seidel 1983). Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 7, IHOT 1995).

Stock Transfer Guidelines. This document provides guidance in determining allowable stocks for release for each hatchery. It is designed to foster development of locally-adapted broodstock and to minimize changes in stock characteristics brought on by transfer of non-local salmonids (WDF 1991).

Fish Health Policy in the Columbia Basin. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, *Policies and*

Procedures for Columbia Basin Anadromous Salmonid Hatcheries (Genetic Policy Chapter 5, IHOT 1995).

National Pollutant Discharge Elimination System Permit Requirements This permit sets forth allowable discharge criteria for hatchery effluent and defines acceptable practices for hatchery operations to ensure that the quality of receiving waters and ecosystems associated with those waters are not impaired.

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

The program described in this HGMP is consistent with the following agreements and plans:

- The Columbia River Fish Management Plan
- Yakima/Klickitat Fisheries Project (YKFP or Project)
- WDFW Mid-Columbia Management Area - Fisheries Management and Evaluation Plan (FMEP)
- U.S. vs Oregon court decision
- Production Advisory Committee (PAC)
- Technical Advisory Committee (TAC)
- Integrated Hatchery Operations Team (IHOT) Operation Plan 1995 Volume III.
- Pacific Northwest Fish Health Protection Committee (PNFHPC)
- In-River Agreements: State, Federal, and Tribal representatives
- Northwest Power Planning Council Sub Basin Plans
- Washington Department of Fish and Wildlife Wild Salmonid Policy

3.3 Relationship to harvest objectives.

The *U.S. v. Oregon* Columbia River Fish Management Plan recognized the importance of tribal harvest in the Klickitat River by mandating releases of 4.0 million fall chinook and 3.85-million coho in the river annually since 1988. With these releases, sales of fall chinook and coho have provided a steady contribution to tribal commercial fall season fisheries, with sales to licensed commercial fish buyers averaging nearly 1,500 fall chinook and 2,000 coho annually since 1989 (Table 3.3.1). In addition to this harvest, Yakama Nation fisheries staff estimate that another 1,000 to 3,000 chinook, 500 to 2,500 coho, and 200 to 500 steelhead are harvested annually by tribal fishers and either sold directly to the public or taken home for subsistence use (Klickitat Sub-basin Plans 2000). Overall goals of the Klickitat Subbasin Anadromous Fishery Master Plan (2004)is to maintain the Klickitat fall chinook program for harvest augmentation. with a combined annual average harvest (ocean, Columbia River, and Klickitat basin) of 14,000 fish.

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

Table 3.3.1. Commercial Sales of Chinook, Coho, and Steelhead to Licensed Fish Buyers by Yakama Tribal Fishers, 1989 to 1999

Year	Chinook	Coho	Steelhead
1989	1,573	5,893	247
1990	1,764	1,894	310
1991	2,230	6,037	1,704
1992	786	46	287
1993	541	165	682
1994	1,018	1,922	747
1995	460	1,250	27

1996	1,533	490	25
1997	1,602	282	239
1998	2,261	1,708	162
1999	1,367	1,946	59
Averages			
1989-99	1,376	1,967	408
1995-99	1,445	1,135	102

The largest harvest of Klickitat Hatchery fall chinook is in the Canadian Troll fishery, but they are also harvested in the Canadian sport and net fisheries, the Washington/Oregon coastal sport and troll fisheries, Alaskan fisheries, Columbia River tribal fisheries, and freshwater sport fisheries. Harvest rates have not been estimated for Klickitat Hatchery fall chinook. They were originally the product of Up-River Bright (URB) fall chinook and it is likely that their harvest profiles are similar. The total ocean and freshwater adult equivalent harvest rates for URB fall chinook for return years 1989-1996 ranged from 33% to 73%. The 1989-1993 average was 62% and the 1991-1996 average was 48%. Harvest rates are expected to remain similar to the 1991-1996 average.

Table 3.3.2. Estimated harvest and run size information for Klickitat River fall chinook (adults and jacks, early-fall/tule and URB stocks combined), 1986-2002

Year	Marine1 Harvest	Columbia R. Mouth Return	Col. R. Harvest2		Bonn. Passage Loss3	Klickitat R. Mouth Return4	Klickitat Harvest4	Total Harvest
			Zones 1-5	Zone 6				
1986		25,708	9,022	7,453	462	8,770	8,108	24584
1987		6,668	2,684	1,633	118	2,234	1,527	5,843
1988		4,204	1,922	996	64	1,221	1,221	4,139
1989	9,323	14,208	6,755	2,868	229	4,356	1,764	20,711
1990	15,270	12,817	4,109	2,952	288	5,468	1,574	23,906
1991	3,553	10,349	2,763	1,547	302	5,737	2,791	10,654
1992		7,687	1,694	1,169	241	4,583	1,148	4,011
1993	23,267	6,520	1,339	1,407	189	3,586	1,118	27,130
1994	1,060	6,823	302	745	289	5,487	1,249	3,357
1995	3,446	5,282	308	539	222	4,213	1,470	5,763
1996	4,475	13,805	1,665	1,528	531	10,081	3,704	11,373
1997	4,196	16,664	2,257	1,839	628	11,940	3.612	11,904
1998	3,732	18,036	2,328	1,455	713	13,541	3,504	11,018
1999	5,193	23,272	2,828	1,596	942	17,906	3,335	12,952
2000	8,163	21,936	3,332	3,098	775	14,730	5,241	19,834
2001	2,648	12,953	2,361	2,703	394	7,495	3,065	10,776
2002		24,961	4,168	5,365	771	14,657	2,892	12,425
2003	NA*	NA	NA	NA	NA	NA	NA	NA
2004	NA	NA	NA	NA	NA	NA	NA	NA
Avg:		13,641	2,932	2,288	421	8,000	2,784	12,964
Avg3	7,027	13,556	2,529	1,856	459	8,712	2,702	14,115

NA Data not yet available.*

1. Derived from Regional Mark Information System (RMIS) recovery year data for marine and freshwater coded-wire tag (CWT) recoveries of fall chinook released in the Klickitat River.
2. Derived from *U.S. v. Oregon* Technical Advisory Committee reports.
3. Assume 5% passage attrition ascending Bonneville Dam and through the reservoir.
4. YN and WDFW database estimates.
5. Exclusive of years when available CWT recovery data preclude an accurate estimate of marine harvest.

3.4 Relationship to habitat protection and recovery strategies.

The program described in this HGMP is consistent with the following habitat and protection strategies:

Yakama Nation Fisheries Program (YNFP):
The Lower Klickitat Riparian and In-Channel Habitat Enhancement Project is a BPA-funded watershed restoration project implemented by the Yakama Nation Fisheries Program (YNFP). The YNFP is working in coordination with WDFW, Natural Resources Conservation Service (NR CS), and the Central Klickitat Conservation District. The project was proposed under the Northwest Power Planning Council's Fish and Wildlife Program and funded by BPA in 1997. Initial project restoration projects were located within the Swale Creek and Little Klickitat River watersheds. Included in the project scope of work are in-stream structural modifications, re-vegetation of the riparian corridor, construction of sediment retention ponds to provide late-season flow to the creek and exclosure fencing to prevent channel degradation from livestock. A monitoring program has been initiated to document project success and guide future restoration activities. The second phase of the project will use EDT modeling output to guide and prioritization restoration activities.

Klickitat Subbasin Anadromous Fishery Master Plan:
Prepared by Yakama Nation in cooperation with Washington Department of Fish and Wildlife, April 2004. This master plan addresses proposed facilities, production protocols, monitoring and evaluation, and habitat improvements needed to manage spring and fall chinook salmon, coho salmon, and winter and summer steelhead in the Klickitat subbasin through 2010.

Subbasin Planning and Salmon Recovery:
The current Klickitat program HGMP processes are designed to deal with existing hatchery programs and potential reforms to those programs. A regional sub-basin planning process (Draft Klickitat Sub-Basin Summary May 17, 2002) is a broad-scale initiative that will provide building blocks of recovery plans for listed fish and may well use HGMP alternative ideas on how to utilize hatchery programs to achieve objectives and harvest goals.

Habitat Treatment and Protection:
WDFW is presently partnering in conducting or has conducted habitat inventories within the Klickitat subbasin. Ecosystem Diagnosis and Treatment (EDT) compares habitat today to that of the basin in a historically unmodified state. It creates a model to predict fish population outcomes based on habitat modifications. WDFW is also conducting a Salmon Steelhead Habitat Inventory Assessment Program (SSHIAP) which document barriers to fish passage. WDFW's habitat program issues hydraulic permits for construction or modifications to streams and wetlands. This provides habitat protection to riparian areas and actual watercourses within the watershed.

Limiting Factors Analysis:
A WRIA 30 (Klickitat Basin) habitat limiting factors report (LFA) has been completed by the Washington State Conservation Commission. This limiting habitat factors analysis was conducted pursuant to RCW 75.46 (Salmon Recovery). The purpose of this analysis was "to identify the limiting factors for salmonids" where limiting factors are defined as "conditions that limit the ability of habitat to fully sustain populations of salmon." It was intended that a locally based habitat project selection committee use the findings of this analysis to prioritize appropriate projects for funding under the state salmon recovery program. This analysis may also be used by local organizations and individuals interested in habitat restoration to identify such projects (Washington State Conservation Commission 2000).

3.5 Ecological interactions.

Below are discussions on both negative and positive impacts relative to the Klickitat River l

summer steelhead outplant program and are taken from the Puget Sound listed and non-listed HGMP template (WDFW and NOAA 2003).

(1) Salmonid and non-salmonid fishes or species that could negatively impact the program: Klickitat fall Chinook smolts can be preyed upon release thru the entire migration corridor from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can predate on steelhead smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that can take a heavy toll on migrating smolts (river otters), and returning adults include: harbor seals, sea lions and Orcas. Large numbers of northern pikeminnows congregate at the mouth of the Klickitat River. Predation on the juvenile chinook outmigrants by the northern pikeminnow may have a negative impact on this stock. Avian predation by common mergansers, double crested cormorants, and especially caspian terns pose a large threat.

(2) Salmonid and non-salmonid fishes or species that could be negatively impacted by the program: Co-occurring natural salmon and steelhead populations in local tributary areas and the Columbia River mainstem corridor areas could be negatively impacted by program fish. Of primary concern are the ESA listed endangered and threatened salmonids: Snake River fall-run Chinook salmon ESU (threatened); Snake River spring/summer-run Chinook salmon ESU (threatened); Lower Columbia River Chinook salmon ESU (threatened); Upper Columbia River spring-run Chinook salmon ESU (endangered); Columbia River chum salmon ESU (threatened); Snake River sockeye salmon ESU (endangered); Upper Columbia River steelhead ESU (endangered); Snake River Basin steelhead ESU (threatened); Lower Columbia River steelhead ESU (threatened); Middle Columbia River steelhead ESU (threatened); and the Columbia River distinct population segment of bull trout (threatened). Listed fish can be impacted thru a complex web of short and long term processes and over multiple time periods which makes evaluation of this a net effect difficult. WDFW is unaware of studies directly evaluating adverse ecological effects to listed salmon. See also Section 2.2.3 Predation and Competition.

3) Salmonid and non-salmonid fishes or other species that could positively impact the program. Multiple programs including fall and spring Chinook, and coho programs are released from the Klickitat basin and limited natural production of chinook, coho, chum and steelhead occurs in this system along with non-salmonid fishes (sculpins, lampreys and sucker etc.). These species may serve as prey items during the emigration thru the basin. While not always desired from a production standpoint, these hatchery fish provide an additional food source to natural predators that might otherwise consume listed fish and may overwhelm established predators providing a beneficial, protective effect to co-occurring wild fish

4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program. Klickitat fall Chinook can be preyed upon release thru the entire migration corridor from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can predate on steelhead smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that benefit from migrating smolts (river otters), and returning adults include: harbor seals, sea lions and Orcas. Below are discussions on both negative and positive impacts relative to the Washougal summer steelhead program and are taken from the Puget Sound listed and non-listed HGMP template (WDFW and NOAA 2003).

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 Klickitat River is the homing water source for the target population. The water flowing into pond 24 is re-use rearing water from the hatchery and is made up primarily of spring water from Indian Ford A springs originating across the river from the hatchery. This is the same spring water which is used for the incubation and early rearing of all juveniles. In the spring, river water is introduced for acclimation for this pond. The remaining population is reared in pond 26 which is supplied with spring water from Wonder Springs approximately one-half mile downstream and across the river from the main hatchery. These water sources naturally flow into the Klickitat River and make up a part of its total volume, however, they were not historically available as separate spawning/rearing waters.

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.

Hatchery water withdrawal	Water rights total 6000 – 8000 gpm from the gravity intake with another 4,000 pumped from the river. Water rights are formalized thru trust water right S4-*07272 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports
Intake/Screening Compliance	Intake structures were designed and constructed to specifications at the time the Klickitat facility was constructed. The Mitchell Act Intake and Screening Assessment (2002) has identified design and alternatives needed to get existing structures in compliant including intake screens and velocity sweeps which are not in compliant with NOAA fish screening standards. From the assessment, WDFW has been requesting funding for future scoping, design, and construction work of a new intake system.
Hatchery effluent discharges. (Clean Water Act)	This facility operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) genral permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE). WAG 13-5002. Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE. Discharges from the cleaning treatment system are monitored as follows: *Total Suspended Solids (TSS)*C1 to 2 times per month on composite effluent,maximum effluent and influent samples. *Settleable Solids (SS)*C1 to 2 times per week on effluent and influent samples. *In-hatchery Water Temperature* - daily maximum and minimum readings.

Section 5. Facilities

5.1 Broodstock collection facilities (or methods).

This stock is not managed to provide escapement to the Klickitat Hatchery. Although Klickitat spring Chinook enter the trap volitionally, by the time fall Chinook arrive in the area, the ladder is shut down.

Broodstock are collected at Priest Rapids by volitional return to adult capture pond. In recent years, all of the fall chinook broodstock used for the Priest Rapids Hatchery program have been obtained as volunteers to the hatchery trap in the outlet channel. Adult fall chinook salmon return to the hatchery and adjacent spawning grounds from September through November and are collected as volunteers to the channel. Adults have in the past been collected from the east ladder trap in Priest Rapids Dam, but these fish were usually surplus to the on station production needs. There are usually a sufficient number of eggs taken to supply other hatcheries. Adults are collected throughout the entire run to ensure that the run timing for these populations is maintained. Adults are transferred to the holding ponds.

Ponds (number)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
2	concrete	24500	250	28	3.5	2000

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

Fall chinook collected in the Priest Rapids Hatchery trap are transported by tank truck one mile to the adult holding pond on the main hatchery grounds where they are held for spawning. Juvenile fish on station at Klickitat do not need transport.

5.3 Broodstock holding and spawning facilities.

Fall chinook spawners at Priest Rapids Hatchery are maintained in a 206,000 cubic foot holding pond through maturity. Only well water is used to supply the pond, but back-up is available in the event of a loss of power through gravity feed from Priest Rapids Dam. The maximum temperature of groundwater used at Priest is 16.0 degrees Celsius (range 1.6 - 16.0 degrees from BAMP 1998).

5.4 Incubation facilities..

Eggs are eyed at Preist Rapids Hatchery and then transferred to Klickitat from late Novemebr to late December. The hatchery has 80 stacks of vertical incubators housed in a 4,000 cu ft2 hatchery/incubation building. The incubation facility is supplied with well water, but gravity feed water from Priest Rapids Dam is available as a back-up in the event of a power loss. Eyed eggs are placed in FAL incubators and are used through hatching

Incubator Type	Units (number)	Flow (gpm)	Volume (cu.ft.)	Loading-Eyeing (eggs/unit)	Loading-Hatching (eggs/unit)
FAL	692	308	NA	NA	6500

5.5 Rearing facilities.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)
10	concrete	3500	100	10	3.5	250
1 26	Hypolon Release Pond	29925	190	45	3.5	55
1 24	earthen release pond	24500	175	40	3.5	6000

Fall chinook fry are ponded in raceways. In mid-March the fingerlings are transferred to release ponds 24 - 26 until release at 80fpp. The hypolon pond is gravel bottomed and vinyl sided while pond 24 is an earthen/gravel pond.

5.6 Acclimation/release facilities.

Chinook for this program have been reared on a combination of Klickitat River or adjacent spring water for six months prior to 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. The Klickitat River is the homing water source for the target population. The water flowing into pond 24 is re-use rearing water from the hatchery and is made up primarily of spring water from Indian Ford A springs originating across the river from the hatchery. This is the same spring water which is used for the incubation and early rearing of all juveniles. In the spring, river water is introduced for acclimation for this pond for approximately 6 weeks of imprinting. The remaining population is reared in pond 26 which is supplied with spring water from Wonder Springs approximately one-half mile downstream and across the river from the main hatchery. These water sources naturally flow into the Klickitat River and make up a part of its total volume, however, they were not historically available as separate spawning/rearing waters.

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

Tag complications from marking a large proportion of fish currently at 17% but in the past up to 100%, led to large scale handling and complications with dealing with tagged fish. The current rate has lessoned those difficulties.

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.

Potential Hazard	Risk Aversion Measure
Equipment failure/Water loss	Multiple water sources are available. There is a main river gravity water feed system, three torpedo type river pumps, and several springs available. Backup generator system is automatic in case of power loss.
Flooding/Water Loss	The facility is sited so as to minimize the risk of catastrophic fish loss from flooding and set up with low water alarm probes in strategic locations to prevent loss due to loss of water. Alarm systems are monitored 24/7 with staff available on station to respond to problems.
Disease Transmission	IHOT fish health guidelines are followed. WDFW fish health specialists conduct inspections monthly and problems are managed promptly to limit mortality and reduce possible disease transmission.

Section 6. Broodstock Origin and Identity

6.1 Source.

Source is from Priest Rapids Hatchery. Broodstock used in the program are collected from the run at large volunteering to the hatchery trap. Fall chinook volunteering to the trap are almost entirely hatchery-origin fish, although some wild fish also recruit, as gene flow between the hatchery and the Hanford Reach natural production is thought to be significant (BAMP 1998). Fall chinook propagated through the program originated predominately from adults returning to the volunteer trap or to the east bank fish ladder at Priest Rapids Dam. During the 1970s and early 1980s, however, some eggs were transferred into the facility from outside sources in an attempt to build production (Chapman et al. 1994). These sources included eggs from the Bonneville and Kalama Falls hatcheries and the Ringold Rearing Ponds. The hatchery became self-sustaining in 1984, and the practice of importing eggs into the facility ended that year. The Klickitat fall chinook program was originally developed to rear tule fall chinook from the Spring Creek hatchery. When the Spring Creek program failed to provide the necessary eggs, the program was changed to bright fall Chinook and eggs from Priest Rapids are now used. These fish represented a mix of several different upriver stocks that were selected on the basis of their run timing and physical appearance (showing little spawning coloration).

6.2.1 History.

Introductions of fall-run Chinook salmon into the Klickitat River began in 1946 (Marshall et al. 1995), and although a hatchery broodstock was established, tule stocks from various facilities continued until 1986. Beginning in 1986, Klickitat Hatchery production switched from the tule stock to an upriver bright (URB) fall chinook. Currently, 4 million hatchery URB smolts are released on-station annually, primarily for harvest augmentation. Eyed eggs currently are transferred from Priest Rapids Hatchery to the Klickitat Hatchery for final rearing. There is no capture of fall-run chinook salmon adults at Klickitat Hatchery and eggs are imported yearly from Priest Rapids, Little White Salmon, or Bonneville hatcheries. A naturally spawning population of fall-run chinook salmon exists in the Klickitat River, it appears to be a hybrid of tule and upriver bright stocks. Genetic analysis of naturally spawning Klickitat fall chinook sampled from 1991 to 1994 showed them to be very similar genetically to URB chinook at Priest Rapids Hatchery and in Hanford Reach; and they were closely associated with URB populations at Bonneville and Little White Salmon hatcheries and in the Yakima River (Marshall 2000).

Hatchery sources have included:

Broodstock Source	Origin	Year(s) Used	
		Begin	End
Priest Rapids Fall Chinook Hatchery	H	1995	Present
Snake River Mix Fall Chinook Hatchery	H	1995	1999
Bonneville Fall Chinook Hatchery	H	1997	2000
Little White Salmon Fall Chinook Hatchery	H	1997	1999

6.2.2 Annual size.

Priest Rapids Hatchery collects 13.5 million eggs from 5,000 - 6,000 adults (1:1 ratio of males and females). Out of this amount, 4,500,000 eyed eggs are transferred to Klicktat Hatchery for this program.

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

There is no capture of fall-run chinook salmon adults at Klickitat Hatchery, eggs are transferred from Little White Salmon, or Bonneville hatcheries. Naturally spawning population of fall-run chinook salmon exists in the Klickitat River, it appears to be a hybrid of tule and upriver bright stocks, and exhibits some life history traits from each of the original stocks (Marshall et al. 1995). These fish are not used in broodstock collection.

From 1972 through 1986 about 37 % of the adults held at the hatchery came from fish that attempted to pass Priest Rapids Dam. Beginning in 1989, fish were no longer secured from the Priest Rapids Dam east bank ladder, significantly decreasing the number of natural fish incorporated into the hatchery broodstock. Broodstock used in the program are now secured only from hatchery and natural fall chinook adults volunteering to the Priest Rapids Hatchery trap. Chapman et al (1994) reported that wild-origin (mainly Hanford Reach) fish still recruit to the volunteer trap, at unknown levels relative to the total number collected.

6.2.4 Genetic or ecological differences.

Tule fall chinook are not indigenous to the Klickitat subbasin (see previous section). Hatchery plants from outside the basin first occurred in 1946, and releases from the Klickitat Hatchery began in 1952 and continued until 1986. Releases have included stocks from Cowlitz, Toutle, Kalama, Washougal, Bonneville, Cascade, and Ringold hatcheries. The Klickitat fall chinook program was originally developed to rear tule fall chinook from the Spring Creek Hatchery. When the Spring Creek program failed to provide the necessary eggs, the program was changed to URB chinook. This program also was intended to provide a better quality fish for the tribal terminal fishery in the lower Klickitat River.

6.2.5 Reasons for choosing.

The bright stock was selected for this program because these fish are more desirable for commercial and sport harvesters and to provide a better quality fish for the tribal terminal fishery in the lower Klickitat River. The broodstock chosen does not represent natural populations native or adapted to the watersheds in which hatchery fish will be released.

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 spawning protocol mandates the use of a spawning population of at least 500 adults. The current annual broodstock collection goal for the Priest Rapids program has been up to 6,102, equally divided by sex (IHOT 1995). Future production alternatives specified in the Mid-Columbia Hatchery Plan (BAMP 1998) will necessitate the annual collection of an additional 1,060 adults (1:1 sex ratio) to meet increased Priest Rapids Project fall chinook smolt production objectives (6.0 million sub-yearlings). The current collection goal of 6,102 fall chinook for use as broodstock is not expected to adversely affect the population status of the natural population relative to critical and viable thresholds. The program relies on predominately hatchery-origin adults that volunteer to the hatchery trap, and the number of natural fish removed, and the impact on the viability of the naturally spawning populations, are minimal.

Section 7. Broodstock Collection

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

Up to 6,000 adults are collected at Priest Rapids for the URB program including the portion to Klickitat Hatchery.

7.2 Collection or sampling design

The intent of the broodstock collection procedure applied at Priest Rapids hatchery is to collect enough adults to maintain the hatchery production program. Adults are collected throughout the entire run to ensure that the run timing of the population under propagation is maintained. Although Priest Rapids Hatchery has been self-sustaining in terms of adult fall chinook returns since 1984, egg or fish importations from other facilities may still be allowed to achieve production goals while maintaining regional genetic integrity in times of inadequate hatchery returns (IHOT 1995). Eggs from Priest Rapids Hatchery-origin adults are always given priority for station use. The other fall chinook stock grouping approved for release, but viewed as less well suited than the Priest Rapids Hatchery stock, are mainstem Columbia River up-river brights.

Fall chinook are collected from the run at large captured in the volunteer trap from September through November. Broodstock are collected across the entire run to ensure that the run timing for the population is maintained. Marked stray salmon from programs outside the mid-Columbia would be removed from the hatchery broodstocks, when it appears that the percentage of strays from a given program exceeds 5%. This provisional standard is based upon the NMFS Biological Opinion of system wide hatchery operations in the Columbia River (NMFS 1999), and will be revised when results from ongoing region-wide analyses of genetic introgression from straying provides more definitive direction.

7.3 Identity.

The target population is the Priest Rapids hatchery fall chinook stock. The population is included as part of the Upper Columbia Summer/Fall Chinook ESU (Myers et al. 1998). The hatchery-origin fish are genetically indistinguishable from other URB fall chinook populations present in the project area during the September-November broodstock collection period (Waknitz et al. 1995; Myers et al. 1998). Broodstock are collected from the run at large volunteering to the Priest Rapids Hatchery trap. A proportion of the fall chinook released through the program have an adipose clip/coded wire tag marking combination, enabling evaluation of the contribution of Priest Rapids hatchery fish to the annual broodstock collection.

7.4 Proposed number to be collected:

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

5,720 at 1:1 male to female ratio.

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1990-2001), or for most recent years available. Data below is from Priest Rapids Hatchery. Actual broodstock used is approximately 5,720 per year.

Year	Adults		
	Females	Males	Jacks
Planned	4000	2000	40
1990	2276	1203	451
1991	1533	1103	1088
1992	2615	3482	1161
1993	3732	5231	277
1994	7801	6018	752
1995	4664	6076	982
1996	5044	9236	131
1997	6168	4668	1625
1998	4216	10858	1101
1999	11386	11715	258
2000	4099	3136	443
2001	4253	10280	784
2002	4284	7718	399
2003	3574	5352	784
2004	NA	NA	NA

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

Surplus adults can be sold to fish buyers under contract with WDFW for receiving hatchery carcasses. See Priest Rapids Fall Chinook HGMP.

7.6 Fish transportation and holding methods.

Fall chinook collected in the Priest Rapids Hatchery trap are transported by tank truck one mile to the adult holding pond on the main hatchery grounds where they are held for spawning. The holding pond is supplied with 100 % well water to maintain adult fish in cooler water than available from the river. The adult pre-spawning survival objective for the program is 90 %. No takes of ESA-listed fish occur through the broodstock holding operation. See Priest Rapids Fall Chinook HGMP.

7.7 Describe fish health maintenance and sanitation procedures applied.

Not applicable to this program. See Priest Rapids Fall Chinook HGMP.

7.8 Disposition of carcasses.

Carcasses of fall chinook spawned through the programs are buried on-site at the hatchery. See Priest Rapids Fall Chinook HGMP.

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.

Adverse effects on listed fish that may be encountered incidentally during trapping, are minimized through the following measures:

- The Priest Rapids Hatchery trap will be continuously monitored and operated 3 days per week during the hatchery fall chinook migration (September 1 through November).
- The hatchery trap is located in the hatchery outlet channel ½ mile upstream from its confluence with the Columbia River. A fish weir is not used to guide fish into the hatchery outlet. All fish returning to Priest Rapids Hatchery recruit to the trap as volunteers. The trapping program is therefore not a "run of the river" operation, and captures of other species besides fall chinook salmon that were produced at the hatchery are minimal.
- Other salmonids incidentally trapped will be returned into the outlet channel to continue their migration.

Section 8. Mating

8.1 Selection method.

The spawning protocol mandates the use of a spawning population of at least 500 adults. Spawners are selected and mated randomly from the population maintained in the hatchery holding pond. Fish are spawned throughout the entire run to help ensure that the run timing for the stock is maintained. A portion of each day's egg-take is used for on-site hatchery production to help ensure that return timing of the seasonal run is represented and that the hatchery broodstock remains genetically similar to, and representative of the naturally spawning up-river bright fall chinook populations. See Priest Rapids Fall Chinook HGMP.

8.2 Males.

When spawning fewer than 1 million eggs in a day, the male to female ratio will be 1:1. When spawning more than 1 million eggs in a day, the ratio will not be less than 1 male to 3 females.

8.3 Fertilization.

For daily egg takes under 1.0 million, eggs from two females are spawned into a bucket, and two males are then spawned into the combined eggs. For daily egg takes greater than one million, the fertilization procedure is adjusted. Eggs from two females are spawned into one bucket, and milt from one male is introduced. These eggs are then combined with eggs spawned from two other females and also fertilized with one male, so that a single bucket contains eggs from four females. This procedure equates to a 1 male to 2 female ratio, but provides for back-up fertilization for the combined eggs if milt used from one of the males in the pooled buckets proves to be non-viable. See Priest Rapids Fall Chinook HGMP.

8.4 Cryopreserved gametes.

Cryopreserved gametes are not used.

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.

See prior sections.

Section 9. Incubation and Rearing.

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

Eggs are taken from fish spawned at Priest River Hatchery. Data below is from Priest River Hatchery. Once eyed, 4.5 million eggs are transferred to Klickitat Hatchery.

Year	Egg Take	Eyed-Ponding Survival (%)	Fry-fingerling Survival (%)
1995	17,345,900	98.10	96.50
1996	14,533,500	99.13	98.86
1997	17,007,000	99.24	98.78
1998	13,981,300	98.09	99.19
1999	16,089,600	98.72	99.40
2000	15,349,500	97.89	96.13
2001	13,389,500	94.28	98.69
2002	13,732,550	99.54	97.72
2003	13,820,500	98.90	98.43
2004	NA	NA	NA

At Klickitat Hatchery, eyed egg to smolt release survival for the last nine years has averaged 90.90%.

9.1.2 Cause for, and disposition of surplus egg takes.

4,500,000 eyed aggs are transferred with a program goal of 4,000,000 sub-yearlings planted after egg, fry and rearing losses. Surplus eggs do not exist for the group transferred to Klickitat Hatchery.

9.1.3 Loading densities applied during incubation.

Klickitat Hatchery has 72 stacks of FAL Heath incubators for incubation and hatching. Stack incubators are loaded at 8000 eggs/per tray for hatching. Removal of dead eggs, accurate enumeration and loadings are adjusted during this time. See section 5.4 for load and hatching criteria. Integrated Hatchery Operations Team (IHOT) species-specific incubation recommendations are followed for water quality, flows, temperature, substrate and incubator capacities.

9.1.4 Incubation conditions.

Integrated Hatchery Operations Team (IHOT) species-specific incubation recommendations are followed for water quality, flows, temperature, substrate and incubator capacities. Harmful silt and sediment is cleaned from incubation systems regularly while eggs are monitored to determine fertilization and mortality. Incubation water is from Indian Ford A springs originating across the river from the hatchery. Temperature is monitored by thermograph and recorded and temperature units (TU) are tracked for embryonic development. Dissolved oxygen content is monitored and have been at acceptable levels of saturation with a minimum criteria of 8 parts per million (ppm). When using artificial substrate, vexar or bio-rings, egg densities within incubation units are reduced by 10%.

9.1.5 Ponding.

Fall chinook fry are transferred from Heath trays for ponding upon button-up and swim-up. Fry are ponded when: a visual inspection of the amount of yolk sac remaining with the yolk slit closed to approximately 1 millimeter wide (approximately 1,600 – 1,800 temperature units) or based on (95% yolk absorption) KD factor. The mean weight for fry ponded is 700-800 fpp At this time fry are transferred to the appropriate starter raceway (See HGMP Section 5.5 for raceway specifications) during January and February.

9.1.6 Fish health maintenance and monitoring.

IHOT and WDFW fish health guidelines are followed. Staff conducts daily inspection, visual monitoring and sampling from eye, fry fingerling and sub-yearling stages. As soon as potential problems are seen, these concerns are immediately communicated to the WDFW fish health specialist. In regular monitoring, fish health specialists conduct inspections monthly. Potential problems are managed promptly to limit mortality and reduce possible disease transmission. At spawning, eggs were water-hardened in iodophor as a disinfectant. Formalin (37 % formaldehyde) is periodically dispensed into water supplied to the incubators and raceways to control fungus growth on eggs, and parasite loads on juvenile salmon. Treatment dosage and duration varies by life-stage and condition being treated. All fish disease control procedures are conducted consistent with the Co-manager's Fish Disease Control Policy (WDFW and WWTIT 1998). Since 2002, no reportable pathogens or problems have been reported by staff.

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.

Listed fish are not incubated for this program.

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.

Year	Egg Take	Eyed-Ponding Survival (%)	Fry-fingerling Survival (%)
1995	17,345,900	98.10	96.50
1996	14,533,500	99.13	98.86
1997	17,007,000	99.24	98.78
1998	13,981,300	98.09	99.19
1999	16,089,600	98.72	99.40
2000	15,349,500	97.89	96.13
2001	13,389,500	94.28	98.69
2002	13,732,550	99.54	97.72
2003	13,820,500	98.90	98.43
2004	NA	NA	NA

At Klickitat Hatchery, eyed egg to smolt release survival for the last nine years has averaged 90.90%.

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

The pond loading densities maintained at the hatchery are consistent with those recommended by Piper et al. (1982; 6 lb/gpm and 0.75 lb/ft^3) and Banks (1994; 0.125 lb/ft^3/in) (BAMP 1998). Fry are transferred from the Heath incubation trays to vinyl raceways for start feeding and continued rearing. The raceways have flow through water circulation.

9.2.3 Fish rearing conditions.

Fish are reared on a combination of river and spring water. Fish are moved from raceways to ponds 24 and 26 for final rearing and release. Temperature, dissolved oxygen and pond turn over rate are monitored. IHOT standards are followed for: water quality, alarm systems, predator control measures (netting) to provide the necessary security for the cultured stock, loading and density. Settleable solids, unused feed and feces are removed regularly to ensure proper cleanliness of rearing containers. All ponds are broom cleaned as needed and pressure washed between broods. Temperature and dissolved oxygen are monitored and recorded daily during fish rearing. Temperatures during the rearing cycle range from a high of 65 to a low of 33 degrees F. Ponds are vacuum cleaned on an as needed basis although generally weekly. Netting covers the rearing ponds to minimize predation.

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. Data is from 2002 (Priest Rapids Hatchery).

Rearing Period	Length (mm)	Weight (fpp)	Condition Factor
01/02	Na	943	Na
02/02	Na	429	Na
03/02	Na	356	Na
04/02	Na	152	Na
05/02	Na	87	Na
06/02	87	84	1.089

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

Same as above, see section 9.2.4.

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*).

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
1	Ewos Micro#1 & 2	8	2.15	0.06	0.48
2	Ewos Pacific 1.2mm	2	1.92	0.05	0.55
3	BDS#3	8	3.35	0.05	0.76
4	BDG 1.0mm	8	3.10	0.07	1.05
5	BMG 1.3 and 1.5mm	4	1.75	0.1	1.055
6	BMG 2.0mm	2	1.90	0.05	0.66

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

Fish Health Monitoring	A fish health specialist inspects fish monthly and checks both healthy and if present symptomatic fish. Based on pathological or visual signs by the crew, age of fish and the history of the facility, the pathologist determines the appropriate tests. External signs such as lesions, discolorations, and fungal growths will lead to internal examinations of skin, gills and organs. Kidney and spleen are checked for bacterial kidney disease (BKD). Blood is checked for signs of anemia or other pathogens. Additional tests for virus or parasites are done if warranted.
Disease Treatment	As needed, appropriate therapeutic treatment will be prescribed to control and prevent further outbreaks. Mortality is collected and disposed of at a landfill. Fish health and or treatment reports are kept on file.
Sanitation	All eggs brought to the facility are surface-disinfected with iodophor (as per disease policy). All equipment (nets, tanks, boots, etc.) is disinfected with iodophor between different fish/egg lots. Different fish/egg lots are physically isolated from each other by separate ponds or incubation units. The intent of these activities is to prevent the horizontal spread of pathogens by splashing water. Tank trucks are disinfected between the hauling of adult and juvenile fish. Foot baths containing disinfectant are strategically located on the hatchery grounds to prevent spread of pathogens.

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

Fall chinook are released in May-June as sub-yearling smolts. Program goal has been to release fish when they reach 75 fpp (82 mm fl). Along with size, appearance, and release time are used to indicate the readiness of the population for emigration. No smolt development indices are assessed.

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

None.

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.

Listed fish are not under propagation.

Section 10. Release

10.1 Proposed fish release levels.

4.5 million eyed eggs are transferred from Priest Rapids Hatchery. Depending on eyed egg to smolt loss, approximately 4,000,000 fingerlings are released June - July when they reach 60-80 fpp.

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

Releases are made from Klickitat Hatchery to the Klickitat River (RKm 67.2).

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

Release Year	Fingerling Release		
	No.	Date (MM/DD)	Avg Size (fpp)
1996	4,380,000	05/16-06/08	64.0
1997	3,625,870	May	65.0
1998	4,387,480	05/21-05/31	71.0
1999	4,289,100	06/02-06/07	71.0
2000	3,972,500	05/15-05/22	55.0
2001	3,850,300	05/22-05/25	66.0
2002	3,968,900	06/03-06/07	65.0
2003	3,664,100/ 520,000	6/03-6/19/ 7/16-7/20	73.0 79.0
2004	2,590,650/ 1,635,000	6/14-18/ 7/6-13/	62.2 69.0

10.4 Actual dates of release and description of release protocols.

See section 10.3 above for actual dates. Groups are released in staggered sequence based on size of fish. Goal is to get the fish close to 60 fpp before releases. Screens at the end of the ponds are removed, then stoplogs and sumps are removed to slowly lower the pond no more than one foot per hour. The initial release is volitional with most fish quickly vacating the ponds. In following days, the pond level has been slowly dropped with most fish vacating completely.

10.5 Fish transportation procedures, if applicable.

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

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

Chinook for this program have been reared on a combination of Klickitat River or adjacent spring water for six months prior to 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. The Klickitat River is the homing water source for the target population. The water flowing into pond 24 is re-use rearing water from the hatchery and is made

up primarily of spring water from Indian Ford A springs originating across the river from the hatchery. This is the same spring water which is used for the incubation and early rearing of all juveniles. In the spring, river water is introduced for acclimation for this pond. The remaining population is reared in pond 26 which is supplied with spring water from Wonder Springs approximately one-half mile downstream and across the river from the main hatchery. These water sources naturally flow into the Klickitat River and make up a part of its total volume, however, they were not historically available as separate spawning/rearing waters.

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

Straying at unacceptable levels to the Snake River has been an issue. For brood year 2002 25% of the production was tagged as 1,000,000 eyed eggs were transferred to Washougal Hatchery in order to facilitate tagging of the program for Klickitat Hatchery. After tagging, fish were transferred back to Klickitat Hatchery for rearing and release of 800,000 blank wire tags and 200,000 Ad and CWT releases.

Due to budget and operational constraints, brood year 2003 fish were Coded Wire Tag (CWT) and adipose fin clipped 650,000 fish (16.25%) at Klickitat Hatchery. This level has been agreed upon by the Co-managers and NOAA to achieve a satisfactory level of data collection for survival and straying for releases in spring 2004.

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

The program transfers in 4,500,000 eggs. In good years,

10.9 Fish health certification procedures applied pre-release.

Prior to release from Klickitat Hatchery, the population health and condition is established by the Area Fish Health Specialist. This is commonly done 1-3 weeks pre-transfer and up to 6 weeks on systems with pathogen free water and little or no history of disease. Prior to this examine, whenever abnormal behavior or mortality is observed, staff also conducts the Area Fish Health Specialist. The fish specialist examines affected fish, and recommends the appropriate treatment. Reporting and control of selected fish pathogens are done in accordance with the Co-managers Fish Disease Control Policy and IHOT guidelines.

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

Emergency procedures and disposition of fish would adhere to the protocols and procedures set forth in approved operation plans. If the program is threatened by ecological or mechanical events, the Complex manager would contact and inform regional management of the situation. Based on a determination of a partial or complete emergency release of program fish, if an on-station emergency release was authorized personnel would pull screens and sumps and fish would be forced released into the Washougal River.. No release of fish will occur without a review by WDFW Fish Management and a risk assessment is performed.

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.

- 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.
- The Yakama Nation transition plan calls for moving a portion of the program to lower Klickitat River acclimation sites in the future depending on funding.
- Release period is staggered from May to July to minimize density affects and competition.
- Co-managers and NOAA have agreed that 16.25% of the program will achieve a satisfactory level of data collection for survival and straying for releases in spring 2004.
- WDFW proposes to continue monitoring, research and reporting of hatchery smolt migration performance behavior, and intra and interspecific interactions with wild fish to access, and adjust if necessary, hatchery production and release strategies to minimize effects on wild fish.
- WDFW fish health and operational concerns for Klickitat fall chinook plants programs are communicated to Region 5 staff for any risk management or if needed, treatment. See also section 9.7.

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.

Juvenile Monitoring. Juvenile fish at Klickitat Hatchery are monitored on a routine basis by the hatchery staff to determine the condition factor of fry, fingerlings and smolts. Samples are taken by the WDFW Fish Health Specialist to determine the health condition of fry, fingerling and smolts prior to release. Sampling of fingerlings for tag retention and fin mark quality, prior to release, is conducted by WDFW marking program.

ESA Assessments, Ecological Interactions, and Natural Production Studies. WDFW and the Yakama Nation completes Biological Assessments and Hatchery and Genetic Management Plans to comply with the Endangered Species Act. These assessments and plans help guide production, considering the potential impacts on the biological community. Additional monitoring is needed to evaluate Klikcitat Hatchery Creek releases, possible interactions with wild stocks in the migration corridor, and to identify potential hatchery reform measures. Currently, staff are working to identify critical study questions to evaluate these topics.

Environmental Monitoring. Environmental monitoring is conducted at Service facilities to ensure these facilities meet the requirements of the National Pollution Discharge Elimination System (NPDES) permit and is also used in managing fish health. On a short-term basis, environmental monitoring helps identify when changes to hatchery practices are required. The following parameters are currently monitored - Total Suspended Solids (TSS) - 1 to 2 times per week on composite effluent, maximum effluent and inflow samples. Once per month on pollution abatement pond inflow and effluent samples. - Settleable Solids (SS) - 1 to 2 times per week on inflow and effluent samples. Once per week on pollution abatement pond inflow and effluent samples.

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

None are committed through Mitchell Act funding. Through a multi-species BPA funded programs, some Montitoring and Evaluation functions are performed. As the Hatchery (Draft Klickitat Subbasin Master Plan 2003)

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.

Scientific protocols are followed and adaptive management plans will be planned.

Section 12. Research

12.1 Objective or purpose.

Beginning in February, the Yakama Tribe will take over management of the fish hatchery after 50 years of state management. The state will continue to have a hand in operations and will partner with the Yakama Nation on funding research identified in the Klickitat Subbasin Master Plan (May 2004).

12.2 Cooperating and funding agencies.

NA

12.3 Principle investigator or project supervisor and staff.

NA

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

NA

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

NA

12.6 Dates or time periods in which research activity occurs.

NA

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

NA

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

NA

12.9 Level of take of listed fish: number 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).

NA

12.10 Alternative methods to achieve project objects.

NA

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

NA

12.12 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury or mortality to listed fish as a result of the proposed research activities.

NA

Section 13. Attachments and Citations

13.1 Attachments and Citations

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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:_____