HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Coweeman Winter Steelhead Program
Species or Hatchery Stock:	Winter Steelhead (Onchorynchus mykiss) Elochoman River
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Coweeman River Lower Columbia River
Date Submitted:	July 18, 2001
Date Last Updated:	July 11, 2001

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Coweeman Winter Steelhead Program

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

Elochoman Winter Steelhead (*Onchorynchus mykiss*)

1.3) Responsible organization and individuals

Name (and title):	Chuck Johnson, Region 5 Hatchery Operations Manager Mark Johnson, Complex Manager	
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

The steelhead program is funded through the Mitchell Act via NMFS for the purpose of mitigation for lost fish production due to development within the Columbia River Basin. 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 production planning.

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

Funding for this program is provided through the Mitchell Act via NMFS for the purpose of mitigation for lost fish production due to development within the Columbia River Basin.

1.5) Location(s) of hatchery and associated facilities.

14,000 smolts that are acclimated and released at the Coweeman rearing ponds located on tributaries of the Coweeman River and 6,000 smolts are planted directly into the Coweeman River.

Elochoman Hatchery: Located on the Elochoman River (25.0236) at RM 12.

1.6) Type of program.

Isolated harvest

1.7) Purpose (Goal) of program.

Augmentation

Goal of the program is to provide fish for sport harvest opportunity.

1.8) Justification for the program.

This hatchery program will be operated to provide fish for harvest while minimizing adverse effects on listed fish. This will be accomplished in the following manner:

1. Hatchery fish will be released as smolts at a time and size to minimize or eliminate adverse interactions with listed fish.

2. Hatchery fish will be externally marked to distinguish them from wild fish.

3. Fish will be acclimated before release when possible.

4. Hatchery fish will be propagated using appropriate fish culture methods and consistent with the Co-Managers' Disease Policy, spawning and genetic guidelines and state and federal water quality standards.

5. These hatchery fish will be harvested at a rate that does not adversely effect wild fish.

1.9) List of program "Performance Standards".

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

Performance Standards and Indicators for lower Columbia River **Isolated Harvest** Steelhead programs

Performance Standard	Performance Indicator	Monitoring and Evaluation Plan
Produce adult fish for harvest	Survival and contribution rates	Monitor catch

Meet hatchery production goals	Number of juvenile fish released	Future Brood Document (FBD) and hatchery records
Manage for adequate escapement where applicable	Hatchery return rates	Hatchery return records
Minimize interactions with listed fish through proper broodstock management and mass marking. Maximize hatchery adult capture effectiveness. Use only hatchery fish	Number of broodstock collected	Rack counts
	Stray Rates	Spawning guidelines Hatchery records
	Sex ratios	Hatchery records
	Age structure	
	Timing of adult collection/spawning	Hatchery records
	Total number of wild adults passed upstream	Hatchery records
	Adherence to spawning guidelines	Spawning guidelines
Minimize interactions with listed fish through proper rearing and release strategies	Juveniles released as smolts	FBD and hatchery records
	Out-migration timing of listed fish / hatchery fish	FBD and historic natural outmigration times
	Size and time of release	FBD and hatchery records
	Hatchery stray rates	Hatchery records (marked vs unmarked)
Maintain stock integrity and genetic diversity	Effective population size	Spawning guidelines
	HOR spawners	

Maximize in-hatchery survival of broodstock and their progeny; and Limit the impact of pathogens associated with hatchery stocks, on listed fish	Fish pathologists will monitor the health of hatchery stocks on a monthly basis and recommend preventative actions / strategies to maintain fish health	Co-Managers Disease Policy Fish health monitoring records
	Fish pathologists will diagnose fish health problems and minimize their impact	
	Vaccines will be administered when appropriate to protect fish health	
	A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings	
	Fish health staff will present workshops on fish health issues to provide continuing education to hatchery staff.	
Ensure hatchery operations comply with state and federal water quality standards through proper environmental monitoring	NPDES compliance	Monthly NPDES records

1.11) Expected size of program.

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

No broodstock collected at this facility.

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

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling		
Yearling	Coweeman River (26.0003)	14,000 from ponds 6,000 direct plant

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

Sport Harvest:

Winter	Harvest	Escapement (estimated)
1999-2000	125	125
1998-1999	29	29
1997-1998	31	31
1996-1997	75	75
1995-1996	99	99
1994-1995	185	185
AVE	91	91

Based on the assumption that 50% of the hatchery return is harvested, total returns from winter 1994-95 through 1999-2000 have averaged 182 fish, a return rate of 0.91%.

Data from WDFW punchcards.

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

1980

1.14) Expected duration of program.

Ongoing

1.15) Watersheds targeted by program.

Coweeman River (26.0003)

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

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

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

None

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

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

Coweeman winter steelhead are listed in the SASSI report (WDFW) as a distinct stock based on the geographical isolation of the spawning population. Generally, run timing is similar to other lower Columbia River wild winter steelhead stocks with entry from December to June, peaking in April. Spawning takes place from March to early June, with the peak in late April or early May. Wild winter steelhead predominately use the middle to upper Coweeman mainstem and tributaries for spawning. Information is not available on adult age class structure, sex ratio, and size range.

The WDFW's Lower Columbia River FMEP outlines the strategies used to limit genetic and ecological interaction between hatchery steelhead and wild steelhead stocks. Hatchery winter steelhead are acclimated before release in the Coweeman ponds, which are located in the lower reach of the Coweeman River (RM 8). Lower river acclimation and releases are intended to keep hatchery steelhead residuals and returning adult spawners in the lower river away from prime wild steelhead spawning areas. The advanced spawn timing of hatchery winter steelhead (Chambers Creek stock) results in peak spawning during January, three months earlier than Coweeman winter wild steelhead.

Juvenile hatchery steelhead have the potential to negatively interact with other juvenile fish, including wild winter steelhead and fall chinook, through competition and predation.

Coweeman fall chinook are listed in the SASSI report (WDFW) as a mixed stock of composite production. Generally, they begin entering the subbasin in August with the majority of spawning occurring in September and October. Most spawning occurs in the mainstem Coweeman River between the Jeep Club Bridge and Mulholland Creek (approx. 6 miles).

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

None.

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

Lower Columbia Steelhead, Chinook and Chum; Mid Columbia Steelhead; Upper Columbia Steelhead and Spring Chinook; Snake River Sockeye, Chinook and Steelhead; Upper Willamette Steelhead and Chinook; Columbia River Bull Trout.

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

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds (*see definitions in "Attachment 1").*

Critical and viable population thresholds have not been established for the above ESU's and the populations within them. NMFS has formed a Lower Columbia River/Willamette River Technical Review Team to review population status within these ESU's and develop critical and viable population thresholds.

The SASSI report (WDFW) describes the status of winter steelhead in the Coweeman as "depressed" and Coweeman River fall chinook as "healthy".

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

Not available.

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

Wild winter steelhead abundance estimates were generated from WDFW redd surveys. Fall chinook abundance estimates include both hatchery and wild spawners. Less than 10% of the fall chinook spawning population on the Coweeman River are hatchery spawners. The following tables were taken from WDFW's Lower Columbia River FMEP.

Table 3. Wild winter steelhead abundance estimates in the LCMA

Brood Year	Index Redd Surveys					Pop. Est. Trap Counts		Index Trap/redd
	Coweeman	SF Toutle	Green	EF Lewis	Washougal	NF Toutle	Kalama	Cedar
1977							774	
1978							694	
1979							371	
1980							1,025	
1981							2,150	
1982							869	

1983							532	
1984		836					943	
1985		1,807	775				632	
1986		1,595		282			919	
1987	889	1,650	402	192			982	
1988	1,088	2,222	310	258			1,078	
1989	392	1,371	128	140		18	494	
1990	522	752	86	102		36	355	
1991		904	108	72	114	108	959	
1992		1,290	44	88	142	322	1,973	
1993	438	1,242	84	90	118	165	842	
1994	362	632	128	78	158	90	725	
1995	252	396	174	53	206	175	1,030	
1996						251	725	70
1997		388		192	92	183	456	78
1998	314	374	118	250	195	149	372	38
1999		562	72	276	294	133	478	

Table 5. Fall chinook salmon abundance estimates in the LCMA

	Coweeman
1977	81
1978	58
1979	80
1980	50
1981	35
1982	63
1983	40
1984	136
1985	158
1986	97
1987	62
1988	1,027
1989	770
1990	241
1991	174
1992	424
1993	327
1994	525
1995	774
1996	2,148
1997	1,328
1998	144

1999	93

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

Unknown for winter steelhead. Extensive hatchery programs have operated in the LCR and partitioning of a fall chinook hatchery escapement was not possible until return year 1996, when all LCMA hatcheries coded-wire-tagged a portion of their production. Less than 10% of the spawning populations in Mill, Germany, Coweeman, SF Toutle, EF Lewis, NF Lewis, and Wind basins are hatchery spawners.

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 *(see "Attachment 1" for definition of "take")***.**

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Juvenile steelhead releases.

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

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

See "take" table

- 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.

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.

In the early winter "Chambers Creek" steelhead programs, hatchery fish are released for harvest augmentation. The integration of hatchery and harvest programs can be found in the WDFW's Lower Columbia River FMEP, where selective fisheries for hatchery salmon and steelhead are consistent with wild salmon and steelhead recovery.

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 is authorized under the Columbia River Fisheries Development Program, Columbia River Fish Management Plan and U.S. vs. Oregon.

The Coweeman acclimation ponds are operated in conjunction with the Lower Columbia Fly Fishers.

3.3) Relationship to harvest objectives.

WDFW's Lower Columbia River FMEP harvest management plan integrates hatchery production into a plan that maximizes fishing opportunity while minimizing risks to listed salmon and steelhead. WDFW uses selective fisheries to maximize harvest rates on hatchery stocks while setting wild stock harvest rates consistent with wild stock protection and/or rebuilding. Selective fisheries were initiated for winter steelhead in 1986 in the lower Columbia River tributaries. This regulation requires the release of all wild steelhead. The estimated mortality for wild winter steelhead for these fisheries in lower Columbia River tributaries ranges from 0% to less than 3% per basin depending on the fishing regulations. Until wild steelhead populations have recovered, wild steelhead release regulations will be in effect with incidental mortality limited to less than 3% on wild stocks.

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

Fisheries benefitting from the program will include sport fisheries in the Coweeman subbasin (including the lower Cowlitz River) and the lower Columbia mainstem. Harvest rates specific to the Coweeman subbasin are not available; however, harvest rates have been as high as 70% for hatchery steelhead in the Cowlitz River. On the Kalama River harvest rates for hatchery fish are believed to range from 40% to 70% and averaged near 50%. We expect that the harvest rate of hatchery fish will remain greater than 40% for most stocks.

3.4) Relationship to habitat protection and recovery strategies.

The extended freshwater residency of steelhead and the anadromous forms migratory patterns require specific and varied freshwater and estuary habitat types. These

ecosystems have been degraded by past and present human activities that have reduced the habitat quality, quantity, and complexity. The primary land use activities responsible for these include: road building, timber harvesting, agriculture, and rural development. These upslope and riparian activities have increased sediment, altered woody debris availability and recruitment, increased water temperatures, changed runoff patterns, and reduced river flow.

The Washington State Conservation Commission has completed a limiting factors analysis (LFA) for the Coweeman subbasin (WRIA 26). In general, the LFA identifies poor floodplain connectivity, extensive logging, and high road densities as the major problems affecting natural production in the subbasin. Much of the lower Coweeman River floodplain has been diked, channelized, or filled with dredge spoils resulting in very limited rearing and over-wintering habitat. Most lands in the watershed are managed for timber production, and historically there were a number of splash dams in the Coweeman subbasin. The riparian zone is simple and in early sucessional stages and as a result summer time temperatures are elevated, large woody debris is lacking, and the subbasin is subject to increased peak flows. High road densities contribute excessive fine sediments to the system.

Winter steelhead use the Columbia River estuary primarily during the winter, and spring. It was estimated that the tidelands, swamps, and wetlands in the Columbia River estuary were reduced by 40% from 1870 to 1970 (Sherwood et al. 1990). The recent changes in ocean current patterns, such as El Nino have reduced smolt to adult survival of all Columbia River salmonids. Smolt to adult survival of hatchery steelhead in the lower Columbia have decreased since the 1980's. Reduction in estuary habitat and poor ocean conditions have contributed to the recent decline of steelhead trout.

Recent changes in the Forest Practices Act and proposed habitat enhancement and restoration projects by the Cowlitz and Wahkiakum Conservation District, and private groups will improve anadromous production. However, restoring ecosystem function will take decades.

3.5) Ecological interactions.

Predation by birds and other fish species occurs while juvenile hatchery steelhead are in the acclimation ponds and during their subsequent outmigration after release. Hatchery steelhead smolt and residuals have the potential to negatively impact juvenile wild winter steelhead and fall chinook through competition and predation, after their release from the acclimation ponds.

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.

Surface water sources obtained from tributary creeks of the Coweeman River. Pounds of fish released from acclimation ponds are under the lower limit that would necessitate an NPDES permit, therefore, no water quality parameters are monitored.

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.

Intake screening may not meet NMFS guidelines at this time. They are unsophisticated structures of local design.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

NA (see Elochoman Hatchery HGMP).

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

NA

5.3) Broodstock holding and spawning facilities.

NA

5.4) Incubation facilities.

NA

5.5) Rearing facilities.

Coweeman ponds.

5.6) Acclimation/release facilities.

Coweeman ponds.

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

None.

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.

Fish disease transmission is managed in accordance with the agency fish disease policy. Water source is gravity fed and monitored daily.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1) Source.

Adult steelhead returning to the Elochoman Hatchery.

6.2) Supporting information.

6.2.1) History.

Stock originated from Chambers Creek in Washington state. Sufficient returns have occurred for the past 20 broods such that importation of outside stocks is unnecessary.

6.2.2) Annual size.

Only hatchery origin fish are used as broodstock identified by missing adipose fin.

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

The level of natural fish in the returning broodstock is unknown prior to 1986. Since that time only hatchery origin returning broodstock have been used for propagation purposes identified by their missing adipose fin.

6.2.4) Genetic or ecological differences.

The difference in spawn timing (3 months earlier hatchery fish), poor reproductive success for these fish in the wild (Hulett et al. 1998), and spatial separation at spawning have helped to maintain genetic differences between hatchery and wild fish. Fish are released as age-1+ smolts whereas wild steelhead are predominantly age-2+ smolts. Outmigration timing for both life history types is similar but is slightly earlier for hatchery component (Fuss et. al. 1999).

6.2.5) Reasons for choosing.

Production of two year steelhead smolts is costly, therefore it was economically beneficial for hatcheries to produce one year smolts. Since steelhead spawn from January to June, hatchery personnel selected the earliest returning and spawning steelhead to develop the Chambers Creek winter steelhead stock in the 1940's. This stock was transplanted to the lower Columbia in the 1950's. Spawning time and return time are approximately three months earlier for hatchery fish when compared to wild fish. WDFW views these as

management opportunities that reduce mixed stocked fishery impacts and genetic risks to wild fish.

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.

NA

SECTION 7. BROODSTOCK COLLECTION

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

Adults (at Elochoman Hatchery)

7.2) Collection or sampling design.

NA

7.3) Identity.

The target population of hatchery origin fish are identified by an adipose-fin clip and are the only source used for broodstock.

7.4) Proposed number to be collected:

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

No broodstock collected at this facility.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	Adults				
	Females	Males	Jacks	Eggs	Juveniles
1988					
1989					
1990					
1991					
1992					
1993					
1994					

Year	Adults		Jacks	Eggs	Juveniles
	Females	Males			
1995					
1996					
1997					
1998					
1999					

Data source: (Link to appended Excel spreadsheet using this structure. Include hyperlink to main database)

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

NA

7.6) Fish transportation and holding methods.

NA

7.7) Describe fish health maintenance and sanitation procedures applied.

NA

7.8) Disposition of carcasses.

NA

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.

NA

SECTION 8. MATING

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

8.1) Selection method.

NA

8.2) Males.

NA

8.3) Fertilization.

NA

8.4) Cryopreserved gametes.

NA

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.

NA

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

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

NA

9.1.2) Cause for, and disposition of surplus egg takes.

NA

9.1.3) Loading densities applied during incubation.

NA

9.1.4) Incubation conditions.

NA

9.1.5) Ponding.

NA

9.1.6) Fish health maintenance and monitoring.

NA

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.

NA

9.2) <u>Rearing</u>:

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

Not available.

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

Not available.

9.2.3) Fish rearing conditions

Not available.

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.

Not available.

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

Not available.

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*).

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

Fish health is monitored daily. Regular monthly scheduled visits are conducted by the area Fish Health Specialist. Treatment for disease is conducted under the advisement of the Fish Health Specialist. Sanitation procedures are done in accordance with the Co-managers Fish Health Manual, (WDFW 1996).

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

NA

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

None at this time.

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.

NA

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling				
Yearling	14,000 (pond)*	5	April15-May 15	Coweeman R. (26.0003)
	6,000 (planted)**	5	April 15-May 15	

*- 14,000 released from rearing/acclimation pond at RM 8 (Cowlitz County Flyfishers)
**- 6,000 direct plant at RM 10

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

Stream, river, or watercourse: Coweeman River (26.0003)
Release point: RM 8 and RM 10
Major watershed: Coweeman(trib to Cowlitz River)
Basin or Region: Columbia River

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

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988								
1989								
1990								
1991								

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1992								
1993								
1994								
1995								
1996								
1997								
1998								
1999								
Average								

Data source: (Link to appended Excel spreadsheet using this structure. Include hyperlink to main database)

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

Fish are volitionally released from the third week in April to the third week in May.

10.5) Fish transportation procedures, if applicable.

Fish transported for off-station release or transfer to acclimation ponds are in transit for 1.0 to 1.5 hours depending on the location of release. Loading densities are kept between 0.5 and 1.0 pounds per gallon. Salt is added to the tanker at a rate of 0.5% of the volume by weight. Temperature is monitored in the tank and tempering is performed at the release / transfer site if the difference between the tank and the release water is greater than 7 degrees F. Supplemental oxygen is administered at 2.5 liters per minute.

10.6) Acclimation procedures.

Transferred site plants on the Coweeman River are acclimated to tributary stream water sources for a period of approximately two months prior to release.

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

All steelhead are adipose-fin clipped.

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

In the event of surplus fish to the program, total program numbers will be reduced through the reduction of hatchery origin smolts planted. Hatchery origin smolts, if in surplus numbers, will be planted in local land-locked ponds and lakes.

10.9) Fish health certification procedures applied pre-release.

As set forth in the Co-managers Fish Health Manual (WDFW, 1996).

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

Every effort will be made to avoid pre-programmed releases including transfer to alternate facilites. The water system is gravity fed and generally continues to flow during flood events. Emergency releases, if necessary, would be managed by removal of outlet screens and stoplogs of the rearing vessel.

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

All fish will be released in smolting condition to minimize their retention and interacton with natural and listed fish stocks within the system prior to seaward migration.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

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

See section 1.10

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

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.

SECTION 12. RESEARCH

12.1) Objective or purpose.

12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

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

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

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

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

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

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

12.10) Alternative methods to achieve project objectives.

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

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.

SECTION 13. ATTACHMENTS AND CITATIONS

Busack, C., and A. Marshall. 1991. Genetic analysis of YFP chinook salmon stocks. Pages 2-45 *in* C. Busack, C. Knudsen, A. Marshall, S. Phelps, and D. Seiler. Yakima Hatchery Experimental Design. Progress Report, DOE/BP-00102. Bonneville Power Administration, Portland, OR.

Byrne, J. and H.J. Fuss. 1998. Annual coded-wire tag program Washington: Missing Production Groups. Annual Report 1998. Bonneville Power Administration, Portland, Or. Project Number 89-066. 107 pp.

Crawford, B. A. 1979. The origin of the trout brood stocks of the Washington Department of Game. Washington State Game Department, Fishery Research Report. 77 pp.

Fuss, H.J., J. Byrne, and C. Ashbrook. 1999. Migratory behavior and incidence of post-release residualism of hatchery-reared coho and chinook salmon released into the Elochoman River. Washington Department of Fish and Wildlife, Report No. FPT 99-08.

Fuss, H.J., J. Byrne, and C. Ashbrook. 1999. Migratory behavior and incidence of post-release residualism of hatchery-reared steelhead and cutthroat trout released into the Elochoman River. Washington Department of Fish and Wildlife, Report No. FPT 99-09.

Fuss, H.J., J. Byrne, and C. Ashbrook. 1998. Stock characteristics of hatchery-reared salmonids and Washington Department of Fish and Wildlife Columbia River Hatcheries. Washington Department of Fish and Wildlife, Annual Report H98-03. 65 pp.

Fuss, H.J. and P. Seidel. 1987. Hatchery incubation techniques at WDF hatcheries. Washington Department of Fisheries, Technical Report 100. 86 p.

IHOT (Integrated Hatchery Operations Team). 1995. Operation plans for anadromous fish production facilities in the Columbia River basin. Volume III-Washington. Annual Report 1995. Bonneville Power Administration, Portland Or. Project Number 92-043. 536 pp.

Phelps, S.R., B.M. Baker, P.L. Hulett, and S.A. Leider. 1994. Genetic analysis of Washington steelhead: Initial electrophoretic analysis of wild and hatchery steelhead and rainbow trout. Washington Department of Fish and Wildlife, Report # 94-9. 63 pp.

Washington Department of Fish and Wildlife. 998. Water resource inventory area river mile indices for the Columbia and Snake river basins. Unpublished document. Habitat Management Division, Washington Department of Fish and Wildlife, Olympia, WA.

Washington Department of Fisheries (WDF) and Washington Department of Wildlife (WDW). 1993. 1992 Washington State salmon and steelhead stock inventory - Appendix three Columbia River stocks. Washington Dept. Fish and Wildlife, 600 Capitol Way N, Olympia, WA. 98501-1091. 580 pp.

Washington Department of Fisheries (WDF), Washington Department of Wildlife (WDW), and Western Washington Treaty Indian Tribes (WWTIT). 1992. 1992 Washington State salmon and steelhead stock inventory (SASSI). Washington Dept. Fish and Wildlife, 600 Capitol Way N, Olympia, WA. 98501-1091 . 212 pp.

Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes. 1998. Co-managers of Washington fish health policy. Fish Health Division, Hatcheries Program. Washington Dept. Fish and Wildlife, Olympia.

Wood, J.W. 1979. Diseases of Pacific Salmon, their prevention and treatment, 3rd edition. Washington Department of Fisheries, Hatchery Division, Olympia, Washington. 82 p.

Piper, R.G. et. al. 1982. Fish Hatchery Management. United States Department of the Interior, Fish and Wildlife Service, Washington D.C. 517 pp.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information 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:_____

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

Listed species affected: Chinook ESU/Population: Lower Columbia Activity: Rearing pond/plant				
Location of hatchery activity: Coweeman River Dates of activity: February-May Hatchery program operator: WDFW/Volunteers				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		Unknown		
Other Take (specify) h)				

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

Instructions:

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