Klickitat Hatchery Complex
Summer Steelhead

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HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Klickitat River- Summer Steelhead
Species or Hatchery Stock	*Oncorhynchus mykiss* Summer Steelhead
Agency/Operator	Yakama Nation
Watershed and Region	Klickitat Subbasin/Columbia Gorge Province
Date Submitted	July 2012
Date Last Updated	July 2012

Section 1: General Program Description

1.1 Name of hatchery or program.

Klickitat River-Local Broodstock

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

Summer Steelhead – *Oncorhynchus mykiss*

ESA Status: Threatened

1.3 Responsible organization and individuals.

Name (and title):	Jason Rau (Complex Manager)
	Bill Sharp (YKFP Klickitat Coordinator)
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Co-operators	**Role**
Washington Department of Fish and Wildlife	Hatchery Specialist 1
National Marine Fisheries Service	Manager of Mitchell Act Funds

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

Funding Sources
Mitchell Act and BPA

Operational Information	Contract Number NA06NMF4360230
Full time equivalent staff	5 (1 new staff)
Annual operating cost (dollars)	$203,000 (NPCC Step-1 estimate)

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	Klickitat River Summer Run Steelhead
Broodstock collection location (stream, RKm, subbasin)	Lyle Falls (RKm 3.5), and Klickitat Hatchery (RKm 68), Castile Falls (Rkm 103)
Adult holding location (stream, RKm, subbasin)	Klickitat Hatchery (RKm 68)
Spawning location (stream, RKm, subbasin)	Klickitat Hatchery (RKm 68)
Incubation location (facility name, stream, RKm, subbasin)	Klickitat Hatchery (RKm 68)
Rearing location (facility name, stream, RKm, subbasin)	Klickitat Hatchery (RKm 68), and McCreedy Creek Acclimation Facility (RKm 113)

1.6 Type of program.

Current Program- Historical hatchery releases of steelhead in the Klickitat have consisted of summer steelhead smolts derived from the Skamania-origin steelhead reared at both Skamania and Vancouver hatcheries. In addition, several releases were also made from the Beaver Creek, Goldendale, and Naches hatcheries. The founder broodstock of Skamania steelhead came from the summer runs of the Washougal and Klickitat steelhead populations. Steelhead releases in the Klickitat began in 1961 and continued to the present time with a release goal of about 90,000 smolts. Since 1961, the releases have ranged from a low of approximately 16,000 to a high of approximately 125,000 and have averaged about 85,000 fish (Table 6-3). Hatchery smolts are 100% adipose-clipped for harvest retention and have historically been scatter-planted as direct stream releases at various locations ranging from as high as the Klickitat hatchery at Rkm 69 and as low as Rkm 0.8 near the river mouth. This type of release strategy lacks imprinting of juveniles on water sources located in terminal locations (i.e. hatchery ponds and/or acclimation ponds using unique water sources) which confounds the managers' ability to trap and remove surplus hatchery adults. As a result, surplus adults are likely spawning naturally in the Klickitat River creating the potential for introgression with natural origin steelhead.

While historical releases of Skamania hatchery steelhead have provided harvest benefits for terminal fisheries, much uncertainty exists regarding the degree of introgression between Skamania hatchery steelhead and the Klickitat River's natural populations of summer and winter run steelhead. NOAA fisheries concluded that insufficient information exists to determine the effects of hatchery releases on natural steelhead populations in the Klickitat (Klickitat Steelhead Recovery Plan 2009). As a result, it is unclear whether or not Skamania steelhead have inadvertently affected the viability of the natural population and increased the

extinction risk associated with the natural population's persistence. Despite the fact that more empirical data is needed for a thorough Population Viability Analysis, past genetic work has suggested that the hatchery strain remains genetically distinguishable from native stocks as only 4.0% of naturally produced steelhead juveniles had their most likely assignments to the hatchery strain (Narum et al 2006).

Additionally, from the early 1960s to 2005, Castile Falls likely blocked most steelhead from stream habitat located upstream of the falls. By 2005, upstream fish passage conditions at Castile Falls were improved to allow steelhead access to this portion of the Subbasin. Habitat modeling work conducted by both the ICTRT (Interior Columbia Technical Recovery Team) and YN Biologists indicate that adult steelhead production potential above the falls may be as high as 750 adults. If the production potential estimate is accurate, total steelhead production in the Klickitat River Subbasin could increase to over 2,000 fish in the future.

Future Program- YN's proposed hatchery programs are designed to benefit conservation and recovery of Klickitat River steelhead while sustaining harvest opportunities for treaty and non-treaty fisheries. The primary goals of the program are to :

1. Provide conservation benefits to the natural population by reducing the 5% risk of extinction from moderate to low.[1]

2. Provide the broodstock needed for producing steelhead juveniles and adults for harvest consistent with *U.S. v Oregon* principles and programmatic objectives.

There are three options for the steelhead programs in the Klickitat River Basin:

The program has the following components:

1. Continue Skamania program until Klickitat Hatchery upgrades are implemented.
    - Mark all releases to allow live detection of adult returns at Lyle

2. Current data suggest that <5% of natural smolt production is the progeny of hatchery-origin fish (Narum et al. 2006). Continue to monitor. If this increases to >5% for 3 consecutive years or more than 5 years in 10, then improve the segregated hatchery program by implementing measures including, but not limited to:
    - Collect local HOR fish for brood at Lyle
    - Spawn, rear using spring water, acclimate, and release at Klickitat

[1] The ICTRT rated the Klickitat River steelhead population at Moderate risk of extinction in one hundred years for both abundance/productivity and spatial structure/diversity (Klickitat Subbasin Recovery Plan 2008)

Hatchery
- Cull diseased fish

3. If the percentage of natural smolt production from hatchery-origin parents increases to > 10% then options are:
   - Discontinue program if all parties/stakeholders agree
   - Change the hatchery program to an integrated program using NOR brood stock

4. By 2020 (2-3 fish generations from 2005 when passage improvements above Castile first became operational), if passage at Castile Falls has not exceeded 150 fish (20% of estimated 750 fish capacity) in at least 1 year, or if the mean passage at Castile Falls from 2012-2019 is less than 80% of the 150 fish goal (< 120 fish), then:
   - Implement an integrated NOR program at McCreedy Hatchery
     - Base the program size (number of smolts released) on a maximum 25% collection rate of NOR passage at Castile for brood stock. The maximum size of the program would be sufficient brood collection to release 70,000 smolts

Several management strategies have been identified to help meet the primary conservation goal of the program. These strategies include:

1. Terminate direct stream releases of out-of-basin Skamania smolts

Once the infrastructure upgrades and additional raceways have been constructed at the Klickitat hatchery, direct stream releases of out-of-basin Skamania hatchery-origin juveniles will be terminated. Broodstock will be collected locally and juveniles will be reared and imprinted on spring water used at the Klickitat hatchery. By trapping adult volunteers escaping fisheries at the Klickitat hatchery, this management action will likely reduce the proportion of hatchery fish on the natural spawning grounds by 50-80% annually.[2] Bonneville Power Administration, Klickitat Hatchery Program EIS is anticipated to conclude in Fall 2011. (HDR schedule estimate provided 6/23/09 shows date of completion estimated 3/15/11. HDR schedule provided 11/10/09 shows date of completion estimated at 8/31/11). Hatchery upgrades and construction of infrastructure will likely begin soon after. Direct stream releases of out-of-basin Skamania steelhead will likely cease in 2015 when necessary infrastructure comes online for collection of broodstock, adult holding and rearing of juveniles.

2. Conduct research targeting critical uncertainties on hatchery/wild interactions and the effects on spatial structure and diversity metrics of

[2] Rough estimate of current volunteer rate of hatchery spring Chinook

the natural population

A feasibility study will be conducted as part of the Master Plan (Draft Yakama Nation 2012) to investigate broodstock collection and juvenile rearing strategies, expected smolt to adult survival rates, and risks associated with steelhead hatchery practices. M&E activities will attempt to estimate proportion of effective hatchery spawners on the natural spawning grounds and also attempt to determine the degree of introgression and offspring production from hatchery fish. Reducing the spatial structure/diversity risk to a low rating would require reducing the impacts of the outside stock hatchery program on the natural spawning areas, or determining that the natural population is actually experiencing very little impact from the Skamania stock origin returns (ICTRT 2009).

3. **Implement and operate harvest augmentation program using the guidelines and criteria established by the HSRG for Primary populations[3]**

   Long-term implementation of a segregated or integrated program will be guided by M&E activities targeting critical uncertainties, ongoing Population Viability Assessments (PVAs), and the managers' ability to meet HSRG's operating criteria for integrated and segregated hatchery programs.

4. **Assess steelhead natural recolonization of upper Klickitat watershed and the potential use of artificial propagation to accelerate recolonization**

   The conservation component of the hatchery program will not be implemented until 2020 (approximately 2-3 generations) to determine if wild steelhead are able to re-colonize stream habitat above Castile Falls. Full passage at Castile Falls was completed in 2005. The return year of 2005/2006 constitutes the beginning of the natural re-colonization evaluation period. If by 2020, steelhead escapement above Castile Falls has not increased to a minimum of 150 adults, hatchery supplementation will be considered as a tool to accelerate the re-colonization process.

[3]The population designations used by the HSRG (Primary, Contributing, or Stabilizing) were adopted after discussions with managers and followed those developed in the Lower Columbia River Salmon Recovery Plan (LCFRB 2004).

1.7 Purpose (Goal) of program.

YN's proposed hatchery programs are designed to benefit conservation and recovery of Klickitat River steelhead while sustaining harvest opportunities for treaty and non-treaty fisheries. The primary goals of the program are to :

1. Provide conservation benefits to the natural population by reducing the 5% risk of extinction from moderate to low.[1]

2. Provide the broodstock needed for producing steelhead juveniles and adults for harvest consistent with *U.S. v Oregon* principles and programmatic objectives.

1.8 Justification for the program.

- The YN is required under U.S. vs. Oregon treaty obligations to release steelhead for harvest into the Klickitat River.
- Conservation of Columbia River fisheries resources as defined and required by the Mitchell Act.
- Steelhead are listed as Threatened under ESA. Steelhead abundance, diversity and spatial structure need to be increased to achieve recovery objectives identified by NOAA Fisheries for this species (Klickitat Steelhead Recovery Plan 2009).
- Through the Columbia Basin Fish Accords BPA has committed funds for infrastructure upgrades at both Lyle Falls and Castile Falls Fishways to expand R, M&E function. An EIS is underway to determine preferred actions outlined in the Klickitat Master Plan for implementation of hatchery reform. Full buildout of those proposed actions include new and upgraded infrastructure at the existing Klickitat Hatchery (RM 42.0), a new steelhead acclimation site at McCreedy Creek (RM 72.0) if natural colonization is not effective, and special evaluation of funding strategies with potential construction of a new hatchery and acclimation facility at Wahkiacus (RM 17.0) for 2.0M fall Chinook and 1.0M coho. The EIS will assist in determining the course of action of either full build out, partial build out, or no action. The Fish Accord Agreement also identifies O&M funding for future actions as implemented.

This program terminates the direct stream releases of Skamania Summer Steelhead program which uses a non-native fish stock to provide harvest benefits in the basin. The new program will utilize local hatchery-origin or natural origin fish to provide harvest opportunity and potentially use locally adaptive NOR fish for a small-scale conservation program. Both programs are designed for

[1] The ICTRT rated the Klickitat River steelhead population at Moderate risk of extinction in one hundred years for both abundance/productivity and spatial structure/diversity (Klickitat Subbasin Recovery Plan 2008)

conservation benefits targeting abundance, diversity and spatial structure of this listed population which will lead to the delisting of the species under ESA. However, the use of hatchery smolt releases to accelerate re-colonization of the upper basin will not be implemented until 2020 (2-3 generations) to determine if steelhead are able to colonize habitat above Castile Falls without intervention with hatchery production (Draft Klickitat Anadromous Fisheries Master Plan 2008). Passage improvements to Castile Falls were completed in the year of 2005 which marks the beginning of the natural re-colonization period through 2020. Hatchery intervention would at the earliest begin in 2020.

In order to minimize impacts on listed fish the following actions are included in this HGMP:

Summary of risk aversion measures for the Klickitat summer steelhead program.

Potential Hazard	**Risk Aversion Measures**
Water Withdrawal	Water rights are formalized through trust water right S4-*07272 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.
Intake Screening	YN has received funding for future scoping, design, and construction work to replace the non-compliant river intake system at the Klickitat Hatchery to meet NOAA compliance (Mitchell Act Intake and Screening Assessment 2002). New screens will prevent entrainment or impingement of listed and unlisted fish stocks.
Effluent Discharge	This facility operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) administered by the Environmental Protection Agency (EPA). Following procedures outlined in this program reduces impacts to stream water quality from hatchery operations.
Broodstock Collection & Adult Passage	Broodstock will be collected at the new Lyle Falls Fishway at RKm 2.2, Castile Falls RKm 102 and the Klickitat Hatchery. New facilities will be based on recent NMFS passage criteria thereby reducing mortality rates on listed steelhead.
Disease Transmission	*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	To prevent competition and predation on natural origin fish, hatchery steelhead smolts will not be released above Castile Falls unless the integrated program (McCreedy Creek Acclimation) is deemed necessary. Predation rates (index) will be developed for hatchery steelhead released below Castile Falls to determine impacts to juvenile spring Chinook and steelhead.

1.9 List of program "Performance Standards".

See section 1.10.

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

1.10.1 Benefits:

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Assure that hatchery operations support Columbia River Fish Management Plan *(US v Oregon)*, production and harvest objectives	Achieve 10 year average of 2.0% smolt to adult survival (SAR) for both release groups of program. Manage the composite population for a PNI value of 0.67 or greater (up to 0.9). Support current levels of harvest for terminal treaty and sport fisheries provided from previous Skamania origin hatchery releases. (~2,000). Long-term objective of providing 2,400 fish harvested in terminal tribal and sport fisheries.	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 Yakama Nation 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 50 adults are to be collected throughout the spawning run in proportion to timing, age, and sex composition of the natural return.	Annual run timing, age and sex composition, and return timing data are collected.
Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish	Use mass-mark (adipose-fin clip) for selective fisheries with additional release groups elastomer tagged if needed.	Returning fish are sampled throughout their return for length, sex, and marks.
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 WDFW and NWIFC 1998).	Necropsies of fish to assess health, nutritional status, and culture conditions	USFWS staff to inspect adult broodstock yearly for pathogens and parasites and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, USFWS recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as 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 examinations 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, adult broodstock, in lots of 60, 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 with 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 federal regulations. Hatchery juveniles are raised to smolt-size (6-8 fish/lb) and released from the hatchery at a time that encourages rapid migration downstream. Mass mark production fish to identify them from naturally produced fish (except CWT only groups)	As identified in this HGMP: Monitor size, number, date of release and mass mark quality. Collect real-time DNA data to identify origin of adult fish, thereby ensuring that only Klickitat River fish are used as broodstock. Estimate number of hatchery fish on spawning grounds.
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 the USF&WS Lower Columbia Fish Health Center will monitor the program monthly. Examinations performed at each life stage may include tests for virus, bacteria, parasites, and/or pathological changes.
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 instream 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	YN 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).

If the conservation program targeting natural production above Castile Falls is implemented, an additional 35-40 NOR adults will be taken for broodstock resulting in a total egg take of about 180,000 and a total release of 160,000 juveniles between the two programs. 90,000 juveniles will be released on station from the Klickitat hatchery for harvest, and 70,000 juveniles will be released above Castile Falls for conservation. All NOR broodstock will be air spawned and temporarily reconditioned for an on-station kelt release.

If a segregated using local hatchery returns is implemented, approximately 50-60 HOR adults will be used for broodstock each year. This should result in an egg-take of approximately 105,000 and a release of 90,000 juveniles

If an integrated harvest program is implemented to replace the current out of basin releases of Skamania stock, approximately 50-60 NOR adults will be used for broodstock each year. This should result in an egg-take of approximately 105,000 and a release of 90,000 juveniles. No more than 25% of the NOR run will be collected for broodstock.

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

Age Class	Max. No.	Size (fpp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Yearling	90,000	6-8	April-May	Klickitat	68	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.

Because this is a new program, no survival data are available. The program assumes an initial SAR of 2.0%. Adult returns to the Subbasin are expected to range from 390 (0.3% SAR) to 5,200 (4.0% SAR) and average 2,600 (2.0% SAR).

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

New program estimated start date: 2014.

1.14 Expected duration of program.

Continuous until natural production increases to the point where conservation and harvest objectives can be achieved without the program.

1.15 Watersheds targeted by program.

Klickitat Subbasin/Columbia Gorge Province

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

Alternative programs considered are presented below. More information on these alternatives can be found in the Draft Klickitat River Anadromous Fisheries Master Plan (Yakama Nation 2012)

1.16.1 Potential Alternatives to the Current Program

Alternative 1- Maintain Existing Program

This management alternative would maintain the current hatchery operations in the Klickitat consisting of a 90,000 release of hatchery Skamania-origin steelhead. The juveniles are reared to a smolt age of 1 yr at the Skamania Hatchery and directly released in the lower River. This is not the preferred alternative due to the genetic introgression risk associated with the domesticated imported hatchery stock and the Klickitat indigenous stock that could result in loss of genetic diversity.

Alternative 2- Eliminate Hatchery Program and Improve Habitat

Analyses indicate that, with optimistic assumptions regarding the effectiveness of

the habitat actions, the adult escapement target of 2,500 adults may be achieved. However, the run size back to the Subbasin was insufficient to meet the 2,400 harvest objective for combined tribal and sport fisheries. This alternative was therefore rejected.

Section 2: Program Effects on ESA-Listed Salmonid Populations

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

- The existing Program is described in the "Biological Assessment for the Operation of Hatcheries Funded by the National Marine Fisheries Service" (March 1999)
- Statewide Section 6 consultation with USFWS for interactions with Bull Trout
- To satisfy Section 7 consultations, YN is writing HGMPs to cover all stock/programs in the Klickitat River including fall Chinook, spring Chinook, steelhead and coho released from Klickitat Hatchery.

This document is intended to be consistent with NOAA (2008) which states (RPA 39):

The FCRPS Action Agencies will continue funding hatcheries in accordance with existing programs… Consultation under the ESA on the operation of hatchery programs funded by the FCRPS Action Agencies [will] include the submittal of updated and complete HGMPs. Updated and complete HGMPs are to be submitted to NOAA Fisheries and ESA consultation should be initiated by … July 2009 for hatchery programs in the Middle Columbia … ESA consultations should be completed by January 2010 for hatchery programs in the Middle Columbia …

Project sponsors are also aware of direction in NOAA (2009) calling "for consultations on hatchery programs within the MCR Steelhead DPS to be completed by January 2010". Project sponsors remind NOAA of its statement in this document that "mitigation obligations will not be diminished under this process". The Yakama Nation considers this project essential to meeting federal commitments to honor the Treaty of 1855, and to "protect, rebuild, and enhance" anadromous salmon populations throughout tribal usual and accustomed fishing areas as described in the 2008-2017 United States v Oregon Management Agreement and in the Columbia River Fish Accords. As such, any changes to program parameters which would diminish the number of adult salmon returning to tribal usual and accustomed fishing areas that result from this HGMP development and consultation process will not be implemented unless and until they are considered and approved in appropriate policy fora.

NOAA. 2008. Consultation Title: Remand of 2004 Biological Opinion on the Federal

Columbia River Power System (FCRPS) including 19 Bureau of Reclamation Projects in the Columbia Basin (Revised pursuant to court order, NWF v. NMFS, Civ. No. CV 01-640-RE (D. Oregon). Tracking Number: 2005/05883. https://pcts.nmfs.noaa.gov/pls/pcts-pub/pcts_upload.summary_list_biop?p_id=27149

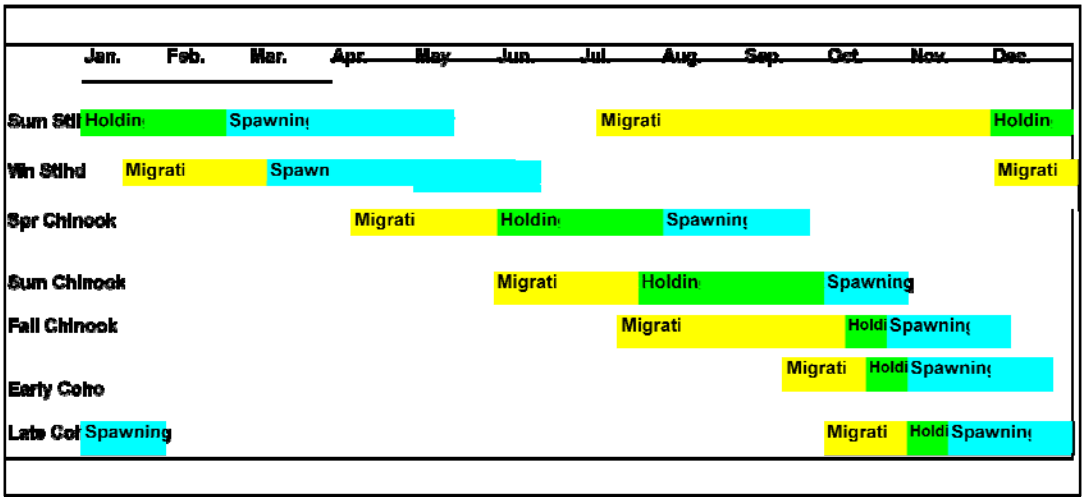
NOAA. 2009. Letter from Rob Jones, Chief, Salmon Recovery Division, National Marine Fisheries Service, Portland Oregon to "Interested Parties", dated March 5, 2009. NMFS, Portland Office, 1201 NE Lloyd Blvd, Suite 100, Portland, Oregon.

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 Klickitat Subbasin where the program fish are released:

ESA-listed stock	Status	Take Level	Action
Summer Steelhead-Natural	Threatened	Minor	Broodstock collection/trapping at Lyle Falls, and Castile Falls
Winter Steelhead-Natural	Threatened	Minor	Broodstock collection/trapping at Lyle Falls, Castile Falls
Bull Trout – Natural	Threatened	Minor	Broodstock collection/trapping at Lyle Falls, Castile Falls

Adult and juvenile run-timing for listed steelhead and other fish species are presented in the figure below.



The majority of the steelhead population is found from the mouth of the Klickitat River to Castile Falls. Steelhead access to areas above Castile Falls has been limited due to poor natural migration conditions at the falls. Steelhead spawning is concentrated between RKm 8 and 80. Tributary spawning occurs in Swale,

Snyder, Dead Canyon, Summit, and White creeks, the lower Little Klickitat River, and other small tributaries (Appendix A).

Resident bull trout are found primarily in the West Fork Klickitat River. However, bull trout likely use the mainstem Klickitat River as a migration corridor (Appendix A).

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

Mid-Columbia Steelhead will be directly affected by the program.

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

Steelhead and Bull Trout may be incidentally affected by the program.

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.

Mid-Columbia River Steelhead *(Oncorhynchus mykiss)* were listed as threatened under the ESA on January 5, 2006. The MCR steelhead DPS includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin. The Biological Review Team (BRT) found moderate risks to the DPS's productivity, spatial structure, and diversity, with the greatest relative risk being attributed to the ESU's abundance. Informed by this assessment, the opinion of the BRT was closely divided between the "likely to become endangered within the foreseeable future" and "not in danger of extinction or likely to become endangered within the foreseeable future" categories.

Information on steelhead abundance, productivity, and population growth trends is reported in NOAA 2005.

Status of Klickitat summer and winter runs:

The existence of naturally spawning winter steelhead was confirmed in the early 1980s and winter steelhead are presumed to be indigenous. Howell et al. (1985) recognized both summer and winter races of steelhead in the Klickitat Subbasin, with an adult winter steelhead migration period of January through May and a spawning period of March through June. To protect the winter run, current regulations prohibit sport fishing for steelhead in the Klickitat River from December through May; the treaty fishery is closed from January through March. Both seasons have been longer in previous years.

The ICTRT has identified Klickitat River steelhead as an independent population belonging to the Mid-Columbia ESU. The Middle Columbia steelhead ESU was

listed as threatened under the ESA on March 25, 1999 (64 FR 14517). The Klickitat steelhead population includes both summer-run and winter-run steelhead.

Temporal and spatial spawning segregation between the Klickitat steelhead summer and winter runs has not been clearly defined. Genetic analysis of juveniles and adults is expected to provide additional information about the spatial and temporal distribution of both steelhead races (Chapter 7.0 Klickitat Master Plan).

Past genetic analysis on steelhead have shown some degree of genetic differentiation between tributaries to the Klickitat River; genetic samples from the upper Klickitat, White Creek, and Trout Creek seem to diverge most widely from the Skamania Hatchery stock (Marshall unpublished). Recent genetic analysis indicates there may be six to seven genetically distinct populations of naturally reproducing steelhead in this river system. The results also suggest that the genetic integrity and variation of native Klickitat River steelhead have been maintained despite repeated hatchery introduction and that the potential is high for restoring the population's viability (Narum et al. 2006).

No solid historical data exist on the size and productivity of the Klickitat summer steelhead run. Based on NOAA Fisheries historical intrinsic potential analysis, the ICTRT considers the Klickitat River population to be an "intermediate" sized population that can support a minimum of 1,000 spawners (ICTRT 2007). They concluded that spawner abundance should be distributed over 6 major spawning areas and 4 minor spawning areas within the Klickitat population boundaries (Figure 6-1). The percent of total Subbasin steelhead habitat present in each MaSA and MiSA is shown in Figure 6-2[3].

The escapement of naturally spawning (summer and winter, hatchery and wild combined) steelhead in the Klickitat River from 1987 to present has been estimated at approximately 700 fish (see below). However, this estimate is based on redd count data which is believed to be an underestimate because of difficulties associated with conducting accurate counts during spring flow conditions (NPCC 2004). YN biologists hypothesize that the actual mean escapement is closer to 1000 spawners annually. Mark recapture estimates conducted from 2005-2009 suggest that natural returns of summer and winter steelhead combined to the lower Klickitat River average about 1500 fish.

Additionally, from the early 1960s to 2005, Castile Falls likely blocked all steelhead from stream habitat located upstream of the falls. By 2005, upstream fish passage conditions at Castile Falls were improved to allow steelhead access to this portion of the Subbasin. Habitat modeling work indicates that adult steelhead production potential above the falls may be as high as 750 adults (Appendix C). If the production potential estimate is accurate, total steelhead production in the Klickitat River Subbasin could increase to over 2,000 fish in the near future.

The most comprehensive set of steelhead spawner survey data was collected between 1990 and 2010. Redd counts over these years indicate an average escapement of about 700 fish. This figure is undoubtedly an underestimate due to

the inherent difficulty in conducting accurate counts during spring flow conditions. Mainstem spawning distribution is concentrated between RKm 8 and RKm 80.0, with occasional spawning above Castile Falls. Tributary spawning occurs in Swale, Snyder, Wheeler, Dead Canyon, Summit, and White creeks, and the Little Klickitat River.

Summary of Klickitat River Steelhead terminal harvest, estimated escapement and total run size to the mouth (1986-2008)

		Harvest							
			Sport[2]			Tribal			
Year	Run[1]	Hatchery	Wild	Total	Hatchery[3]	Wild[3]	Total	Escapement[4]	Redds[5]
1986-87	9,834	1,426	54	1,480	5,107	901	6,008	2,346	
1987-88	3,751	1,480	34	1,514	1,141	201	1,342	895	
1988-89	4,208	1,718	0	1,718	1,263	223	1,486	1,004	
1989-90	1,702	833	0	833	536	95	631	238	95
1990-91	2,957	1,055	0	1,055	1,464	258	1,722	180	72
1991-92	3,595	823	8	831	1,620	286	1,906	858	
1992-93	3,251	1,260	0	1,260	1,033	182	1,215	776	
1993-94	3,402	1,211	25	1,236	1,151	203	1,354	812	
1994-95	1,915	857	34	891	482	85	567	457	
1995-96	1,805	864	9	873	433	76	509	423	169
1996-97	1,082	608	14	622	241	43	284	176	71
1997-98	2,185	1,062	18	1,080	455	80	535	570	228
1998-99	1,521	650	12	662	224	39	263	596	239
1999-00	1,725	575	28	603	214	0	214	908	363
2000-01	2,851	1,433	59	1,492	495	67	562	797	319
2001-02	5,264	3,708	16	3,724	724	55	779	761	304
2002-03	6,022	3,552	97	3,649	1285	363	1,648	725	290
2003-04	2,766	1,673	0	1,673	369	151	520	573	229
2004-05	2,957	1,658	0	1,658	747	153	900	399	160
2005-06[6]	2,101	1,115	0	1,115	368	98	466	520	12
2006-07[6]	2,518	1,610	0	1,610			285	623	74
2007-08[6]	2,493	1,531	3	1,534			342	617	62
2008-09[6]	3,841	1,742	67	1,809			1081	951	77
Avg:	3,206	1,411	21	1,431	968	178	1,070	705	212

Note: Data for this table are from YN and WDFW databases and US v. Oregon TAC reports

[1]Sum of harvest and escapement

[2]Sport Harvest numbers include data from May 1 - April 30 for 1986-87 through 2005-06, and April 1 - March 31 for 2006-07 on.

[3]Hatchery and wild proportions of tribal harvest are estimated as follows: For 1999-00 through 2005-06 percentages estimated from sampling of ceremonial and subsistence harvest were applied to total tribal harvest. For 1986-87 through 1998-99 the average percentages from the 1999-2005 sampling were applied to total tribal harvest.

[4]Assumes 2.5 fish per redd. For years when redd counts were unavailable or unreliable, assumes average escapement-to-total-harvest ratio from years when reasonably accurate redd counts were available

[5]Actual redd counts expanded based on mileage surveyed

[6]High flows, turbidity, and/or poor access limited survey ability and effectiveness, probably biasing the redd count low.

Columbia Basin DPS Bull Trout *(Salvelinus confluentus)* June 10, 1998 (63 FR 31647), Threatened.

The Fish and Wildlife Service issued a final rule listing the Columbia River and Klamath River populations of bull trout *(Salvelinus confluentus*) as a threatened

species under the Endangered Species Act on June 10, 1998 (63 FR 31647). The Columbia River Distinct Population Segment is threatened by habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, and past fisheries management practices such as the introduction of non-native species.

The Lower Columbia Recovery Unit Team identified two core areas (Lewis and Klickitat rivers) within the recovery unit. The Klickitat Core Area includes all tributaries downstream to the confluence with the Columbia River. Recent evidence indicates that both resident and adfluvial bull trout are present in the Subbasin. There are numerous confirmed and anecdotal reports of bull trout in the mainstem Klickitat River from the mouth up to the area below Castile Falls. Sizes reported are indicative of an adfluvial life history. Presence of resident populations has also been documented in the West Fork Klickitat River, Fish Lake Stream, Little Muddy Creek, Trappers Creek, Clearwater Creek, Two Lakes Stream, and an unnamed tributary to Fish Lake Stream (all within the West Fork Klickitat watershed).

The abundance of the stock in the Klickitat River is poorly known. There are insufficient data to make an assessment. However, it appears that there are very few bull trout in the lower- to mid-Klickitat drainage. Bull trout appear to be more abundant in the upper drainage where habitat conditions are more favorable.

Preliminary results of recent genetic analysis indicate that resident bull trout in the Klickitat Subbasin are genetically distinct from other Columbia tributary populations, but that fish in two West Fork Klickitat tributaries (Trappers and Clearwater creeks) do not differ significantly from each other.

The impacts of hatchery salmon and steelhead in the main Klickitat River on bull trout. Is unknown. Generally, in drainages colonized by anadromous salmon, steelhead and char successfully co-exist by occupying different ecological niches. However, negative interactions (predation) may occur when hatchery fish are released near char spawning and rearing areas.

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

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

Broodstock Program:

Broodstock Collection: Adult trapping and hatchery broodstock collection activities at Lyle Falls will take up to 60 summer steelhead each year for the long-term, harvest augmentation program. Collection of hatchery and wild fish will depend on the type of program implemented. Continuation of a segregated program would use 100% hatchery origin fish while a new, integrated hatchery program would take 100% natural origin fish. In addition to this, up to 40 natural origin fish may be taken for the upper basin's small scale conservation program if insufficient numbers of steelhead cannot be trapped at Castile Falls. No more than 50% of the natural origin return would be trapped at Castile Falls for the upper basin's

program. Because all adult collection facilities will be designed to meet NMFS standards, few fish should be injured or killed due to fish handling and sorting procedures. This assumption is supported by historical data which show that no listed fish mortalities have been observed during this operation of the Klickitat Hatchery.

Genetic introgression: Straying of hatchery fish into natural spawning areas may lead to genetic introgression. DNA samples will be collected from both hatchery and natural fish populations to determine level of effect, if any, over time. Additionally, fish passage operations and harvest rates may be adjusted to achieve a PNI of 0.67 for the integrated hatchery and natural stock.

Rearing Program:

Operation of Hatchery Facilities: Expect some losses in juvenile rearing in the hatchery environment (0%-15% loss from egg-to-smolt of all eggs cultured).

Water diversion: Water is diverted from the stream for hatchery operations. This results in a decrease in the amount and quality of approximately 0.25 mile of stream habitat. The loss in habitat may result in a decrease in steelhead and bull trout abundance; although loss has not been quantified and is expected to be negligible. In addition, The Mitchell Act Intake and Screening Assessment (NOAA April 2002) has identified design and alternatives needed to get existing structures in compliance with NOAA fish screening standards. From the assessment, YN has been requesting funding for future scoping, design, and construction work of a new intake system at the Klickitat Hatchery.

Water Quality: 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). 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): Collected 1 to 2 times per month on composite effluent, maximum effluent and influent samples.

Settleable Solids (SS): Collected 1 to 2 times per week on effluent and influent samples.

In-Hatchery Water Temperature: Daily maximum and minimum readings are collected.

Water quality monitoring is not expected to result in the take of listed species because fish are not affected by the sample collection process.

Disease: Disease outbreaks in the hatchery could 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 1995) Chapter 5 have been instrumental in reducing disease

outbreaks. Fish are planted and transferred after a fish health specialist has determined the population's health. Indirect take from disease is unknown.

Release:

Hatchery Production/Density-Dependent Effects: It is possible for hatcheries to release numbers of fish that can exceed the density of the natural productivity in a limited area for a short period of time and can compete with listed fish. Fish planted under the proposed program will be made at a fish size, time, and condition factor that will ensure that fish will migrate rapidly from the system, thereby reducing potential competition and predation impacts to listed fish populations. Indirect take from density dependent effects is unknown.

Competition and Predation: According to the HSRG (2004), and supported by data presented by Flagg et al. (2000), the potential for predation of wild salmonids by hatchery-reared smolts will depend on the size, number, and spatial distribution of both predators and prey, the functional and numerical responses of the predators, and the amount of time that predators and prey are in proximity. Busack et al. (2005) reviewed published rates of predation by juvenile hatchery salmonids on wild juvenile Chinook and found that predation rates were generally low (<2% of natural population consumed). In contrast, data collected on hatchery coho predation rates on wild fall Chinook juveniles in the Lewis River were quite high (>11%) (Hawkins and Tipping 1999). The variability in study results is one reason that the HSRG (2004) suggests that hatcheries monitor predation impacts resulting from hatchery releases. This type of study is proposed as part of the Draft Klickitat River Anadromous Fisheries Master Plan (Yakama Nation 2012).

In general, hatchery fish can consume fish that are 50% of their body size; however studies reviewed by Busack et al. (2005) indicated that the range may extend from approximately 38% (steelhead) to 75% (coho). NOAA Fisheries and the USFWS in a number of biological assessments and opinions, e.g. USFWS 1994 and NMFS 1999, were of the opinion that juvenile salmonids can consume prey that are 33% of their body length and smaller. Predation by hatchery fish on wild fish can occur anywhere the two stocks exist in space and time. Therefore, predation may not only be a concern in the stream environment, but also in the estuary and marine environment.

The site-specific nature of predation, and the limited number of empirical studies that have been conducted, make it difficult to predict the predation effects of this specific hatchery release. The YN is unaware of any studies that have empirically estimated the predation risks to listed fish posed by the Klickitat Hatchery programs. 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.

Date of Release: The release date can influence the likelihood that listed species are encountered. The summer steelhead spawning window is from mid-February to mid-May while winter –run spawning occurs early March and lasts to late-May to early June (Draft Klickitat Anadromous Fisheries Master Plan 2008). Depending on available temperature units, steelhead eggs will hatch in 4-7 weeks with fry

emergence approximately 2-3 weeks after hatching. This means that the majority of fry emergence takes place after hatchery smolts have left the Klickitat River system in April/May. Additionally, steelhead fry are found in shallow low velocity stream habitat not generally be accessible to the larger steelhead smolts, thereby reducing encounter rates and predation levels.

Fish Size at Release: Based on the 33% of body length predation assumption put forward by NMFS and USFWS and a steelhead size of release range of 180-220 mm, hatchery steelhead may consume juvenile fish that range in size from 59-73 mm and smaller

During the time of release, the majority of steelhead juveniles present in the system is expected to be 1+ smolts that are generally larger than 80 mm. These fish are too large to be consumed by hatchery smolts.

Release Location and Release Type: The likelihood of predation may also be affected by the location and the type of release. Other factors being equal, the risk of predation may increase with the length of time that fish co-mingle. 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. Summer steelhead will be released volitionally from rearing sites located at RKm 68 and RKm 102 (tentative). Dawley et al. 1984 found that steelhead migrate in the Columbia River mainstem at a rate of 35 Rkm per day, which if applicable to the Klickitat would mean that hatchery steelhead require less than 4-days to migrate out of the system. The short duration of time that the hatchery fish are present in the Klickitat River should reduce possible competition and predation effects to listed fish species.

Residualism: To maximize smolting characteristics and minimize residualism, the YN adheres to a combination of acclimation, volitional release strategies, size, and time guidelines as developed for the Cle Elum Supplementation and Research Facility (CESRF) (Hager et al., 1999). These same guidelines will be applied to the summer steelhead program in the Klickitat River. The guidelines include the following:

1. Feeding rates and regimes throughout the rearing cycle are to be programmed to satiation feeding to minimize size variations and re-programmed as needed to achieve goals for smolt size at time of release.

2. Fish Condition factors, standard deviation and co-efficient of variation (CV) on lengths of fish will be collected throughout the rearing cycle. The data are used to ensure that fish growth rates achieve size at release targets, with less than a 10% variation.

3. Releases from the hatchery and acclimation sites are set to mimic wild fish emigration timing.

4. Releases from acclimation ponds will be volitional so that fish not ready to migrate will likely remain in the ponds. This action should reduce

competition effects to wild populations. Remaining fish that do not actively migrate may be transported to the lower river and released.

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), was incorporated by NOAA-Fisheries into their 1999 hatchery opinion (NMFS 1999) to address potential mainstem corridor and ocean effects, as well as other potential ecological effects from hatchery fish. Recent annual releases have been well below this ceiling with approximately 140 to 145 million for the entire Columbia River basin. Although hatchery releases occur throughout the year, approximately 80 percent occur from April to June and Columbia River mainstem out-migration occurs primarily from April through August (www.fpc.org). 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 emigrational 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 and an inability to measure.

Monitoring:

1) Smolt Monitoring- Smolt traps above Castile Falls and lower Klickitat River will be used to monitor hatchery fish migration timing and abundance.
2) Adult trapping at Lyle Falls, Castile Falls, and Klickitat River Hatchery will be monitored for impacts to listed steelhead and bull trout adults.

These activities have the potential to harass, kill, or injure handled fish. For example, smolt monitoring with screw traps in the Klickitat River have resulted in some fish losses over time. Incidental take of steelhead juveniles resulting from rotary screw trap operations averaged 3.7% of the total number of juveniles handled between 2003 and 2006. Mortality associated with future screw trap operations is not expected to exceed 5% of all wild juvenile steelhead handled.

Incidental mortality associated with adult trapping and broodstock collection is not expected to occur with the infrastructure improvements to the Lyle Falls Fishway and adult trap.

Lyle Falls Juvenile Steelhead rotary screw trap handling information for the Klickitat River (2003-2006)

	Workups		Tallies		Grand Totals		
Year	Morts	Total Handled	Morts	Total Handled	Morts	Total Handled	% mortality
2003	8	764	64	515	72	1279	5.6%
2004	1	486	110	2054	111	2540	4.4%

2005	1	379	8	817	9	1196	0.8%
2006	0	81	0	35	0	116	0%
Totals					192	5131	3.7%

* preliminary

Research:
No hatchery research is proposed.

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).

Estimated listed salmonid take levels by hatchery activity.

Steelhead

ESU/Popu	Middle Columbia River Steelhead
Activity	Klickitat Hatchery Steelhead Program
Location of hatchery activity	Klickitat R. Hatchery
Dates of activity	May – September
Hatchery Program Operator	YN & WDFW through co-managed YKFP

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)		*5,000		
Capture, handle, tag/mark/tissue sample, and release (d)				
Removal (e.g., broodstock) (e)			**60-100	
Intentional lethal take (f)				
Unintentional lethal take (g)				
Other take (indirect, unintentional) (h)				

* Past juvenile trapping operations for monitoring purposes not associated with the hatchery have captured ~5,000 steelhead parr and smolts.

** If a segregated program is implemented in the long-term, 0% NORs will be collected for broodstock. If an upper basin conservation program is implemented (in addition to the integrated program needs of 60 adults), an additional 40 adults will be collected for broodstock. Although steelhead have not been taken during past hatchery practices, it is anticipated that adult steelhead will be collected and handled at the new collection facilities at Lyle Falls and Castile Falls. No or minimal (<1%) mortality is expected from these operations. The number of adult steelhead expected to be handled during trapping operations are listed below in table tables below.
Note all NOR brood will be air spawned and temporarily reconditioned for an on-station kelt release.
a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migration 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.

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.

Program activities will be eliminated or severely curtailed if take levels exceeded those identified for the program. NMFS staff will be notified in writing when take levels are within 95% of those permitted. They will also be notified when take levels have been reached, and the actions that are being implemented to prevent further take of listed species.

Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.
No wild summer or winter steelhead have been collected at the Klickitat Hatchery. The new integrated harvest and conservation programs will collect up to 100 natural-origin adults each year.

The following table presents ongoing monitoring activities under the existing YKFP Klickitat Monitoring & Evaluation Project (#1995-063-35), with anticipated ESA take and approach by specific action.

YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION PROJECT DESCRIPTION

Action	Overview of Action or Purpose	Description	Location	Anticipated Take (per year)				
				General ESA Approach/Notes	Bull Trout adults	Bull Trout juveniles	Steelhead adults	Steelhead juveniles
Spawning ground surveys	Document the abundance and temporal and spatial distribution of spawners and redds in the Klickitat Subbasin for spring Chinook, fall Chinook, coho, and steelhead.	Conduct spawner surveys via wading and/or rafting within the known geographic range in the Klickitat Subbasin. Count individual redds and record location using handheld GPS units. Record counts of live fish and carcasses. Collect biological information from carcasses (length, sex, scale sample, and tag/mark data). Examine carcasses for sex determination, egg/milt retention (percent spawned), and presence of decimal coded wire tags (CWT) tags or external experimental marks. Make attempts to cover the entire known spawning range of each species. Survey each stream reach multiple times (preferably at least 3 survey passes) during the spawning periods.	Throughout Klickitat Subbasin (Klickitat River and anadromous-accessible tributaries); approximately 150 river miles of survey reaches	"Take" for this action may include disturbing/stressing fish, temporary movement of fish to other areas, and temporary interruption of spawning. Survey timing is as follows: spring Chinook - mid August through early October; fall Chinook - late October through early to mid December; coho - mid October through mid February; steelhead - late January through early June. No mortalities anticipated.	< 5	< 5	< 100	< 50
Adult salmonid monitoring at Lyle Falls Fishway	Collect data on adult salmonids in the Klickitat River to better understand fish use, run timing, and estimate abundance.	Operate adult trap in the Lyle Falls fishway. Trap will be operated as flows and debris levels allow. Trap will be checked on a regular basis (typically every 24 hours, occasionally longer if fish numbers and water temperatures allow). Biological data will be collected including fish length, tag inspection, scale sample, and DNA samples. Marks (opercle punches and floy tags) will be administered to assist in subsequent resight/recapture and development of population estimates. Fish will be placed in water-filled blackout tubes (PVC tubes with cutout sections) for biological sampling; no anesthesia is used due to harvest availability of fish after leaving trap. Depending on funding, fish may also be PIT-tagged and/or radio-tagged to assist in determination of migration/holding patterns, passage issues, and fishway use. Appropriate anesthesia, ,e.g. CO_2,.will be used.	RM 2.3 on the Klickitat River; T03N, R12E, Sec. 25 NWSW	"Take" for this action includes fish trapping and handling, collection of biological data and marking/tagging. Mortality only occurs on very rare occasions. Trap is operated year round as flows and debris/bedload levels allow.	< 5	0	400-600 Klickitat wild; 50 Snake wild; 500-1000 Klickitat hatchery; 50 Snake hatchery; < 2% mortality	0

Action	Overview of Action or Purpose	Description	Location	Anticipated Take (per year)				
				General ESA Approach/Notes	Bull Trout adults	Bull Trout juveniles	Steelhead adults	Steelhead juveniles
Adult salmonid monitoring at Castile Falls fishway	Collect data on adult salmonids in the Klickitat River to better understand fish use, run timing, and estimate abundance	Operate enumeration facility in the Castile Falls fishway. Facility will be operated as flows and debris levels allow. Facility will be checked on a weekly or biweekly basis. Video and PIT tag detection equipment installed in fishway will be primary means of monitoring fish. Occasional trapping and handling of fish will occur for biological sampling purposes (fish length, tag inspection, scale sample, and DNA samples). When operated as a trap, facility will be checked every 24-72 hours depending on fish numbers and water temperatures. Handled fish will be placed in water-filled blackout tubes (PVC tubes with cutout sections) or appropriate anesthesia will be used.	RM 64.6 on the Klickitat River; T09N R13E, Sec. 18 SWSW	"Take" for this action includes occasional fish trapping and handling, collection of biological data and marking/tagging. Mortality will likely occur only on very rare occasions. Facility will be operated year round as flows and debris/bedload levels allow.	0	0	50-200 Klickitat wild; < 2% mortality	0
Juvenile out-migration monitoring	Continuous monitoring of juvenile outmigration in the upper and lower Klickitat River utilizing rotary screw traps. Information to provide an index of number of smolts, parr, and fry starting to make their way out of the Klickitat system.	Operate floating rotary screw traps to monitor juvenile (smolt, parr, and fry) outmigration in the upper and lower Klickitat River. Traps will be fished year round (as flows, debris levels, and hatchery releases allow) at the: 1. Klickitat Hatchery trap, 2.Lyle Falls trap, and 3. seasonally (between May and November) at the Castile Falls trap. Calibration studies (mark-recapture trials) will be conducted to estimate trap efficiency and assist in development of smolt production estimates. Environmental and trap data will be recorded along with bio-data on 10 to 30 of each salmonid species represented. Fish will be anesthetized and sampled for length, weight, scales, and DNA. Additional tags or marks may also be administered (fin clips for mark-recapture efficiency testing and PIT tags). The excess and non-salmonid fish will be tallied by species. Depending on funding, 1 or 2 additional smolt traps or instream PIT tag antennas may temporarily be deployed in selected key tributaries, e.g. White Creek.	Lyle Falls (RM 2.3 on the Klickitat River; T03N,R12E, Sec. 25 NWSW) Klickitat Hatchery (RM 42 on the Klickitat River; T06N R13E, Sec. 4 SWNE) Castile Falls (RM 64 on the Klickitat River; T09N,R13E, Sec.19 NENE	"Take" for this action includes fish trapping and handling, collection of biological data and marking/tagging. Mortality only occurs on rare occasions. Lyle Falls and Klickitat Hatchery traps are operated year round (as flows, debris levels, and hatchery releases allow); Castile Falls trap is operated seasonally (generally May to November)	< 5	< 5	< 5 (kelts)	1500-2500 wild; 2000-3000 hatchery: < 5% mortality

Action	Overview of Action or Purpose	Description	Location	Anticipated Take (per year)				
				General ESA Approach/Notes	Bull Trout adults	Bull Trout juveniles	Steelhead adults	Steelhead juveniles
Juvenile and resident salmonid population surveys	Determine the spatial distribution and relative abundance of salmonids throughout the Subbasin to provide baseline information and to guide hatchery and habitat actions.	Electrofishing surveys will be conducted in selected key tributary and mainstream reaches. Standard depletion estimates to determine abundance will be utilized. Snorkel surveys will also be used in selected reaches. Population surveys may be completed in selected reaches pre and post-habitat improvement actions. The number of sites sampled will be determined by time allotted to other field season activities, e.g. habitat surveys. Fish captured will be anesthetized and sampled for length, weight, scales, and DNA. Depending on funding, additional tags or marks may also be administered, e.g. fin clips and PIT tags for abundance estimation and juvenile outmigration monitoring.	Throughout Klickitat Subbasin; specific locations to be determined	"Take" for this action includes fish capture (via electrofishing), scaring/stressing fish or temporary moving of fish to other areas (during snorkel surveys), handling, and collection of biological data. Mortality only occurs on very rare occasions. Sampling will generally occur in the summer and early fall.	< 5	< 5	< 5	1500-2000; < 2% mortality
Scale analysis	Scales are taken at traps and from carcasses encountered on spawner surveys as part of a continuous and ongoing sampling routine to determine age and stock composition of juvenile and adult salmonid stocks in the Klickitat Subbasin.	Fish scales are taken at screw traps, at the Lyle and Castile adult traps, and from carcasses encountered on spawning surveys. The majority of the scale reading is done by YKFP M&E staff; some scales may be read by WDFW staff.	Same location as screw traps, adult traps, and spawner surveys (above)	No effect – action is scale reading and analysis;	No effect – action is scale reading and analysis	No effect – action is scale reading and analysis	No effect – action is scale reading and analysis	No effect – action is scale reading and analysis

Action	Overview of Action or Purpose	Description	Location	Anticipated Take (per year)				
				General ESA Approach/Notes	Bull Trout adults	Bull Trout juveniles	Steelhead adults	Steelhead juveniles
Sediment monitoring	Monitor stream sediment loads associated with natural and anthropogenic factors, such as logging, agriculture, and road building, which can increase sediment loads in streams used by all salmonids in the Klickitat Subbasin.	Gravel samples will be collected and analyzed using Washington State DNR Timber, Fish and Wildlife (TFW) monitoring methodology. McNeil gravel core samples will be collected at 10-12 sites and will be sieved to estimate percentage composition of various substrate particle sizes.	Klickitat River between RM 16 and 88; Diamond Fork Cr. between RM 0 and 12; White Cr. RM 9; Tepee Cr. RM 5	"Take" for this action may include scaring/stressing fish, temporary moving of fish to other areas, and minor localized turbidity increases during gravel sampling. Sampling will occur in the fall (October – November). No anticipated mortalities.	0	0	<5	<10
Water quality monitoring	Continue ongoing water quality monitoring at established and selected new sites.	Record water quality measurements on selected tributaries and within selected habitat survey reaches on a seasonal and as-possible basis. Portable field meters will be used to measure and record the following parameters: temperature, dissolved oxygen, pH, conductivity, and turbidity. Data will be recorded at 36-38 locations, approximately 5-8 times per year at each location. Temperature is also continuously monitored via data loggers placed in streams at these locations.	Approximately 38 locations throughout Klickitat Subbasin (Klickitat R. and tributaries)	No effect is anticipated.				
Habitat Surveys	Complete TFW habitat surveys at selected sites. Quantitative habitat data will provide the foundation for decision-making relative to habitat restoration, as well as refining related attributes of the EDT model. Survey data will also assist in effectiveness monitoring of habitat restoration	Collect baseline data on existing habitat conditions throughout the basin. The habitat inventories will be conducted using the Washington State DNR Timber, Fish and Wildlife (TFW) monitoring methodology (modules: Stream Segment Identification, Reference Point Survey, Habitat Unit Survey, and Large Woody Debris Survey). Sites may include previously surveyed sites and/or new sites.	Throughout Klickitat Subbasin; specific locations to be determined	"Take" for this action may include scaring/stressing fish or temporary moving of fish to other areas during habitat survey. Surveys generally occur in late spring and summer. No anticipated mortalities.	0	< 50	0	< 100

Action	Overview of Action or Purpose	Description	Location	Anticipated Take (per year)				
				General ESA Approach/Notes	Bull Trout adults	Bull Trout juveniles	Steelhead adults	Steelhead juveniles
	projects and in other land management planning.							
Genetic data collection, analysis, and synthesis	Provide information on subpopulation structure, geographic variation, and production in order to minimize any effects from hatchery actions.	Genetic samples will be collected from adult salmonids at the Lyle and Castile adult traps, and from juveniles at rotary screw traps. Additional samples may also be collected via stream electrofishing. Samples will be sent to Columbia River Intertribal Fish commission (CRITFC) genetics lab or other genetics labs for analysis. YKFP biologists, in collaboration with CRITFC geneticists, will compile existing data and analyze genetics information.	Same location as screw traps, adult traps, and spawner surveys (above) Other locations to be determined throughout Klickitat Subbasin.	Take for this action includes fish capture and handling (with non-lethal fin clip, fin punch, or opercle punch sampling) during stream electrofishing and adult trap and screw trap operation. No anticipated mortalities.	0	0	Included in adult trapping above	Included in screw trapping and electrofishing above

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.

For ESU-wide hatchery plans, the plant of summer steelhead into the Klickitat River is consistent with:

- 1999 Biological Opinion on Artificial Propagation in the Columbia River Basin (NMFS 1999)
- Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)
- The *U.S. v. Oregon* Columbia River Fish Management Plan
- Columbia River basin Fish and Wildlife Program (http://www.nwcouncil.org/library/2000/2000-19/Default.htm)
- Yakima/Klickitat Fisheries Project (YKFP or Project)
- Klickitat River Anadromous Fisheries Master Plan (YN 2008 *in draft)*
- Scientific Principles and Recommendations of the HSRG for summer steelhead production in the basin (HSRG 2004).

For statewide hatchery plan and policies, hatchery programs in the Columbia system adhere to a number of guidelines, policies and permit 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 YN Columbia hatchery operations for the production of summer steelhead for the Klickitat River:

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagated salmon. 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 used to maintain genetic variability within the hatchery populations.

Stock Transfer Guidelines. This document provides guidance in determining allowable stocks for release from 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 (WDFW 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 (Fish Policy Chapter 5, IHOT 1995).

Hatchery Reform: Principles and Recommendations of the Hatchery Scientific Review Group for summer steelhead production in the basin (HSRG 2004). Provides guidance on how hatcheries can be used to conserve naturally spawning salmon and steelhead populations.

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:

- 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, http://www.fws.gov/pnfhpc/)
- In-River Agreements: State, Federal, and Tribal representatives
- Northwest Power Planning Council Sub Basin Plans (NPPC 2004)
- Lower Columbia Fisheries Management and Evaluation Plan (WDFW 2003)
- Lower Columbia Steelhead Conservation Initiative (WJNRC and WDFW 1998)
- Memorandum of Understanding for Joint Operation of the Klickitat Hatchery
- Klickitat Steelhead Recovery Plan. (NOAA2009)

3.3 Relationship to harvest objectives.

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.

The primary purpose of hatchery programs in the Mid-Columbia Management Area (MCMA) is to provide harvest opportunity. All hatchery steelhead released for harvest augmentation are adipose fin-clipped. Presence of an adipose fin allows anglers to easily identify wild fish and limit their handling

The Klickitat summer steelhead harvest is important to the subsistence fishing needs of Yakama tribal members. The *U.S. v. Oregon* management plan stipulates that steelhead harvest shares be based on the aggregate of mainstem and tributary catches by tribal and recreational fisheries and, further,

that neither the treaty share nor the non-treaty share shall exceed 50 percent of the aggregate harvestable steelhead. Within this framework, each season's regulations for the Klickitat River are developed through consultation between the Washington Department of Fish and Wildlife and the Yakama Indian Nation. Federal court decisions (U.S. vs. Oregon 1969 and U.S. vs. Washington 1974) ruled that Indian tribes who signed treaties with the federal government in the 1850s have treaty fishing rights to harvest a share (50 percent) of surplus fish resources. The treaty tribes may fish in their usual and accustomed fishing grounds in the Columbia River basin and other Washington waters. These court decisions mandated cooperative fisheries management in a government-to-government relationship between Washington State and the treaty Indian tribes. These decisions also mandate state hatchery facilities to produce fish to ensure harvest opportunities for treaty tribes.

Member tribes of the Columbia River Inter-Tribal Fish Commission may conduct fisheries in Drano Lake and White Salmon, Klickitat, Walla Walla and Yakima river watersheds, and the mainstem Columbia River. The WDFW does not regulate these fisheries. Each tribe retains its authority to regulate its fisheries and issues fishery regulations through its respective governing bodies. Tribal staff is represented on the CRFMP Technical Advisory Committee and participate in monitoring activities and data sharing with other parties. The tribes have policy representation in the U.S. vs. Oregon harvest management processes and generally coordinate fisheries with the Columbia River Compact (the Compact).

Selective fisheries were initiated for steelhead sport fisheries 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 4% to less than 7% per basin depending on the fishing regulations. Harvest rates have been as high as 70% for hatchery steelhead in the Cowlitz River. (See also Section 1.12, above).

Harvest						
	Sport			Tribal		
Year	Hatchery	Wild	Total	Hatchery[2]	Wild[2]	Total
1986-87	1,426	54	1,480	5,107	901	6,008
1987-88	1,480	34	1,514	1,141	201	1,342
1988-89	1,718	0	1,718	1,263	223	1,486
1989-90	833	0	833	536	95	631
1990-91	1,055	0	1,055	1,464	258	1,722
1991-92	823	8	831	1,620	286	1,906
1992-93	1,260	0	1,260	1,033	182	1,215
1993-94	1,211	25	1,236	1,151	203	1,354
1994-95	857	34	891	482	85	567
1995-96	864	9	873	433	76	509
1996-97	608	14	622	241	43	284
1997-98	1,062	18	1,080	455	80	535
1998-99	650	12	662	224	39	263
1999-00	575	28	603	214	0	214
2000-01	1,433	59	1,492	495	67	562
2001-02	3,708	16	3,724	724	55	779

2002-03	3,552	97	3,649	1285	363	1,648
Harvest						
	Sport			Tribal		
Year	Hatchery	Wild	Total	Hatchery[2]	Wild[2]	Total
2003-04	1,673	0	1,673	369	151	520
2004-05	1,658	0	1,658	747	153	900
2005-06[5]	1,115	0	1,115	368	98	466
Average	1,378	20	1,398	968	178	1,146

3.4 Relationship to habitat protection and recovery strategies.

The new program will eliminate the practice of importing Skamania Summer Steelhead into the basin. Broodstock will be collected from adult fish returning to the Klickitat River. Using fish locally adapted to the environmental conditions present in the basin are expected to improve survival and reduce genetic risks to listed steelhead.

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

Klickitat Steelhead Recovery Plan (NOAA 2009) - This plan provides habitat strategies to be used to recover ESA-listed steelhead in the Klickitat Subbasin. The hatchery program has considered current and future habitat conditions in sizing the program and defining release locations**.**

Klickitat Watershed Enhancement Project (KWEP) (Conley 2005):
The KWEP 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 (NRCS), 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. Project restoration activities are prioritized to benefit listed steelhead populations and the habitat that they use. A monitoring program has been initiated to document project success and guide future restoration activities. The second phase of the project will use Ecosystem and Diagnosis and Treatment EDT modeling output to guide and prioritization restoration activities.

Subbasin Planning and Salmon Recovery(NPPC 2004 and Yakama Nation 2004):
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 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:
YN and others are conducting, or have conducted, habitat inventories within the Klickitat Subbasin. Ecosystem Diagnosis and Treatment (EDT) compares habitat today to that of the Subbasin 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 documents 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 Subbasin) 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 1999).

The Strategic Plan For Salmon Recovery (HB 2496): Klickitat County functions as the lead entity for this plan which includes Klickitat River and major creeks, Big White Salmon and Little White Salmon. This document provides the prioritized actions addressing limiting factors from which the Salmon Recovery Funding Board projects are ranked for consistency and effectiveness.

3.5 Ecological interactions.

Below are discussions on both negative and positive impacts relative to the Klickitat River summer steelhead outplant program.

(1) Salmonid and non-salmonid fishes or species that could negatively impact the program: Klickitat summer steelhead smolts can be preyed upon through the entire migration corridor extending from the Subbasin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny ray fishes, as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons, in the Columbia mainstem and sloughs can prey on steelhead smolts. Mammals that can take a heavy toll on migrating smolts and/or returning adults include harbor seals, sea lions, river otters, and Orca whales.

(2) Salmonid and non-salmonid fishes or species that could be negatively impacted by the program: Natural salmon and steelhead populations that inhabit local tributaries 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 through a complex web of short- and long-term processes and over multiple time periods which makes evaluation of the net effect difficult.

3) Salmonid and non-salmonid fishes or other species that could positively impact the program. Fall and spring Chinook and coho are released to the Klickitat Subbasin. The Subbasin also supports limited natural production of Chinook, coho, chum, and steelhead as well as non-salmonid fishes (sculpins, lampreys, suckers, etc.). These species may serve as prey items during the emigration through the Subbasin. While not always desired from a production standpoint, the hatchery fish provide an additional food source for natural predators that might otherwise consume listed fish. Hatchery fish may be so numerous that predators consume them in greater numbers resulting in less predation on wild fish.

4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program. Aquatic and terrestrial species that consume salmonids will benefit from the continued release of fish from this program. Common species that may benefit include northern pikeminnow, smallmouth and largemouth bass, gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons, harbor seals, sea lions, river otters, bear, and killer whales (orcas). Additionally, salmon carcasses act as a source of marine derived nutrients that positively impact riparian plants and also provide nutrients back to the stream.

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.

For the on-station integrated steelhead program spring water from Indian Ford A will be used for incubation and early rearing, final rearing and acclimation will be at newly constructed jumbo raceways at Pond #26 fed by Wonder Springs. Rearing 100% of the hatchery life cycle on spring water will increase homing fidelity back to the hatchery of this harvest augmentation component.

The acclimation sites at McCreedy Creek (if built) will use water from the stream for rearing. All intakes structures will be screened according to NMFS criteria. Stream temperatures will fluctuate with the natural temperatures in McCreedy Creek; which is dominated by spring water.

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.

Potential Hazard	Risk Aversion Measure
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 through trust water right from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.
McCreedy Creek Acclimation	The water intake at this facility will be screened according to NMFS standards. Water will only be diverted from the creek for 6 weeks each spring.
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 compliance including intake screens and velocity sweeps which are not compliant with NOAA fish screening standards. From the assessment, YN 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) 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, and 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)* 1 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).

Broodstock will be collected at Lyle Falls, Castile Falls, and the Klickitat Hatchery.

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

Adult steelhead will be trucked for less than 1 hour to spawning facilities located at the Klickitat Hatchery. Fish will be trucked using guidelines described in Hager and Costello (1999).

5.3 Broodstock holding and spawning facilities.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
4	Fiberglass	1.570		16	5	100-200

5.4 Incubation facilities.

Incubator Type	Units (number)	Flow (gpm)	Volume (cu.ft.)	Loading-Eyeing (eggs/unit)	Loading-Hatching (eggs/unit)
FAL	168	96	NA	8000-10000	8000-10000

5.5 Rearing facilities.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)	Max. Flow Index	Max. Density Index
6	Concrete	3500	100	10	3.5	300-350	1.85	0.2
6	Intermediate Rearing Troughs	87	17	3.3	2	25	NA	0.4

5.6 Acclimation/release facilities.

If natural re-colonization of habitat above Castile Falls by adult steelhead is unsuccessful, new acclimation facilities will be constructed at McCreedy Creek. The site will consist of intake structure and up to 20 mobile metal raceways approximately 20 feet long, 5 feet wide, and 4 feet deep. Access to the raceways, drain boxes, and screens for maintenance would be provided by catwalks. The steelhead would be reared at 8 fish per pound (fpp). A water supply of 7 cubic feet per second (cfs) would be required.

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

No significant fish losses have occurred at the Klickitat Hatchery for any species.

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 and/or 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 to minimize the risk of catastrophic fish loss from flooding and equipped with low water alarm probes in strategic locations to prevent loss of fish due to loss of water. Alarm systems are monitored 24/7 with staff available on-station to respond to problems. McCreedy Creek facility could be temporarily impacted by 100-year flood events. Fish in this facility would be released into the stream environment during such an event.
Disease Transmission	IHOT fish health guidelines are followed. 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.

Depending on the type of program implemented in the long term, broodstock will consist of hatchery origin steelhead from the Skamania stock (for segregated program) or natural origin steelhead from the native Klickitat stock (for integrated program). Regardless, broodstock will be collected locally at the identified trapping locations (section 5.1).

6.2.1 History.

These proposed changes would be a new program, therefore not applicable. Currently, out-of-basin Skamania stock is used to provide fish for harvest in the Subbasin. Direct stream releases of out-of basin Skamania fish will be phased out with the implementation of a new segregated or integrated program.

6.2.2 Annual size.

Depending on the type of program, annual broodstock needs will be approximately 60-100 natural origin adults or 50-60 hatchery origin adults. If the integrated program is implemented for harvest only (~90k smolt release) then broodstock needs will also likely range from 50-60 adults or until enough females are taken to achieve the egg take goal of 105,000. If the upper basin conservation program is implemented in addition to the integrated harvest program, an additional 40 adults (70k smolt release) will be needed for broodstock or until enough females are taken to achieve an additional egg take of ~82,000 eggs. The additional 10-20 adults will be collected in the first 2-3 years of program implementation to ensure that the egg take goal is met, and that adequate numbers of ripe females and males occurs simultaneously for mating. If surplus adults are collected, they will be released back to the River upon immediate notice. The total NOR adult broodstock needs for both integrated programs constitutes about 7.5% - 12.5% of total summer steelhead escapement to the basin. Broodstock will be collected based on a 1:1 male to female ratio.

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

If a new integrated program is implemented, the program will use 100% NOR adults. The old program used out-of-basin Skamania stock and no natural fish (from the Klickitat River) were ever used as broodstock.

6.2.4 Genetic or ecological differences.

The program will use native broodstock, therefore no differences are expected.

6.2.5 Reasons for choosing.

Using native stock will ensure that the broodstock have the traits needed for program fish to thrive in the Klickitat River.

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.

DNA samples will be collected from both the natural and hatchery components to determine if genetic divergence is occurring over time. DNA sample analysis may also be used prior to broodstock selection to ensure out-of-basin stocks are

not incorporated into broodstock, especially with Lyle Falls collections. Information on run-timing, age and sex composition will also be collected. On a 5-year cycle, DNA samples will be collected from wild juvenile steelhead in key tributaries. Adults will be collected randomly throughout the full run-timing of the species.

Section 7. Broodstock Collection

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

Adults

7.2 Collection or sampling design

Adults will be collected at random throughout the full migration period for summer steelhead. Winter steelhead will not be used as broodstock.

7.3 Identity.

Collection of summer steelhead will not occur during periods when winter steelhead are migrating past Lyle Falls. Real-time DNA samples will be collected on all fish used for broodstock to ensure that only native Klickitat River summer steelhead are collected (Draft Klickitat Anadromous Fisheries Master Plan 2012). Collected adults of non-native origin will be returned to the river unharmed near the mouth of the Klickitat River.

7.4 Proposed number to be collected:

7.4.1 Program goal (assuming 1:1 sex ratio for adults):
70-80 NOR adults

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1990-2001), or for most recent years available.

Not Applicable; this is a new program. Historically, Skamania Hatchery summer steelhead returning to the Washougal River were used as broodstock.

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

All surplus Klickitat origin HOR fish returning to the Klickitat Hatchery will be distributed to tribal members for ceremonial and subsistence purposes. Any non-native origin HOR fish will be returned unharmed to the Klickitat River near the mouth.

7.6 Fish transportation and holding methods.

Fish will be handled and transported as defined in Hager and Costello (1999). Fish will be anesthetized with carbon dioxide (CO_2) gas or other appropriate anesthetic in a water solution prior to handling, and an aqua-slime agent will be added to transport water. The anesthetized fish are loaded into a portable fish transportation tank where they revive from the CO_2. Fish will be in the transport system for less than 1 hour.

7.7 Describe fish health maintenance and sanitation procedures applied.

Once fish are transferred to the adult holding ponds, they will receive regular treatments with a formalin solution to prevent fungal infection. The fish will be held in cold spring water, which helps to prevent disease or parasite problems.

The spawning area and equipment are routinely disinfected with an iodine

solution to prevent disease outbreaks. "Green" eggs are water-hardened in an iodine solution to prevent disease or viral contamination. Ovarian fluid and tissue samples are collected and analyzed for viral and bacterial pathogens.

7.8 Disposition of carcasses.

NOR adult broodstock will be live-spawned and the adults PIT-tagged (upon collection at Lyle Falls or Castile Falls) and returned to the river. Adult carcasses (if any) will be disposed of in an upland landfill.

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.

- Adults will be collected at random throughout the run at large to ensure that the full range of life history traits is incorporated into the hatchery.
- No more than 25% of the NOR return will be used for broodstock needs
- A 1:1 sex ratio is the target for broodstock spawning.
- NOR adults will be live-spawned and released to the stream.

Section 8. Mating

8.1 Selection method.

Broodstock is collected from summer steelhead from throughout the run. Program targets are: 1) fish are paired at random from ripe fish, 2) fish are live-spawned with a single other individual, and 3) fish are spawned only once and will not be used for multiple spawning.

8.2 Males.

Backup males will be collected and used to ensure the availability of ripe males to spawn with ripe females throughout the spawning period. Repeat spawners will be included proportionally to the observed age structures and the probability of random collection throughout the run-timing period. Scale samples will be collected on all broodstock to determine if repeat spawners are present.

The target sex ratio for this program is 1:1, although the actual ratio may vary. This is a new program with initial uncertainty at start.

8.3 Fertilization.

The steelhead protocols include the goal of 1:1 sex ratios (one male/one female family units), and whenever possible a 2x2 factorial mating will be utilized. Adult females will be live spawn by use of air injection. Gametes may be pooled, but only after the results of the IHN viral sampling verifies negative results.

Prior to spawning, anesthetized adults are dried and wiped down with an iodine

solution. Ovarian fluid and tissue samples are collected and analyzed for viral and bacterial pathogens. "Green" eggs are water-hardened in an iodine antiseptic solution. The eggs are rinsed and treated with another iodine solution bath prior to initiation of the incubation process. Eggs will be incubated in an incubation building separate from salmon facilities. Quarantine methodology will be adapted to prevent the spreading of pathogens.

8.4 Cryo-preserved gametes.

Cryo-preserved gametes will not be 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.

Broodstock are selected at random throughout the wild summer steelhead run. Spawning is done randomly based on availability of ripe fish. Matings are done on a 1:1 sex ratio, i.e. one male and one female. Factorial matings of 2x2 crosses will be utilized to prevent genetic population impacts. DNA samples will be collected from both the natural and hatchery components of the run to track and detect changes in allele frequency or presence.

Section 9. Incubation and Rearing.

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

The integrated program will collect approximately 105,000 eggs from NOR adults. This value may change as more is learned about egg-to-smolt survival rates for the native fish population.

9.1.2 Cause for, and disposition of surplus egg takes.

Variability in fecundity and egg survival rates may result in surplus egg take. Surplus eggs from NOR adults will be reared and incorporated into the on-station release.

9.1.3 Loading densities applied during incubation.

Eggs will be incubated in vertical stack incubators supplied with cold spring water at a constant temperature of 48-50 degree Fahrenheit. After IHN viral screening is completed, eggs will be pooled into 10,000 egg/tray loadings with "vexar" substrate. Eggs identified with IHN will be destroyed.

9.1.4 Incubation conditions.

Eggs will be pooled into 10,000 eggs/tray loadings. Egg development will be tracked daily by use of temperature unit (TU) monitoring. Eggs will be treated daily until hatching with a 1:600 formalin flow through treatment to prevent fungal infection. Upon hatching (500+ temperature units) and egg yolk absorption, fry will be removed from incubators and placed into intermediate rearing troughs for initial feeding. Temperature units for fry at the time of ponding will be ~1000 TU.

9.1.5 Ponding.

Fry will be initially reared in intermediate troughs. Fry are to be inspected daily

beginning at 950 TU, and will be ponded when an estimated 90% of the fry are buttoned up. Ponding is forced, swim up is volitional, and feeding will begin when an estimated 90% of the fry have surfaced in the pond. When fry densities approach loading limits within intermediate trough confines, then these populations will be transferred to raceways for juvenile rearing.

9.1.6 Fish health maintenance and monitoring.

Staff will conduct daily inspection, visual monitoring and sampling from eye, fry fingerling and sub-yearling stages. As soon as potential problems are seen, these concerns will be immediately communicated to the fish health specialist. In addition fish health specialists will conduct inspections monthly. Potential problems are to be managed promptly to limit mortality and reduce possible disease transmission. Formalin (37% formaldehyde) will be dispensed into water for control of ecto-parasites on juvenile fish and for fungus control on eggs.

The steelhead incubation, rearing, and adult holding areas are to be contained in a quarantine area. Disinfection protocols apply in the form of iodophore foot baths at incubation entrances, separate tools and equipment from Chinook operations.

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.

Not Applicable- New program using a different source of fish.

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

Steelhead densities in the intermediate troughs will be kept below 2 pounds of fish per gpm (gallons per minute) inflow, and 1 pound per cubic foot of water volume. Steelhead transferred to 100 foot raceways will be kept at densities below 10 pounds of fish per gpm inflow and 1 pound per cubic foot of volume. All the water used in the various containers for the steelhead initial rearing (including incubation & adult ponds) is single use water with no re-use. Some re-use water may be used for juvenile rearing in raceways.

9.2.3 Fish rearing conditions.

Influent and effluent water will be monitored per NPDES fin-fish rearing regulations. Flow index and loadings will be monitored throughout early, juvenile and smolt acclimation rearing periods.

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 as this is a new program. Fish growth rates will be designed to achieve a release size of 6-8 fpp (fish per pound) in late April.

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*).

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
May-July	Ewos Micro#1&2	8	2.0	0.003	0.5
August-September	Ewos Pacific 1.2mm	2	1.75	0.02	0.60
October-December	Ewos Pacific 1.5mm	2	0.9-1.25	0.03	1.0
January-April	Ewos Pacific 1.5mm	2	.9	0..057	1.0

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

Monitoring	A fish health specialist inspects fish monthly at Klickitat Hatchery and checks both healthy and any symptomatic fish. Based on pathological or visual signs observed 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	Bacterial cold water disease (Flavobacteriosis) can occur mid-summer with Florfenicol used to control. IHN can occur from mid-summer to fall. Loss of fish to IHN in 2002 at the Klickitat Hatchery was 6% of the summer steelhead population (Skamania). 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 iodophore (as per disease policy). All equipment (nets, tanks, boots, etc.) is disinfected with iodophore between different fish/egg lots. Different fish/egg lots are physically

	isolated from each other by separated 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.

ATPase data will be collected to determine smoltification levels prior to release. Hatchery staff will also look for behavioral clues such as swarming, and fish jumping at screens.

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 (Rearing).

- Monitor and implement feeding and growth regimes that reduce incidence of residualism and maximize smoltification.
- Steelhead Rearing Guidelines target release sizes and condition factors that result in actively migrating smolts that vacate the system and limit freshwater interactions with listed species.
- Reared steelhead smolts will come from summer steelhead parents collected throughout the run. Steelhead smolts will be acclimated in large ponds at the hatchery. The ponds will be equipped with natural cover, and camouflaged pond bottoms.
- Fish will migrate volitionally from acclimation ponds upon release.

Section 10. Release

10.1 Proposed fish release levels.

The initial release level is 90,000 smolts. If native adult steelhead are unable to colonize habitat upstream of Castile Falls, an additional 70,000 smolts may released.

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

Klickitat Hatchery (RKm 68) and McCreedy Acclimation Facility (RKm 113)

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

Initial releases will consist of 90,000 yearling smolts at 6-8 fpp.

10.4 Actual dates of release and description of release protocols.

Fish will be released volitionally from both rearing sites. Fish are expected to migrate from April through Mid-June depending on water temperature. Fish that do not volitionally release may be trucked down river for mainstem release to avoid interaction with wild fish. These fish may be uniquely marked to evaluate behavior, survival and age-class structure of this group to the volitional outmigrants.

Klickitat Hatchery – April 1- May 1
McCreedy Creek – April 15 –June 15 (if implemented)

10.5 Fish transportation procedures, if applicable.

The McCreedy Creek release group (if implemented) will be transported to acclimation facilities 6-weeks prior to the target release date. Standard transport procedures will be followed (Hager and Costello 1999).

On-station releases will not need to be transported as all rearing activities occur in a single location.

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

See 10.5.

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

The on-station release will be 100% ad-clipped. A sub-sample of each group will also be PIT-tagged to determine survival and harvest rates, as well as migration return timing at Lyle Falls and the Klickitat Hatchery.

If the McCreedy Creek facility is built, it release group of 70,000 will be 100% elastomer tagged.

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

All surplus hatchery-reared juveniles with NOR parents will be released.

10.9 Fish health certification procedures applied pre-release.

Prior to plants or releases, the population health and condition are established by the USFWS Fish Health Specialist. This is commonly done 1-3 weeks pre-release or up to 6 weeks before on systems with pathogen-free water and little or no history of disease. Prior to this examination, staff will contact the USFWS Fish Health Specialist if abnormal behavior or mortality is observed,. The fish health specialist will examine affected fish and will recommend the appropriate treatment. Reporting and control of selected fish pathogens are done in accordance with the Yakama Nation and IHOT guidelines.

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

Rearing ponds on station are above the 100-year floodplain. The facility also has a backup water supply (secondary reuse water) that can be tapped in an emergency.

Fish in the McCreedy Creek acclimation ponds will be released if water intakes

fail, or ponds are likely to be flooded.

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.

- Fish will be released volitionally to ensure rapid migration through the system. This will reduce competition and predation effects on listed steelhead and bull trout.

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.

A proportion of each release group will be PIT-tagged for the purpose of monitoring smolt to adult survival performance indicator (2%) and any differential survival between the release groups. Results from the survival analysis will be used to make changes to hatchery operations if needed.

The composite hatchery and natural population will be managed for a Proportion of Natural Influence (PNI) by using 100% NOR broodstock for the juvenile release program and by minimizing the number of hatchery fish present on the spawning grounds. The overall objective is to achieve a PNI of greater than 0.67.

Actions proposed to reduce the proportion of hatchery steelhead adults (pHOS) present on the spawning grounds include maintaining high harvest rates and removing hatchery steelhead at Lyle Falls and Castile Falls. Terminal fisheries are expected to sufficiently remove adequate numbers of HORs as harvest rates have averaged about 88% over the last 10 years. In years with strong hatchery returns, additional harvest will be encouraged by increasing daily bag limits for adult hatchery-origin steelhead. Additionally 80-90% of the returning HORs from the Klickitat Hatchery release group not caught in fisheries are expected to volunteer back to the hatchery due to the unique signature from the spring water used for acclimation.

Contribution to fisheries will be monitored by both Tribal and WDFW biologists through currently existing creel survey protocols.

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

Upon adoption of the Klickitat River Anadromous Fisheries Master Plan, the

combination of BPA and Mitchell Act funds will be sufficient to conduct needed M&E.

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

Monitoring, evaluation, and research follow scientific protocols and will employ the adaptive management process, as needed. YN will take risk aversion measures to eliminate or reduce ecological effects, injury, or mortality as a result of monitoring activities. Most trap mortalities are the result of equipment failure or extreme environmental conditions that flood traps. YN will take precautions to make sure the equipment is properly functioning during the season. If environmental conditions are forecast that will cause high mortality, then traps will be removed or opened up to allow unobstructed passage without mortality. Any take associated with monitoring activities is unknown but all follow scientific protocols designed to minimize impact.

Section 12. Research

12.1 Objective or purpose.

None Proposed

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 periods 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 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).

12.10 Alternative methods to achieve project objects.

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

13.1 Attachments and Citations

Busack, C., K. Currens, T. Pearsons, L. Mobrand, "Tools for Evaluating Ecological and Genetic Risks in Hatchery Programs", 2004 Final Report, Project No. 200305800, 91 electronic pages, (BPA Report DOE/BP-00016399-1).

Conley. W. 2005. Klickitat Watershed Enhancement Project. FY2005 Contract annual Report.

Dawley, E. M., R.D. Ledgerwood, T.H Blahm, R.A. Kirn, and A.E. Rankis. 1984. Migrational Characteristics And Survival Of Juvenile Salmonids entering the Columbia River estuary During 1983. Annual Report to the Bonneville Power Administration, Portland, OR.

Flagg, T.A., B.A. Berejikian, J.E. Colt, W.W. Dickhoff, L.W. Harrell, D.J. Maynard, C.E. Nash, M.S. Strom, R.N. Iwamoto, and C.V.W. Mahnken. 2000. Ecological and behavioral impacts of artificial production strategies on the abundance of wild salmon populations. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-41: 92p.

Hager, R.C. and R.J. Costello. 1999. Optimal Conventional and Semi-natural Treatments for the Upper Yakima Spring Chinook Salmon Supplementation Project: Treatment Definitions and Descriptions and Biological Specifications for Facility Design. Proj. No. 95-06404, Prepared for Bonneville Power Administration. Portland, OR.

Hawkins, S.W., Tipping, J. M. 1999. Predation By Juvenile Hatchery Salmonids on Wild Fall Chinook Salmon Fry in the Lewis River, Washington. California Fish and Game 85(3):124-129

Hatchery Scientific Review Group (HSRG). 2004. Hatchery Reform: Principles and recommendations of the HSRG. Long Live the Kings, 1305 4th Ave., Suite 810, Seattle, Wa.

Howell, P., K. Jones, D. Scarnecchia, L. LaVoy, W. Knedra and D. Orrman. 1985. Stock assessment of Columbia River anadromous salmonids. Vol: I. U.S. Dep. Energy, Bonneville Power Administration. Project No. 83-335, 558 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.

Klickitat Steelhead Recovery Plan. 2009. Recovery Plan for the Klickitat River Population of the Middle Columbia River Steelhead Distinct Population Segment. Prepared by National Marine Fisheries Service

Northwest Region.

Narum S. R., M. Powell, R. Evenson, B. Sharp and A. Talbot. 2006. Microsatellites Reveal Population Substructure of Klickitat River Native Steelhead and Genetic Divergence from an Introduced Stock. North American Journal of Fisheries Management **26**:147-155.

NMFS (National Marine Fisheries Service). 1999. Biological opinion on artificial propagation in the Columbia River Basin.

NOAA 2005. Updated Status of Federally Listed ESU's of West Coast Salmon and Steelhead. NOAA Technical Memorandum NMFS-NWFSC-66.

NPPC 2004. Klickitat Subbasin Plan. Prepared for the Northwest Power and Conservation Council. Prepared by the Yakama Nation, Klickitat County, and Washington Department of Fish and Wildlife.

WDFW and NWIFC 1998. Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State. Prepared by the Washington Department of Fish and Wildlife and The Northwest Indian Fisheries Commission.

USFWS (U.S. Fish and Wildlife Service). 1994. Biological assessment for operation of U.S. Fish and Wildlife Service operated or funded hatcheries in the Columbia River Basin in 1995-1998. Submitted to National Marine Fisheries Service (NMFS) under cover letter, dated August 2, 1994, from William F. Shake, Acting USFWS Regional Director, to Brian Brown, NMFS.

Washington Department of Fisheries. 1991. Stock Transfer Guidelines. Hatcheries Program, Washington Department of Fisheries. Olympia, WA.

Washington Department of Fish and Wildlife. Fisheries Management and Evaluation Plan WDFW, 2003. Lower Columbia River. Submitted to NMFS. Portland, OR.

Washington Joint Natural Resources Cabinet and Washington Department of Fish and Wildlife. 1998. Lower Columbia Steelhead Conservation Initiative (LCSCI). State of Washington. Olympia, WA.

Washington State Conservation Commission. 1999. Salmonid habitat limiting factors water resource inventory area 30 - Klickitat watershed. Final Report.

Witty, K., C. Willis and S. Cramer. 1995. A review of potential impacts of hatchery fish on naturally produced salmonids in the migration corridor of the Snake and Columbia Rivers. S.P. Cramer and Associates, Inc, Gresham, OR.

Yakama Nation 2004. Klickitat Subbasin Supplement. Prepared for the

Northwest Power and Conservation Council. Prepared by the Yakama Nation.

Yakama Nation 2012. *Draft* Klickitat River Anadromous Fisheries Master Plan. Yakima/Klickitat Fisheries Program, Toppenish, WA.

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:_____

Section 15

ADDENDUM A. PROGRAM EFFECTS ON OTHER (AQUATIC OR TERRESTRIAL) ESA-LISTED POPULATIONS

15.1) List all ESA permits or authorizations for USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species associated with the hatchery program.

No permits in place for this new program. They will be developed through consultation with appropriate agencies as facilities and programs are developed**.**

15.2) Describe USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species and habitat that may be affected by hatchery program.

Hatchery operations may impact USFWS listed Klickitat River bull trout (*Salvelinus confluentus*). Bull trout are listed as Threatened by the USFWS. The USFWS has designated the West Fork Klickitat River and Klickitat River reaches adjacent to the Yakama Indian Reservation as Critical Habitat (Federal Register 2005). Stream habitat in the Klickitat River Subbasin has been impacted by human activities associated with agriculture, logging, recreation, and urban development.

Hatchery facilities are located both within and near the Klickitat River. Water for rearing anadromous fish at the Klickitat River hatchery is diverted from the river. New juvenile acclimation sites are being developed at the Wahkiacus Hatchery (RKm 27) that will disturb upland and riparian habitat near the stream channel. A diversion structure will also be built at this facility to provide water for acclimating hatchery smolts.

Other listed or candidate species that may be impacted by the construction and operation of the Wahkiacus Hatchery and Acclimation Facility Creek include:

Oregon Spotted Frog (*Rana pretiosa)*-	Candidate
Bald Eagle (*Haliaeetus leucocephalus)* -	Threatened
Northern Spotted Owl (*Strix occidentalis)* –	Threatened

The possible impact the construction of new facilities or operation of these facilities may have on these species has not been quantified.

15.3) Analyze effects.

Bull Trout

Possible hatchery operational effects to listed bull trout in the Klickitat River are described below. The effects are expected to be on-going while the hatchery program remains in place.

Water diversion: Water is diverted from the stream for hatchery operations. This results in a decrease in the amount and quality of habitat for approximately 0.25 mile. The loss in habitat may result in a decrease in steelhead and bull trout abundance although the loss has not been quantified. In addition, The Mitchell Act Intake and Screening Assessment (2002) has identified design and alternatives needed to get existing structures in compliance with NOAA fish screening standards. From the assessment, YN has been requesting funding for future scoping, design, and construction work of a new intake system at the Klickitat Hatchery.

Waste and Pollutants: All hatchery facilities will 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). The limitations listed in the permit are assumed to be protective of water quality and therefore the hatchery waste water is likely to have little impact on bull trout.

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 populations' health. The level of indirect take of bull trout from disease is unknown.

Broodstock Collection: Bull trout adults may be handled at steelhead adult collection systems located at Lyle Falls and Castile Falls. Because facilities will be designed to NMFS standards, little impact (injury or loss) to bull trout is expected from their operation

Acclimation Facilities: New acclimation facilities are likely to be constructed in the upper Subbasin at McCreedy Creek. Migratory adult and juvenile bull trout may be affected by facility operations or fish releases from this facility.

Release of Juveniles: The program will release 90,000 summer steelhead into the Klickitat River each year. These fish may compete with and prey on juvenile bull trout. Smolt length at release will range from 145-180 mm. If it assumed that steelhead of this size can consume fish up to 33% of their body length, there is the possibility that bull trout less than 59 mm may be susceptible to predation. Because hatchery summer steelhead will not be released in the primary bull trout stream (West Fork Klickitat River), it is unlikely that the hatchery smolts will prey on, or compete with, listed bull trout.

Food: The carcasses of summer steelhead adults that spawn naturally in the Subbasin may increase stream productivity through the addition of ocean-derived nutrients.

Increased productivity may result in an increase in food availability to both juvenile and adult bull trout. Offspring of naturally spawning coho may also provide a food source for bull trout.

Monitoring and Evaluation: Smolt trapping may be used to determine that hatchery summer steelhead juveniles migrate quickly through the system after release. Some bull trout may be captured and handled at the trapping facilities.

Oregon Spotted Frog

Neither the hatchery operations nor the proposed new facilities are likely to adversely impact this species. The only known population of Oregon Spotted Frog in the Klickitat River Subbasin is located in the Conboy Lake National Wildlife Refuge (NWR) managed by USFWS (NPPC 2004). The refuge is located approximately 10 miles east of Trout Lake and 7 miles southwest of Glenwood in the Glenwood Valley/Camas Prairie area.

Bald Eagle

Bald eagles can be found throughout the year in the Klickitat River Subbasin. Because this species feeds on salmon, hatchery production should result in an increase in food for this species as more adult fish return to the Subbasin. Hatchery activities such as fish transport and the operation of the McCreedy Creek Acclimation Facility may result in the harassment of this species, but the effect is expected to be short-term and minor in nature.

Northern Spotted Owl

No facilities will be located in nor activities conducted in areas inhabited by the Northern Spotted Owl or in suitable owl habitat.

15.4) Actions taken to minimize potential effects.

Bull trout

Diversion Screens: All intake screens will be built or updated to meet NMFS screen criteria for fry.

Waste and Pollutants: All terms and conditions associated with the NPDES Permit will be implemented and followed.

Broodstock Collection: Any bull trout collected as part of hatchery operations will be returned unharmed to the stream.

Acclimation Facilities: These facilities will be sited so as to reduce impacts to riparian and stream habitats to the extent possible. The YN will coordinate the location and construction of this facility with USFWS staff to minimize or avoid impacts to all listed species.

Monitoring and Evaluation: Bull trout collected during juvenile trapping operations will be released unharmed to the stream.

Oregon Spotted Frog

Prior to constructing acclimation facilities in McCreedy Creek, the stream and riparian area near proposed sites will be surveyed for species presence. If this species is found, the YN will coordinate with USFWS staff to develop mitigation and protection measures. This activity will be covered through the EIS needed for implementation of the 2008 Draft Klickitat River Anadromous Fisheries Master Plan

Bald Eagle

Acclimation facilities will not be located near bald eagle nests.

Northern Spotted Owl

The acclimation facility is not located in Northern Spotted Owl habitat; no adverse impacts are expected to this species.

15.5) References

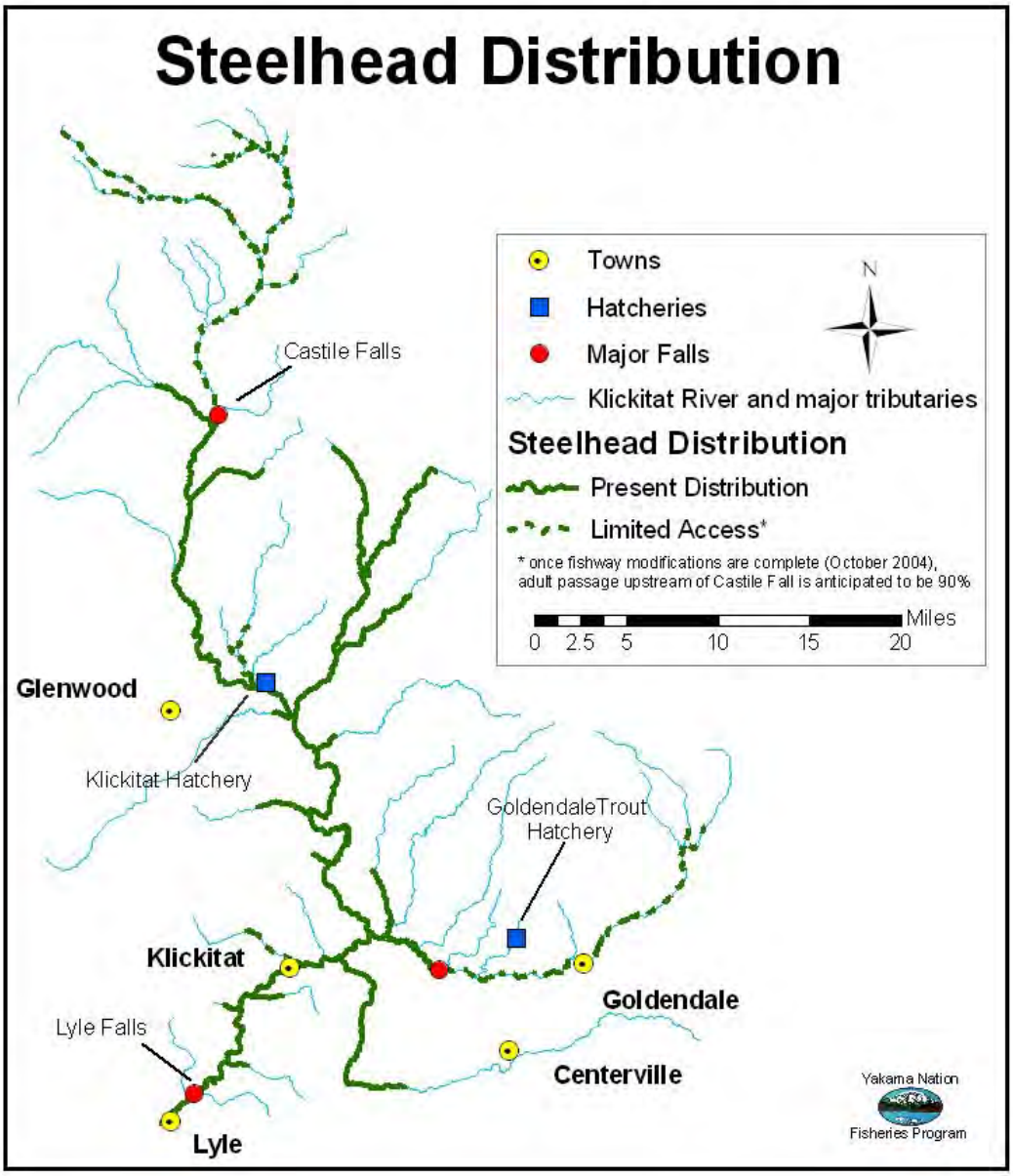
IHOT (Integrated Hatchery Operations Team). 1995. Operation plans for anadromous fish production facilities in the Columbia River basin. Volume III-Washington. Annual Report 1995. Bonneville Power Administration, Portland Or. Project Number 92-043. 536 pp.

NPPC 2004. Klickitat Subbasin Plan. Prepared for the Northwest Power and Conservation Council. Prepared by the Yakama Nation, Klickitat County, and Washington Department of Fish and Wildlife.

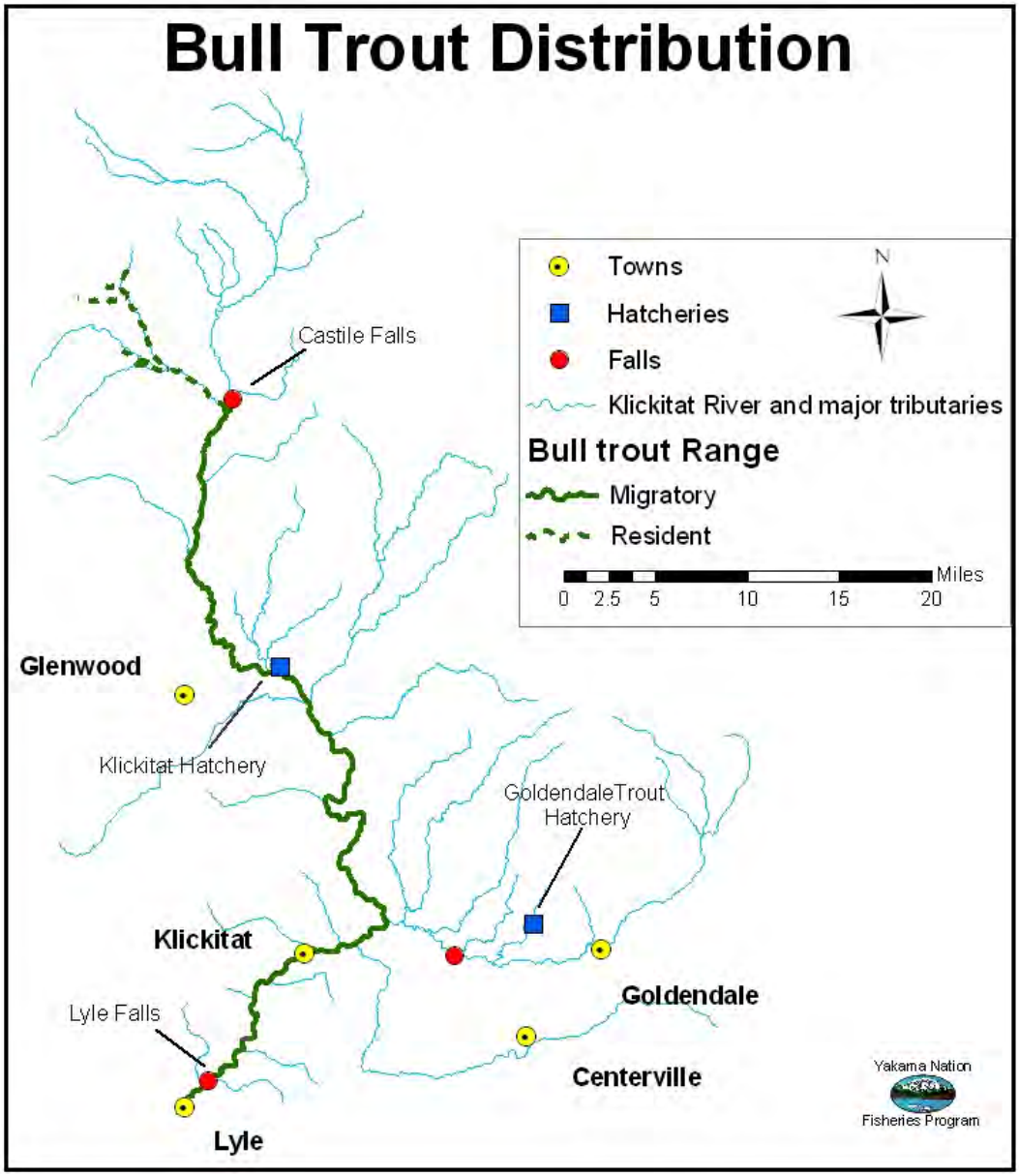
Yakama Nation 2012. *Draft* Klickitat Anadromous Fisheries Master Plan. Yakima/Klickitat Fisheries Program, Toppenish,WA.

Appendix A- Steelhead and Bull Trout Distribution

Steelhead Distribution



Bull Trout


Bull Trout Distribution
Towns
Hatcheries
Falls
Klickitat River and major tributaries
Bull trout Range
Migratory
Resident
Miles
0 2.5 5 10 15 20
N
Castile Falls
Glenwood
Klickitat Hatchery
GoldendaleTrout Hatchery
Klickitat
Goldendale
Lyle Falls
Centerville
Lyle
Yakama Nation
Fisheries Program

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