HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Photo source: WDFW HEAT Unit, September 2014.

Hatchery Program:	Marine Technology Center Coho Hatchery Program (Segregated)
Species or Hatchery Stock:	Coho (*Oncorhynchus kisutch)* Green River Stock (originally)
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Central Puget Sound
Date Submitted:	
Date Last Updated:	September 17, 2014

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Executive Summary

ESA Permit Status:
On March 31, 2004, the Washington Department of Fish and Wildlife (WDFW) and the Puget Sound Treaty Tribes submitted a Hatchery Genetic Management Plan (HGMP) for the Marine Technology Lab (also known as "Marine Technology Center") coho program under Limit 6 of the 4(d) rule. WDFW and the Co-managers are now re-submitting an updated HGMP to update the description of the program and incorporate new information. NMFS will use the information in this HGMP to evaluate the hatchery impacts on salmon and steelhead listed under the ESA. The primary goal of an HGMP is to devise biologically-based hatchery management strategies that ensure the conservation and recovery of salmon and steelhead populations.

The Puget Sound coho Evolutionary Significant Unit (ESU) is not listed under the ESA. No listed salmon or steelhead populations were historically supported in the Central Puget Sound tributaries adjacent to this program.

Marine Technology Lab Coho Program:
The purpose of the program is to provide a hands-on learning experience for 11th and 12th-grade students enrolled in the Highline School District vocational program at the Puget Sound Skills Center (PSSC). Program fish are produced from adults returning to the Marine Technology Lab (MTL) fishway in Seahurst (Ed Munro) Park on Puget Sound, near Burien, in WRIA 9. Supplemental eggs and fry may be provided by Soos Creek Hatchery, located on Soos Creek, tributary to the Green River; Soos Creek Hatchery was the original broodstock source from which the program was initiated in 1970. The program annually releases up to 10,000 yearling smolts directly into Puget Sound from Seahurst Park beach.

The program will be operated as a "segregated" program, with the intent to minimize the genetic and reproductive fitness differences between the hatchery broodstock and adjacent naturally spawning populations. This site, and other Central Puget Sound tributaries adjacent to this site, supported no natural salmon populations prior to the installation of the fish ladder and adult holding pond in 1970. The program was temporarily suspended in 2012 and 2013, to accommodate the *Seahurst Beach Shoreline Restoration Project*, completed in August 2014. This project included renovations to the facility's fishway and holding pond, as well as water intake and diversion pipes on North Creek; these renovations are expected to help resolve some of the facility's water quality and sedimentation issues. The program will be reinitiated in 2014 with eyed-eggs from Soos Creek Hatchery.

Broodstock Collection:
The broodstock is derived from adults returning to the MTL fishway/holding pond. The current egg-take goal is 10,000 at MTL; up to 80 adult pairs may be collected, although returns since 2008 averaged <30 total adults. In the event of broodstock shortfalls, eyed-eggs and fry may be provided from Soos Creek Hatchery.

Harvest:
Tribal and non-Tribal commercial and recreational fisheries directed at salmon and steelhead produced through WDFW hatchery releases are managed to minimize incidental effects to listed Chinook salmon and steelhead. Compliance with the fisheries management strategy defined in the *Comprehensive Coho Management Plan* (PSTT and WDFW 1998) allows fisheries on WDFW hatchery-origin stocks that are not likely to adversely affect listed Chinook, steelhead or listed summer chum.

All program fish are released with an adipose fin-clip, but are not coded-wire tagged; therefore their direct contribution to recreational, tribal and commercial harvest is unknown.

Monitoring, Evaluation, and Adaptive Management:
Coho smolts from this program are released 100% mass-marked (adipose fin-clip) fish to allow identification as hatchery-origin upon adult return at hatchery facilities and on the spawning grounds. All broodstock returning to the hatchery will be monitored for their adipose-fin clip to differentiate from any possible listed fish.

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WDFW conducts annual spawning ground surveys in selected Green River tributaries (Hill, Newaukum, Spring, Cress, and North Fork Newaukum creeks). Survey data are used to track annual trends in population abundance and spatial distribution. WDFW continues to annually monitor natural production and smolt emigration timing via juvenile trapping on the mainstem Green River, at RKm 34.5. These monitoring programs will provide information to adaptively manage the coho hatchery programs in the watershed.

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1 SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1 Name of hatchery or program.

Marine Technology Lab (also known as "Marine Technology Center") Coho Program

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

Green River coho (*Oncorhynchus kisutch*) Soos Creek Hatchery stock - not ESA-listed

1.3 Responsible organization and individuals

On-site Lead Contact

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Hatchery Operations Staff Lead Contact

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Fish Management Staff Lead Contact

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

None.

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

The *Puget Sound Skills Center* (PSSC) is jointly owned and operated by a consortium of South King County (Highline) school districts. The hatchery coho program is a component of the Marine Science and Technology Program curriculum. The instructor, Joe Weiss, manages the hatchery facilities at the Marine Technology Lab with the participation of the students. Operating costs of the coho program are incorporated into the overall budget and not itemized.

1.5 Location(s) of hatchery and associated facilities.

Broodstock Source:
Adults returning to the holding pond at the Marine Technology Lab.

Supplemented with Soos Creek (Green River) hatchery stock on low return years.

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Table 1.5.1: Location of culturing phases, by facility.

Facility	Culturing Phase	Location
PSSC Marine Technology Lab (MTL)	Adult holding/spawning; Incubation, Rearing; Acclimation, Release	Located at 13201 16th Avenue SW, Burien WA; Seahurst (Ed Munro) Park beach, (on Central Puget Sound).
Soos Creek Hatchery	Supplemental broodstock collection/egg-take	Located on Big Soos Creek (WRIA 09.0072) at RM 0.6, tributary to the Green River (WRIA 09.0001) at RM 33.6.

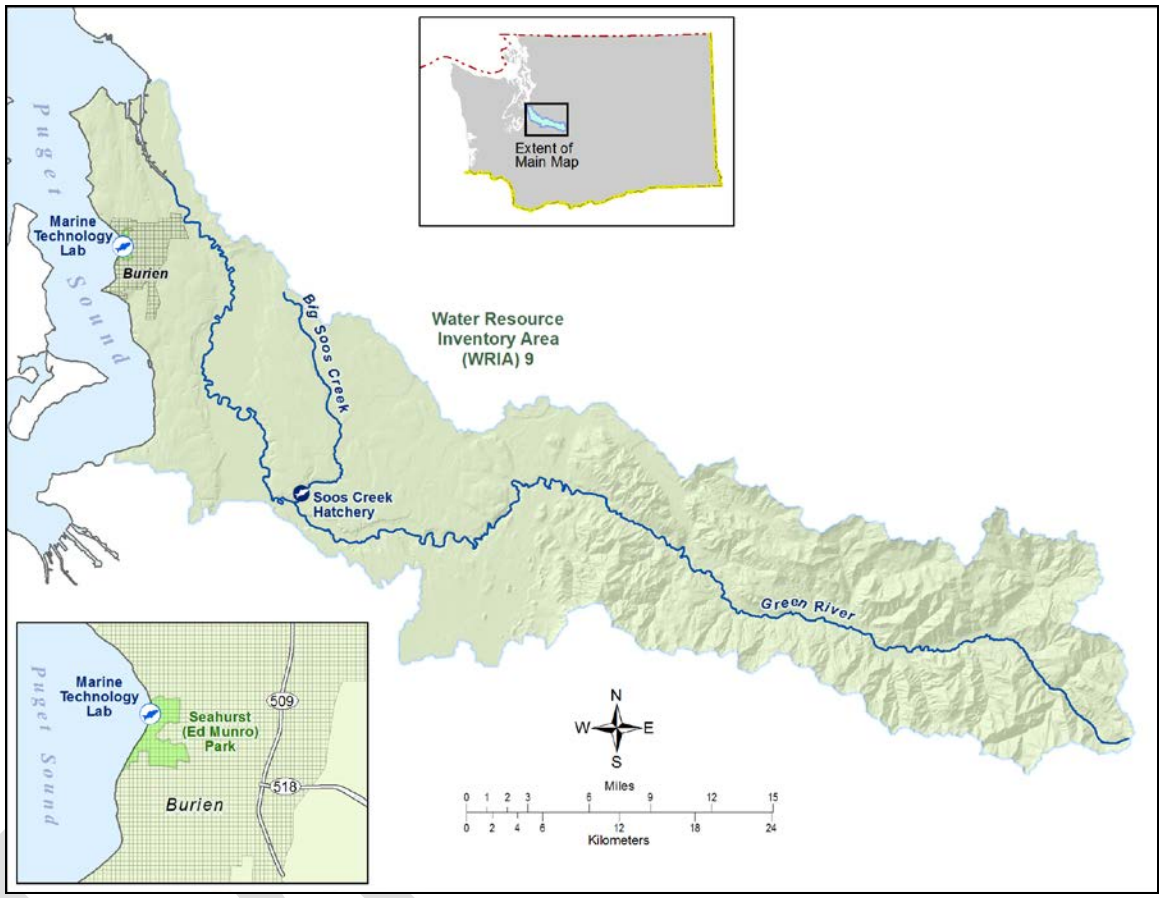

Figure 1.5.1: Map WRIA 9, and locations of PSSC's Marine Technology Lab and Soos Creek Hatchery. Source: WDFW GIS Unit 2014.

1.6 Type of program.

Segregated harvest.

1.7 Purpose (Goal) of program.

Education/ Harvest Augmentation. The primary goal of this program is to provide a hands-on learning experience for 11th and 12th-grade students enrolled in the Highline School District vocational program. This program releases up to 10,000 yearling coho to provide fish for harvest opportunity.

1.8 Justification for the program.

The location of this small hatchery facility allows for the rearing and release of an estimated 10,000 coho smolts from locally-collected broodstock, along a section of Puget Sound shoreline segregated from any listed populations. The adipose fins of the smolts are clipped prior to release.

To minimize impacts on listed fish by the Marine Technology Lab coho operation, the following Risk Aversions are included in this HGMP:

Table 1.8.1. Summary of risk aversion measures for the Marine Technology Lab coho program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.1	Surface water rights are formalized through water right deeded through a lease by the City of Burien to the Puget Sound Skills Center (PSSC). No listed salmonids are known to occur in the small stream used as a water source.
Intake Screening	4.2	No fish, listed or otherwise, are known to occur above the intake.
Effluent Discharge	4.2	The facility meets guidelines not requiring the following permits: "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) general permit (>20,000 lbs total on site production and > 5,000 lbs of fish feed per month).
Broodstock Collection & Adult Passage	7.9	Coho salmon voluntarily enter a pond accessible at high tide from Seahurst Beach. No listed Chinook are known to enter the stream.
Disease Transmission	2.2.3, 7.7. 9.2.7	This program is operated consistent with the *Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State* (WDFW and WWTIT 1998, updated 2006), which details hatchery practices and operations designed to stop the introduction and/or spread of infectious fish pathogens.
Competition & Predation	2.2.3, 10.11	Fish are released at a time, size, and location to minimize predation and competition in marine waters. Smolts are released in May to allow Chinook salmon to grow to a size that reduces the potential for predation. Smolts are released directly into Puget Sound; nearby independent tributaries have no listed salmon populations identified.

1.9 List of program "Performance Standards".

See HGMP section 1.10. Standards and indicators are referenced from Northwest Power Planning Council (NPPC) Artificial Production Review (APR) (NPPC 2001).

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

1.10.1 <u>"Performance Indicators" addressing benefits.</u>

Table 1.10.1.1"Performance Indicators" addressing benefits.

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
3.1.3 Program addresses ESA responsibilities.	Program complies with Federal ESA-listed fish take authorizations for harvest and hatchery actions.	Hatchery program operation addresses ESA requirements through the development and review of this HGMP. HGMP is updated and revised to manage risks to listed fish in compliance with the Terms and Conditions of permits.

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		Enhancement co-op submits yearly WDFW *Volunteer Fish Production Release and Planting Record Form* that includes details on number of fish, date and location of releases.
3.2.1 Fish produced for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding overharvest of non-target species.	Annual number of fish produced by this program caught in all fisheries, including estimates of fish released and associated incidental mortalities	Hatchery fish are externally-marked differentiate hatchery-from natural-origin fish, enable mark-selective fisheries. Harvests and hatchery returns are monitored by agencies to provide up-to-date information. Monitor juvenile hatchery fish size, number, date of release and mass-mark quality; monitor contribution of hatchery adult fish to fisheries and escapement
3.3.1. Artificial propagation program contributes to an increasing number of spawners returning to natural spawning areas.	An annual number of naturally-produced adults or redds on the spawning grounds or selected natural production index areas is estimated.	Not applicable. Nearby independent tributaries have no listed salmon populations identified.
3.3.2 Releases are sufficiently marked to allow statistically significant evaluation of program contribution to natural production, and to evaluate effects of the program on the local natural population.	Percentage of total hatchery releases are identifiable as hatchery-origin fish. Mass-mark (fin clips, otoliths, tags, etc.) production fish to allow for their differentiation from naturally-produced fish.	Annually monitor and report size, number, mass-mark quality (mark rate/tag rate) and date of all hatchery releases. Annually sample returning fish for the mass-mark and CWT in fisheries and at the hatchery; monitor and report numbers of estimated hatchery (marked) and natural (unmarked) fish.
3.4.1 Fish collected for broodstock are taken throughout the return or spawning period in proportions approximating the timing and age distribution of population from which broodstock is taken.	Temporal distribution of broodstock collection at point of collection.	Collection of broodstock is done representatively and systematically throughout the entire return period. Collect annual run timing, age and sex composition and spawning escapement timing data. Adhere to WDFW spawning guidelines (Seidel 1983; HSRG 2009).
3.5.6 The number of adults returning to the hatchery that exceeds broodstock needs is declining.	Program is properly sized to meet harvest objectives; program fish are fully utilized in target fisheries	Hatchery returns are enumerated annually.
3.6.1 The hatchery program uses standard scientific procedures to evaluate various aspects of artificial propagation.	Apply minimal monitoring standards in the hatchery: food conversion rates, growth trajectories, mark/tag rate error, weight distribution (CV).	Collect annual run timing, age and sex composition data upon adult return. Annually record growth rates, mark rate and size at release and release dates. Enhancement co-op submits

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		yearly WDFW *Volunteer Fish Production Release and Planting Record Form* that includes details on number of fish, date and location of releases.
3.8.3 Non-monetary societal benefits for which the program is designed are achieved.	Program meets education/outreach goals. Contributes to the cultural benefits that fishing provides. Recreational fishery angler days, length of season, number of licenses purchased.	Program keeps accurate annual records and reports data to WDFW. Annual harvest of hatchery fish based on mark-recovery estimates and creel surveys.

1.10.2 "Performance Indicators" addressing risks.

Table 1.10.2.1: "Performance Indicators" addressing risks.

Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
3.1.3 Program addresses ESA responsibilities	Program complies with Federal ESA-listed fish take authorizations for harvest and hatchery actions.	HGMP is updated to reflect any major changes in program and resubmitted to NOAA fisheries. Program risks have been addressed in this HGMP through best available science hatchery management actions. WDFW staff annually reviews Future Brood Document (FBD) for stock, size, number, date and location of releases from all production programs. Monitor and record juvenile hatchery fish size, number, date of release and mass-mark quality; monitor contribution of hatchery adult fish to fisheries and escapement.
3.2.1 Fish produced for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while adequately minimizing by-catch of non-target species.	Number of marks released and estimated proportion of marks in out-migrant juveniles and returning adults on the spawning ground. Production fish are mass-marked (adipose fin-clip) to allow for their differentiation from naturally-produced fish	Monitor and record juvenile hatchery fish size, number, date of release and mass-mark (fin clips, tags, etc.) quality; monitor contribution of hatchery adult fish to fisheries and escapement. Harvest is regulated to meet appropriate biological assessment criteria. Steelhead fisheries in the Lewis River are mark selective, and require the release of all wild steelhead. Agencies monitor harvests and hatchery escapements to provide up-to-date information.
3.2.2 Release groups are sufficiently marked to allow statistically significant evaluation of program contribution to natural	Percentage of total hatchery releases are identifiable as hatchery-origin fish. Mass-mark (adipose-fin clip, CWT, otolith-mark, etc., depending	Annually monitor and report mass-mark type, quality and rates. Annually assess harvest of mass-marked hatchery fish based on

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production and to evaluate effects of the program on the local natural population.	on species) produced fish to allow for their differentiation from naturally produced fish for selective fisheries.	CRC estimates and creel surveys.
3.3.2 Releases are sufficiently marked to allow statistically significant evaluation of program contribution to natural production and to evaluate effects of the program on the local natural population.	All hatchery production is identifiable in some manner (fin-marks, tags, otolith, etc.) consistent with information needs.	Annually monitor and report mass-mark type, quality and rates. Examine returning fish encountered for the mass-marked at the hatchery and on the spawning ground. Annually record numbers of estimated hatchery (marked) and natural (unmarked).
3.4.1 Fish collected for broodstock are taken throughout the return or spawning period in proportions approximating the timing and age distribution of population from which broodstock is taken.	Temporal and age distribution of broodstock collected, compared to that of naturally-produced population at collection point.	Collect annual run timing, age and sex composition and return timing data.
3.4.3 Life history characteristics of the natural population do not change as a result of this hatchery program.	Life history patterns of juvenile and adult NOR are stable.	Not applicable. Nearby independent tributaries have no listed salmon populations identified.
3.5.1 Patterns of genetic variation within and among natural populations do not change significantly as a result of artificial production.	Within and between populations, genetic structure is not affected by artificial production.	Not applicable. Nearby independent tributaries have no listed salmon populations identified.
3.5.2 Collection of broodstock does not adversely impact the genetic diversity of the naturally-spawning population	Total number of natural spawners reaching the collection facility. Timing of collection compared to overall run timing.	All on-station hatchery releases are identifiable in some manner (fin-marks, tags, etc.). Collect annual run timing, origin, and age and sex composition data.
3.5.4. Juveniles are released on-station or after sufficient acclimation to maximize homing ability to intended return locations.	Location of release (on-station, acclimation pond, direct plant). Release type (forced, volitional or direct stream release).	Annually record and report release information, including location (on-site), method (force) and age class (smolts) in hatchery data systems (WDFW Hatcheries Headquarters Database).
3.5.5 Juveniles are released at fully-smolted stage.	Level of smoltification at release. Release type (forced, volitional or direct).	Annually monitor and record size, number, date of release and release type.
3.7.1 Hatchery facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols (IHOT, PNFHPC, *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State*).	Annual reports indicating levels of compliance with applicable standards and criteria. Periodic audits indicating level of compliance with applicable standards and criteria.	The program is operated consistent with the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006), *Fish Health Policy in the Columbia Basin*, and *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995). Enhancement co-op coordinators communicate regularly with Region 5 staff.

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3.7.2 Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring.	Discharge water quality compared to applicable water quality standards by NPDES permit. Compliance with water right permit.	See HGMP section 4.2. Enhancement co-ops comply with all permits required and submits MOU to WDFW for each year involved in the project before project is approved.
3.7.3 Water withdrawals and in-stream water diversion structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.	Water withdrawals compared to NMFS, USFWS and WDFW applicable passage and screening criteria for juveniles and adults.	Barrier and intake structure compliance assessed and needed fixes are prioritized.
3.7.4 Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens. Follow the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, revised 2006).	Necropsies of fish to assess health, nutritional status, and culture conditions.	WDFW Fish Health Section inspect adult broodstock yearly for pathogens and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, WDFW's Fish Health Section recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as deemed necessary. A Fish Health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams for pathogens and parasites.	Examine fish 1 to 6 weeks prior to transfer or release, in accordance with the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006).
	Inspection of adult broodstock for pathogens and parasites.	*Soos Creek Hatchery:* At spawning, lots of 60 adult broodstock are examined for pathogens.
	Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites.	Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006).
3.7.6 Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally-produced population.	Spatial and temporal spawning distribution of natural populations above and below broodstock collection site is currently compared to historic distribution.	Annual run timing, age, and sex composition and return timing data are collected.
3.7.7 Weir/trapping operations do not result in significant stress, injury or mortality in natural populations.	Mortality rates in trap. Pre-spawning mortality rates of captured fish in the hatchery	Traps checked regularly. Annually record and report abundances and observations of natural- origin fish at hatchery facilities.

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	and/or after release.	
3.7.8 Predation by hatchery fish does not significantly reduce numbers of natural fish.	Hatchery juveniles are raised to smolt-size and released from the hatchery at a time that fosters rapid migration downstream. Relative body size of program fish released and size of prey, especially ESA-listed, zero-age Chinook and steelhead.	Hatchery smolt release size and time are monitored to quantify/minimize predation effects on naturally-produced listed salmon.

1.11 Expected size of program.

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

Annual broodstock collection level is up to 80 adult coho.

In the event of shortfalls, Soos Creek Hatchery provides eyed-eggs and fry to supplement this program.

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

Table 1.11.2.1. Fish release levels by life stage and location.

Life Stage	Release Location	Annual Release Level
Yearling	Seahurst Park beach, Central Puget Sound (WRIA 9)	10,000

Source: Future Brood Document 2014

The program was suspended for two years in 2012, to accommodate the Phase 2 of the Shoreline Restoration Project at Seahurst County Park. The program plans to resume in 2014, with eyed-eggs from Soos Creek Hatchery.

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

Coho are adipose fin-clipped, but have not been coded-wire tagged; as such, no smolt-to-adult survival rates have been estimated.

Table 1.12.1: Adult returns, by year, Marine Technology Lab coho program.

Return Year	Adult Return
2002	56
2003	28
2004	52
2005	60
2006	48
2007	0
2008	24
2009	28
2010	20
2011	0
2012	0
2013	0

Source: Marine Technology Lab data 2014.
Note: Program was suspended in 2012 and 2013 for shoreline restoration work and facilities renovations.

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

Program was started in 1970.

1.14 Expected duration of program.

On-going.

1.15 Watersheds targeted by program.

Smolts are released directly into Central Puget Sound, although Seahurst Park is located within WRIA 9 (Green-Duwamish Watershed) (see **Figure 1.5.1**).

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

Alternative 1. Eliminate or reduce the program numbers. The primary goal of this program is to provide a hands-on learning experience for students enrolled in the Highline School District vocational program. This requires on-station incubation and rearing of a small number of coho salmon.

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

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

This HGMP is submitted to NOAA Fisheries for ESA consultation, and determination regarding compliance of the plan with ESA section 4(d) rule criteria for joint state/tribal hatchery resource management plans affecting listed Chinook salmon and steelhead.

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

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

This program takes place along a section of Puget Sound shoreline (between the Green/Duwamish and Puyallup basins) that is segregated from any listed Chinook or steelhead populations (Ruckelshaus et al. 2006, PSSTRT 2011). However, backfill, if required, is provided by Soos Creek Hatchery (Green/Duwamish basin).

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

None.

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

Puget Sound Chinook (*Oncorhynchus tshawytscha*): Listed as *Threatened* on March 24, 1999 (64FR14308); *Threatened* status reaffirmed on June 28, 2005 (70FR37160); reaffirmed *Threatened* by five-year status review, completed August 15, 2011 (76FR50448), updated April 14, 2014 (79FR20802). The Puget Sound Chinook salmon ESU is composed of 31 historically quasi-independent populations, of which 22 are believed to be extant currently. The ESU includes all naturally-spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Strait of Juan De Fuca from the Elwha River (inclusive) eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington (Ford 2011), as well as twenty-six artificial propagation programs (NMFS 2014). In the Duwamish/Green River basin, the Technical Recovery Team (TRT) has identified one

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demographically independent population (DIP) (Duwamish/ Green River Chinook) (Ruckelshaus et al. 2006).

Puget Sound steelhead *(Oncorhynchus mykiss*): were listed as *Threatened* under the ESA on May 11, 2007 (72FR26722); reaffirmed *Threatened* by five-year status review, completed August 15, 2011 (76FR50448), updated April 14, 2014 (79FR20802). The DPS includes all naturally spawned anadromous winter-run and summer-run *O. mykiss* (steelhead) populations, below natural migration barriers in the river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington (Ford 2011), and includes six artificial propagation programs (NMFS 2014).In the Duwamish/ Green River basin, the TRT has preliminarily delineated one demographically independent population (DIP) of winter steelhead; (Green River), no summer run populations were identified in the basin (PSSTRT 2013a).

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

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

Green/ Duwamish fall Chinook in the Puget Sound Chinook ESU. Recent escapement levels (2003-2011) have averaged 1,860 for natural spawners in the Green/Duwamish DIP. During this same time period, the population has shown declining trend (SaSI, WDFW 2012). (See also Soos Creek Coho HGMP.)

*Puget Sound Chinook salmon: Updated Risk Summary***.** All Puget Sound Chinook populations are well below the TRT planning range for recovery escapement levels. Most populations are also consistently below the spawner recruit levels identified by the TRT as consistent with recovery. Across the ESU, most populations have declined in abundance somewhat since the last status review in 2005, and trends since 1995 are mostly flat. Several of the risk factors identified by Good et al. (2005) are also still present, including high fractions of hatchery fish in many populations and widespread loss and degradation of habitat. Many of the habitat and hatchery actions identified in the Puget Sound Chinook recovery plan are expected to take years or decades to be implemented and to produce significant improvements in natural population attributes, and these trends are consistent with these expectations. Overall, the new information on abundance, productivity, spatial structure and diversity since the 2005 review does not indicate a change in the biological risk category since the time of the last BRT status review (Ford 2011).

*Puget Sound steelhead: Updated Risk Summary***.** The status of the listed Puget Sound steelhead DPS has not changed substantially since the 2007 listing. Most populations within the DPS are showing continued downward trends in estimated abundance, a few sharply so (Ford 2011). For all but a few putative demographically independent populations of steelhead in Puget Sound, estimates of mean population growth rates obtained from observed spawner or redd counts are declining—typically 3 to 10% annually—and extinction risk within 100 years for most populations in the DPS is estimated to be moderate to high, especially for *draft* populations in the *putative* South Sound and Olympic MPGs. Collectively, these analyses indicate that steelhead in the Puget Sound DPS remain at risk of extinction throughout all or a significant portion of their range in the foreseeable future, but are not currently in danger of imminent extinction. (See also Soos Creek Coho HGMP.)

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

Not applicable (see HGMP section 2.2.1).

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

Not applicable. See HGMP section 1.12 for program performance.

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

Not applicable. See HGMP section 1.12 for program performance.

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

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

Broodstock collection: No listed salmon or steelhead are collected or handled during trapping and spawning. The facility's stream did not support any salmon populations prior to the installation of the fish ladder and pond, which was were part of the park's seawall construction in 1970.

In the event of shortfalls, Soos Creek Hatchery provides backfill for this program (see Soos Creek Hatchery Coho HGMP).

Disease effects: The risk of disease transmission to wild salmonids in the area (Puget Sound) is low. Transmission of hatchery-origin diseases from the hatchery to wild fish in areas where they co-occur is an unlikely event. Although hatchery populations can be considered to be reservoirs for disease pathogens because of their elevated exposure to high rearing densities and stress, there is little evidence to suggest that diseases are routinely transmitted from hatchery to wild fish (Steward and Bjornn 1990). These impacts are addressed by rearing fish at lower densities, within widely recognized guidelines, continuing well-developed monitoring, diagnostic, and treatment programs already in place per the *Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State* (WDFW and WWTIT 1998, updated 2006).

Predation/Competition: Although coho have been documented to prey on other salmonids (primarily pink, chum and sockeye salmon) (Hawkins and Tipping 1999; Seiler et al. 2002; Hargreaves and LeBrasseur 1986), any predation potential to listed populations should be minimized by the timing and proximity of the release. Smolts from this program are released directly into Puget Sound, at the Seahurst (Ed Munro) County Park beach (Burien); no listed Chinook or steelhead are known to inhabit the two unnamed creeks (locally known as "North Creek" and "Seahurst Creek") that enter Puget Sound at Seahurst County Park (Ruckelshaus et al. 2006, PSSTRT 2011).

Potential Marine Technology Lab (MTL) coho HGMP predation and competition effects on listed salmon: This program takes place along a section of the Central Puget Sound shoreline (between the Green/Duwamish and Puyallup basins) that is segregated from any listed Chinook or steelhead populations (see HGMP section 2.2.1). The MTL program releases yearling coho at 11 fish per pound (151 mm fl). Juvenile Chinook salmon emigrating out of the Puyallup River (south of MTL) and the Lake Washington watershed (north of MTL) in May, averaged 72 mm fl (Samarin and Sebastian, 2002) and 79 mm (Seiler et al., 2003), respectively. This is larger than the average size hatchery coho released through the program (**Table 2.2.3.1**) and are not likely to be preyed upon by the hatchery coho.

Seiler et al. (2003) also indicates that by early May up to 75% (**Table 2.2.3.2**) of the migrants had emigrated out of the Lake Washington watershed (Cedar River, Issaquah Creek and Bear Creek). Food resource competition risks to listed Chinook juveniles are not likely to be substantial since the larger coho are likely to select different food sources. MTL also releases coho directly into Puget Sound, precluding any freshwater competition for food sources or predation. Potential predation and competition risks to listed Chinook juveniles in the marine and nearshore areas are likely to be low.

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Smoltification and seaward migration of naturally-produced steelhead juveniles occurs principally from April to mid- May, and average 140- 160 mm in length. The inshore migration pattern of steelhead in Puget Sound was not well known, and it was generally thought that steelhead smolts moved offshore quickly, typically within a few weeks (PSSTRT 2011).

Table 2.2.3.1. Average length by statistical week (mid-March through late-June) of natural origin juvenile Chinook salmon migrants captured in traps in Puget Sound watersheds. The minimum predator length corresponding to the average length of Chinook salmon migrants, assuming that the prey can be no greater than 1/3 the length of the predator, are provided in the final row of the table. (NS = not sampled.)

Watershed	Statistical Week														
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Skagit [a] 1997-2007	41.3	41.6	43.0	43.1	43.7	47.3	49.8	52.5	56.8	57.8	56.6	59.2	61.1	64.0	68.0
Stillaguamish [b] 2001-2002	NA	NA	NA	NA	51.4	53.5	55.7	57.8	60.0	62.1	64.2	66.4	68.5	70.6	72.8
Cedar [a] 1998-2008	41.5	42.3	43.1	47.6	55.6	62.6	69.5	72.1	76.7	79.4	84.7	91.0	95.7	96.2	98.8
Green [a] 2000-2008	41.7	42.1	43.8	46.2	50.0	50.1	57.2	64.0	69.5	70.7	73.0	77.0	83.0	83.8	86.0
Puyallup [c] 2002	NA	NA	NA	NA	NA	NA	NA	66.2	62	70.3	73.7	72.7	78.7	80.0	82.3
Dungeness [a] 2005-2008	39.5	40.0	41.2	57.4	55.6	52.5	55.9	60.4	66.3	68.2	67.7	70.5	73.7	75.5	77.6
All Systems Average Length	41.0	41.5	42.8	48.6	51.3	53.2	57.6	62.2	65.2	68.1	70.0	72.8	76.8	78.4	80.9
Minimum Predator Length	124	126	130	147	155	161	175	188	198	206	212	221	233	237	245

[a] Source: WDFW Wild Salmon Production/Evaluation Unit (pers. comm. Matt Klungle 2009).
[b] Source: regression models presented in Griffith et al. (2001) and Griffith et al. (2003).
[c] Source: Samarin and Sebastian (2002).

Table 2.2.3.2. Average cumulative proportion (%) of the total number of natural origin juvenile Chinook salmon migrants estimated to have migrated past traps in Puget Sound watersheds.

Watershed	Statistical Week														
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Skagit 1997-2007	40.9	25.7	55.0	59.9	65.4	68.3	70.9	73.8	75.6	79.1	84.4	88.8	92.4	94.5	96.3
Cedar 2001-2008	61.8	65.0	67.4	69.0	69.3	69.9	70.6	72.4	75.5	79.1	84.9	88.9	94.4	97.0	98.5
Bear Creek 2001-2008	11.4	12.3	13.1	13.3	13.5	14.3	18.1	29.9	43.5	57.5	76.9	89.0	95.0	98.1	99.0
Green 2000-2008	54.6	59.0	63.3	65.3	67.4	68.7	69.2	70.4	72.8	74.7	81.2	87.6	92.3	95.8	98.0
Dungeness 2005-2008	23.7	30.7	34.8	36.3	37.2	38.0	38.9	40.1	41.1	43.5	49.5	54.5	63.0	69.4	77.5
All Systems Average Length	**38.5**	**38.5**	**46.7**	**48.8**	**50.6**	**51.8**	**53.4**	**57.3**	**61.7**	**66.8**	**75.4**	**81.8**	**87.4**	**91.0**	**93.9**

Source: WDFW Wild Salmon Production/Evaluation Unit (pers. comm. Matt Klungle 2009).

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

Unknown.

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

See "Take" table.

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

Any listed (unmarked) Chinook or steelhead that may enter the trap during broodstock collection will be returned to the bay. If significant numbers are observed impacted by this program operation, then staff would inform the WDFW District Biologist who along with the Hatchery Complex Manager would determine an appropriate plan and consult with NOAA fisheries, if needed.

3 SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

This is a segregated/harvest program, and is not used to supplement natural-origin fish.

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.

This HGMP is included as one of the WDFW-managed plans. WDFW hatchery programs in Puget Sound operate under, and adhere to Co-manager priorities and legal requirements of the *Puget Sound Salmon Management Plan* (*PSSMP* 1985), and the Terms and Conditions of Permits issued under the Endangered Species Act (ESA). Legal requirements, Co-manager priorities and general principles for hatchery management are adapted to the unique genetic and ecological conditions of the Green/Duwamish watershed.

Comprehensive Coho Management Plan (CCMP): Provides an overarching co-manager agreed-to plan, which seeks to develop and implement improved coho management approaches that support the maintenance and restoration of wild stocks in a manner that reflects the Region's fisheries objectives (resource protection, allocation, and harvest stabilization), production constraints, and production opportunities (PSTT and WDFW 1998).

Washington Department of Fish and Wildlife Commission Policy C-3619. WDFW adopted the *Hatchery and Fishery Reform Policy C-3619* in 2009. Its purpose is to advance the conservation and recovery of wild salmon and steelhead by promoting and guiding the implementation of hatchery reform. The intent of hatchery reform is to improve hatchery effectiveness, ensure compatibility between hatchery production and salmon recovery plans and rebuilding programs, and support sustainable fisheries. *WDFW Policy C-3619* works to promote the conservation and recovery of wild salmon and steelhead and provide fishery-related benefits by establishing clear goals for each state hatchery, conducting scientifically defensible-operations, and using informed decision making to improve management. It is recognized that many state operated hatcheries are subject to provisions under *U.S. v Washington* (1974) and *U.S. v Oregon* and that hatchery reform actions must be done in close coordination with tribal Co-managers (available at http://wdfw.wa.gov/commission/policies/c3619.html).

Hatchery Reform- Principles and Recommendations of the Hatchery Scientific Review Group: WDFW programs have incorporated the suggestions this report provided, in a detailed description of the HSRG's scientific framework, tools and resources developed for evaluating hatchery programs, the processes used to apply these tools, and the resulting principles, system-wide recommendations, and program-specific recommendations to reform (HSRG 2004) (see also HGMP section 6.2.3).

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

This hatchery program, and all other WDFW anadromous salmon hatchery programs within the Puget Sound Chinook ESU, operates under *U.S. v Washington*, which provides the legal framework for coordinating these programs, defining artificial production objectives, and maintaining treaty-fishing rights through the court-ordered *Puget Sound Salmon Management Plan* (PSSMP 1985).

The program is implemented in accordance with the legislatively-mandated *Puget Sound Recreational Enhancement* (*PSRE*) program.

Hatchery salmon and steelhead production levels are negotiated annually through various contracts between WDFW and Co-managers, and are detailed in the annual *Future Brood Document* (FBD). The FBD is a pre-season planning document for fish hatchery production in Washington State for upcoming broodstock collection and fish rearing seasons (July 1 – June 30). The FBD is coordinated between WDFW, the *Northwest Indian Fisheries Commission* (NWIFC) representing Puget Sound and coastal treaty tribes, eastern Washington treaty tribes, and Federal fish hatcheries. Hatchery production by volunteers, schools, and *Regional Fisheries Enhancement Groups* (RFEGs) are represented by WDFW.

Cooperative Fish & Wildlife Project Memorandum of Understanding (2001-2002).

See also HGMP section 3.1.

3.3 Relationship to harvest objectives.

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

The primary goal of this program is to provide a hands-on learning experience for students enrolled in the Highline School District vocational program. This program releases up to 10,000 juvenile coho to provide fish for potential harvest opportunity.

See also Soos Creek Coho HGMP.

3.4 Relationship to habitat protection and recovery strategies.

Habitat protection and recovery strategies are addressed in documents developed for the Puget Sound area and individual watersheds. Different groups are involved in planning, funding and realizing restoration projects through the region as listed below.

Puget Sound Salmon Recovery Plan (2005): Describes habitat related challenges (http://www.govlink.org/watersheds/9/plan-implementation/HabitatPlan.aspx). Based on this recovery plan, a number of habitat actions have been implemented, with additional improvements identified to be considered in the future.

Puget Sound Partnership Action Plan: An ESU-wide recovery planning effort is being undertaken by the Puget Sound Partnership, a collaborative group dedicated to restoring salmon and steelhead throughout Puget Sound (online at http://www.pugetsoundpartnership.org).

State of Our Watersheds: Individual member Tribes have worked with the NWIFC and SSHIAP to create the State of Our Watersheds report. This document examines key indicators of habitat quality and quantity across more than 20 watersheds in western Washington that lie within tribal Usual and Accustomed fishing areas as defined by *U.S. vs. Washington* (1974 Boldt decision). The Green River habitat section can be found under the Muckleshoot chapter at http://maps.nwifc.org:8080/sow2012/.

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Lead Entities: community and watershed-based groups that develop local salmon habitat recovery strategies and recruit organizations to do habitat protection and restoration projects that will implement the strategies. Lead entities perform an essential role in salmon recovery in Washington State. The Lead Entity for the Green River/Duwamish River watershed is King County (WRIA 9).

City of Burien Shoreline Master Program Restoration Plan (2009). This update builds upon other elements of the City's Shoreline Master Program (SMP) update completed to date including the draft *Shoreline Inventory* (March 2008, revised October 2008) and *Shoreline Analysis and Characterization* (June 2008, revised October 2008), and the *Seahurst Park Master Plan* (see below). Available at: http://wa-burien.civicplus.com/DocumentView.aspx?DID=1148.

Figure 3.4.1: Seahurst Park shoreline looking south from the Marine Technology Lab, April 2013.

Seahurst Park Master Plan (2002). The plan proposed to preserve all the existing undeveloped area, and increase the natural habitat area and function. The plan is based on four concepts: removing existing shoreline protection structures; modeling restored beach slopes and substrates after natural conditions; replenishing gravel and sand lost to erosion; and restoring and protecting the natural delivery paths of sediment to the beach. Since adoption of the master plan, the City of Burien included an additional concept: to preserve existing functioning nearshore habitats including unstable forested bluffs, eelgrass beds, and stream deltas. As part of implementation of the master plan, the seawall south of the south park entrance was removed and the beach reshaped to a more natural shoreline state, including the addition of native vegetation and large longshore wood placement. The *Seahurst Park Bulkhead Removal and Beach Restoration Project* was constructed between November 2004 and February 2005 made possible by funding from the City of Burien, the state's *Salmon Recovery Funding Board* (SRFB), and U.S. Army Corps of Engineers (Corps). Additional phases of the Master Plan include seawall redevelopment and nearshore restoration for the remainder of the park (see *Seahurst Park-North Shoreline Restoration Project* below). *Master Plan Summary* is available at: https://burienwa.gov/DocumentCenter/View/284.

Figure 3.4.2: Seahurst Park shoreline, looking south (July 2014). The portion of the seawall adjacent to the Marine Technology Lab will not be removed. Photo by Burien Parks.

Figure 3.4.3: Shoreline adjacent to the North Creek wetlands renovation, September 2014. Photo courtesy Joe Weiss, MTL.

Seahurst Park-North Shoreline Restoration Project (2013). The *Seahurst Shoreline Ecosystem Restoration Project* (*Phase2*) is a joint project between the City of Burien and the Corps. The goal is to remove around 1800 feet of seawall and 3900 cubic yards of riprap along the beach, reconnect the beach with primary sediment sources, and restore forage fish nearshore habitat to the pre-wall conditions that existed prior to 1972 (see **Attachment 1**). This project follows the same process as for the South Shoreline project (Phase 1 – see *Seahurst Park Master Plan* above), which removed around 1000 feet of seawall, and was completed December 2008. The City of Burien and the Corps worked in partnership with WDFW and WRIA-9. Additional project funds include the state *Estuary and Salmon Recovery Program* (ESRP) and the *Puget Sound and Adjacent Resources Program* (PSAR). Included with and in addition to the ESRP program, funding was also sought through an Environmental Protection Agency (EPA) grant specifically targeting highly visible seawall removal projects. Construction was scheduled for September 2013 through July 2014. Details about the project is available at the City of Burien project website.

Regional Fisheries Enhancement Groups (*RFEGs*): Citizen-based groups in conjunction with local governments work on habitat actions to benefit both listed and non-listed stock in the system including the Mid Puget Sound RFEG.

3.5 Ecological interactions.

(1) *Salmonid and non-salmonid fishes or other species that could negatively impact the program.* Negative impacts by fishes and other species on this program could occur directly through predation on program fish, or indirectly through food resource competition, genetic effects, or other ecological interactions. In particular, fishes and other species could negatively impact survival rates through predation on newly released, emigrating juvenile fish in the freshwater and marine areas. Certain avian and mammalian species may also prey on juvenile salmonids while the fish are rearing at the hatchery site, if these species are not excluded from the rearing areas. Species that could negatively impact juvenile salmonids through predation include the following:

- Avian predators, including mergansers, cormorants, belted kingfishers, great blue herons, and green herons
- Mammalian predators, including mink, river otters, harbor seals, and sea lions
- Cutthroat trout

Rearing and migrating juveniles and adults originating from the program may also serve as prey for large, mammalian predators in estuarine and nearshore marine areas, to the detriment of population abundance and the program's success in augmenting harvest. Species that may negatively impact program fish through predation may include:

- Orcas
- Sea lions
- Harbor seals
- River otters

(2) *Salmonid and non-salmonid fishes or other species that could be negatively impacted by the program (focus is on listed and candidate salmonid species).*

- Puget Sound Chinook
- Puget Sound steelhead
- Bull trout

(3) *Salmonid and non-salmonid fishes or other species that could positively impact the program.* Fish species that could positively impact the program may include other salmonid species and trout present in the Puget Sound through natural and hatchery production. Juvenile fish of these species may serve as prey items for hatchery-origin salmonids during their migration through the marine area. Decaying carcasses of spawned adult fish may contribute nutrients that increase productivity in the watershed, providing food resources for emigrating fish.

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Salmonid adults that return to the Green/Duwamish Basin, and any seeding efforts using adult salmon carcasses, may provide a source of nutrients and stimulate stream productivity. Many watersheds in the Pacific Northwest appear to be nutrient-limited (Gregory et al. 1987; Kline et al. 1997) and salmonid carcasses can be an important source of marine derived nutrients (Levy 1997). Carcasses from returning adult salmon have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of aquatic invertebrates (Mathisen et al. 1988); and 3) juvenile salmonids have been observed to feed directly on the carcasses (Bilby et al. 1996). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward 1993; Slaney et al. 2003; Ward et al. 2003).

(4) *Salmonid and non-salmonid fishes or other species that could be positively impacted by the program.* The coho program could positively impact marine fish species that prey on juvenile fish. Nutrients provided by decaying coho carcasses may also benefit fish. These species include:

- Northern pikeminnow
- Cutthroat trout
- Steelhead
- Bull trout
- Chinook salmon
- Pacific staghorn sculpin
- Numerous marine pelagic fish species

4 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.

Table 4.1.1: Available water source, PSSC Marine Technology Lab, Burien.

Water Source	Available Water Flow (gpm)	Avg Water Temp. (ºF)	Usage	Limitations
Unnamed Creek (surface)	Not measured	49-55°	Incubation and rearing	Year-round creek sufficient to maintain facility

The water source for the hatchery facility is a small unnamed stream (locally known as "North Creek") that drains the high bluff area along Seahurst Park in Burien. A diversion box diverts part of the stream flow into the Lab. The utilized water is drained through a 33-foot pipe into Puget Sound. Any overflow not utilized is returned to the stream below the diversion box.

The original pipes (**Figure 4.1.1**) and diversion box to the rearing tanks were old and poorly engineered. Flooding and sedimentation during high flow events resulted in significant egg and fry mortalities from 2008 through 2012. Flooding caused by heavy rainfall events inundated the creek with sediment debris loads, and filled the holding pond and fish ladder. Sediment from these events also plugs the diversion box. Although it can be easily cleared by hand, these events usually occurred at night, and because facility is not staffed 24/7, hours may pass before it can be fixed.

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Figure 4.1.1: Old water intake pipe from North Creek, April 2013.

The City of Burien's North Shoreline Restoration Project included a proposal to restore North Creek to a more natural channel, while still retaining hatchery operations for the Marine Technology Lab (*North Shoreline Restoration Project Proposal* 2009). The project was scheduled for October 2012 to May 2013, and included upgrades to the Marine Technology Lab's intake, which would address water flow concerns; however, funding could not be secured, and the project was put on indefinite hold. Funding for the new hatchery facility has been provided through funds from the Washington Department of Ecology, the City of Burien, and NMFS Salmon Enhancement Funds (personal comm. Joe Weiss, April 15, 2013). The North Shoreline Restoration Project was scheduled to begin August 2013 (see *Seahurst Park-North Shoreline Restoration Project* in HGMP section 3.4), with work on the seawall and riprap removal scheduled from October 2013 through January 2014. Construction was completed by July 2014. Facility renovations included relocating the hatchery fishway and holding pond (see HGMP section 5.1), as well as improvements to the facility's freshwater reservoir, with new pipes and valves for both the intake and drain (**Figure 4.1.2**). The existing 24-inch culvert and water tank diversion was replaced with a new 8'x3' diversion sump/basin. A natural stream channel was constructed downstream of the culvert and sump.

Figure 4.1.2: North Creek wetland restoration above the hatchery intake (left). Hatchery intake on North Creek (right).

North Creek surface water use is regulated under a water rights permit deeded to the Puget Sound Skills Center through a lease from the City of Burien.

NDPES permit:
Total on-site production at the hatchery is <20,000 lbs and < 5,000 lbs of fish feed per month; therefore, an "Upland Fin-Fish Hatching and Rearing" *National Pollution Discharge Elimination System* (NPDES) general permit is not required.

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.

The water source, locally known as "North Creek," is a small stream with no historical salmon runs. No listed salmonids use this water source.

5 SECTION 5. FACILITIES

PSSC's Marine Technology Lab (MTL) at Seahurst Park is a waterfront facility which includes a classroom, wet lab, boat ramp, salmon hatchery, and 750-gallon sea water aquariums. Students assist in hatchery operations over course of the school year, however, the primary focus of this facility is education.

Note: Hatchery production was suspended in 2012 to accommodate the *North Shoreline Restoration Project* for Seahurst Park (pers. comm. Joe Weiss, August 15, 2013; see also HGMP section 3.4). Phase 2 of the *Seahurst Park Seawall Removal and Beach Restoration Project*, occurred August 2013 through July 2014.

5.1 Broodstock collection facilities (or methods).

Broodstock is collected from adult coho returning to the hatchery trap, near the outlet of North Creek. Coho enter a terminal pond via a fish ladder that is accessible at high tide along Seahurst Beach. Eyed-eggs can be supplemented from Soos Creek hatchery in years when on-station broodstock collection goals are not reached.

The previous holding pond and fishway were subject to heavy sedimentation during winter high flows (**Figure 5.1.1**). Work on relocating the fish ladder began February 2014, and North Creek wetlands restoration (**Figure 5.1.2**) began in April. Installation of the ladder and new holding pond was completed by May 2014 (**Figures 5.1.3** and **5.1.4**). The holding pond and fish ladder have removable barriers (**Figure 5.1.5**) that will allow any sediment entering the pond to continue down the course to the beach, where it will aid in nourishment of the shoreline, while keeping the system sediment-free.

Figure 5.1.1: Holding pond (filled with sediment) and fishway entrance on North Creek, April 2013, prior to Shoreline Restoration Project: downstream (left) and upstream (right).

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Figure 5.1.2: North Creek restoration, with fishway and holding pond removed, September 2014. Photo by Joe Weiss.

Figure 5.1.3: New fishway entrance from Seahurst Park beach, relocated in front of the Marine Technology building. Fish can enter the fishway at high tide. Photos by Burien Parks (February 2014) and Joe Weiss (September 2014).

Figure 5.1.4: Renovated fishway and adult holding pond. Photos by Joe Weiss and Burien Parks, 2014.

Figure 5.1.5: Removable barriers in the renovated fishway, looking into the pond entrance.

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

Broodstock is taken from adult fish returning on-site, and are not transported. In the event of broodstock shortfalls, eyed eggs are provided from Soos Creek Hatchery (see Soos Creek Hatchery Coho HGMP). Eggs are transported from Soos Creek Hatchery in buckets placed on burlap and ice in coolers. Transportation time is 30-35 minutes.

5.3 Broodstock holding and spawning facilities.

Pre-renovation, broodstock were held in a 20' x 15' x 3' concrete pond supplied with creek water. Sediment deposits from North Creek annually filled the pond (**Figure 5.1.1**), which the students removed each fall. Post-renovation, broodstock are held in the newly constructed 16’x8’x4’ oval holding pond (**Figure 5.3.1**), accessible by the relocated fishway (see also **Attachment 2**: City of Burien plans for fish ladder and ponds). The pond is supplied with water from North Creek via an 8” PVC pipe, and is accessible through the fishway at high tide. Spawning takes place at pond side.

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Figure 5.3.1: Renovated holding pond. Photos courtesy of Joe Weiss, 2014.

5.4 Incubation facilities.

Table 5.4.1: Incubation vessels available at the Marine Technology Lab.

Type	Trays	Size
Vertical stack incubators	6	24" x 25" x 3"

5.5 Rearing facilities.

Table 5.5.1: Rearing ponds available at the Marine Technology Lab.

Type	Number	Size	Volume
Fiberglass circular tanks	8	4-ft diameter	375 gallons

5.6 Acclimation/release facilities.

Coho are reared in fiberglass circular tanks supplied with creek water their entire time at the hatchery. Sea water is mixed into the tanks ten days prior to release to begin saltwater acclimation.

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

In previous years, power failures have shut down the fresh water pumps that fill the rearing tanks, which led to fry mortalities. This problem was precluded when a back-up generator was installed in 2009.

Flood and sedimentation issues due to the poorly engineered water diversion box (see HGMP section 4.1) has resulted in significant egg mortalities from 2008 to 2012. The intake was renovated in 2014, as part of the shoreline restoration project at Seahurst Park (**Figure 4.1.2**).

River otter predation has been a problem in the past, associated with some adult mortality in the holding pond. A cyclone fence surrounded the old pond, but otters could still enter though the fish ladder. Adults are spawned as quickly as possible to reduce their time in the pond before the otters find them. The effects of otter predation at the new pond site will remain unknown, until program adults begin to return again in 2017.

5.8 Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

The facility has a low-water alarm system and back-up generator for power outages (see HGMP section 5.7). As this is an educational facility, staff is present during business hours only. However, staff can be contacted by pager or phone should an emergency arise.

The *Seahurst Seawall Removal Project* plans include a new fishway and pond, and updating the water system to prevent sediment issues during heavy rain events (see HGMP section 4.1.1). Construction at the park began August 2013, and was completed by July 2014. No listed salmonids are known to occur in the small stream used as a water source.

6 SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1 Source.

Broodstock is collected from adult hatchery coho returning to the Marine Technology Lab holding pond through the fish ladder. Puget Sound coho is not ESA listed. When shortfalls occur, eyed-eggs and fry may be provided from Soos Creek Hatchery.

6.2 Supporting information.

6.2.1 History.

The program began in 1985 with eggs of Green River origin. This program is now maintained by returns to the Marine Technology Lab, as part of Puget Sound Skills Center's (PSSC) Marine Technology curriculum. The PSSC is an alternative high school-level educational program, which serves the Federal Way, Tahoma, and Tukwila and Highline school districts. The original broodstock was acquired from the Soos Creek Hatchery in 1970.

In most years, the stock is self-sustaining from returns to the Marine Technology Lab. Additional eyed eggs from Soos Creek Hatchery are brought in, as needed, to meet release goals. Up to 10,000 yearlings are released from the MTL facility, which is on a small, non-fish bearing, spring-fed creek.

In 2012, hatchery activities were suspended for two years to accommodate the Shoreline Restoration Project at Seahurst Park. No returning adults were collected at this time. The project will resume with brood year 2014 eyed-eggs from Soos Creek Hatchery.

See HGMP section 6.1.

6.2.2 Annual size.

Up to 80 adults.

6.2.3 Past and proposed level of natural fish in broodstock.

Past levels of natural-origin fish incorporated into the MTL hatchery broodstock are unknown. Currently this production is managed as a segregated program, and only adipose fin-clipped fish are collected from returning broodstock. Eyed-eggs transferred from Soos Creek Hatchery are from an integrated program (see Soos Creek Coho HGMP).

6.2.4 Genetic or ecological differences.

Unknown.

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6.2.5 Reasons for choosing.

The program was initiated with eggs of Green River-origin. Current program uses locally-adapted stock, with eggs back-filled from Soos Creek Hatchery when egg-take goals are not met.

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.

Coho salmon voluntarily enter a pond accessible at high tide from Seahurst Beach. No listed chinook or steelhead are known to enter the stream.

7 SECTION 7. BROODSTOCK COLLECTION

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

Adults.

7.2 Collection or sampling design.

Adults enter a concrete holding pond via a fish ladder between October 15 and November 15. Only hatchery-origin fish, distinguished by adipose fin-clips are used for broodstock, although unmarked returns have never been observed at the facility.

7.3 Identity.

All coho released through this program have been consistently mass marked since 2001.

7.4 Proposed number to be collected:

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

Up to 80 adults collected annually.

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

Table 7.4.2.1: Broodstock and eggs collected at PSSC Marine Tech Lab facility, 2000-2011.

Year	Broodstock		Eggs Collected	Eggs Received[a]	
	Females	Males		Number	Source
2000	25	25	25000	0	---
2001	30	30	30000	0	---
2002	28	28	28000	0	---
2003	14	14	14000	5000	Soos Cr Hatchery
2004	26	26	26000	0	---
2005	30	30	30000	0	---
2006	24	24	24000	0	---
2007	0	0	0	[a]5000	Soos Cr Hatchery
2008	12	12	12000	[b]5000	
2009	14	14	14000	[b]5000	
2010	10	10	10000	[b]5000	
2011	0	0	0	[a]5000	
2012	Program suspended[c]				
2013					

Source: Marine Technology Lab data 2013.

[a] Backfill when on-site broodstock egg-take goals are not reached.

[b] Water flow problems lead to egg loss, requiring back-fill from Soos Creek Hatchery.

[c] Program suspended for two years to accommodate Phase 2 of the Shoreline Restoration Project at Seahurst Park.

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No eggs were taken in 2012. Planned construction for the North Shoreline Restoration Project in Seahurst Park was scheduled for October 2012 through May 2013. Hatchery production was shut down to accommodate the renovations, however, funding for the project could not be secured, and project stalled. New plans for the Seahurst Park renovations are scheduled to begin in August 2013, and were completed in July 2014. The program will be restarted with eyed-eggs from Soos Creek Hatchery.

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

Excess broodstock are killed and frozen on-site for later dissection by students as per the class curriculum.

7.6 Fish transportation and holding methods.

Adult fish are not transported

7.7 Describe fish health maintenance and sanitation procedures applied.

Standard fish health protocols, as defined in the *Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State* (WDFW and WWTIT 1998, updated 2006) are adhered to. No antibiotics or formalin treatment is applied.

7.8 Disposition of carcasses.

Carcasses are deposited on an adjacent beach for nutrient enhancement.

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.

Coho salmon voluntarily enter a pond accessible at high tide from Seahurst Beach. No listed Chinook or steelhead are known to enter the stream.

8 SECTION 8. MATING

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

8.1 Selection method.

Broodstock is collected from randomly-paired ripe hatchery-origin fish returning to the MTL fish ladder.

In the event of shortfalls, eyed-eggs are provided from Soos Creek Hatchery (see also Soos Creek Coho HGMP).

8.2 Males.

All adult males collected are considered for spawning, and are selected randomly on spawn days. Jacks are usually not used, and have not been observed for this program.

In the event of shortfalls, eyed-eggs are provided from Soos Creek Hatchery (see also Soos Creek Coho HGMP).

8.3 Fertilization.

Eggs from five females collected into one bucket and milt from five males collected into one container and then mixed together.

In the event of shortfalls, eyed-eggs are provided from Soos Creek Hatchery (see also Soos Creek Coho HGMP).

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8.4 Cryopreserved gametes.

Cryopreserved gametes are not used. In the event of shortfalls, eyed-eggs are provided from Soos Creek Hatchery (see also Soos Creek Coho HGMP).

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.

No listed fish are included in the mating scheme through this program. Puget Sound coho are not ESA-listed; no listed fish populations have been identified in adjacent streams.

9 SECTION 9. INCUBATION AND REARING -

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

9.1 Incubation.

The program goal was set at 30,000 eggs, however, this goal has not been met since brood year 2007. FBD 2014 sets the egg-take at 10,000.

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

Table 9.1.1.1: Survival rates from egg-take to ponding, Marine Technology Lab coho.

Brood Year	Eggs		Survival Rates (%)	
	Collected	Received (Eyed)	Green-to-Eyed Up	Eye-Up-to-Ponding
2000	25,000	0	40	75
2001	30,000	0	40	80
2002	28,000	0	32	71
2003	14,000	5,000	21	67
2004	26,000	0	46	80
2005	30,000	0	47	83
2006	24,000	0	54	92
2007	0	5,000	N/A [b]	N/A [b]
2008	12,000	[c]5,000	25	100
2009	14,000	[c]5,000	7	[c]100
2010	10,000	[c]5,000	0	[c]100
2011	0	5,000	N/A [d]	N/A [d]
2012	[e]N/A	N/A	N/A	N/A
2013	[e]N/A	N/A	N/A	N/A

Source: Marine Technology Lab data 2013.

[a] No adult return, requiring back-fill from Soos Creek Hatchery.

[b] Records incomplete

[c] Water flow problems lead to egg loss, requiring back-fill from Soos Creek Hatchery.

[d] Fry loss due to equipment failure (see HGMP section 10.3).

[e] Hatchery production was shut down in 2012 in anticipation of Shoreline Development Plan renovations and upgrades to the facility.

9.1.2 Cause for, and disposition of surplus egg takes.

No excess eggs are collected beyond the needs of the program. If hatchery losses exceed the expected levels, then program goals for release are not met.

9.1.3 Loading densities applied during incubation.

Fertilized eggs are placed in trays at around 5,000 eggs per tray.

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9.1.4 Incubation conditions.

Eggs are incubated in vertical trays supplied with creek water at the flow of 3.5 gpm. Water temperature is monitored and dissolved oxygen levels are monitored when needed. The use of surface water often causes silt problems; however, this has not been an issue at the facility. Excess amounts of silt can be removed by "rodding" the trays and brushing the tray screens. Vexar® is not used.

9.1.5 Ponding.

When fish are 95%+ buttoned-up (mid-December/ mid-January), swim-up fry are force-ponded into one circular tank when they reach around 600 fpp (late-February).

9.1.6 Fish health maintenance and monitoring.

Eyed-eggs are picked prior to hatching; no formalin is used. Fry loss in the ponds is picked daily. Fry are checked when requested by WDFW Fish Health Specialist.

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

No listed fish are incubated for this program.

9.2 Rearing:

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

Table 9.2.1.1: Survival rates from fry to smolt release, PSSC Marine Tech Lab coho, 2000-2011.

Brood Year	Release Year	Survival Rates (%)
2000	**2002**	19
2001	**2003**	76
2002	**2004**	20
2003	**2005**	29
2004	**2006**	20
2005	**2007**	6
2006	**2008**	18
2007	**2009**	N/A[a]
2008	**2010**	79
2009	**2011**	46
2010	**2012**	0 [b]
2011	**2013**	0
2012	**----**	Program suspended
2013	**----**	Program suspended

Source: Marine Technology Lab data 2013.
[a] Records incomplete.
[b] Fry were lost due to equipment failure (see HGMP section 10.3).

In spring 2011, a low water alarm prompted response from PSSC staff. Although directions are provided, the back-up generator was mistakenly primed using (chlorinated) City water, which killed all the fry.

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

Loading and density levels at WDFW hatcheries conform to standards and guidelines set forth in Fish Hatchery Management (Piper et al. 1982) and the co-managers Fish Health Policy (WDFW

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and WWTIT 1998, updated 2006). Fish rearing densities are maintained at maximum of less than 3lbs of fish /gpm at release and under 0.35lbs/ft^3.

9.2.3 Fish rearing conditions

Table 9.2.3.1: Monthly average surface water temperature (°F) measured at North Creek, Marine Technology Lab, Burien.

Month	Average Water Temperature (ºF)
September	54
October	54
November	52
December	51
January	49
February	49
March	50
April	52
May	52
June	54
July	55
August	55

Source: MTL Hatchery records, 2012

When unfed fry reach ~600fpp (late February), they are moved in to one circular tank supplied with creek water. Fish are mass-marked (adipose fin-clip only) the following March/April, when they are approximately 60 fpp.

Fish growth and density levels are closely monitored and fish are split off into other tanks following the density requirements. Yearlings can be raised in up to six tanks.

Seawater is added to the rearing ponds ten days prior to release.

Tanks are cleaned once every two weeks during cooler months, and once a week during warmer months. Water level is lowered, and tanks are cleaned using sterile brush.

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

Not available.

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

Not available.

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

Fish eat the food supplied by WDFW, as available through their state contract; the food brand used may vary, depending on cost and vendor contracts. Feeding frequencies vary depending on the fish size and water temperature, and usually begins at four feedings/7-days a week and ends at one feeding/7-days a week.

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

Fish health is monitored on a daily basis by hatchery staff and at upon request by a state Fish Health Specialist. Procedures are consistent with the Co-Manager's Fish Health Policy (WDFW and WWTIT 1998, updated 2006).

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Tanks are cleaned with iodine solution when empty.

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

The migratory state of the release population is determined by fish behavior, silvery coloration and size (25 fpp or larger). ATPase activity is not measured.

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

No "NATURES" type rearing methods are applied through the program.

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.

No listed fish are under propagation through this program; Puget Sound coho are not ESA-listed.

10 SECTION 10. RELEASE

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

10.1 Proposed fish release levels.

Table 10.1.1: Proposed release levels

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Yearling	10,000	11	May	Puget Sound

Source: Future Brood Document 2013
Note: 11fpp = 151 mm fl

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

Stream, river, or watercourse: Puget Sound
Release point: Seahurst Beach (Burien)
Major watershed: Central Puget Sound
Basin or Region: Puget Sound

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

Table 10.3.1: Number and size released, Marine Tech Lab coho program, 2000-2012.

Release Year	Yearlings	Avg. size (fpp)	CV	Date(s)
2000	5,922	14	n/a	5/16, 6/8
2001	5,613	13	n/a	5/17
2002	1,550	13	n/a	5/21
2003	7,629	11	n/a	5/14, 6/9
2004	1,384	15	n/a	5/14
2005	1,718	12	n/a	5/20
2006	2,048	13	n/a	6/7
2007	710	14	n/a	5/17
2008	2,150	12	n/a	6/12-13
2009	5,350	14	n/a	6/15
2010	6,300	12	n/a	6/7, 6/14
2011	2,750	13	n/a	6/3
2012	Program suspended			
2013				
Average	**3,593**	**13**		

Source: WDFW Hatcheries Headquarters Database and PSSC Marine Tech Lab 2013

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No eggs taken in 2012 or 2013 (see HGMP section 7.4.2).

10.4 Actual dates of release and description of release protocols.

Coho are force released in late-May/early-June, near the end of the school year, based on size and smoltification levels. Students carry the smolts in 5-gallon plastic buckets to Seahurst Beach, where they are released into Puget Sound on an incoming tide.

10.5 Fish transportation procedures, if applicable.

Not applicable.

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

Coho are reared on creek water the entire time at the hatchery. Because smolts are released directly into Puget Sound, seawater is mixed with creek water ten days before release to begin salt water acclimation.

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

Table 10.7.1: Number and mark type released.

Brood Year	Yearlings	Marking
2014	10,000	Ad-clip only

Source: Future Brood Document 2014

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

No excess fish have been raised through this program. Adult returns 2006 to 2011 did not meet broodstock goals, and eyed eggs were transferred from Soos Creek Hatchery.

10.9 Fish health certification procedures applied pre-release.

Prior to release, the fish are checked by the facility manager for any diseases, and are released if deemed healthy. WDFW Hatcheries staff came out to the facility once, in 1995, to treat a bacterial infection with antibiotics.

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

In the case of a catastrophic event (drought) critical to the fish survival, the fish would be released early to prevent their loss in the ponds.

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

All yearling coho salmon will be released in late-May into the Puget Sound to minimize the likelihood for interaction, and adverse ecological effects, to listed natural Chinook salmon and steelhead juveniles. Juvenile Chinook migrate seaward as sub-yearling smolts predominately in May, while steelhead seaward migration occurs principally from April to mid-May (PSSTRT 2011). See also HGMP section 2.2.3.

The Puget Sound Technical Recovery Team has not identified a historical Chinook or steelhead population for the creek in which releases occur.

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11 SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

The purpose of monitoring is to identify and evaluate the benefits and risks from this hatchery program, elements of which are identified in HGMP section 1.10. The Co-managers conduct numerous ongoing monitoring programs, including, catch, escapement, marking, tagging, smolt trapping and fish health testing. The enhanced monitoring and evaluation programs focus on the risks posed by ecological interactions with listed species.

See also Soos Creek Coho HGMP.

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

Continue to mass-mark fish to allow identification at the hatchery rack and on the spawning grounds for possible straying. All broodstock returning to the hatchery will be monitored for their adipose-fin clip to differentiate from any possible listed fish.

See also Soos Creek Coho HGMP.

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

See HGMP section 11.1.1.

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

Risk aversion measures will be developed in conjunction with the monitoring and evaluation plans.

See also Soos Creek Coho HGMP.

12 SECTION 12. RESEARCH

12.1 Objective or purpose.

Research specific to the Marine Tech Lab coho program is not conducted. The Army Corps of Engineers is responsible for monitoring changes resulting from the shoreline restoration project.

12.2 Cooperating and funding agencies.

Not applicable.

12.3 Principle investigator or project supervisor and staff.

Not applicable.

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

Not applicable.

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

Not applicable.

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12.6 Dates or time period in which research activity occurs.

Not applicable.

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

Not applicable.

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

Not applicable.

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

Not applicable.

12.10 Alternative methods to achieve project objectives.

Not applicable.

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

Not applicable.

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.

Not applicable.

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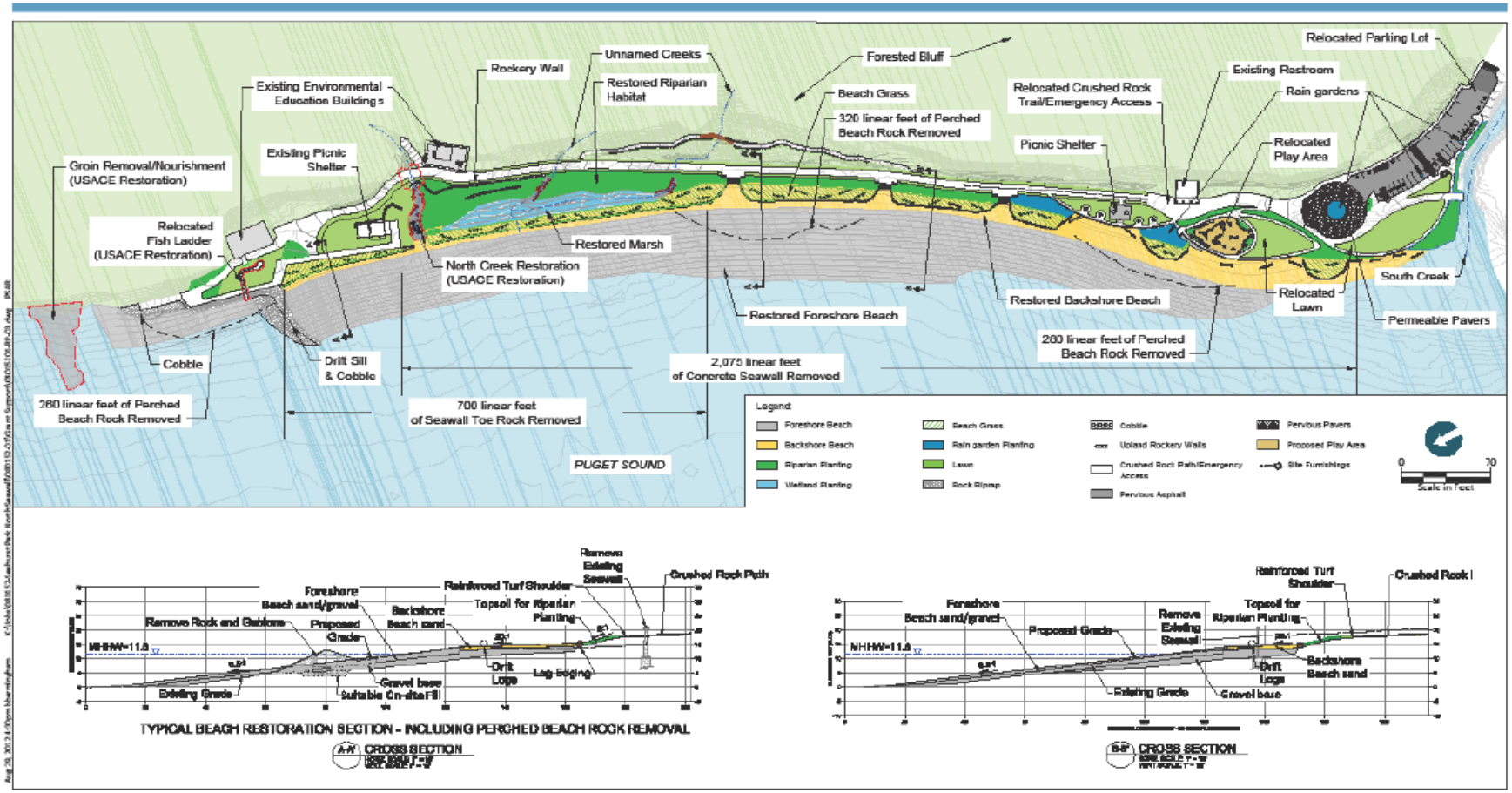
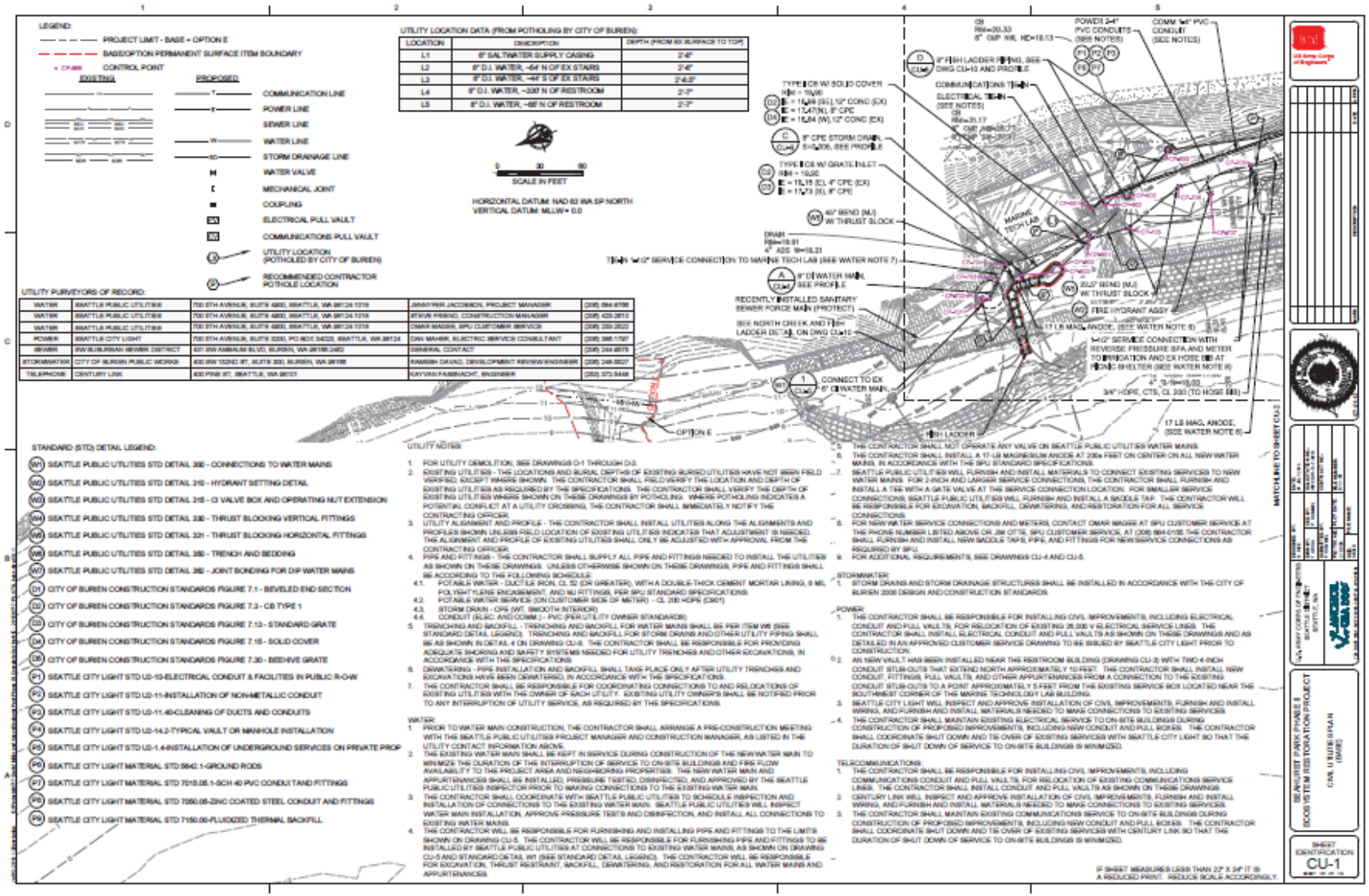
Attachment 1: Map of planned renovations, Seahurst Park Shoreline Restoration Project, including fish ladder/pond relocation and North Creek restoration.

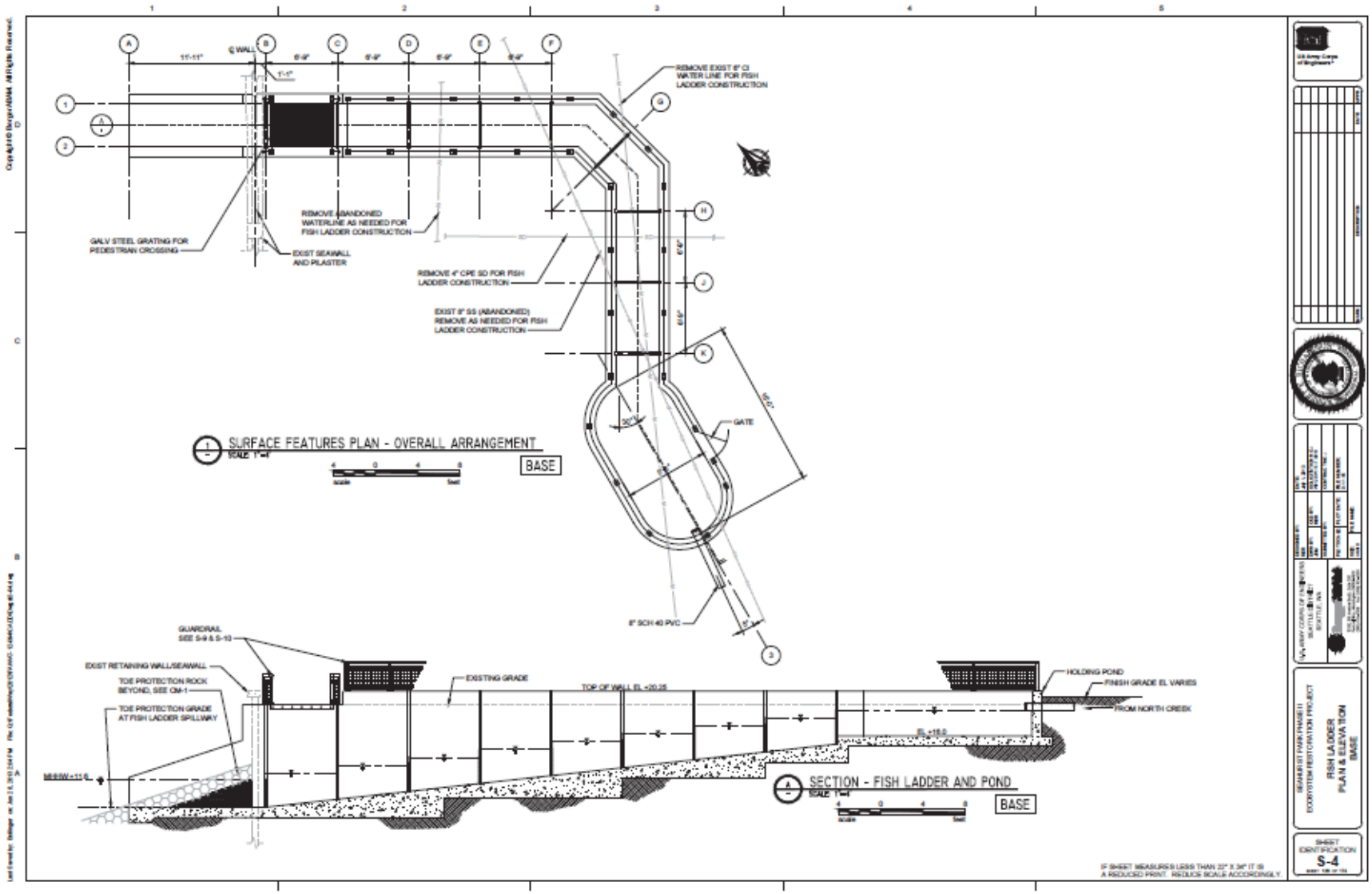
Source: City of Burien.



Attachment 2: Plans for Marine Technology Lab fish ladder and pond construction.

Source: City of Burien.




SURFACE FEATURES PLAN - OVERALL ARRANGEMENT
SCALE 1"=4'
BASE
REMOVE EXIST 8" CI WATER LINE FOR FISH LADDER CONSTRUCTION
REMOVE ABANDONED WATERLINE AS NEEDED FOR FISH LADDER CONSTRUCTION
GALV STEEL GRATING FOR PEDESTRIAN CROSSING
EXIST SEAWALL AND PILASTER
REMOVE 4" CPE SD FOR FISH LADDER CONSTRUCTION
EXIST 8" SS (ABANDONED) REMOVE AS NEEDED FOR FISH LADDER CONSTRUCTION
GATE
8" SCH 40 PVC
SECTION - FISH LADDER AND POND
SCALE 1"=4'
BASE
GUARDRAIL SEE S-9 & S-10
EXIST RETAINING WALL/SEAWALL
TOE PROTECTION ROCK BEYOND, SEE CM-1
TOE PROTECTION GRADE AT FISH LADDER SPILLWAY
EXISTING GRADE
TOP OF WALL EL +20.25
HOLDING POND
FINISH GRADE EL VARIES
FROM NORTH CREEK
MHHW +11.6
EL +15.0
IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.
SEAFIRST PARK PHASE II
ECOSYSTEM RESTORATION PROJECT
FISH LADDER
PLAN & ELEVATION
BASE
SHEET IDENTIFICATION
S-4

14 SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

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

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15 ADDENDUM A. PROGRAM EFFECTS ON OTHER (AQUATIC OR TERRESTRIAL) ESA-LISTED POPULATIONS. (Anadromous salmonid effects are addressed in Section 2)

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.

The WDFW and the USFWS have a Cooperative Agreement pursuant to section 6(c) of the Endangered Species Act that covers the majority of the WDFW actions, including hatchery operations.

> *"The department is authorized by the USFWS for certain activities that may result in the take of bull trout, including salmon/steelhead hatchery broodstocking, hatchery monitoring and evaluation activities and conservation activities such as adult traps, juvenile monitoring, spawning ground surveys..."*

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

Several listed and candidate species are found in King County; however the hatchery operations and facilities for this program do not fall within the critical habitat for any of these species. As such there are no effects anticipated for these species.

Listed or candidate species:
"No effect" for the following species:

Bull trout *(Salvelinus confluentus)* –Threatened [critical habitat designated]
Marbled murrelet (*Brachyramphus marmoratus*) –Threatened [critical habitat designated]
Canada Lynx (*Lynx canadensis*) –Threatened [critical habitat designated]
Gray Wolf (*Canis lupus*) –Threatened
Grizzly bear (*Ursus arctos horribilis*) –Threatened
Northern Spotted owl (*Strix occidentalis caurina*) –Threatened [critical habitat designated]

Candidate Species
Fisher *(Martes pennanti)* – West Coast DPS
North American wolverine *(Gulo gulo luteus)* – contiguous U.S. DPS
Oregon spotted frog *(Rana pretiosa)* [historic]
Yellow-billed cuckoo *(Coccyzus americanus)*
Whitebark pine *(Pinus albicaulis*)

15.3 Analyze effects.

Not applicable

15.4 Actions taken to minimize potential effects.

Not applicable

15.5 References

Not applicable

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16 "Take" Tables

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

Listed species affected: Chinook (*Oncorhynchus tshawytscha*) Steelhead (*O. mykiss*)	**ESU/Population:** Puget Sound Chinook Puget Sound Steelhead	**Activity:** Marine Technology Lab Coho Program
Location of hatchery activity: Seahurst Park (Burien, WA)	**Dates of activity:** October-May	**Hatchery program operator:** WDFW

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]	-	-	0	
Capture, handle, tag/mark/tissue sample, and release [d]	-	-	-	-
Removal (e.g. broodstock) [e]	-	-	-	-
Intentional lethal take [f]	-	0	0	-
Unintentional lethal take [g]	-	0	0	-
Other Take (specify) [h]	-	-	-	-

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

Instructions:

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

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