

CLACKAMAS HATCHERY



PROGRAM MANAGEMENT PLAN 2017

Clackamas Hatchery

(Clear Creek Acclimation, Foster Creek Acclimation, Eagle Creek Hatchery)

INTRODUCTION

Clackamas Hatchery is located on the Clackamas River in McIver State Park, 6 miles west of the city of Estacada, Oregon. The site is located at an elevation of 313 feet above sea level, at latitude 45° 17' 46" N (45.30528) and longitude 122° 21' 37" W (122.3686). The area of the site is 17 acres.

Water rights total 44,354 gpm from the Clackamas River and a well. The Clackamas River provides the majority of water used for hatchery operations. All ponds and raceways receive single-pass water.

The hatchery is operated with 4.5 FTE's.

Rearing Facilities at Clackamas Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (ft ³)	Number Units	Total Volume (ft ³)	Construction Material	Age	Condition	Comment
Adult Holding Ponds	60	10	4.25	2250	3	10,080	concrete	1980	good	Remodeled in 2001
Raceways	75	17	3.2	4,080	4	16,320	concrete	1980	good	
Raceways	75	17	3.2	4,080	6	24,480	concrete	1987	good	
Rearing Ponds	300	50	4.5	67,500	2	135,000	asphalt/ concrete	1980	good	
Rearing Ponds	300	50	4.5	67,500	1	67,500	asphalt/ concrete	1987	good	
Canadian Troughs	15	2.66	1.66	66	2	132	fiberglass	1988	good	
Vertical Incubators					272		fiberglass	1980	good	17 stacks of 16 trays

PURPOSE

Clackamas Hatchery began operation in 1979 and is operated from three funding sources: National Marine Fisheries Service (NMFS), Portland General Electric (PGE) and the City of Portland. The NMFS funding is part of the Columbia River Fisheries Development Program (Mitchell Act)—a program to enhance declining fish runs in the Columbia River Basin. PGE and the City of Portland provide funding as mitigation for fishery losses caused by hydroelectric development in the Sandy and Clackamas river systems.

Clackamas Hatchery is used for adult collection, egg incubation and rearing of spring Chinook and winter steelhead, rearing of coho and acclimation of summer steelhead.

PROGRAM TYPE

The ODFW Hatchery Management Policy defines hatchery programs as either harvest or conservation programs. Harvest programs operate to enhance or maintain fisheries without impairing naturally reproducing populations. Conservation programs operate to maintain or increase the number of naturally produced fish without reducing the productivity of naturally reproducing populations.

Clackamas Hatchery programs are harvest programs used for mitigation of fishing and harvest opportunities lost due to habitat loss and migration blockage due to hydroelectric projects in the Clackamas River and Sandy River Basins.

GOALS

Sandy River (11) Spring Chinook: to mitigate for the loss of spring Chinook catch in sport and commercial fisheries due to habitat degradation and passage impairment resulting from City of Portland construction and operation of dams on the Bull Run River.

Clackamas River (19H) Spring Chinook: to mitigate for loss of spring Chinook catch in sport and commercial fisheries due to loss of habitat quantity and quality due to construction and operation of PGE on the Clackamas River and USACE hydropower dams on the Columbia River.

South Santiam (24H) Summer Steelhead: to provide fish for sport fisheries and mitigate for fisheries lost due to habitat and production loss in the Clackamas, Willamette and lower Columbia rivers.

Clackamas River (122H) Winter Steelhead: to help meet PGE and City of Portland mitigation agreement goals, and to provide sport harvest opportunities on hatchery winter steelhead in the lower Clackamas River without intentional risks to naturally producing populations.

Big Creek (13H) Coho: to provide fish for the Select Area Fisheries Enhancement (SAFE) Program to mitigate for reduced coho salmon catch in sport and commercial fisheries due to habitat and passage loss or degradation in the Columbia River Basin.

The Portland General Electric (PGE) mitigation agreement calls for the annual production of no more than 25,000 pounds of salmon and steelhead. The City of Portland mitigation goal is for no more than 32,000 pounds of spring Chinook and steelhead. The remaining hatchery production is to contribute to the Columbia River sport and commercial fisheries, and to meet subbasin fishery management goals.

OBJECTIVES

Objective 1: Foster and sustain opportunities for sport, commercial, and tribal fishers consistent with the conservation of naturally produced native fish.

Spring Chinook

Sandy River (11X) Stock:

Provide 150,000 eggs for transfer to Oxbow Hatchery.

Clackamas River (19H) Stock:

Produce 70,000 eggs for Lower Willamette STEP.

Produce 750,000 eggs for transfer Bonneville Hatchery.

Produce 280,000 eggs for transfer to Big Creek Hatchery.

Produce 260,000 eggs for transfer to Eagle Creek National Fish Hatchery.

Produce 480,000 smolts (48,000 pounds) for release into the Clackamas River.

Produce 165,000 smolts (15,000 pounds) for transfer to Clear Creek Acclimation for acclimation and release into the Clackamas River.

Produce 240,000 smolts (24,000 pounds) at Eagle Creek NFH for release into Eagle Creek.

Coho:

Big Creek (13H) Stock:

Produce 540,000 fingerlings (19,286 pounds) for transfer to CCF Tongue Point Net Pens.

Summer Steelhead:

South Santiam River (24H) Stock:

Acclimate 150,000 smolts (33,333 pounds) for release into the Clackamas River.

Winter Steelhead:

Clackamas River (122) Stock:

Produce 200,000 eggs for transfer to Oak Springs Hatchery.

Produce 150,000 eggs for transfer to Eagle Creek National Fish Hatchery

Release 110,000 smolts (21,666 pounds) into the Clackamas River.

Release 50,000 smolts (8,333 pounds) from Foster Cr. Acclimation Pond.

Produce 100,000 smolts (16,667 pounds) at Eagle Creek NFH for release into Eagle Creek.

Objective 2: Contribute toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery-produced fish.

Objective 3: Maintain genetic resources of native fish populations spawned or reared in captivity.

Objective 4: Restrict the introduction, amplification, or dissemination of disease agents in hatchery produced fish and in natural environments by controlling egg and fish movements and by prescribing a variety of preventative, therapeutic and disinfecting strategies to control the spread of disease agents in fish populations in the state.

Objective 5: Minimize adverse ecological impacts to watersheds caused by hatchery facilities and operations.

Objective 6: Communicate effectively with other fish producers, managers and the public.

CURRENT PRACTICES TO ACHIEVE OBJECTIVES

The sections that follow describe the current hatchery practices used at this facility. Because ODFW hatcheries are managed to maximize use of the hatchery rearing space, hatchery operations are dynamic and subject to annual change depending upon statewide program needs.

The Native Fish Conservation Policy, the Fish Hatchery Management Policy, the Fish Health Management Policy and Hatchery Genetic Management Plans provide guidelines for the management of wild and hatchery fish in Oregon. These policies describe the brood collection, rearing, release, and health management strategies currently used at this facility.

Objective 1: Foster and sustain opportunities for sport, commercial, and tribal fishers consistent with the conservation of naturally produced native fish.

Adult Collection

Spring Chinook:

Sandy River (11) Stock: Broodstock collection takes place at Sandy Hatchery (when accessible to returning fish), the mouth of Cedar Creek and, at temporary weir/trap locations on the Bull Run River and in the upper Sandy Basin. A total of 108 adults are collected for broodstock. Collected brood fish are then transported to Clackamas Hatchery for spawning. Up to 20 Wild males may be used in the broodstock; gametes are taken in the field and adults are released back into the river.

Clackamas River (19) Stock: Adults arrive in the Clackamas River from May through September. Peak spawning occurs in late September. Adults are collected at the hatchery.

Coho:

Big Creek (13) Stock No adults are collected at this facility (see Big Creek Hatchery Plan for additional information).

Summer Steelhead:

South Santiam River (24) Stock: No adults are held for spawning at this facility (see South Santiam Hatchery Plan for additional information). Adults returning to this facility are recycled down stream for sport fishing opportunity or donated to the Oregon Food Bank.

Winter Steelhead:

Clackamas River (122H) Stock: Wild and hatchery steelhead adults arrive in the Clackamas River from February through May, with peak spawning in May. The broodstock is made up from 100% hatchery fish collected at the hatchery.

Objective 2: Contribute toward the sustainability of naturally produced native fish populations through the responsible use of hatcheries and hatchery-produced fish.

Rearing and Release Strategies

Rearing and release strategies are designed to limit the amount of ecological interactions occurring between hatchery and naturally produced fish. Fish are reared to sufficient size that smoltification occurs within nearly the entire population, which will reduce the retention time in downstream migration. Rearing on parent river water, or acclimation to parent river water for several weeks, is used to ensure strong homing to the hatchery, thus reducing the stray rate to natural populations. Various release strategies are used to ensure that fish migrate from the hatchery with least amount of interaction with native populations. The specific rearing and release strategies used at this hatchery are outlined below.

Spring Chinook

Clackamas River (19H) Stock:

Receive 645,000 fish at 16 fish/pound from Bonneville Hatchery in October. Rear 480,000 smolts to a size of 10 fish/pound for on-station release into the Clackamas River in early March. All smolts are fin-clipped and 130,000 are coded wire tagged prior to release.

Transfer a total of 165,000 smolts to Clear Creek Acclimation at 11 fish/pound for release into the Clackamas River in February (55,000), March (55,000) and April (55,000) All fish are fin-clipped prior to release (marking and tagging take place at Bonneville Hatchery).

Rear 240,000 smolts to a size of 10 fish/pound at Eagle Creek NFH for release into Eagle Creek in March. All fish are fin-clipped and 40,000 are coded-wire tagged prior to release.

Coho:

Big Creek (13H) Stock:

Receive 545,000 fingerlings from Bonneville Hatchery in May at a size of 135 fish/pound; rear to a size of 28 fish/pound for transfer to CCF Tongue Point Net Pens in mid-October. All fish are fin-clipped and 25,000 are coded-wire tagged prior to transfer.

Summer Steelhead:

South Santiam River (24H) Stock:

Receive 150,000 smolts from Bonneville Hatchery in mid-March at a size of 4.5 fish/pound; acclimate and release into the Clackamas River in April. All fish are fin-clipped and right-maxillary clipped prior to release.

Receive one group of 25,000 smolts from Bonneville Hatchery at a size of 4.5 fish/pound at Foster Creek Acclimation site in March for acclimation and release into the Clackamas River in April. All fish are fin-clipped prior to release.

Winter Steelhead:

Clackamas River Wild (122) Stock:

Receive 50,000 smolts at a size of 6 fish/pound from Bonneville Hatchery in March for acclimation and release into the Clackamas River in early May. All fish are fin-clipped prior to release.

Receive 60,000 smolts at a size of 6 fish/pound from Oak Springs Hatchery for acclimation and release in early April. All fish are fin-clipped prior to release.

Produce 110,000 smolts at a size of 5 fish/pound at Eagle Creek NFH for release into Eagle Creek in May. All fish are fin-clipped prior to release.

Receive 25,000 smolts from Bonneville Hatchery at a size of 6 fish/pound at Foster Creek Acclimation site in February for acclimation and release into the Clackamas River in early March and receive 25,000 smolts from Bonneville Hatchery at a size of 6 fish/pound at Foster Creek Acclimation site in early April for acclimation and release into the Clackamas River in May. All fish are fin-clipped prior to release.

Objective 3: Maintain genetic resources of native fish populations spawned or reared in captivity.

Broodstock Selection and Spawning

Oregon's Native Fish Conservation Policy and Hatchery Genetic Management Plans outline broodstock selection and spawning protocols for some fish stocks. The following practices are currently being used at Clackamas Hatchery:

Spring Chinook:

Sandy River (11) Stock: Adults are collected throughout the run at Sandy Hatchery and/or at off-station sites by angling, in weirs/traps, or by seine/tangle net, and then transported to Clackamas Hatchery where they are held and spawned. Adults are spawned at a 1:1 male to female ratio. Up to 20 Wild males may be used in the broodstock; gametes are taken in the field and adults are released back into the river.

Clackamas River (19H) Stock: Adults are collected throughout the entire run and spawned at a 1:2 male to female ratio. Only hatchery fish are utilized as broodstock; all wild fish are passed above the North Fork Dam to spawn naturally.

Coho:

Big Creek (13H) Stock: No adults are collected at this facility (see Big Creek Hatchery Plan for additional information).

Summer Steelhead:

South Santiam River (24H) Stock: No spawning is conducted at this facility (see South Santiam Hatchery Plan for further information).

Winter Steelhead:

Clackamas River (122H) Stock: Adults are collected throughout the run and spawned at a 1:1 male to female ratio. Broodstock is made up of 100% hatchery fish (progeny of original wild broodstock).

Objective 4: Restrict the introduction, amplification, or dissemination of disease agents in hatchery produced fish and in natural environments by controlling egg and fish movements and by prescribing a variety of preventative, therapeutic and disinfecting strategies to control the spread of disease agents in fish populations in the state.

Fish Health Management Programs—All Stocks

ODFW has adopted a Fish Health Management Policy that describes measures that minimize the impact of fish diseases on the state's fish resources. The primary objective of fish health management programs at ODFW hatcheries is to produce healthy smolts that will contribute to the fishery and return sufficient numbers of adults to continue propagation of the stocks and provide supplementation if desired. Equally important is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stocks.

ODFW has implemented both disease control and disease prevention programs at all of its facilities to achieve these objectives. These programs include the following standard elements:

Disease Control (Reactive)

- Perform necropsies of diseased and dead fish to diagnose the cause of loss.
- Prescribe appropriate treatments and remedies to disease. This includes recommending modifications in fish culture practices, when appropriate, to alleviate disease-contributing factors.
- Apply a disease control policy as stated in the Oregon Administrative Rules which dictates how specific disease problems will be addressed and what restrictions may be placed on movements of diseased stocks.

- Conduct applied research on new and existing techniques to control disease epizootics.

Disease Prevention (Proactive)

- Routinely remove dead fish from each rearing container and notify ODFW Fish Pathology if losses are increasing. Monthly mortality records are submitted to Fish Pathology from each hatchery.
- Routinely perform examinations of live fish to assess health status and detect problems before they progress to clinical disease or mortality.
- Implement disease preventative strategies in all aspects of fish culture to produce a quality fish. This includes prescribing the optimal nutritional needs and environmental conditions in the hatchery rearing container based on historical disease events. It also involves the use of vaccines or antibiotics in order to avoid a disease problem.
- Use a disease prevention policy that restricts the introduction of stocks into a facility. This will help avoid new disease problems and fish pathogens not previously found at the site.
- Use sanitation procedures that prevent introduction of pathogens into and/or within a facility.
- Conduct applied research on new and existing disease prevention techniques.
- Utilize pond management strategies (e.g., Density Index and Flow Index guidelines) to help optimize the quality of the aquatic environment and minimize fish stress that can be conducive to infectious and noninfectious diseases. For example, a Density Index is used to estimate the maximum number of fish that can occupy a rearing unit based on the rearing unit's size. A Flow Index is used to estimate the rearing unit's carrying capacity based on water flows.

Fish Health Activities at Clackamas Hatchery

Health Monitoring

- Monthly health monitoring examinations of healthy and clinically diseased fish are conducted on each fish lot at the hatchery. The sample includes a minimum of 10 moribund/dead fish (if available) and 4-6 live fish per lot.
- All fish are given a health inspection no longer than 6 weeks before fish are released or transferred. This exam may be in conjunction with the routine monthly visit.

- Examinations for *Myxobolus cerebralis*, agent of whirling disease, are conducted annually on 60 fish held for a minimum of 180 days at the facility.
- At spawning, a minimum of 60 ovarian fluids and 60 kidney/spleen/pyloric caeca (based on a minimum sampling at the 5% incidence level) are examined for viral pathogens from each salmon lot. If prespawning mortality is above normal, necropsies are conducted on dead adult fish for bacteria, parasites and other causes of death.
- Whenever abnormal behavior is reported or observed, or mortality exceeds 0.1% per day over five consecutive days in any rearing container, the fish pathologist will examine the affected fish, make a diagnosis and recommend the appropriate remedial or preventative measures.
- Reporting and control of specific fish pathogens are conducted in accordance with the Fish Health Management Policy. Results from each examination mentioned above are reported on the ODFW Fish Health or Virus Examination forms.

Fish and Egg Movements

- Movements of fish and eggs are conducted in accordance with the Fish Health Management Policy.

Therapeutic and Prophylactic Treatments

- Adult spring Chinook are injected with antibiotics for the control of bacterial diseases.
- At spawning, eggs are water-hardened in iodophor for disinfection.
- Juvenile fish are administered antibiotics orally as needed for the control of bacterial infections and for prevention of diseases.
- Only approved or permitted therapeutic agents are used for treatments:
 - FDA labeled and approved for use on food fish
 - Allowed by the FDA as an Investigational New Animal Drug
 - Obtained by extra-label prescription from a veterinarian
 - Allowed by the FDA as low regulatory priority or deferred regulatory status
 - Approved by the FDA through USFWS for fish listed under the federal Endangered Species Act.

Sanitation

- All eggs brought to the facility are surface-disinfected with iodophor.
- All equipment (e.g., nets, tanks, rain gear, boots) is disinfected with iodophor between uses with different fish/egg lots.
- Different lots of fish/eggs are physically segregated from each other by separate ponds, incubator units and water supplies.
- Fish transport trucks are disinfected between the hauling of different fish lots.
- Filtered and UV-disinfected water is provided for incubation and early rearing of winter steelhead to be shipped to Oak Springs Hatchery.
- Spring Chinook juveniles are not held at Clackamas Hatchery from mid-September to early October to avoid exposure to IHN virus in the water supply.

Objective 5: Minimize adverse ecological impacts to watersheds caused by hatchery facilities and operations.

Environmental Monitoring

Primarily, environmental monitoring is conducted at ODFW facilities to ensure these facilities meet the requirements of the National Pollution Discharge Elimination Permit administered by the Oregon Department of Environmental Quality. It is also used in managing fish health. On a short-term basis, monitoring helps identify when changes to hatchery practices are required. Long-term monitoring provides the ability to quantify water quality impacts resulting from changes in the watershed (e.g., logging, road building and urbanization). The following environmental parameters are currently monitored at all ODFW hatcheries:

- Total Suspended Solids (TSS) – measured quarterly. Two composite samples are collected, one during normal operations and one during cleaning. Some facilities may take more samples because of multiple outfalls.
- Settleable Solids (SS) – measured quarterly. Two composite samples are collected, one during normal operations and one during cleaning. Some facilities may take more samples because of multiple outfalls.
- pH – measured quarterly when settleable solids are measured.
- Total Ammonia and Total Phosphorus – measured quarterly during the first 12 months of the permit when settleable solids are measured.

- Water Temperatures – daily maximum and minimum water temperatures are measured within the hatchery. Temperature units are recorded for egg development in some hatcheries. Effluent and receiving stream temperatures are measured weekly from April to October.
- Dissolved Oxygen (DO) – measured only when conditions warrant (e.g., periods of low flows and high temperatures).
- Air Temperatures – maximum and minimum temperatures are recorded daily at some stations, but there are no special monitoring requirements.
- Flow Logs – changes in water flows through the hatchery ponds are recorded weekly.

Objective 6: Communicate effectively with other fish producers, managers and the public.

Coordination/Communication within ODFW

Annual Fish Production Meetings: ODFW conducts meetings throughout the state to set annual fish production goals for all public hatcheries in Oregon. These meetings involve the participation of ODFW research, management and fish culture staff as well as representatives from applicable federal agencies and tribes.

Record Keeping: The following records are kept at all ODFW hatcheries:

- Anadromous Adult Transaction Report – details the collection and disposition of all adult fish handled at the facility.
- Mark Recovery Report – details sex, fish length and tag information from all marked adult fish that are captured.
- Egg and Fry Report – records all egg and fry movements, treatments, etc.
- Monthly Poned Report – updates hatchery operations from the previous month (i.e., current number of fish, size, transfers or releases, feed conversion, mortality, medication, etc.).
- Monthly Progress Report – document summarizing operational activities for the hatchery and all satellite facilities (e.g., fish culture, fish health, fish distribution, maintenance and safety).
- Fish Loss and Treatment Report – records disease problems and daily mortality.

- Fish Loss Report/Investigation – when 1,000 or more juveniles or 10 or more adult fish are accidentally lost in a single accident.
- Predator Mortality Report – documents any fish predators that may die at the hatchery facility.
- Fish Liberation Reports – details information regarding all fish releases (e.g., fish numbers, size, location, method of release, marks, etc.).
- Coded–Wire Tag Release Reports – record of all juvenile fish released with coded-wire tags.
- Length Frequency Record – details fish lengths of all anadromous fish released (based on a sample of the releases).
- Chemical use, waste discharge monitoring, purchasing, budget, hazardous materials, safety, vehicles, equipment, maintenance and alarm logs.
- Visitor Log – some facilities record the daily visitor use of the facility; however, this is not a requirement.

Hatchery Management System (HMS): Computerized system to collect, report, summarize and analyze hatchery production data. This system is a tool to be used in production control at all hatchery management levels.

Interagency Coordination/Communication

Production Advisory Committee (PAC): The Columbia River PAC is comprised of representatives from the regulatory management agencies and tribes. This group meets monthly to discuss anadromous fish production issues and to provide an opportunity for communication among the anadromous fish hatchery managers.

Technical Advisory Committee (TAC): The Columbia River TAC is comprised of regulatory fish harvest technicians. This group provides management direction used in establishing hatchery fish production goals. TAC meets monthly.

Pacific Northwest Fish Health Protection Committee (PNFHPC): This group is comprised of representatives from U.S. and Canadian fish management agencies, tribes, universities, and private fish operations. The groups meets twice a year to monitor regional fish health policies and to discuss current fish health issues in the Pacific Northwest.

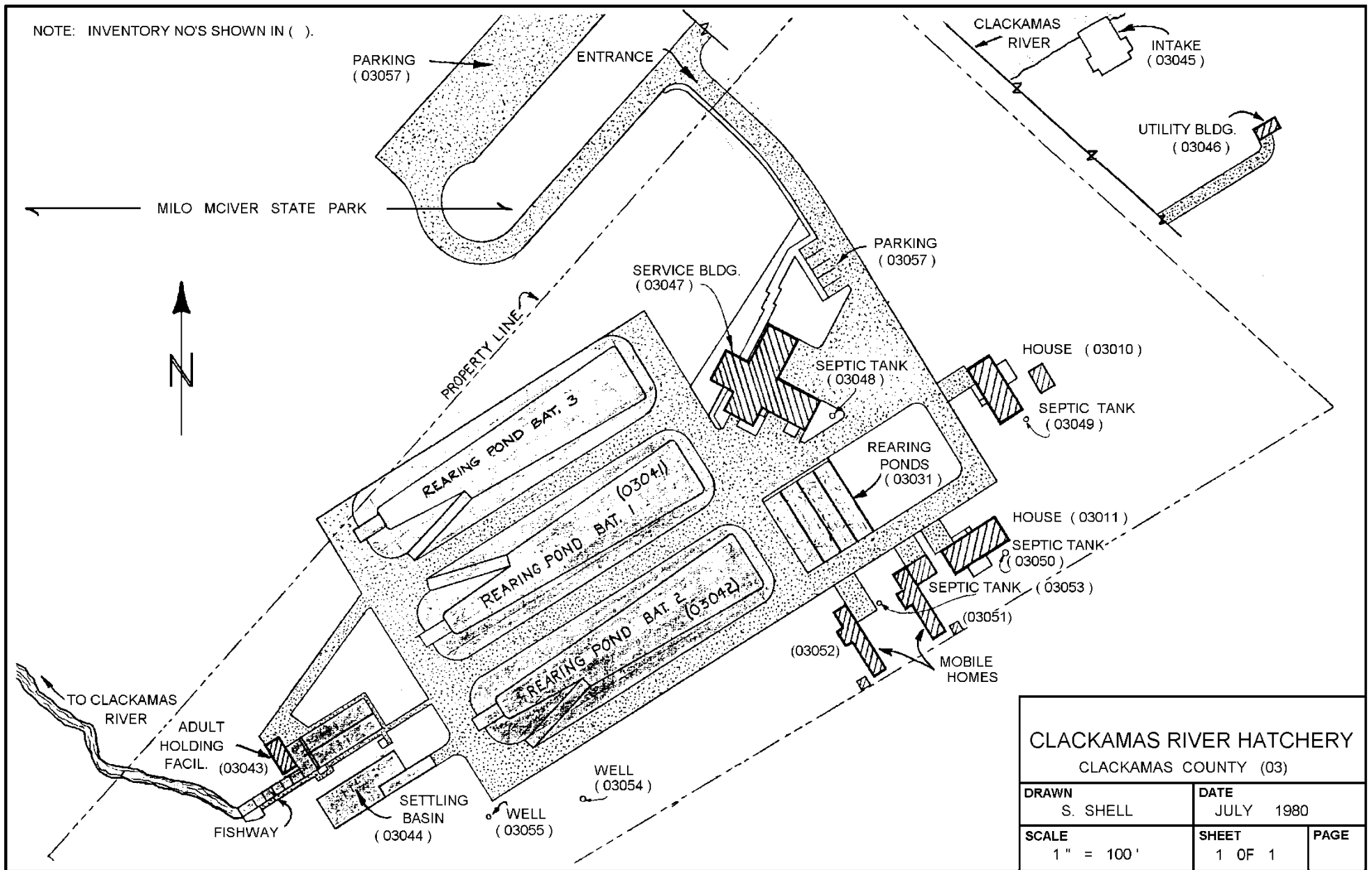
In-River Agreements: State and tribal representatives meet annually to set Columbia River harvests as part of the *U.S. v. Oregon Agreement*. Periodic meetings are also held throughout the year to assess if targets are being met.

In-Season Communications: Communication with PAC, the Columbia River Inter-Tribal Fish Commission, Washington Department of Wildlife, Washington Department of Fisheries, U.S. Fish and Wildlife Service and Idaho Department of Fish and Game takes place each year to coordinate proper fish and egg transfers in an effort to meet basin-wide goals at all facilities, where applicable. Streamnet (www/streamnet.org): Hatchery return data are input into StreamNet, a cooperative information management and data dissemination project focused on fisheries and aquatic related data and data related services in the Columbia River basin and the Pacific Northwest. StreamNet is funded through the Northwest Power and Conservation Council's Fish and Wildlife Program by the Bonneville Power Administration and are administered by the Pacific States Marine Fisheries Commission. The data are maintained and disseminated through the Pacific States Marine Fisheries Commission (PSMFC).

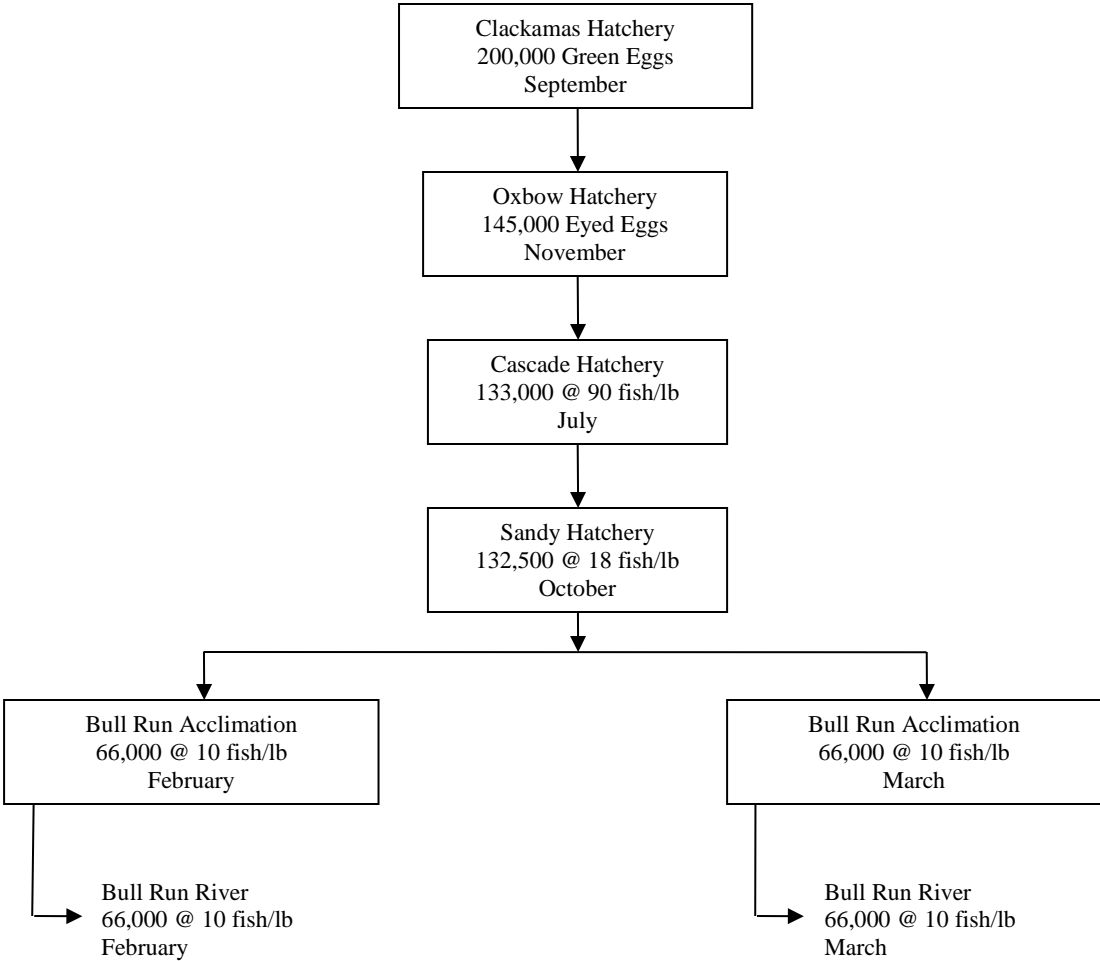
Other: A meeting which includes staff from Portland General Electric, City of Portland and ODFW is held each year to discuss hatchery operations.

Communication with the General Public

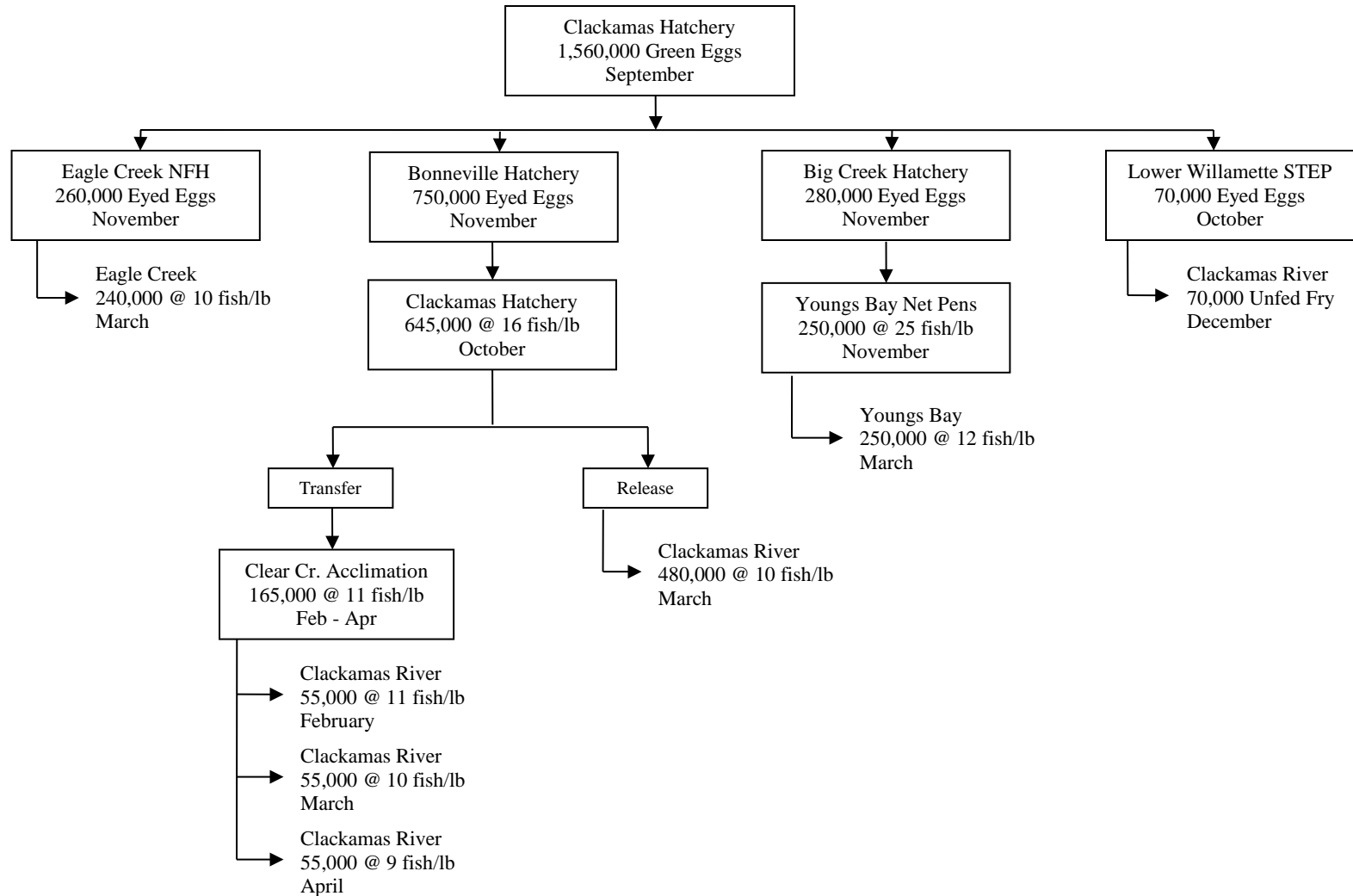
Clackamas Hatchery receives approximately 20,000 visitors per year.



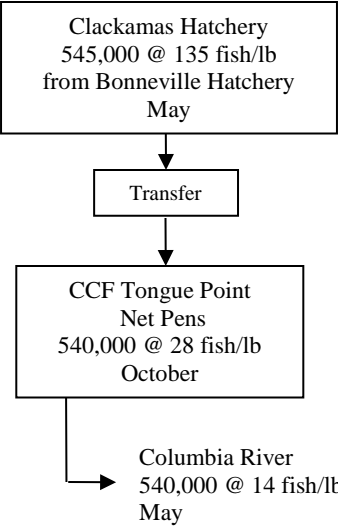
**Clackamas Hatchery
Spring Chinook Salmon – Stock 11 (Sandy River)**



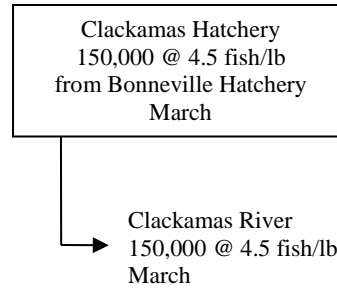
Clackamas Hatchery Spring Chinook Salmon – Stock 19H (Clackamas River)



**Clackamas Hatchery
Coho Salmon – Stock 13H (Big Creek)**



**Clackamas Hatchery
Summer Steelhead – Stock 24H (South Santiam River)**



Clackamas Hatchery Winter Steelhead – Stock 122H (Clackamas River)

