



Hatchery Update

Carson National Fish Hatchery



Carson NFH

Introduction

Carson National Fish Hatchery (NFH) is one of 12 National Fish Hatcheries operated by the U.S. Fish and Wildlife Service (USFWS) in the Columbia River basin. Carson NFH works closely with a USFWS Fish Health Center (FHC), Fish Technology Center (FTC) and Fisheries Program Office (FPO), all located within the Columbia River basin. The Columbia River Fisheries Program Office (CRFPO) works with 6 of these hatcheries as part of a Hatchery Evaluation Team (HET) conducting monitoring and evaluation to address Hatchery Reform issues. The hatchery is supported through Mitchell Act funds, which are administered by the Department of Commerce, NOAA Fisheries.

About Carson National Fish Hatchery

Carson NFH is located 13 miles northwest of Carson, in Skamania County, Washington. Situated at the confluence of the Wind River and Tye Springs, the facility began producing fall Chinook salmon and trout in 1938. Early attempts to introduce spring Chinook salmon into the Wind River between 1938 and 1940 met with little success due to impassable Shipherd Falls, two miles upstream from the mouth of the Wind River.

The hatchery was remodeled in 1956 under the Mitchell Act in order to establish a run of spring Chinook salmon in the Wind River. At that time, a fish ladder was also built at Shipherd Falls to allow salmon passage.

Spring Chinook salmon production became the primary focus of Carson NFH in 1976, when the last fall Chinook salmon were released into the Wind River. Currently, the hatchery only produces spring Chinook salmon.

Facilities at Carson NFH include 46 raceways, two earthen rearing ponds, two adult holding ponds, an egg incubation building, and several administrative and support buildings. Four residences provide on station housing for staff. Staff residence provides for emergency and security support for the fish resources and physical facility. The primary water supply for the hatchery is Tye Springs, and secondarily the Wind River.

Hatchery Purpose / Goal

Carson NFH operates as part of the Columbia River Fisheries Development Program under the 2008–2017 United States v Oregon Management Agreement. The primary purpose of the hatchery under this agreement is to provide harvest by releasing 1.17 million healthy spring Chinook salmon smolts directly into the Wind River from the hatchery site. These releases help mitigate for fish losses in the Columbia River basin due to the impacts of main stem hydropower, and other basin development. Releases also contribute to important tribal ceremonial, and subsistence fisheries as well as non-tribal sport fisheries. Management strategies also provide for adequate adult escapement (approximately 1,200 adult fish) back to the hatchery in order to ensure continued production goals. Spring Chinook salmon from Carson NFH are an important component of restoration and mitigation programs.

In addition to its primary responsibilities under US v OR, Carson NFH currently produces spring Chinook salmon under cooperative agreements with several Northwest Indian Tribes. Carson NFH produces 250,000 spring Chinook salmon smolts for the Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon (CTUIR). These smolts are transported to the Walla Walla River drainage and released as part of a reintroduction program. Carson NFH also produces 50,000 spring Chinook salmon smolts for the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO). These smolts are part of an on-going research program to determine which of three rearing locations provides

the best adult survival. These fish are transported to the Hood River sub-basin for acclimation and release.

Hatchery Operations

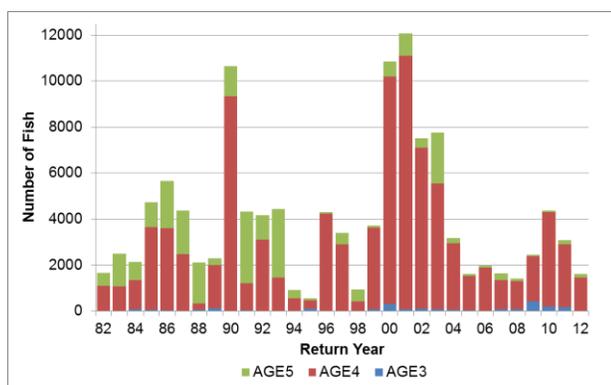
Hatchery operations are guided by current USFWS Policies, a Comprehensive Hatchery Management Plan established in 2002, a Hatchery Genetic Management Plan established in 2004, and the recommendation and assessments of the USFWS Columbia Basin Hatchery Review Team in 2007. These policies, plans and on-going review by the Hatchery Evaluation Team ensure that the USFWS and Carson NFH meet their responsibilities and obligations under all management plans, agreements, treaties, and Congressional actions; including the Endangered Species Act and 2007 Biological Opinion on hatchery operations.

Sampling of Returning Fish

A proportion of returning adults are sampled at the hatchery for biological information. Sex and length are recorded and scales are collected so that age can be determined. By combining the sample information and number of returning fish, it is possible to calculate the number of fish for each age group and each release year. This process is known as run reconstruction. Since 1982 an average of 2% of Carson NFH spring Chinook salmon have returned as three year old adults, 77% as four year old adults, and 21% as 5 year old adults.

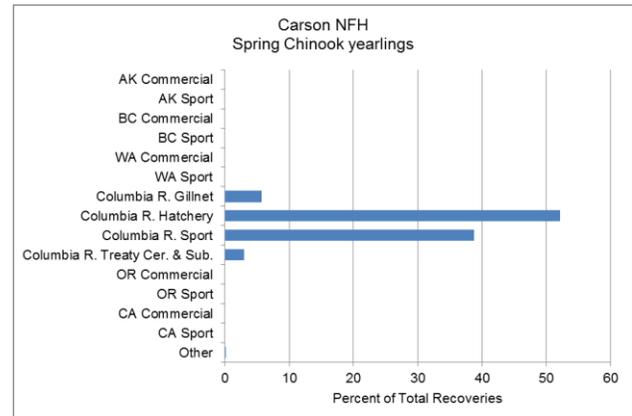
The number of fish returning from a hatchery release is influenced by many factors including the size, condition and health of fish at release, impact of dams, predators, and water flow during downstream migration, ocean conditions during the entire oceanic life span, harvest rates on returning adults, upstream migration barriers, water temperatures throughout the life cycle, habitat obstructions, behavioral characteristics unique to each stock and the genetic attributes specific to each discrete population unit.

Returning adult fish are also sampled for microscopic coded-wire tags implanted in their snouts and PIT tags implanted in the body cavity prior to release.



Harvest Contribution

Analysis of the returned coded-wire tags enable highly accurate determinations of survival rates among differentially marked groups of fish as well as their contribution to various fisheries. Since 1982, on average, more than half of returning adults are captured in Columbia River and Wind River fisheries. This includes harvest in the freshwater sport fishery, tribal treaty and subsistence fishery, and Columbia River gill net fishery.



Passive Integrated Transponder (PIT) Tags

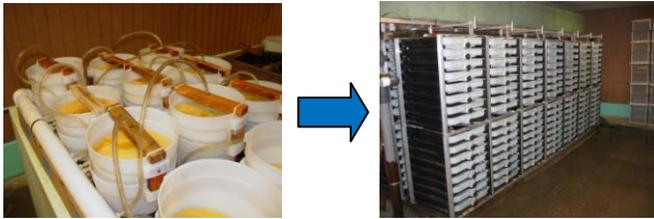
Carson NFH implants 30,000 PIT tags each year into juvenile fish prior to their release. PIT tags, or 'Passive Integrated Transponders', transmit a unique individual coded signal. This signal is passive in that it requires no internal power source. The PIT tag signal is activated by a reader or PIT tag detector. The detector powers the PIT tag circuitry by radio frequency induction and receives the unique code back from the tag. Radio frequency identification does not require line of sight, and tags can be read as long as they are within the range of a detector. These tags can be detected through water, wood, plastic, fabric, fiberglass, rock, most ferrous metals, animal bone and tissue.

PIT tag detectors are located at the Carson NFH hatchery adult ladder and throughout the Columbia River basin at dams, hatcheries, fish passage facilities, and an estuary trawl operated by NOAA. Detections of PIT tags provide information for real-time assessments of migration timing and survival rates. In 2010, a multi-year PIT Tag Effects Study (PTES) was initiated. The goal of this study is to determine if PIT tags influence smolt-to-adult return ratio (SAR) estimates which could have implications for harvest management and species recovery.

Increasing Egg Incubation Efficiency

Carson differed from the other Columbia Gorge salmon hatcheries in that eggs were incubated in buckets instead of incubation trays. In 2012, Carson NFH remodeled the hatchery building and converted all egg incubation to trays. This greatly increased the efficiency of spawning operations by reducing the number of people needed in

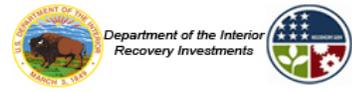
the incubation building during spawning operations and the amount of space needed to incubate eggs. Another benefit was since the other gorge hatcheries already used incubation trays, staff from those other stations could easily help out in the incubation building during our spawning operations without having to learn new methods.



Shade Covers Protect Young Salmon

New shade covers were installed to protect the fry from the damaging rays of the summer sun. Salmon fry are susceptible to sunburns and blisters which can get infected. Before the covers were installed, the fish used to crowd the wall and fight for shade. Because of this, not all of the raceway was being utilized by the fish, artificially increasing their rearing density. All of this had a negative effect on their growth and survival. These covers will prevent sunburn and reduce stress. By shading the raceway, the fish will use all of the available

rearing space and can spend more time eating and less time trying to hide from the sun and predators.



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