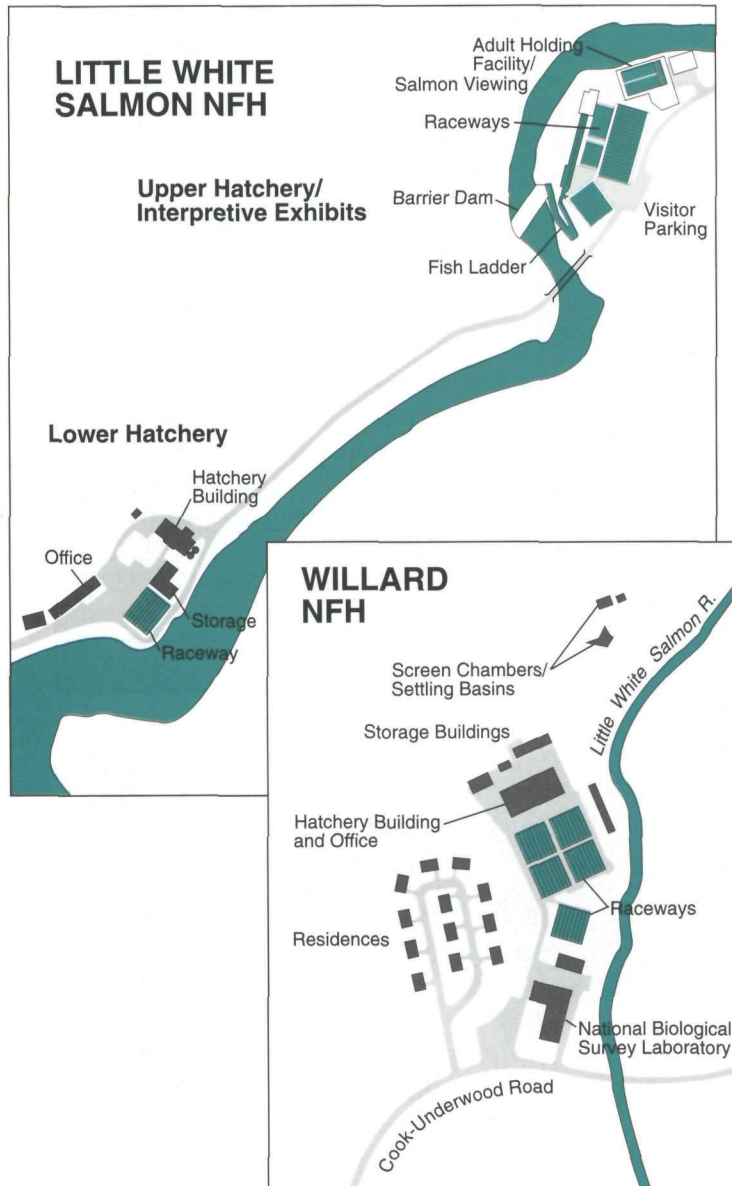


# Visiting the Hatcheries

The Little White Salmon/Willard National Fish Hatchery Complex is open to the public from 7:30 a.m. to 4 p.m. daily. An interpretive walking tour, public parking and restrooms are located at the Little White Salmon facility. In August, October and November, salmon can often be seen spawning below the barrier dam at Little White Salmon. Fishing is a popular activity at Drano Lake, below Little White Salmon. All Washington State fishing regulations and license requirements apply.



Little White Salmon National Fish Hatchery is located 12.5 miles east of Stevenson, Washington, along State Highway 14. Turn north at the west end of the Little White Salmon River Bridge and drive along the river road approximately one mile to the hatchery. Willard N.F.H. is located 5 miles up the west end of the Cook-Underwood Road on the Little White Salmon River. Conducted tours for school and other groups can be arranged; please call the complex office in advance.

For additional information, please write or call:  
 Little White Salmon/Willard N.F.H. Complex  
 56961 SR 14  
 Cook, Washington 98605  
 (509) 538-2755



The U.S. Fish and Wildlife Service manages National Fish Hatcheries and National Wildlife Refuges throughout the country for the continued conservation, protection, and enhancement of our fish and wildlife resources and their habitats.

*No person shall, on the basis of race, color, sex, age, national origin, religion, physical or mental restrictions, be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination in any program or activity of the Department of the Interior.*



U.S. DEPARTMENT OF THE INTERIOR  
 FISH AND WILDLIFE SERVICE



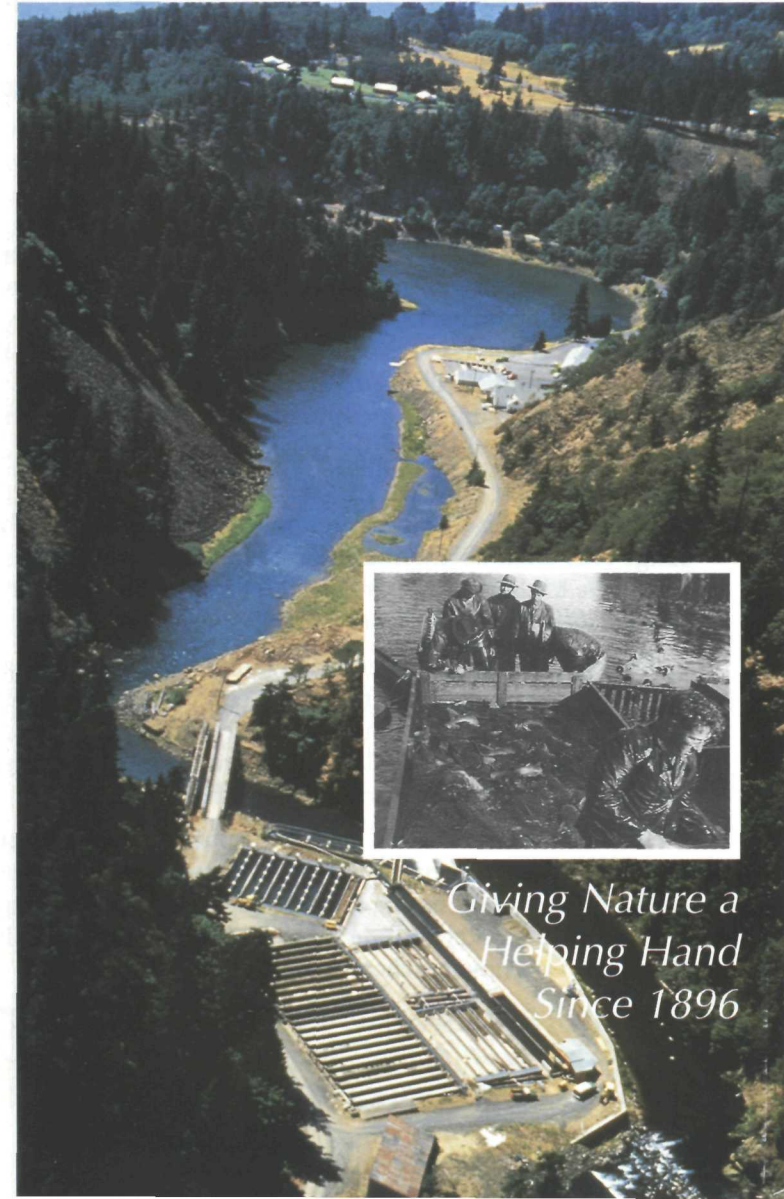
September 1994

NFH 13230

# LITTLE WHITE SALMON/ WILLARD



## National Fish Hatchery Complex Cook, Washington



*Giving Nature a  
 Helping Hand  
 Since 1896*



# Raising Salmon Since 1896

## Hatchery Care—From Egg to Smolt



Spawning operations at Little White Salmon, 1949.

"...the supply of salmon is likely to be so much reduced through overfishing that the industry depending on their capture must soon be abandoned, unless the skill and well directed efforts of man are utilized to maintain the stocks upon which he draws so heavily and so continuously."

—J.W. Collins, fishery biologist, 1892

In the late 1800's, overfishing caused a rapid decline of chinook salmon in the western United States. By 1890, scientists predicted the collapse of the fishery, and suggested hatcheries as one solution to the problem. Little White Salmon National Fish Hatchery, established in 1896 at the mouth of the Little White Salmon River in south-central Washington, was a pioneer in the fledgling science of salmon propagation.

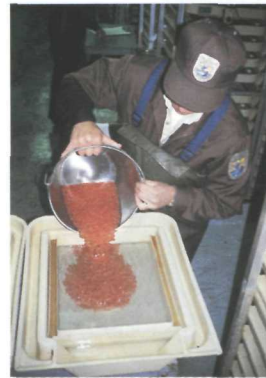
Early methods were primitive, and there were many questions to address, from what food to use to how to control disease outbreaks. Today the Little White Salmon/Willard Complex is a highly successful facility, raising spring and fall-bright chinook, and coho (silver) salmon. Over 9.4 million young salmon are released to the river, or transferred to other sites for release, each year.

Hatcheries provide a safe environment for the development of salmon eggs and young, when natural habitat has been altered or destroyed. Adult salmon return from May to November. A fish ladder directs them to indoor holding ponds. When they are ready to spawn, a mechanical lift brings them to an anesthetic tank. Since spawning is the final act of a salmon's life, the sedated fish are killed to facilitate collection of eggs and milt.

Females are opened to release eggs; then milt is stripped from a male and mixed with the eggs. Tissue and scale samples are taken from the salmon to determine age and check for disease. Most of the coho eggs are taken to the Willard Hatchery, where the eggs are incubated and smolts are reared, while chinook eggs are incubated at Little White Salmon Hatchery.

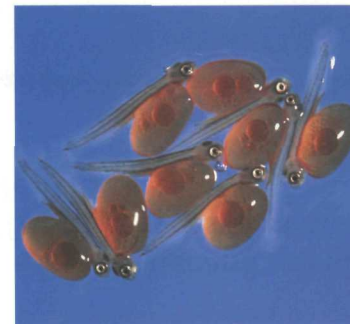


Collecting eggs



Sac fry

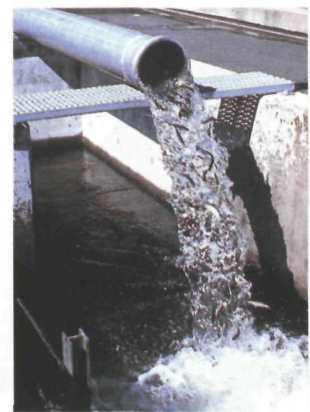
After 53 days, the eggs hatch into *sac fry*, tiny eel-like creatures with sacs of egg yolk attached to their bellies. The yolk sustains them for several weeks, as their bodies continue to develop. (In the wild, they stay hidden in their gravel nests during this time.)



Feeding fry in raceways

Hatchery smolts are released in the spring, when wild smolts begin their migration. Instinct drives them downstream to the mouth of the Columbia River. There they linger for several weeks as their bodies acclimate to salt water, and then head out to sea. 6 months to 5 years later, they return to the Little White Salmon River to begin the cycle anew.

When the yolk is completely absorbed, the young salmon—now called *fry*—are transferred to nursery tanks or outdoor raceways. They are fed a nutritious pelleted food containing fish and grain meal and vitamins. At 6 to 18 months, depending on species, the fry *smolt*: tails lengthen, juvenile spots disappear, and they get the urge to migrate.



Releasing smolts

### HATCHERY ACTIVITIES

#### Adult Salmon Viewing (Little White Salmon)

Spring chinook: May through August  
Coho/fall chinook: October through mid-November

#### Hatchery Spawning (Little White Salmon)

Spring chinook: mid-July through mid-August  
Coho/fall chinook: Late October through late November

#### Smolt Production

Smolts can be seen year-round at both hatcheries.



In many ways the life histories of Pacific salmon are similar. All are born in fresh water and spend their early lives there, migrate to the sea where they grow to adult size, and then return to their home streams to spawn. The three types of salmon raised at Little White Salmon and Willard may look similar at first glance, but each is uniquely adapted to its particular lifestyle.

## SPRING CHINOOK

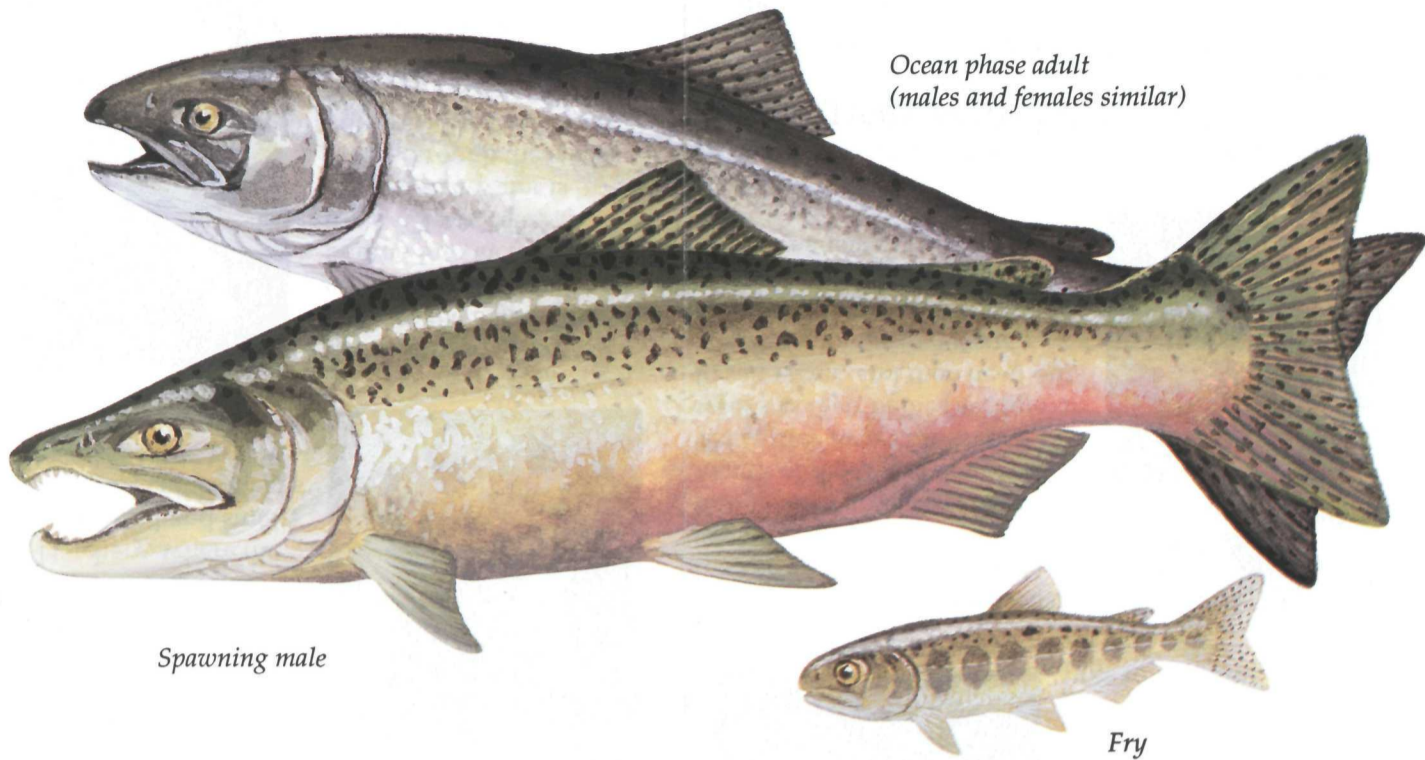
**LENGTH:** 3' average; 4' record.

**WEIGHT:** 15 lbs average; 35 lbs record.

**IDENTIFYING FEATURES:** When they first arrive in fresh water, spring chinook are greenish with paler flanks. As spawning approaches they become grayer and darker; spawning males can be almost black. Their bodies are slender and rounded in cross-section, whereas fall chinook are more slab-sided; this allows spring chinook to swim more easily in turbulent, fast-flowing water.

**LIFE HISTORY:** Spring chinook spend 1 to 5 years at sea. They migrate upriver from March to May and stay in fresh water for weeks or months before they are ready to spawn. Unlike fall chinook, spring chinook prefer to spawn in smaller rivers and side streams. Spring chinook fry spend over a year living in fresh water, and are aggressive to others of their kind.

**STATUS:** Spring chinook used to outnumber fall chinook in Columbia River catches 2 to 1, but this is no longer the case. Because their fry spend a long time living in streams, spring chinook have been especially hard-hit by pollution and siltation of stream habitat. Upriver stocks — those that have to pass through several dams — are very low. Lower river stocks have increased since the 1950's, mainly due to hatchery production.



## FALL-BRIGHT CHINOOK

**LENGTH:** 3' average; 4'10" record.

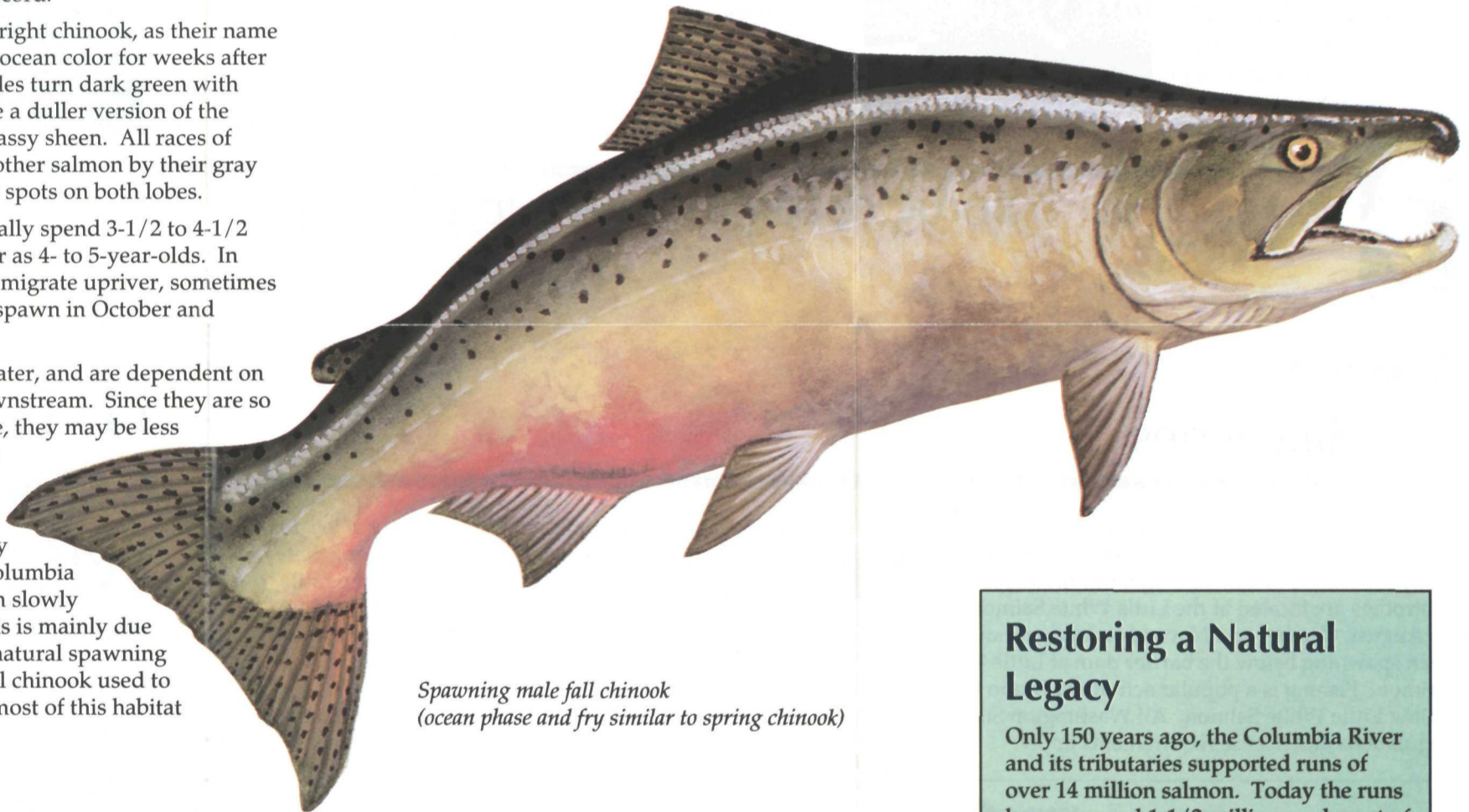
**WEIGHT:** 18 lbs average; 126 lbs record.

**IDENTIFYING FEATURES:** Fall-bright chinook, as their name implies, retain their "bright" silvery ocean color for weeks after entering fresh water. Spawning males turn dark green with rose-pink flanks. Females may have a duller version of the males' colors, but some acquire a brassy sheen. All races of chinook can be distinguished from other salmon by their gray gums and their tail fins, which have spots on both lobes.

**LIFE HISTORY:** Fall chinook typically spend 3-1/2 to 4-1/2 years at sea, returning to fresh water as 4- to 5-year-olds. In August and September fall chinook migrate upriver, sometimes swimming 60 miles in a day. They spawn in October and November.

Fry spend only 6 months in fresh water, and are dependent on the spring freshet to carry them downstream. Since they are so young and small when they migrate, they may be less able to navigate through slackwater impoundments behind dams than spring chinook and coho smolts.

**STATUS:** Fall-brights are presently the most abundant salmon in the Columbia River Basin, and numbers have been slowly increasing since the mid-1960's. This is mainly due to hatchery production, since little natural spawning habitat is left. Historically many fall chinook used to spawn in the main river stem, and most of this habitat has been altered by dams.



### Restoring a Natural Legacy

Only 150 years ago, the Columbia River and its tributaries supported runs of over 14 million salmon. Today the runs hover around 1-1/2 million, and most of these are hatchery-raised. Many factors have contributed to the decline, including clearing of forests, overgrazing, dams, and urban pollution.

Salmon recovery in the Northwest is a cooperative effort involving the Fish and Wildlife Service and over 70 other State, Federal, and Tribal agencies. 17 National Fish Hatcheries contribute about 900,000 returning adult salmon and steelhead trout each year, and the stream habitat wild salmon need is being protected and rehabilitated. People are also exploring ways to reduce the impact of their activities on salmon. Find out how you can help by contacting the U.S. Fish and Wildlife Service or your state fish and game department.

## COHO (SILVER)

**LENGTH:** 2' average; 3'3" record.

**WEIGHT:** 6 lbs average; 33 lbs record.

**IDENTIFYING FEATURES:** Silver in the ocean, coho undergo an amazing spawning transformation. Males get bright red flanks, dark green backs, and dark gray bellies and heads; females sport a paler version of the same colors. Males' jaws become grotesquely hooked. The gums are white — very noticeable when the fish are in their dark spawning colors.

**LIFE HISTORY:** Most coho spend 1-1/2 years at sea, although about 10 percent of males, called "jacks," stay only 6 months. They are not long-distance migrants; Columbia River coho range only from northern California to Vancouver Island, and stay close to shore. Coho migrate upriver in late summer and fall and spawn from October through December.

Coho fry stay in fresh water for 18 months before heading out to sea. Unlike other salmon fry, young coho are colorful, with orange bellies and black-and-white bordered fins. Their colors aid them in territorial displays; they are the most aggressive of all salmon fry, both to their own and other species.

**STATUS:** Unlike chinook, coho will spawn in small coastal streams that have been less affected by development. However, wild coho in the Columbia Basin have been hard hit by loss of stream habitat, and continue to decline. 90 percent of Columbia River coho are now hatchery-raised.

