

U.S. Fish & Wildlife Service

# Dworshak

## *Fisheries Complex*

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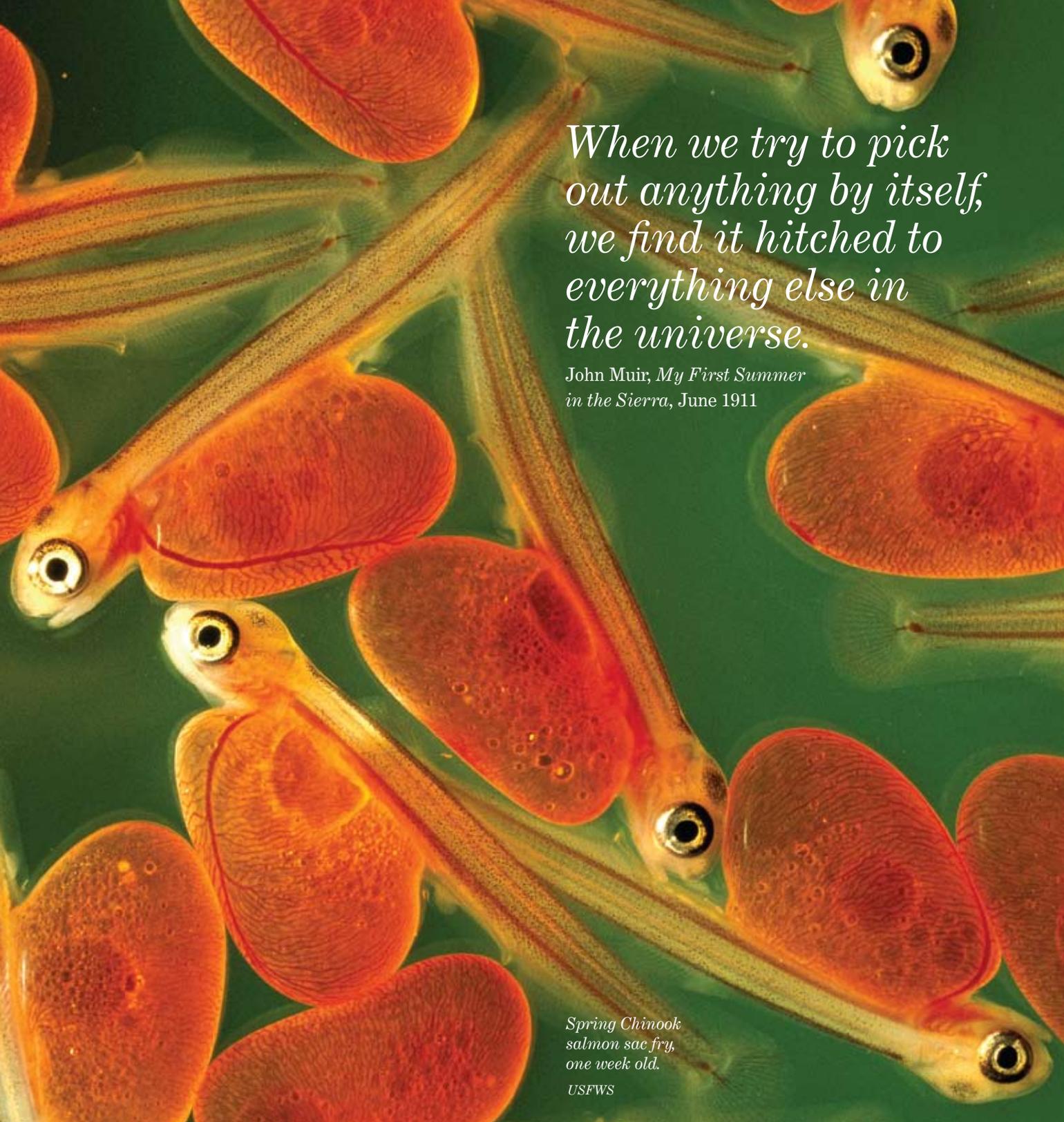
*Dworshak National Fish Hatchery*

*Idaho Fishery Resource Office*

*Idaho Fish Health Center*

*Kooskia National Fish Hatchery*



A close-up photograph of several young salmon fry, one week old, swimming in water. The fry are translucent with prominent, bright orange-red yolk sacs. Their bodies are thin and elongated, with visible fins and large, dark eyes. The background is a soft, greenish-brown color, suggesting a natural aquatic environment.

*When we try to pick  
out anything by itself,  
we find it hitched to  
everything else in  
the universe.*

*John Muir, *My First Summer  
in the Sierra*, June 1911*

*Spring Chinook  
salmon sac fry,  
one week old.*

USFWS

## Dworshak Fisheries Complex

Located within the Clearwater River basin in north-central Idaho, the Dworshak Fisheries Complex consists of Dworshak and Kooskia National Fish Hatcheries, the Idaho Fishery Resource Office, and the Idaho Fish Health Center.

Dworshak National Fish Hatchery (NFH) is funded by the Army Corps of Engineers and co-managed by the U.S. Fish and Wildlife Service and the Nez Perce Tribe of Idaho. Both Dworshak and Kooskia hatcheries work together closely to ensure the return of salmon and steelhead from the Pacific Ocean to the Clearwater River.

Dworshak NFH is located at the confluence of the North Fork and the main Clearwater River, just below Dworshak Dam. The dam blocked migrating steelhead and salmon from reaching their natural spawning grounds on the North Fork of the Clearwater River, and its height made it impossible to construct a fish ladder.

*Dworshak National Fish Hatchery lies below Dworshak Dam.*

*Dworshak NFH helps continue the return of salmon and steelhead from the Pacific Ocean to the Clearwater River.*



*Susan Sawyer/USFWS*

*Fishing for steelhead below Dworshak hatchery on the main Clearwater River.*

## Hatchery Operations

Dworshak hatchery raises cold-water fish species: Clearwater River 'B' run steelhead, spring Chinook and coho salmon, and rainbow trout. The hatchery is one of the world's largest combination producers of anadromous fish, meaning they hatch in freshwater, spend one to four years in the ocean as adults, and then return to their freshwater birth streams to spawn. All salmon and most steelhead die naturally after spawning.

Dworshak National Fish Hatchery is unique in that water temperatures for steelhead-rearing ponds can be controlled through recirculation and filtration similar to an aquarium.

Depending on the time of year, hatchery water can either be heated or chilled to the proper temperature for each fish species. Water flows through biological filtration beds where bacteria convert wastes into harmless by-products before the water reaches settling ponds and, eventually, the river.

Steelhead are raised for one year in water at or near 50° F to achieve optimum health and quality prior to their spring release at a size of about 8 inches. The hatchery strives for increased growth rates in fish during the fall, which decreases the need for using heated recycled water in the winter when fish are more susceptible to infections.

Chinook and coho salmon are raised in much colder water — 38-44° F — for up to 18 months prior to release.

*Steelhead smolts in Burrows pond.*

*Steelhead and Chinook smolts are released in April.*

*All hatchery ponds are protected from predatory birds by wire netting.*

## Idaho Fishery Resource Office

The Fishery Resource Office (FRO) is located at Dworshak National Fish Hatchery. Established in 1981, the FRO provides evaluation and fish management planning for the three federal hatcheries in Idaho: Dworshak, Kooskia, and Hagerman National Fish Hatchery. FRO staff assesses how each of these hatcheries is meeting their established mitigation goals.

The primary goal of the FRO is to assist in management and evaluation of fishery resources that relate to federal issues, such as:

- Fishery resources of national significance
- Fishery mitigation for federal projects
- Assistance to Native American Tribes
- Other fishery projects as called for under federal law

Activities under this goal support protection, restoration and enhancement of anadromous fishery resources in the Lower Snake River Basin.

The FRO also helps set up and design studies to evaluate hatchery effectiveness and various management scenarios. This involves working with state, Tribal, and federal fishery offices to evaluate fish management programs throughout Idaho.



*Susan Sawyer/USFWS*  
Biologists check young steelhead and salmon for implanted tags prior to hatchery release.



*USFWS*  
Biologists sample wild fish populations in area rivers.

USFWS

## Idaho Fish Health Center

The Fish Health Center (FHC) was originally built in 1969 as part of Dworshak National Fish Hatchery. The FHC provides fish health services within Idaho, eastern Washington, and eastern Oregon. Federally-funded National Fish Hatcheries within Idaho, as well as private fish growers, receive health diagnostic and inspection services from the FHC. In addition, the FHC works in cooperation with other federal, state, and Tribal agencies to survey, sample, and analyze hatchery and wild fish populations.



*©2007 Kim Glennon*

*Lab staff monitor hatchery steelhead for health issues.*

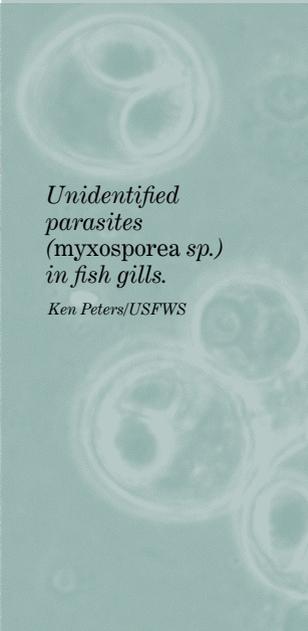


*Susan Sawyer/USFWS*

*Staff also conduct wild fish health surveys in area rivers.*

Along with the Tribes, the FHC coordinates with federal agencies regarding involvement with species listed under the Endangered Species Act. Fish Health Center staff are active participants in committees and technical groups that govern policy and develop recommendations on salmon and steelhead in the Pacific Northwest.

*The FHC lab cultures fish parasites and bacteria to determine disease treatments.*



*Unidentified parasites (myxosporea sp.) in fish gills.*

*Ken Peters/USFWS*



*Laura Kessel/USFWS*

## Kooskia National Fish Hatchery

Kooskia National Fish Hatchery is located 35 miles upriver from Dworshak National Fish Hatchery, at the mouth of Clear Creek on the Clearwater River. The hatchery was built in 1969 to enhance sport and Tribal fishing and to mitigate spring Chinook salmon losses resulting from water development projects in the Columbia River Basin.

Kooskia NFH became part of the Dworshak National Fish Hatchery Complex in 1978. As a result of the 2007 Snake River Basin Adjudication, the Nez Perce Tribe will assume management of the hatchery from the USFWS in the near future. Existing goals for Chinook salmon production and coho acclimation will remain the same.

Adult spring Chinook salmon return to the Kooskia NFH fish trap in May and June, and are transported to Dworshak NFH for late August spawning. Fertilized eggs are returned in the fall for hatching, rearing, and release 18 months later. Abundant clean water from Clear Creek and several deep wells is critical to the fish production cycle. Raceway water can be recycled and heated during the winter months, helping to conserve the limited groundwater supply.

*A self-guided tour is available around the hatchery, along with informational brochures. A short, easy foot path is across from the hatchery entrance. The trail tells the story of Chief Looking Glass and his people during the war of 1877. An observation deck offers views of waterfowl and resident wildlife.*

*Nez Perce Tribal staff manage fish production at Kooskia hatchery.*

Susan Sawyer/USFWS

Susan Sawyer/USFWS

## Information and Education

Dworshak's Information/Education program provides comprehensive visitor services, education, and year-round public outreach programs at hatcheries and in local communities throughout Idaho and eastern Washington.

Program goals include:

- Increasing visibility of hatcheries
- Providing information about hatchery programs and services
- Developing effective public awareness and educational activities
- Promoting the region's fish and wildlife resources
- Fostering support and understanding of Fish and Wildlife Service activities

Outreach goals are achieved through a variety of activities, including guided tours, school programs,

information booths and presentations, and youth fishing days. Information/Education staff partner with federal, Tribal, and state agencies, nonprofits, and special interest groups to provide quality programs.



*Hands-on outdoor lessons provide education and fun for area students.*

*Students raise steelhead and release them in the Clearwater River each spring.*





### Hatchery Life of Steelhead and Salmon

Dworshak Fisheries Complex produces steelhead, spring Chinook salmon, coho salmon, and rainbow trout.

**Life Ends, Life Begins.** Ripe adult fish return to the hatchery where they are euthanized so that eggs and milt can be collected and mixed for fertilization. Mature female steelhead produce an average of 6,500 eggs, while Chinook and coho females average about 3,000.

The fertilized eggs are then incubated for one to three months until they reach the “eyed” stage, when black eyespots are visible. Eggs are then sorted, counted, and moved to the larger nursery tanks.

**First Food.** Steelhead and salmon fry hatch with yolk sacs attached, providing their only source of food for the first few weeks. Once the yolk is absorbed, the fry are fed six to eight times daily for several months.



*Egg jar*



*BPA Eyed eggs*

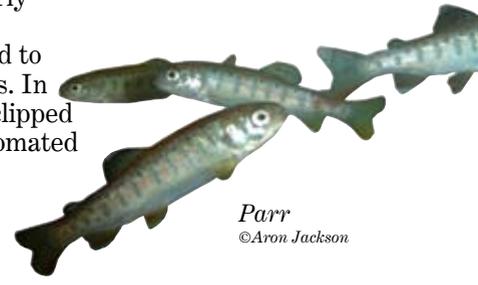


*Sac fry*

*BPA*

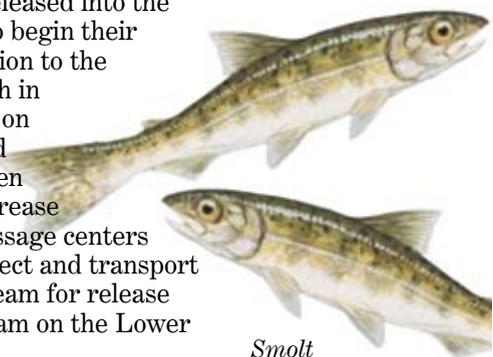


**Marked for Life.** In early summer, young fish, called parr, are moved to outside rearing ponds. In the fall, they are fin-clipped or marked in the automated trailer. These marks are visible on adult fish, indicating they were raised in a hatchery.



*Parr*  
©Aron Jackson

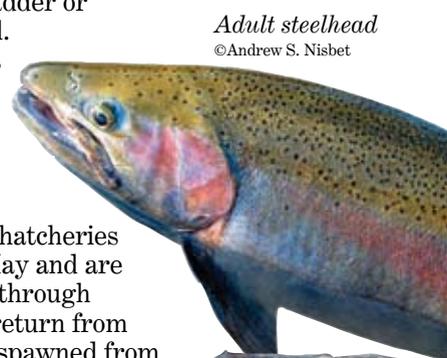
**On Their Way.** Each spring, juvenile fish or smolts are released into the Clearwater River to begin their downstream migration to the ocean. To aid the fish in their journey, dams on the lower Snake and Columbia rivers often release water to increase river flows. Fish passage centers at the dams can collect and transport the smolts downstream for release below Bonneville Dam on the Lower Columbia River.



*Smolt*  
©Sheri Erickson

**Coming Home.** Adult fish enter the hatchery by a fish ladder or gate into a holding pond. The fish are 3 to 5 years old and weigh from 12 to 20 pounds.

**Spawning Season.** Steelhead return to Dworshak and Kooskia hatcheries between October and May and are spawned from January through April. Chinook salmon return from May to August and are spawned from late August to early September. The Nez Perce Tribe collects and spawns coho salmon from October to November.



*Adult steelhead*  
©Andrew S. Nisbet

*Adult salmon and steelhead returning from the ocean enter holding ponds at Dworshak by swimming up a fish ladder.*



## Cultural Connection

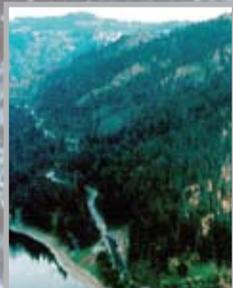
Steelhead and salmon have played a key role in the cultural past of the native peoples who once lived in or near the Clearwater River basin. That tradition continues to this day.

The Nez Perce people, known historically as the “Ni Mii Puu,” lived and thrived in this region for ages. The small town of Ahsahka, next to Dworshak National Fish Hatchery, was once the site of the largest inland fishing village for Native Americans throughout the Pacific Northwest. Each season, Tribes would gather here and harvest from the abundant North Fork runs of Chinook and steelhead. They considered the fish to be much more than a food source or trade item.

Fish were, and still are, a sacred and significant part of many Tribes’ spiritual and cultural identity. For some, the return of these fish also symbolizes the renewal of life.

*From simple bone hooks and lines made of hair to elaborately made willow nets, the Ni Mii Puu employed a variety of techniques to catch fish.*

*Illustrations, University of Idaho/  
Cultural Anthropology Department*



*Present day Ahsahka, ID.  
on the North Fork of the  
Clearwater River below  
Dworshak Dam.*

*ACOE/Walla Walla District*



*Susan Sawyer/USFWS*

*Tribal biologists  
raise coho at both  
Dworshak and Kooskia  
hatcheries.*

Dworshak and Kooskia fish hatcheries have protected Tribal fishing grounds adjacent to each facility. Only Tribal members are allowed to use traditional or modern methods to harvest salmon and steelhead. When fish returns exceed hatchery goals, surplus fish are collected by several different Tribes for ceremonial and cultural purposes. Excess adult fish are often transferred to wilderness streams to supplement natural populations and to provide nutrients after spawning.

Today, Nez Perce Tribal members fill a variety of fish culture, biologist, and maintenance positions within Dworshak Fisheries Complex.

## The Snake River Basin Adjudication

*The Snake River Basin Adjudication agreement: Providing water for Idaho's people, land, and wildlife.*

*Idaho's Snake River is a valuable resource for recreation and agriculture.*

In 2007, Congress enacted a landmark decision that settled a 20-year legal battle over water rights between the Nez Perce Tribe, the state of Idaho, and the U.S. Fish and Wildlife Service.

The SRBA defines the rights and responsibilities of all Idaho water users and provides funding for tribal water and fisheries projects.

The agreement calls for Tribal co-management of Dworshak National Fish Hatchery and full management of Kooskia NFH. Fish production goals at both hatcheries remain the same.

A portion of the settlement provides a Tribal trust fund to protect and restore fish habitat in the Salmon and Clearwater River basins. Part of the agreement allows for multi-agency management of annual water releases from Dworshak reservoir to benefit fish passage and provide for recreational use of the reservoir.



USFWS/NCTC

*Mobile sprinklers use Snake River water to irrigate Southern Idaho fields.*

*Sport fishing for steelhead on the Clearwater River boosts local economies.*



S. Sawyer/USFWS

## Frequently Asked Questions

**Q**—*Why do salmon and steelhead travel back and forth from freshwater to the ocean?*



© Aron Jackson  
McSorley Elementary School

*Young salmon and steelhead imprint on their freshwater birth streams for up to two years.*

*Background photo shows the size of fish food changes as hatchery fish grow during the year.*

Susan Sawyer/USFWS

*Because they've spent years feeding in the ocean, adult fish are not fed once they reach the hatchery via the fish ladder.*

**A**—A genetically inherited instinct is responsible for the urge to migrate to and from the ocean. The ocean is a much richer feeding ground, allowing fish to reach a larger size than in freshwater. The same instinct urging fish to the ocean also signals the time to come home. Scientists believe the fish use their keen sense of smell to follow the unique characteristics of their birth streams.

**Q**—*What kind and how much fish food do you use at the hatchery?*

**A**—Fish are fed a specially formulated diet of fish meal in powder or pellet form, complete with oils, vitamins, grains, minerals, and in some cases, medication. Each year, about 450,000 pounds of food is used to raise 500,000 pounds of hatchery fish to release size.

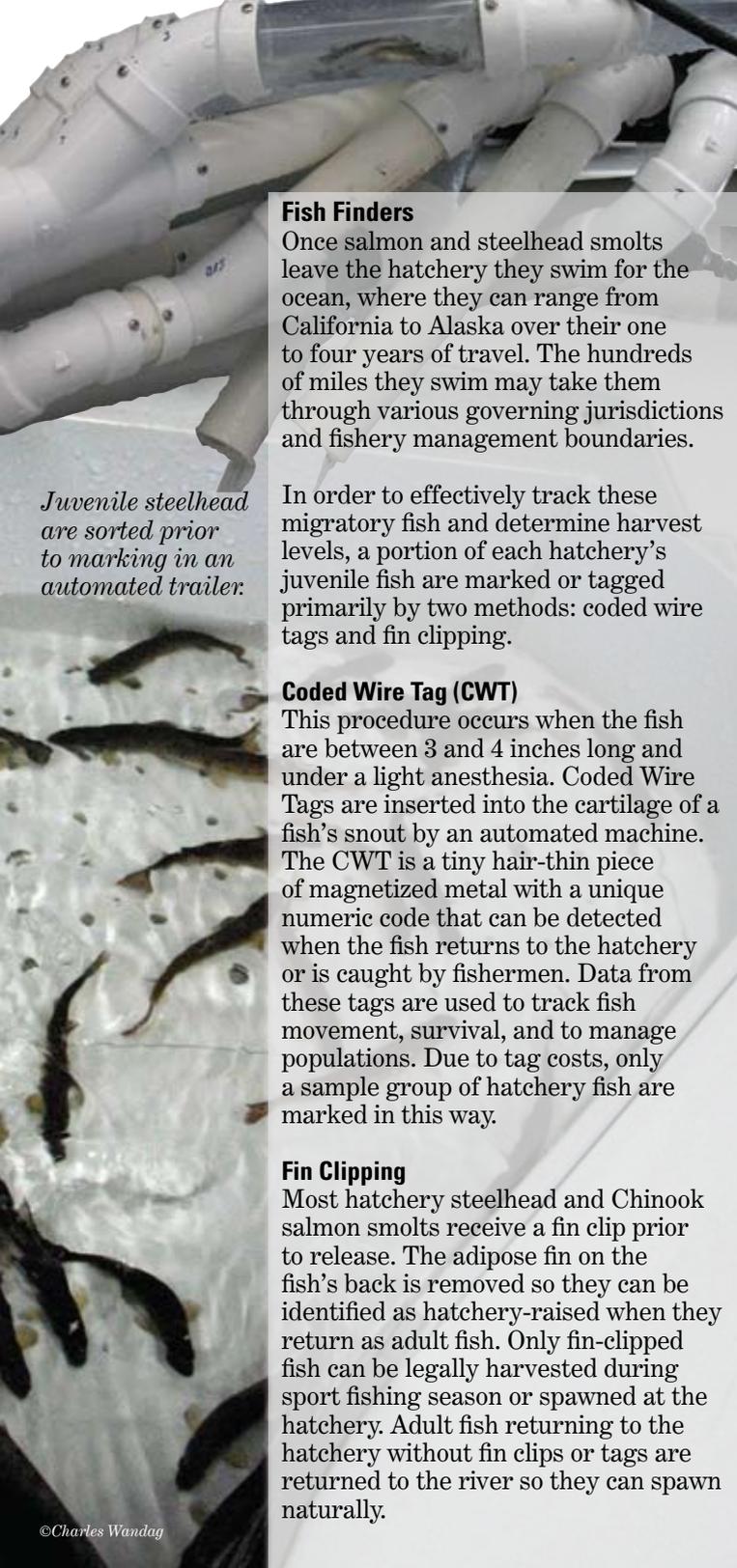
**Q**—*Do you feed the adult fish after they come up the ladder?*

**A**—No, the adult fish have spent several years feeding in the ocean and are able to live off fats and proteins stored in their flesh until they are spawned.

**Q**—*What happens with the spawned fish?*

**A**—Steelhead carcasses are provided to the Nez Perce Tribe for cultural purposes, to universities for research, or to captive endangered species feeding programs. Chinook carcasses in good condition are placed in remote streams in the fall to enhance habitat nutrients.





*Juvenile steelhead are sorted prior to marking in an automated trailer.*

### **Fish Finders**

Once salmon and steelhead smolts leave the hatchery they swim for the ocean, where they can range from California to Alaska over their one to four years of travel. The hundreds of miles they swim may take them through various governing jurisdictions and fishery management boundaries.

In order to effectively track these migratory fish and determine harvest levels, a portion of each hatchery's juvenile fish are marked or tagged primarily by two methods: coded wire tags and fin clipping.

### **Coded Wire Tag (CWT)**

This procedure occurs when the fish are between 3 and 4 inches long and under a light anesthesia. Coded Wire Tags are inserted into the cartilage of a fish's snout by an automated machine. The CWT is a tiny hair-thin piece of magnetized metal with a unique numeric code that can be detected when the fish returns to the hatchery or is caught by fishermen. Data from these tags are used to track fish movement, survival, and to manage populations. Due to tag costs, only a sample group of hatchery fish are marked in this way.

### **Fin Clipping**

Most hatchery steelhead and Chinook salmon smolts receive a fin clip prior to release. The adipose fin on the fish's back is removed so they can be identified as hatchery-raised when they return as adult fish. Only fin-clipped fish can be legally harvested during sport fishing season or spawned at the hatchery. Adult fish returning to the hatchery without fin clips or tags are returned to the river so they can spawn naturally.

### **Fun Fish Facts**

*Fish have the same five senses as people!*

*Q – Can fish see in color?*

A – YES! Fish see color almost as well as people. This is one reason that many fishing lures come in bright colors.

*Q – Which of their five senses do anadromous fish use to find their way home?*

A – Smell! Salmon and steelhead use this sense more than others to find their river or stream of birth or to return to the hatchery. They remember the smells of the water from when they traveled downstream several years before.

*Q – How do fish hold onto their food?*

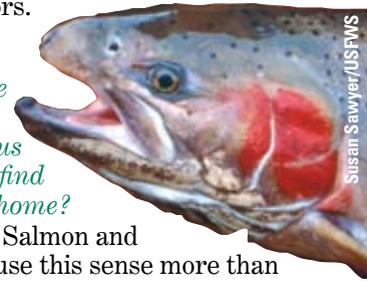
A – Teeth! Many fish have teeth on their tongues, jaws, the roofs of their mouths, and even in their throats. These teeth make it much easier to hold onto the wet and wiggling food they eat in the water.

*Q – Can a fish drown?*

A – YES! A fish can drown if it's pulled through the water too fast by its mouth or tail. To release a fish you have caught, keep it in the water and remove the hook if possible. (If not, cut the line close to the hook so it can rust out.) Gently cradle the fish under its belly, avoiding the gills, and move it back and forth slowly until it swims away on its own.

*Q – Do fish burp?*

A- YES! Fish have a swim bladder they can fill by gulping air from the water to help them float. They can release that air to make them sink.



*Susan Sawyer/USFWS*



*Juvenile spring Chinook salmon in an aeration jar.*

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**U.S. Fish & Wildlife Service**  
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**Washington Relay Service**  
TTY 1 800/833 6388  
Voice 1 800/735 0644  
Telebraille 1 800/833 6385

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*Steelhead sac fry  
emerging from egg.*

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