

# The Life Cycle of Salmonids

Respect Rule: Look, Listen, Learn, and Leave Alone (until instructed).

## Overview

The life cycle of the salmonid is fascinating. The fish hatch and spend the early part of their lives in freshwater. The young salmonids stay in the river where they were born anywhere from a few months to a few years before traveling out to sea. After a period of one to three years in saltwater, the salmonids migrate back to freshwater rivers of their birthplace to breed and die. The effects of human activity have brought a decline in the salmonid population. The survival of salmonids and the observation by future generations of this valuable life-cycle depends on today's stewardship of the riparian habitat that exists in watershed areas of the foothills.

## Background

Anadromous salmonids (salmon and steelhead trout) once ranged into the Mokelumne River, Calaveras River, Tuolumne River, and Stanislaus River systems. Historically, their spawning grounds extended throughout the foothills but are now blocked by dams or other human activity. There are still opportunities to view salmonids at the beginning and the end of their life cycle, to evaluate their habitat, and to engage in projects that will draw awareness to the preservation of these wonderful creatures on the Calaveras River (Corp of Engineers at New Hogan Lake), at the Mokelumne River Hatchery (EBMUD and Dept. of Fish and Game), Knights Ferry on the Stanislaus River, and Moccasin Fish Hatchery on the Tuolumne River. They have educational opportunities that address the salmonids in rivers and streams. The best months to see salmon in the local area are October through December. Steelhead arrive later from December through March. Exact dates may vary, so call ahead before planning a field trip.

## Before-the-Field-Trip Activities

**Activity 1:** Locate the Salmonids

**Time:** 1–2 hours

**Materials:** Where Can I Go To See Salmonids? Fact Sheet and Transparency, Chart paper, markers, can of salmon, package of smoked salmon or product from salmon

1. Discuss with the students what types of fish do people eat.
2. List responses on chart or draw picture (tuna, bass, sardines, salmon).
3. Show students the can of salmon. Explain salmon is one of the most popular types of fish that people in the United States eat.
4. Sense of taste and smell can be very dramatic. Open the can and sample.
5. Salmon is not just a food but it is an animal that leads a very interesting life! Write on chart "fresh water" and "salt water." Discuss with students where "fresh water" fish live. Make sure responses include lake, ponds, streams, and rivers.
6. Discuss with the students where "salt water" fish live (ocean).
7. Discuss with students where fish can be seen (lakes, rivers, oceans, etc.)
8. Continue the discussion:  
Has anyone ever had a fish as a pet?  
Was the water you put into the aquarium salty or "fresh" (like the water you drink)?  
Can fish live in salty water?  
Some fish like salty water and some fish like fresh water. Salmon and steelhead trout are very special because they like both fresh and salty water.
9. Distribute the Where Can I Go to See Salmonids Student Worksheet and discuss: Which part of the Pacific Coast do salmonids live? Students should recognize this is a map of the Northwestern part of the United States. Some salmonids live in the Atlantic Ocean but their range is not shown on this map.



### Objective

Students will realize that the salmon faces a unique set of challenges in its life cycle and the struggle to live, mature, spawn and die.

### Grade Level

K–4

### Adult/Student Ratio

1 to 20

### Where

Riparian habitat: creeks, streams, rivers, school sites, utility facilities: sewers and water treatment plants, dams, hatcheries

### Skills

Sequencing, observing, recording, making connections

### Key Words

Salmonid  
Alevin  
Fry  
Buttoning up  
Smolt  
Milt  
Estuary  
Yolk sac  
Spawn



**Through interpretation, understanding, appreciation, protection.**



—Betty Van Der Smissen and Oswald H. Goering, *A Leader's Guide to Nature-Oriented Activities*

10. Locate the local hatchery.
11. Explain that all the locations shown on the map are sites where salmonids come to spawn or finish out their life and where new salmonids are hatched to continue the cycle. Have students note the neighboring states that have salmonids.
12. Draw rivers leading to the hatcheries.
13. Examine maps carefully. Do the salmonids stay in the ocean or do they go inland? Explain that salmonids spend much of their lives in rivers and streams that may be hundreds of miles from the ocean.

**Activity 2:** Life Cycle of the Salmonids

**Time:** 1 hour

**Materials:** The Saga of the Salmonid Fact Sheet, Salmonid Life Cycle Fact Sheet, slides of the life cycle of salmonid (available through STE Lending Library)

1. Read the Saga of the Salmonid Fact Sheet.
2. Discuss the life cycle stages of the salmonid using Salmonid Life Cycle Fact Sheet.
3. Review the key concepts and words.
  - **Eggs**—salmonids lay their eggs in gravel in the streams.
  - **Alevins**—salmonids hatchlings (Notice the yolk sacs. Alevins stay in the gravel. They get food from their yolk sacs and grow bigger.)
  - **Fry**—baby fish. After the yolk sac is gone, the baby fish swim out of the gravel and eat insects and other food.
  - **Smolt**—fry that is 1–3 years old (orange salmonids). They swim down the river (migrate) toward the sea. The smolt spends time in the estuary (mouth of river meeting the ocean) getting ready to go out to sea.
  - **Adult salmonids**—When the salmonid arrive at the ocean they eat a great deal to get ready for their journey home. They also swim very long distances. Some salmonid swim up to 10,000 miles. They stay in the ocean for a few years. But when it is time to spawn, the most amazing thing occurs: they are able to find the very same river or stream where they were born! Scientists believe it is the smell of the water that allows this to take place. It is sometimes a long and hard journey.

They may have to leap up high waterfalls or fight strong currents.

- **Spawners**—adult salmonids that lay their eggs and then die. The dead fish revitalize the streams and rivers with nutrients and feed river animals. Nature's beautiful cycle of life continues.

## Field Trip Activity

**Activity:** Tour a Hatchery

**Time:** 1½ hours

1. Take students on a tour of a fish hatchery or trout farm.
2. Discuss the life cycle and different kinds of salmonids, raising fry, spawning room, and the harvesting of the eggs.

## After-the-Field-Trip Activity

**Activity:** Life Cycle Activities

**Time:** 45 minutes

**Materials:** Newspapers, paint, string; *Pacific Salmon and Steelhead Coloring Book* and *Salmonid Savers*, *Salmon Boy* told by Joseph Bruchac, and *Come Back Salmon* by Molly Cone book and video (available from the STE Lending Library)

1. Students can create life-cycle mobiles of the salmonid to better understand habitat requirements at all stages of life for anadromous fish. Use newspapers to stuff 3-D, life-sized drawings of the salmonids.
2. Review and color *The Pacific Salmon and Steelhead Coloring Book* and the *Salmonid Savers*.
3. Read *Salmon Boy*.
4. View and read *Come Back Salmon*.

## Resources

### For the Teacher

US Department of Fish and Game  
 US Fish and Wildlife Service  
 US Core of Engineers  
 Trout Unlimited and Fly Fishers  
 Water Education Foundation, Sacramento, CA  
 US Forest Service

### For the Student

*The Pacific Salmon and Steelhead Coloring Book*, US Fish & Wildlife Service  
*Come Back Salmon*, Molly Cone (book or video)  
*Salmon Boy*, a Tlingit tale from *Flying with the Eagle Racing the Great Bear*, Joseph Bruchac.

# Where Can I Go to See the Salmonids?

Fact Sheet

Salmonids may be coming to a river or fish hatchery near you! Here are some places in California, Oregon, Washington, and Idaho where you can see salmon and steelhead. The best months to see salmon are July through October in Oregon, Washington, and Idaho; and October through February in California. Steelhead arrive later, December through March. Exact dates may vary, so call ahead before planning your visit.

For more information on National Fish Hatcheries and salmon viewing, call:

### California:

Coleman National Fish Hatchery  
530/365-8622

### Oregon, Washington, and Idaho:

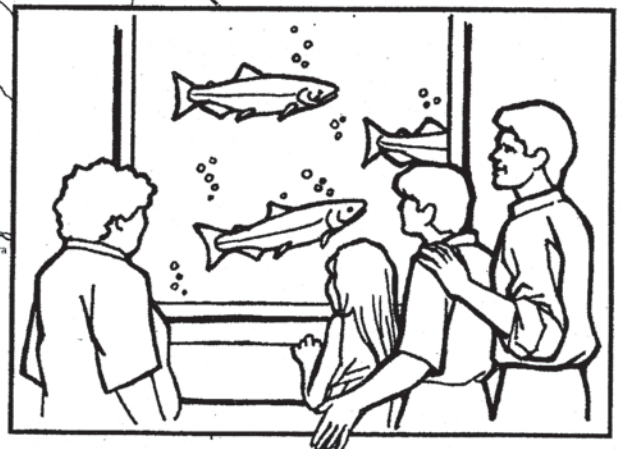
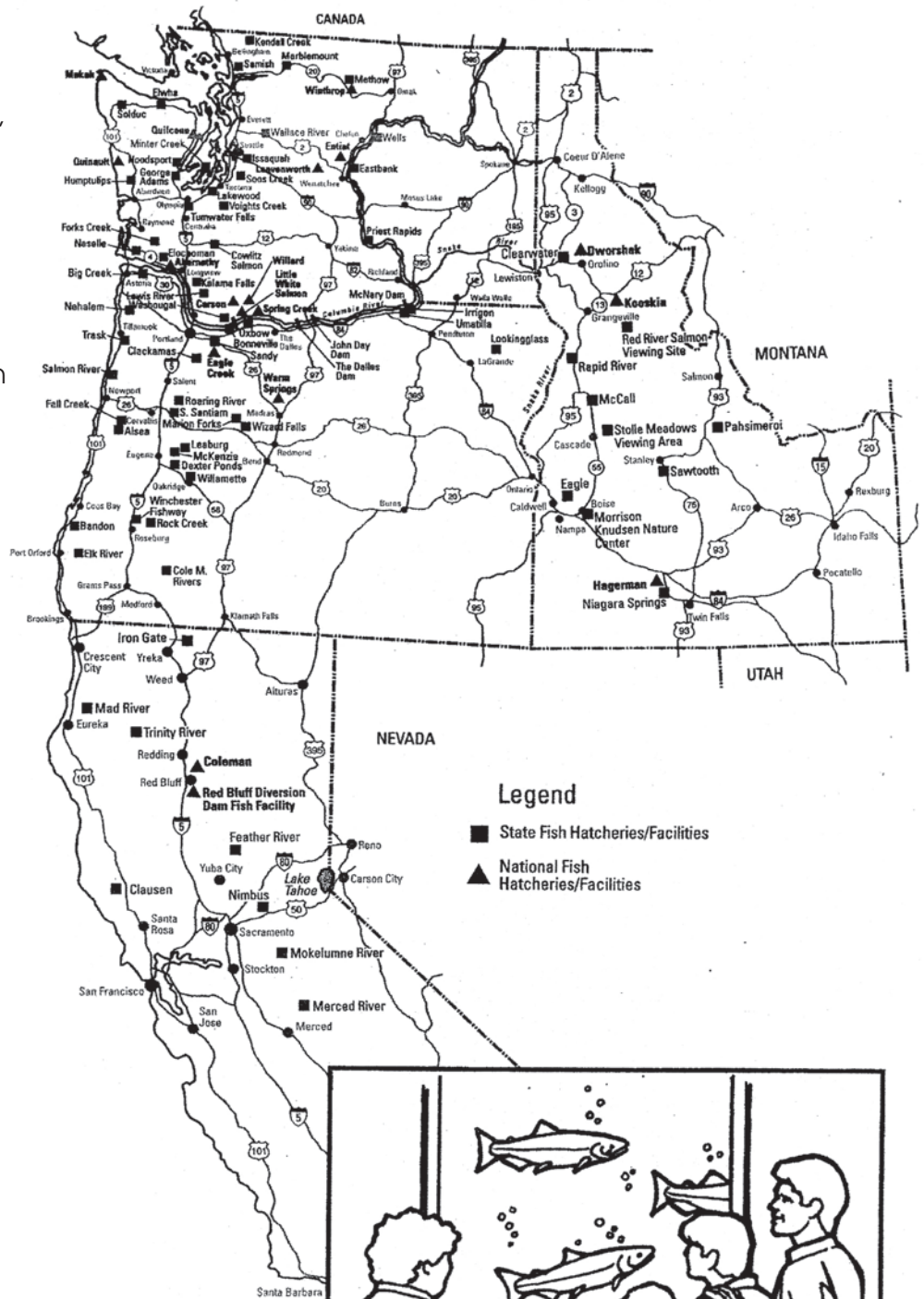
Outreach Specialist, Fisheries  
U.S. Fish and Wildlife Service  
503/231-6874

### State Fish Hatcheries:

California: 916/653-6194  
Oregon: 503/872-5252 x.2112  
Washington: 360/902-2661  
Idaho: 208/334-3791

### Visit Us on the Web!

For more information about seeing salmon and other fish and wildlife in the Pacific Region, visit the U. S. Fish and Wildlife Service on the Web at <http://www.r1.fws.gov> and click on "Visitor Directory."



# The Saga of the Salmonid

## Fact Sheet

Anadromous salmonids spend part of their lives in salt water. Chinook salmon, Coho salmon, steelhead trout and coastal cutthroat trout are all anadromous. These fish leave their stream and migrate out to the ocean where they grow much larger than salmonids that stay in the stream all the time. Chinook usually move into the estuary when they are several months old. The other anadromous fish all spend at least one year in the stream before migrating to sea.

At the river's mouth, freshwater flows into the sea. The sea also surges into the river, and salt water mixes with fresh water. This area of brackish water is the estuary. Migrating fish stay in the estuary for a while before entering the ocean. They find new types of food to eat and grow larger, which helps them survive in the ocean. Their bodies also adjust to the salt water.

The ocean is a vast resource for the fish. They find much to eat, and they grow very large. Cutthroat trout usually keep close to the river's mouth, and stay for only a few months, so they remain fairly small. But salmon and steelhead stay in the ocean for several years and grow very large. They may swim many miles up and down the coast line. California's north coast is rich in food in the Pacific Ocean.

Trout and salmon need cold water to survive and grow. Snow melt from mountain peaks, and rainfall feed their stream and lake habitats. Healthy salmonid streams are usually shaded by trees. The tree roots make the stream banks stable and provide hiding places for the fish. Leaves from the trees fall into the stream and become food for insects, which are in turn eaten by salmon and trout.

As young salmon and trout grow larger, they move from shallow areas into deep pools. Pools are scoured when water plunges over or around boulders and logs. The "bubble curtain" is a favorite place for salmon and trout. They can not be seen by predators above and there is plenty of oxygen. The current brings insects and other small food items. At the end of pools, where the stream narrows, the current picks up and washes the gravels clean, making them ideal for nests.

Some salmon and trout spend their lives in lakes, constantly moving about to find food. The surface of lakes may freeze in winter and the water underneath becomes quite cold. After spring thaw, salmonids feed around the edges of lakes. As the lake surface warms in summer, they retreat to the cold depths. They eat small animals called plankton, and insects that alight on the surface of the lake. As trout grow larger in lake environments, they often feed on small fish, such as minnows or even smaller trout.

# The Salmonid Life Cycle

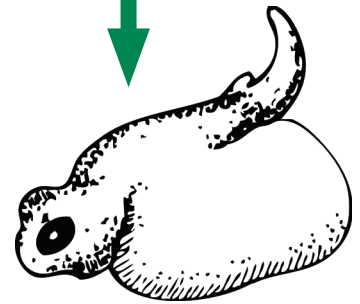
## Fact Sheet



**Spawners** lay eggs in gravel stream bottoms. After spawning, Chinook and Coho salmon die. Steelhead may swim back to the sea and then return to the river to spawn again. They often spawn several times in their lives.

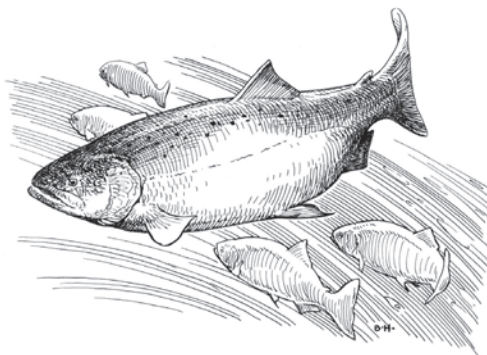


**Eggs** develop in the gravel and hatch into alevins.



**Alevins** stay in the gravel and live on their rich yolk sacs and grow bigger.

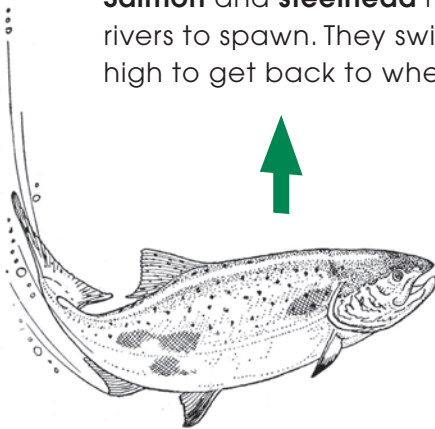
After the yolk sac is used up, the tiny fish are **fry**. They swim out of the gravel to find insects and other small animals that live in or fall into the stream. They will live in gentle water near the stream bank until they get bigger.



The salmonids—**smolts**—migrate downstream, toward the sea. The smolts spend some time in the estuary, getting ready to enter the ocean.



**Salmon** and **steelhead** return to their home rivers to spawn. They swim hard and jump high to get back to where they were born.



**Adults** often eat other fish. Trout do not grow as large as their relatives, the salmon and the steelhead trout, because they do not go out to sea. Adult salmon spend several years in the ocean, where they swim many miles and grow very large. Some trout live in lakes. They may live there all their lives, but often spawn in streams.

