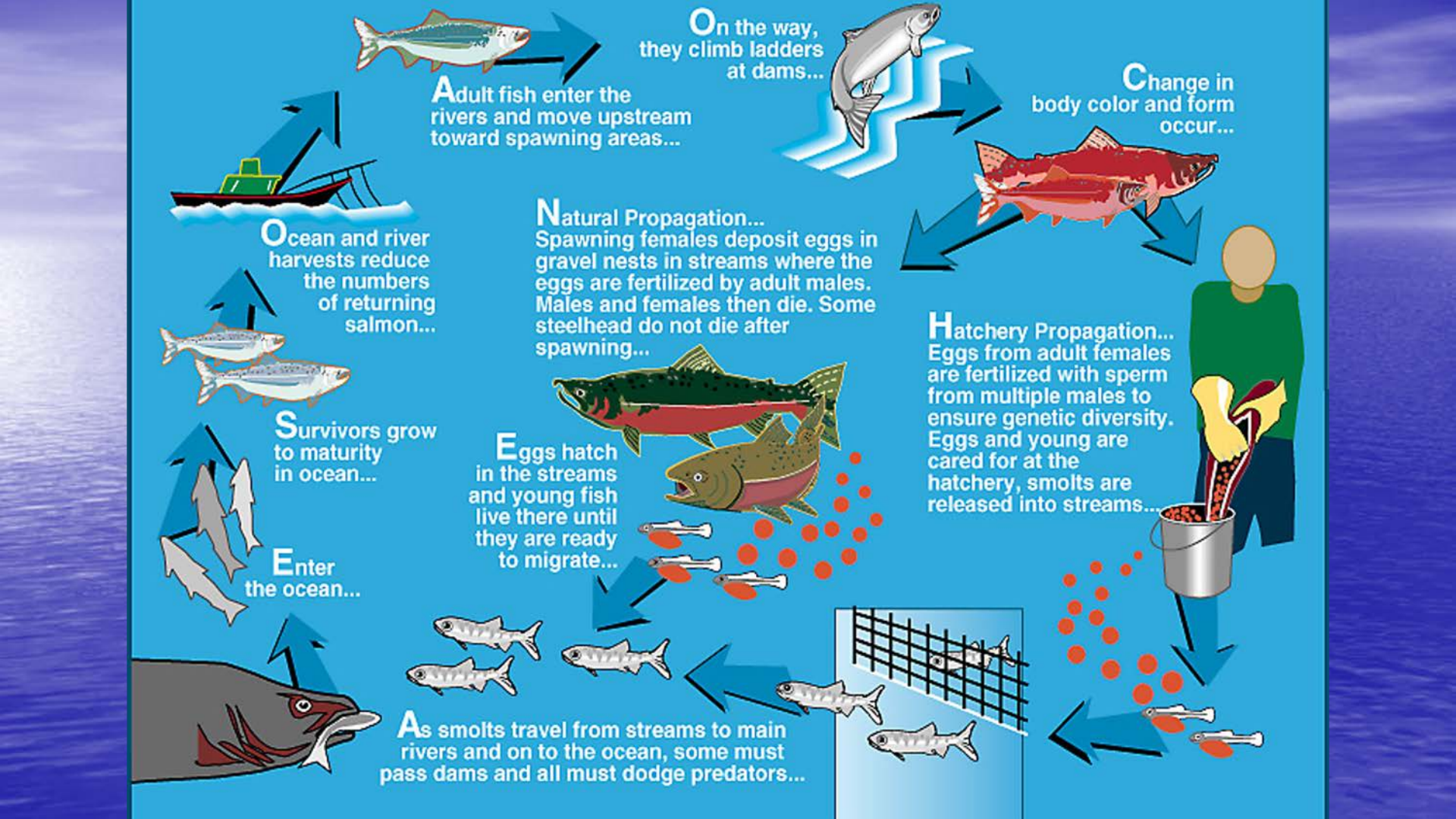
Salmon Life Cycle

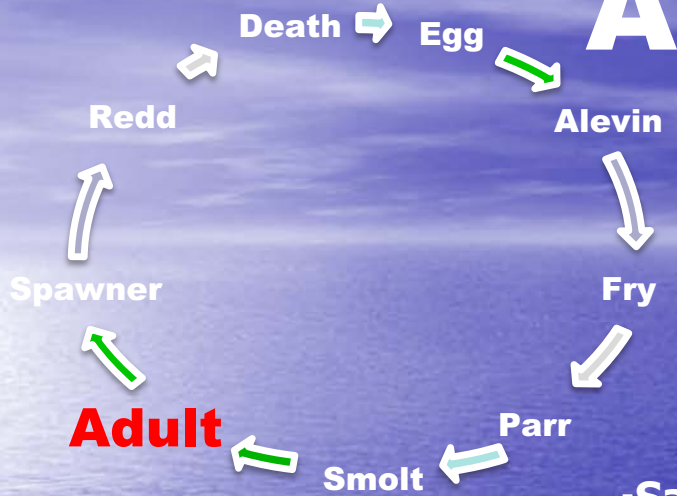
Adapted from Oregon Department of Fish and Wildlife

Salmon and Trout Enhancement Program

Fish Eggs To Fry Volunteer Guide


Adult fish enter the rivers and move upstream toward spawning areas...
On the way, they climb ladders at dams...
Change in body color and form occur...
Natural Propagation... Spawning females deposit eggs in gravel nests in streams where the eggs are fertilized by adult males. Males and females then die. Some steelhead do not die after spawning...
Hatchery Propagation... Eggs from adult females are fertilized with sperm from multiple males to ensure genetic diversity. Eggs and young are cared for at the hatchery, smolts are released into streams...
Eggs hatch in the streams and young fish live there until they are ready to migrate...
As smolts travel from streams to main rivers and on to the ocean, some must pass dams and all must dodge predators...
Enter the ocean...
Survivors grow to maturity in ocean...
Ocean and river harvests reduce the numbers of returning salmon...

ADULT

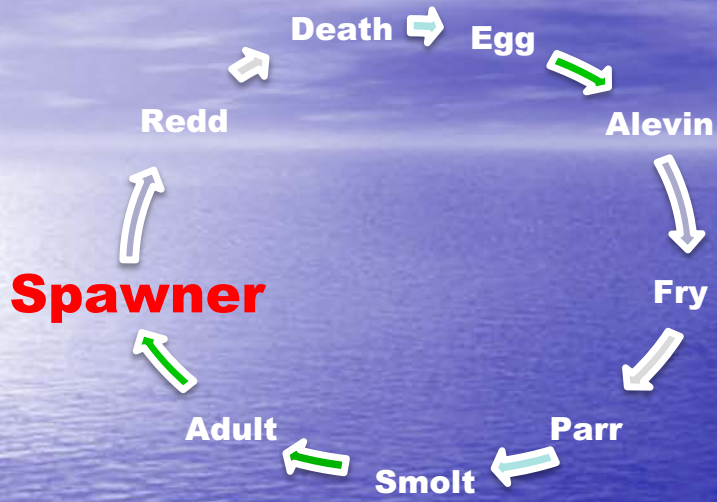


- Most salmon spend more than 80% of their lives in the ocean where they grow big on the prey species available in the ocean.

- Salmon spend 1-5 years in the ocean, depending on species and environmental conditions.
- Salmon travel vast distances to Alaska and even Russia or Japan, yet still return home.
- Commercial and sport fishing for salmon provides millions of dollars to Oregon's economy.

Refer to the "Salmon Species" slides for details on identifying adult salmon

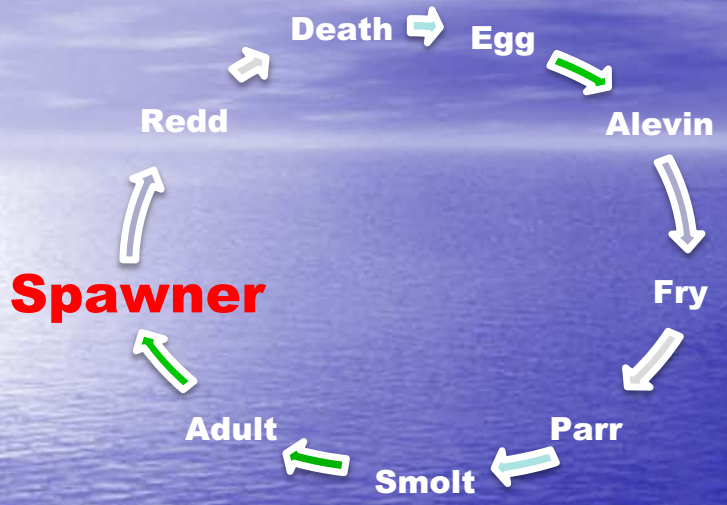
Adults return to spawn

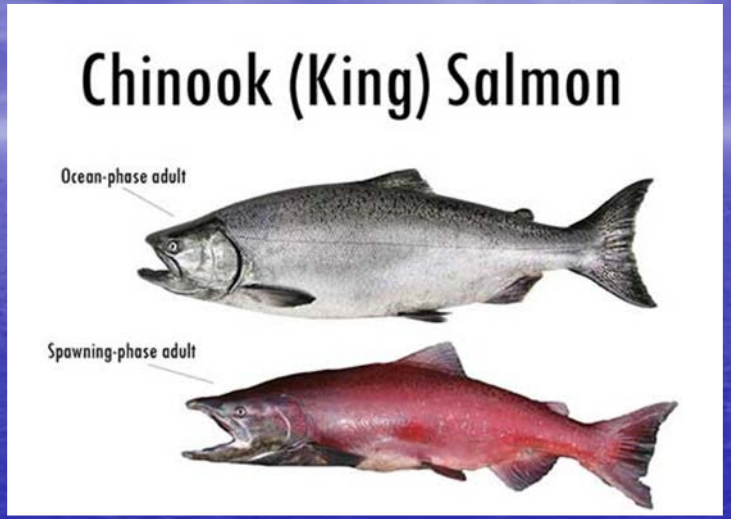


After spending 1-5 years in the ocean, adult salmon return to the stream (or hatchery) where they were born to spawn.

They remember the smell and can find it again.

Adults return to spawn

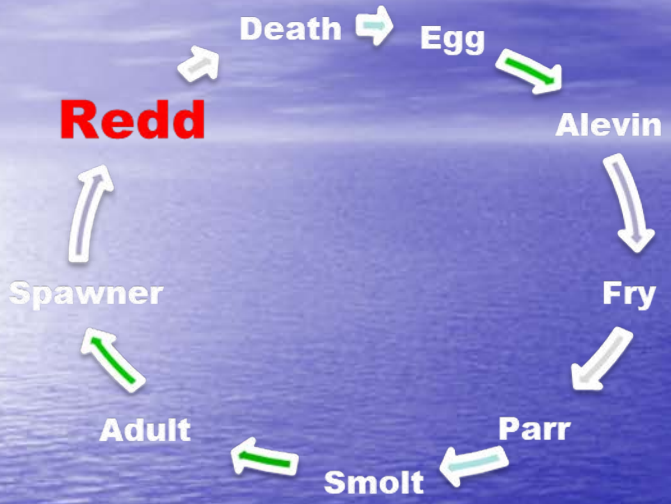




Adults change significantly once they enter freshwater. They change color, stop eating, males develop a kype (hooked jaw), and they stop drinking.

Adults overcome many obstacles during their return migration. Dams, waterfalls, culverts, low water, pollution, sediment, and predators can impact their success.

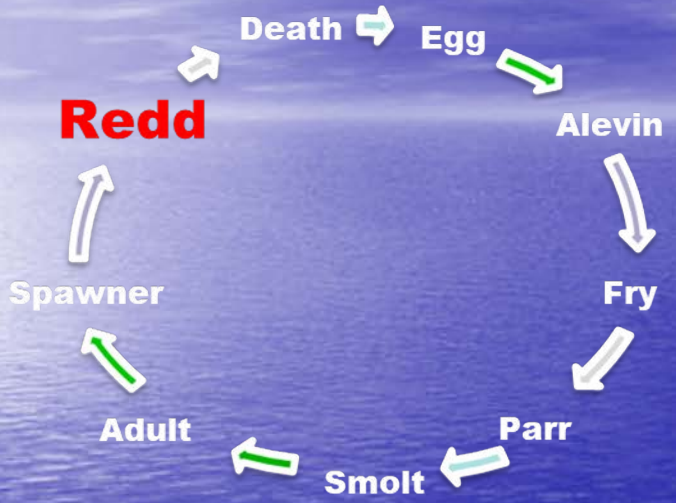
Adult females build a redd

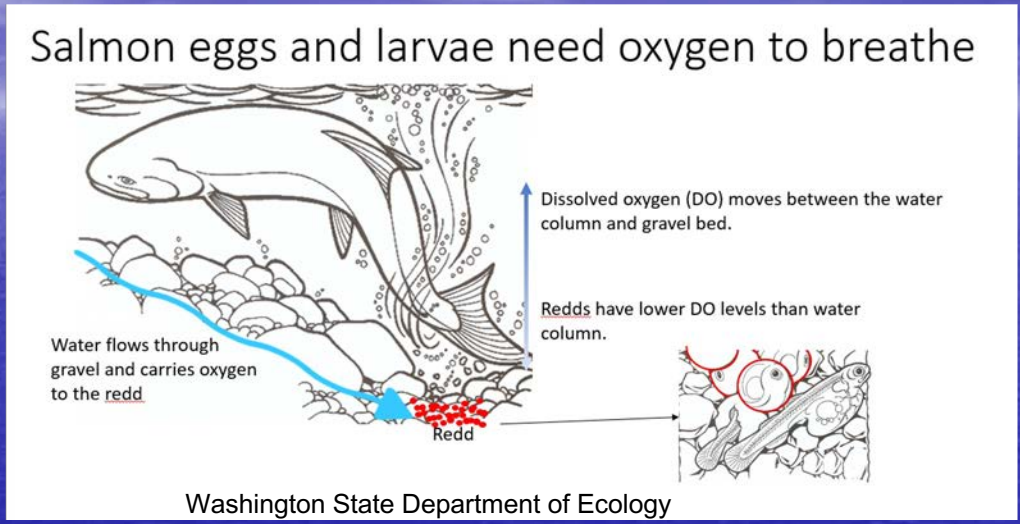


- Adult salmon create spawning beds known as redds to deposit fertilized eggs in the gravel.

- Salmon species spawn in the fall or winter, regardless of when they enter the river.

Adult hens build a redd





Washington State Department of Ecology

- Redds are typically constructed in clean gravel with good flow of clean water, otherwise the eggs would suffocate and die.

- The eggs are deposited and then covered with rocks that are on average 2-4 inches in size. The eggs are hidden and incubate in the spaces between the rocks.

Adults Return, Spawn & Die

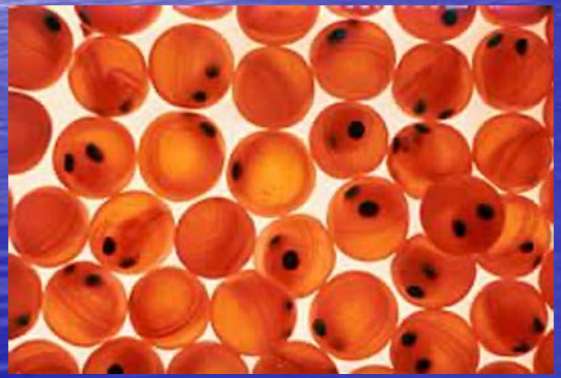
- After making their return journey and going through the hurdles and physical changes all salmon and many steelhead adults will die after spawning.

- Fortunately this death will bring life. The carcasses play an important role in the food web. The carcasses feed many organisms including insects some of which in turn provide food for the young salmon.

- The carcasses bring nutrients from the ocean that benefit the stream and riparian vegetation.

EGGS

- Salmon eggs stay in the gravel for 2-3 months before hatching.



- During this time they develop into embryos, and the baby salmon's eyes can be clearly seen.

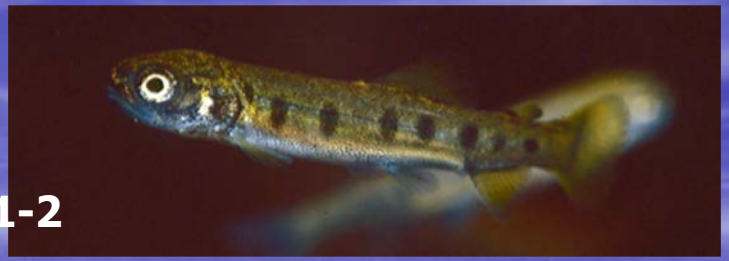
- Average number of eggs deposited per hen is around 3,000 eggs.

ALEVIN

- After hatching from the egg, young salmon, known as alevin, remain in the gravel and feed off the yolk sac still attached to their bodies.

- Alevins remain in the gravel for another 1-2 months before swimming up from the gravel to live in the stream.

FRY



- Fry are typically 1-2 inches in length.

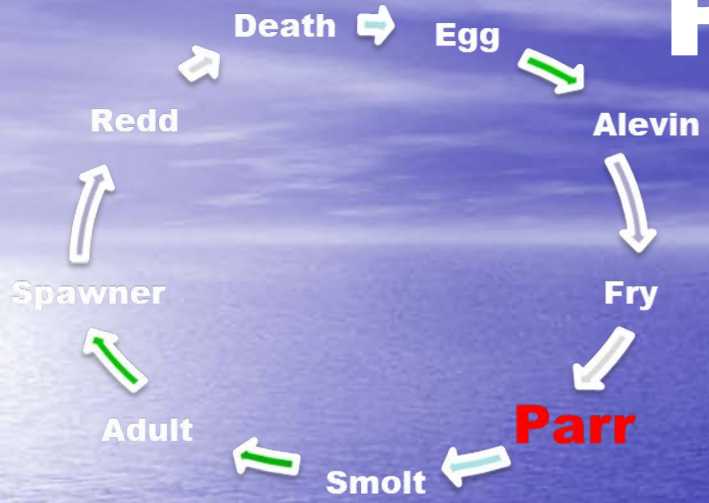
- Young free-swimming salmon that recently left the gravel are known as fry.

- When they emerge from the gravel they are called "Sac Fry" as a small amount of the yolk sack continues to nourish them until they learn to feed.

- Pink and Chum salmon migrate to the ocean as fry while other species may stay in freshwater for many months or years.

Refer to the "Salmon Species" slides for details on identifying salmon fry

PARR

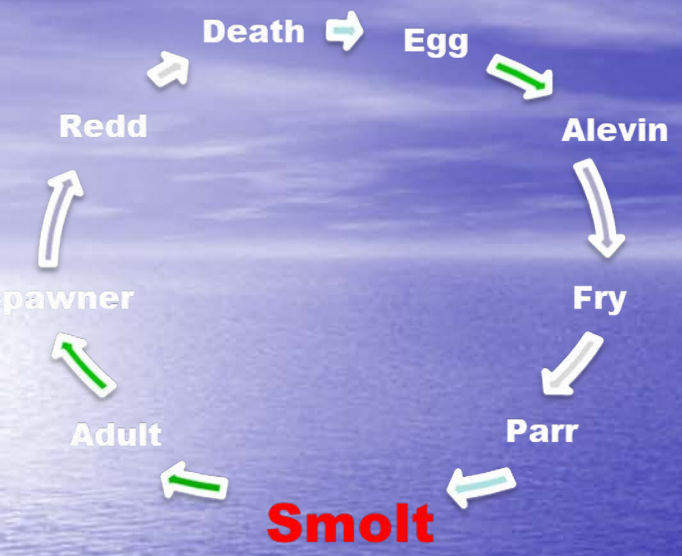


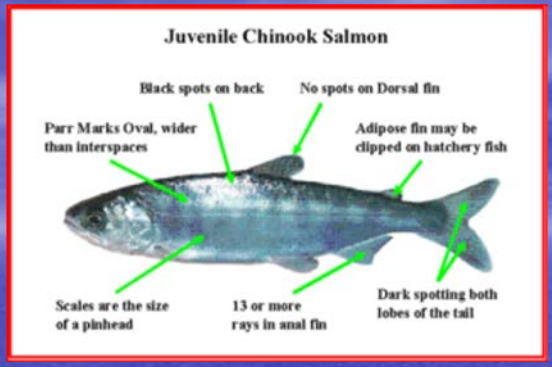
- Young salmon typically between 2-5 inches that are not yet smolts are known as parr (or fingerlings) due to the vertical bars (parr marks) along their bodies.

- Different species can be distinguished by the pattern of parr marks.

- As salmon mature into a smolt, the parr marks disappear.

SMOLT





- When salmon prepare to migrate from freshwater to the ocean, they become smolts.

- Smolting typically happens from 4-10 inches depending on species and environmental conditions.

- Smolts loose their parr marks and the body becomes silvery in color. This is to change camouflage from a stream to the open ocean.

- Many salmon smolts spend some time in estuaries before heading to the ocean.

Comparison of Salmon Life Cycles

Species	Time in freshwater	Time in Estuary	Time in Ocean	Adult Size (Average)
Pink	Days to weeks	Few days	1.5 years	3-10 lbs.
Chum	Days to weeks	1-2 weeks	2.5-3 years	8-12 lbs.
Chinook	3 to 12+ months Main stem large and small rivers.	Days to months	2-5 years	10-40 lbs.
Coho	>12 months Tributaries, slack water and side channels.	Days to a month	2 years	5-20 lbs.
Steelhead	>12 months Tributaries, small streams and rivers. Residents known as Rainbow Trout.	< 1 month	1-4 years	5-30 lbs.
Sockeye	1 to 3 years Lakes	Few days	1-4 years	3-8 lbs.
Cutthroat Trout	1 to 3 years Tributaries	< 1 month	.5-1 year	.5-4 lbs.

Exceptions and variations

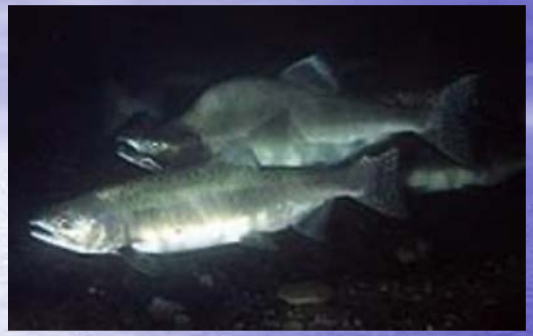
Jack salmon are adult salmon that spend only one year in the ocean and return to their natal streams at a smaller size than other adult salmon.

Mini-jacks are adult salmon that migrate to the estuary but not the ocean and return to spawn at an even smaller size than jacks.

Kelts are adult steelhead that did not die after spawning. Unlike salmon, steelhead typically do not die after spawning and can return to the ocean for a year or more before returning to their natal stream to spawn again. In rare instances, steelhead make this trip from stream to ocean and back again as many as three times.

Residents are adult salmon and trout that do not migrate to the ocean. This is very, very rare in salmon, but fairly common in steelhead.

Bucks and Hens



Pink Salmon, buck (top) hen (bottom)

Telling the difference between male salmon (bucks) and females (hens) is generally easier when they are ready to spawn because their bodies begin to change in different ways.

Chinook, coho, chum and steelhead males will become more colorful than females, while pink and chum salmon develop humped backs.

Sockeye Salmon, buck (bottom) hen (top)

Males will often develop an extended lower jaw called a 'kipe' and will have long, sharp teeth.

Coho Salmon Hen

Coho Salmon Buck