

# Salmon Background

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## Salmon Life Cycle

Salmon are anadromous fish, which means they migrate from salt water to fresh water in order to breed. Beginning their lives in freshwater, they transition through many life stages.

**Eggs** – The eggs are laid in nests of gravel called **Redds**. The female salmon digs a shallow depression in the gravel with her tail. Depending on the species, a female salmon can lay thousands of eggs. After she lays the eggs and the male fertilizes them, she will cover them with a protective layer of gravel.

**Alvein** – When salmon first hatch they get nutrients by slowly absorbing their yoke sacks, which are attached to their bellies after they hatch.

**Fry** – After the yoke sack is completely absorbed the salmon emerges from its gravel nest as a fry. It must find food immediately or starve. Fry feed on **macroinvertebrates**, or small aquatic insects. Depending on the species the fry may head directly out to sea or live in the freshwater stream for several years.

**Smolt** – When salmon reach the estuary their bodies go through a physiological transformation to prepare them for life in salt water. Different species spend different amounts of time in the estuaries, hiding from predators in eelgrass and feeding on plankton.

**Adult** – After spending time in the estuaries the salmon head out to sea. All five species become silvery in color, to camouflage themselves in the ocean environment. Different species spend different amounts of time in the ocean, feeding on smaller fish, growing, and storing up nutrients and energy for the difficult journey home. Some species will stay relatively close to the mouth of their rivers. Others migrate north along the coast, swimming thousands of miles to the Gulf of Alaska and beyond.

**Spawning Adults** – Salmon return to the same stream they were born in to spawn. Scientists now believe that salmon find their birth stream using their keen sense of smell. They can actually smell the differences between water from different streams. Once they return to fresh water salmon stop eating. Males will develop a long hooked nose and sharp teeth. This is for competing with other males, rather than defense against predators or hunting and feeding. Spawning males and females also change from their silver ocean coloration to their bright spawning colors. After spawning the salmon die. Their decomposing bodies provide vital nutrients to the streams where their young will hatch.

## The Importance of Salmon

Salmon are considered a keystone species because at least 137 other species depend on them. Predators feed on young salmon in streams and estuaries, and on adult salmon out in the ocean. Adult salmon returning to their streams provide a bounty of ocean nutrients. Their decomposing bodies feed not only animals, but also the forest itself. Scientists have found that trees and plants growing along healthy salmon streams contain nitrogen isotopes that came from the ocean, carried upstream in bodies of returning salmon. Thus salmon provide a vital connection between different ecosystems. Their life cycle is also a nutrient cycle that sustains the watershed. Salmon are considered indicator

species of a healthy watershed. If salmon are present that indicates or tells us that the watershed is also able to sustain many other species.

### **Salmon Habitat and Conservation**

Salmon face many obstacles and dangers throughout their migration. On average, out of 3,000 eggs only two salmon will survive to spawn.

**The “six C’s” of a healthy salmon habitat are, cold, clear, clean, complex, consistent, and connected.**

**“Cold, clear, and clean”**, refers to the water quality of streams. Salmon require cold water, in part because cold water has a higher level of dissolved oxygen for respiration. Salmon require clear water for a number of reasons. Water that is turbid, or cloudy with sediment, can smother eggs, make it difficult for young salmon to breathe and to see to find food. Sediment can also block sunlight and limit photosynthesis of algae and marine plants. This disrupts the food chain, resulting in fewer aquatic insects and thus less food for young salmon. Young salmon living in turbid waters tend to not grow as fast and also tend to die younger.

**“Complex”** refers to the condition of stream habitat. Rather than a uniform stream, salmon need habitat diversity, from fast moving rapids, to still deep pools in which to hide and rest.

**“Consistent”** refers to water flow. If the flow is too strong redds can wash away, and if the stream is too low or dry, eggs and young fish will die. Thus salmon need a consistent stream flow.

**A healthy riparian buffer can keep streams cold, clear, clean, complex, and consistent.** Trees shade the water and keep it cool. Their roots stabilize banks and prevent erosion that could cloud the water with sediment. Falling leaves also provide food for aquatic insects which are in turn food for juvenile salmon. Fallen trees, known as large woody debris, can create pools and currents and add to habitat complexity. Trees also take up a lot of water, thus in a storm can help control flooding. Pavement and developed areas will lead to increased flooding, as the water rushes downhill and into streams, rather than being absorbed and filtered.

**“Connected”** refers to the fact that salmon use many different habitats, from streams to rivers to estuaries to oceans. They need to be able to migrate from one habitat to the other. Fish passage barriers, such as dams and culverts and can impact salmon survival.

The life cycle of salmon presents a unique challenge to their conservation. To protect salmon, we must not only protect streams and forests, but also estuaries and oceans. Because salmon use so many different habitats, across city, state, and even international boundaries, it can be difficult to organize conservation efforts.

### **Species of Pacific Salmon**

There are five species of Pacific Salmon. The “hand of salmon” is a trick for remembering all five species. Each one of your fingers represents one of the species.

- Chum** - “Thumb” rhymes with “chum.”
- Sockeye** - With your pointer finger you point, or poke, yourself in the eye.
- King** - The middle finger is usually the tallest which represents the biggest fish. Also known as Chinook.
- Silver** - On your ring finger you might wear a silver ring. Also known as Coho.
- Pink** - The pinky represent pink salmon. Also known as humpy.

There are two species of anadromous trout that some scientists include in the salmonid family, **Stealhead and Cutthroat**.

### **Sources**

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