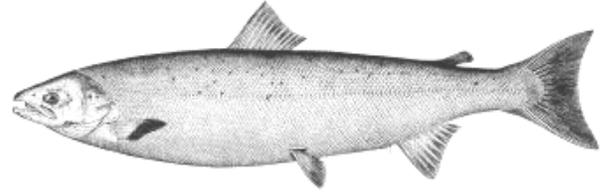


# How Many Salmon?

An Activity from Oregon Coast Aquarium



**Many hazards stand between a salmon egg and adulthood. Sometimes these hazards are natural, and sometimes they come from people. To learn more about the risky life of a salmon, complete this story by filling in the blanks.**

1. There are 15 female Pacific salmon in a stream. Each one lays 7,000 eggs in shallow gravel depressions they have scooped out in the streambed. There are \_\_\_\_\_ eggs in all.
2. Once the eggs are deposited, male salmon fertilize them. In this stream, only half of the eggs are fertilized. There are \_\_\_\_\_ fertilized eggs, each with a chance of hatching.
3. A new road is built near the stream. A large rainstorm comes along, and mud and gravel wash into the stream, killing 4,500 eggs. Now there are \_\_\_\_\_ eggs.
4. It is a hot summer, and lightning starts a forest fire. Ashes drop into the stream, smothering another 3,500 eggs. The remaining eggs hatch, making \_\_\_\_\_ young salmon.
5. After two weeks, the tiny salmon begin their journey downstream to the sea. Chemicals from fields and lawns are washed into the stream by a storm and kill 15,000 salmon. Now there are \_\_\_\_\_ youngsters.
6. The young salmon finally reach the sea. They try to avoid predators, but 11,000 of them are consumed by seals, sea gulls and larger fishes. There are now \_\_\_\_\_ salmon.
7. People in fishing boats catch another 11,500. Two years after their birth, there are \_\_\_\_\_ fish left ready to return home to spawn.
8. As they near the entrance of the same river they swam down, a grounded ship has dumped oil into the ocean. The spill kills another 5,400 salmon, leaving \_\_\_\_\_ to swim upstream.
9. Hungry eagles and bears are waiting for the returning salmon and eat 700 of them. This leaves \_\_\_\_\_ fish headed towards the fish ladders around the dam.
10. While the fish are making their way up the ladder, fishermen and raccoons take another 250 of them. \_\_\_\_\_ salmon remain.
11. As they head towards their final hurdle, a waterfall, the now battered salmon begin jumping up the falls. Some of them become too exhausted, and 638 die. \_\_\_\_\_ salmon arrive at their original streambed to spawn and begin the cycle again.

## **Background:**

### **A salmon's life cycle**

The salmon life cycle begins as an egg buried in loose gravel in a cool stream with lots of oxygen. When the salmon first hatch they are called **alevins**. They wait in the gravel until they finish the last of their yolk then hurry to the surface for a quick gulp of air to fill their swim bladders.

The little salmon, now called **fry**, are whisked downstream with the current towards the ocean. Some species hang out in their native streams for months or even years, hiding in snags and other slack waters and feeding. Others ride the current to estuaries where they will wait while their bodies go through necessary changes for life in the salty oceans.

As the young fry near the estuary they become **smolts**. Their scales grow, they become more silvery to help blend into the ocean environment. The smolts feed like mad in the estuary, trying to become as big as they can before braving the treacherous waters of the Pacific ocean.

Salmon at sea might migrate thousands of miles or they may stay right off the coast. They may spend anywhere between 2 and 8 years feeding in the ocean before returning to their native rivers and streams to spawn. Their homing abilities are legendary and not entirely understood.

On the way back salmon make another stop in coastal estuaries. Like last time, their bodies go through chemical changes so they can survive in the freshwater of their home streams. This time they also stop eating and adopt their flashier, spawning colors. Males may get hooked beaks and humped backs. The journey home is a daunting one, only the strongest will survive to reproduce.

Those salmon who make it will go through the final task of their lives. The females will build gravel nests with their tails called **redds**. and the males will fight for the opportunity to fertilize the females eggs. Although some steelhead and cutthroat will live to spawn again, most anadromous salmon will die after spawning. Their bodies feed the stream environment.

### **Perils of the journey**

The journey to and from the spawning grounds is dangerous indeed. Not even the egg is safe. Some **predators** prefer eggs because they are high energy sources of food. Careless **hikers**, **unleashed dogs** and other disturbances can destroy redds and either crush eggs or loose them to drift downstream. too much **erosion** can cause silt to smother the redds and suffocate the eggs. Streamside vegetation and responsible forestry can help reduce this hazard.

When the fry emerge from the gravel they are very vulnerable to predators. They are small and need to learn very quickly how to hide. Predators are natural but around dams predators gather to await salmon fry that are spilled over the top or rocketed through bypasses. Young salmon must also be wary of dam **turbines**, and **irrigation water diversions**. When the plant life along the streamside is removed the temperatures in the stream increase, the flow is reduced and there are fewer insects to eat. **Pollution** from cities and farms also takes its toll.

At sea, adult salmon must deal with not only the larger oceanic predators like sharks and killer whales but also with **commercial fisheries**. And the trip back upstream can be even more

dangerous. Adults have to face natural predators like bear and eagles plus both commercial and **recreational fishers**. Dams bar the path of migrating salmon. Those who make it up the fish ladders may become confused or even sick in the warmer **slack waters above the dam**. Pollution, erosion and water diversions play key roles in preventing adults from successfully spawning by destroying good salmon spawning habitat.

**Activity:**

Print out the "How Many Salmon?" worksheet. Have your students fill in the blanks to learn more about the salmon's risky life cycle.

**Answers:** 105,000 | 52,000 | 48,000 | 44,500 | 29,500 | 18,500 | 7,000 | 1,600 | 900 | 650 | 12

**Summary:**

With your students (or kids or friends), discuss the following questions:

1. What kinds of natural hazards did the salmon face?
2. What kind of human made hazards did the salmon face?
3. How would your numbers change if you removed all the human-made hazards?

**Extensions:**

- Discuss what you can do to help more salmon make it home to spawn
- Have students research individual hazards (e.g., dams, predators, fishing) and report back to the class.
- Have students write a narrative about the journey of one salmon.