

Salmon Biology

- Salmon is a major source of sustenance and cultural significance for the tribes of the NW, including the people whose traditional homelands we are on today. (For September, we are on the traditional homelands of the Molalla. For November, we are on the traditional homelands of the Siuslaw. The southern Willamette valley is the traditional homelands of the Kalapuya. The descendants of these tribes now make up the Confederated Tribes of Grand Ronde and Confederated Tribes of Siletz Indians.)
 - Salmon is an important part of many cultural and spiritual ceremonies and has been for countless generations. The annual salmon return is celebrated by many tribes as it represents continuation of human and all other life. The annual salmon return and harvest is opportunity to share values and traditions from generation to generation within Native communities.
- Salmon are anadromous. Anadromous fish begin their life in freshwater, migrate to the ocean to live as adults, and return to freshwater to spawn at the end of their life cycle.
 - The Kalapuya people's lives changed with the seasons, including the foods they harvested. Because of this, for the tribes that relied on them for sustenance, salmon represent the cycle of life and provided nourishment that can be smoked and be eaten through the winter.
 - Many tribes, including the ancestral tribes of the the Confederated Tribes of Grand Ronde and Confederated Tribes of Siletz Indians traditionally, used traps and nets made of woven natural fibers to catch salmon. Today, people belonging to Native communities use traditional methods of fishing, in addition to western methods.
- Salmon Life Cycle
 - Female salmon builds a "nest" or redd in the substrate. Ideal substrate for Chinook redds is golf ball to baseball in size. Using her tail, she pushes the substrate around to create a small bowl shape which she will later deposit her eggs in. As she builds the redd, the males are competing to spawn with her. They will push against one another and use their hooked noses (kype) and teeth to outcompete one another. Once a male and female are paired up, they will each roll on their side and wiggle over the redd. The female is depositing her eggs and the male is depositing his sperm. After they have spawning, the salmon will remain in the area for a few days before their carcasses wash down river and return nutrients to the system.
 - A female salmon can lay up to 5,000 eggs. Due to risks posed by water quality, predators, habitat availability, and passage only 1-2% of the fish will return to the spawning grounds as adults and reproduce.
 - Eggs Stages
 - Zygote: Eggs that have been freshly deposited in the gravel. They are about the size of a green pea.

- Eyed-eggs (40-50 days): Eyed-eggs are fertilized. The black dots you see on the eggs are the eyes developing.
 - Alevin or Sac-fry (2-3 months): Alevin have hatched from the eggs but their bodies are too delicate to swim out into open water. They continue to find shelter in the redd and rely on their yolk sac for nutrients.
 - Swim-up/Fry (up to 1 year): Swim-up fry are about the size of your pinky. At this size, they have emerged from the redd and feed off of macros and small aquatic organisms. They begin to develop the colors and markings that help them blend into their surroundings like spots, parr marks (lines along the side), and silver/brown coloring.
 - Smolts (up to 6 months): As the juveniles migrate to the ocean, they go through a process called smoltification. Through this process they begin to develop the shiny silver scales that will help them blend into a marine environment. Juvenile salmon will spend time in estuaries before swimming out into the ocean. An estuary is where saltwater meets freshwater. This time will allow their bodies to adjust to the difference in water types.
 - Adults (3-5 years): Different species of salmon spend different amounts of time in the ocean. On average it is about 3 years. During this time they are swimming all over the west coast of the Pacific Ocean, feeding on other fish, growing, and avoiding threats (killer whales, sharks, fishing boats, warm water pockets). When the time is right, they will migrate back to the stream they were born in (natal stream) to spawn. This can be triggered by changes in weather, temperature, an internal cue, and constellations. Salmon have an incredible sense of smell and they use that to navigate back to their spawning grounds.
- Upon returning to freshwater, their bodies do not have the same adjustment period they did as smolts. This quick transition causes their flesh to break down. That is why you see all the white fungus markings on the migrating adults.
 - Adult salmon are so determined to get back to spawning grounds they stop eating, their only goal is to swim up river to spawn.

Station Outline: Station length varies depending on the class. Most stations are between 30 and 45 minutes.

Station Preparation

1. Arrive at the site early enough to find all the spots where kids can see salmon. At Whittaker Creek this can be in several different locations. At the Carmen Smith Spawning Channel, fish will be easy to spot.
2. Make sure you lead your station from a spot where students will not disturb the fish. Students tend to migrate towards the exciting thing. Set boundaries for how far the students can go to help students stay aware of themselves in space. you can use objects; IE; students can go as far as the big rock and not any further.

3. Before walking up to the stream, remind students that salmon are very sensitive and get stressed out easily. Ask them to be as calm and as quiet as they can be. you may want to challenge students and say "let's see if we can be the quietest/ calmest group today"
4. If fish are spawning, it can be very exciting. It is okay to not cover everything and let the students observe the fish. Take time to talk to them about what they see and then fill in those observations with information about the life cycle and biology of the fish.

Student Participation

1. Once students see the fish it is very exciting and can be distracting. Consider starting the station a ways away from the water and talk about the early stages of the life cycle before bringing students over to watch and learn about the adults.
2. Seeing salmon spawn is a magical experience for kids and adults. It is okay to take a break from talking and just observe. Talk about what you see, what behavior the fish are showing, what the habitat is providing, how to tell the difference between males and females, hatchery and wild, and different species (if applicable)
3. Ask the students if they can count how many wilds vs natives and males vs females there are
4. If fish are not present, talk about why. What has changed to prevent fish from migrating to this portion of the river (usually low water year and warm temps). Talk about how the habitat in front of you supports salmon at all stages of their life cycle. Make sure the conversation is dynamic to keep students engaged.
5. Ask them to point out where they might see fish at different life stages. For example: fry might be tucked under logs for shelter and adults might be in deep pools cooling off or resting

MS Discussion/Wrap Up

- Did anything about the fish surprise you?
- If you were a fish, where would you want to be in this stream and why?
- Some of the kids go fishing and this is a great time to talk about the different types of fish they have seen and how they might be different from salmon
- Salmon, for the most part, return to the same streams where they hatched. How do you think the Salmon knew where to go to get here? How did they navigate? What kind of obstacles do you think salmon face in their journey upstream? - human and non-human. How many salmon do you think end up making it back upstream to spawn?

HS Discussion/Wrap Up

- Can you think of anything human in origin that can impact the ability of salmon to migrate upstream. This can, but doesn't have to include, physical obstacles.
- What are some ways that environmental lawmakers or non-governmental organizations can work to protect salmon populations?

- What are some ways that humans can attempt to mitigate effects on salmon populations? Who are the stakeholders (people that would be affected or care) in this decision-making process.
- If it was your job to do so, how would you go about bringing awareness to human caused threats to salmon populations. How would you make people care?