

Wildlife Express

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SALMON



Photo: CC-BY Roger Phillips at Idaho Fish and Game

inside

Learn about Idaho's sensational salmon!
Who are salmon's ancestors?
Let's cook up some salmon.
Fishing for Idaho Salmon ... you bet!



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IDAHO'S SENSATIONAL SALMON

Three species of salmon may be found in Idaho. They are the Chinook, sockeye and coho.

Salmon Photo: CC-BY Idaho Fish and Game

Our salmon are real travelers. They start their lives in cold, freshwater mountain streams and lakes, travel through large rivers and end up in the salty ocean. They spend one or more years in saltwater before traveling back to the waters where their lives began. They use different habitats during their lifetime! Fishes that start life in freshwater, travel to the ocean, then travel back to freshwater to reproduce are called anadromous (ah-NAD-ruh-mus) fishes.

All of Idaho's salmon have similar life cycles. Salmon begin life as small, pinkish-orange eggs laid in a gravel nest. Females find a spot in a stream where the water speed and depth are just right. They use their tails like shovels to dig nests called redds. They turn on their sides and flip gravel up off the bottom of the stream. Chinook redds may be six feet in diameter and up to four feet deep!

Males "encourage" females to lay eggs by swimming beside them and gently nudging them. As the females release their eggs, the males release a substance called milt that fertilizes the eggs and allows them to grow. Females then move upstream and once again use their tails to kick up gravel to cover and protect the eggs. Both the males and females die after spawning.

The eggs develop in the gravel and hatch into baby fish called sac fry or alevins (al-vins). During this time, they are small and vulnerable. They hide in the redd and get food from a yolk sac attached to their bellies. When the yolk sac is gone, young salmon leave the redd and look for food.

Chinook and coho live in the river feeding, hiding and growing until it is time to migrate to the ocean. Sockeye are a bit different. They may make a redd in a stream attached to a lake or along the shore of a lake. After leaving the redd, young sockeye stay in the lake until it is time for them to migrate to the ocean. Juvenile salmon migrating to the ocean are called smolts. Smolts are only four or six inches long when they start their long journey.

Adult salmon spend one to five years in the sea eating and growing. When the time is right, they get the urge to return to Idaho to spawn in the river where they were hatched. Once they leave the ocean, they never eat again. They depend on stored fat and strong muscles to give them the energy to make it back to Idaho.

Salmon have been an important part of Idaho for millions of years. Let's take a closer look at the salmon that call Idaho home.

CHINOOK

SALMON



Chinook Illustration: CC-BY Joseph Tomelleri

Chinook salmon are also called king salmon, because they are the largest member of the Pacific salmon family. One thing that makes them different from other salmon is their mouths are black! If you open a fish's mouth and see black gums, you are looking at a Chinook salmon.

Idaho's Chinook may grow to be as big as a four-year-old human! They range in size from 18 to 40 inches long and may weigh up to 45 pounds. Adult sizes vary by how long Chinook live in the ocean. Chinook that spend more time in the ocean will be bigger. Idaho's Chinook salmon are separated into three groups: spring, summer and fall. This separation is based on their size and when the adults leave the ocean.

Spring and summer Chinook spawn during August and September in small streams that run into the Clearwater and Salmon rivers. Young spring and summer Chinook live for a year in Idaho before leaving for the ocean in April and

May. In the ocean, they swim along the coast to the Gulf of Alaska.

Fall Chinook spawn in the Clearwater, Salmon and Snake rivers during October and November. They may live in the river for a few months or up to a year before trekking to the ocean. Fall Chinook don't travel in the ocean as far as spring and summer Chinook. They live off the coasts of Oregon, Washington and British Columbia, Canada.

While living in the ocean, Chinook adults are a silvery to olive-brown color. They eat fish and grow to be big, sleek and strong. They may spend one to five years at sea, but most only stay there for two or three years.

As they migrate back to Idaho, their colors become a bit darker. The sides of their bodies turn a reddish-maroon color. This is the clue that they are ready to spawn and start the next generation.

COHO

SALMON

© Dennis Westover

Coho salmon are also called silver salmon. While in the ocean, the sides of their bodies are a shiny silver.

Idaho's wild coho salmon were declared extinct in 1986, but coho are once again swimming in the Clearwater River. This is because of the Nez Perce Tribe. Coho are an important part of the Nez Perce culture. They wanted to return coho to Idaho, so they built a hatchery. With Idaho's coho gone, they got fish from Washington and Oregon for spawning.

In 1995, the first hatchery coho were released into the Clearwater River. The program has been successful. There have been enough fish returning to Idaho to allow some to spawn in the wild and to allow fishing!

Juvenile coho are about six inches when they are released into the Clearwater River. Hatchery coho migrate to the ocean the same year they are released.

Once in the ocean, coho move north. They live off the coasts of Washington and British Columbia, Canada. They stay in the ocean for one to three years and grow to weigh between eight to 12 pounds.

In August and September, they begin their journey back to Idaho. Coho spawn in October and November in streams along the Clearwater River. Spawning coho look different from coho in the ocean. Their heads turn silver-green, and the sides of their bodies become a dark-brown, maroon color. Their backs grow humps, and their jaws form into large hooks which make their teeth look huge. The change is really noticeable in the males. They look fierce!

Coho are cool fish. It's wonderful to see them back in Idaho.



Male Coho Illustration: CC-BY Joseph Tomelleri

Clearwater River Photo: CC-BY Dennis Westover at Flickr.com



Sockeye salmon are sometimes called bluebacks or redfish. In the ocean, their backs are a bluish color, while the sides are silver. When it is time to spawn, their heads turn green, and their bodies become bright red.

Have you ever heard of kokanee? They are sockeye salmon that do not travel to the ocean; they are landlocked. Kokanee are found in many lakes and reservoirs. When they spawn, kokanee look just like sockeye. They have green heads and red bodies. Like their sockeye cousins, kokanee also die after spawning.

Sockeye are truly amazing! They journey more than 900 miles to and from the ocean. To get to their spawning waters, they climb more than 6,500 feet above sea level! Their journey takes them to lakes around the headwaters of the Salmon River near Stanley.

Adults leave the ocean during the summer and spawn during October. Sockeye are different from other salmon; their young live in lakes. Young sockeye live and grow in the lake for one to two years before migrating to the ocean in May. They move northward along the coast to the Gulf of Alaska. They will spend one to three years in the ocean eating tiny animals called zooplankton. Sockeye start their journey back to Idaho in one to three years.

People have probably heard more about sockeye than any other Idaho salmon. Early explorers to Redfish Lake said the lake would

turn red because there were so many sockeye in the lake. This is how Redfish Lake got its name.

As people moved west, they changed salmon habitats. Sockeye numbers soon dwindled, and they were listed as endangered in November 1991. In 1992, only one sockeye, named Lonesome Larry, returned to spawn.

To try to save the sockeye from extinction, Idaho Fish and Game started collecting sockeye that came back to spawn. Sixteen fish were collected in seven years. The genetic makeup of the fish were tested, and their eggs and milt were collected and frozen.

Hatcheries were made to breed sockeye. Biologists were careful to make sure that the sockeye did not lose any of the traits that made this fish special. Millions of sockeye eggs and fish have been released into Redfish Lake and other lakes and streams in the Sawtooth Valley. This program has been successful. Against all odds, sockeye are making a comeback! Hatchery sockeye have migrated to the ocean and have returned to spawn. Their offspring are making the trip, too. For a fish that was almost gone, this is great news.

We may never see Redfish Lake colored red like early explorers did, but we still have sockeye living here. They have been saved from the brink of extinction. With good management, future generations will be able to enjoy Idaho's amazing sockeye salmon!

AMAZING ANADROMOUS

SALMON

Salmon Photo: CC-BY Idaho Fish and Game

We are lucky to have salmon call Idaho home. Salmon are special fishes because they have the ability to live in both freshwater and saltwater! Our salmon hatch in freshwater, travel to the salty ocean to grow and then travel back to freshwater to spawn. What a journey! Fishes that do this are called anadromous (ah-NAD-ruh-mus) fishes.

Anadromous fishes have some adaptations and behaviors that help them with their long trips. When traveling to the ocean, young salmon, called smolts, let the water's current push them. Young, small fish would have a difficult time swimming 600 to 900 miles, so they let rushing spring water give them a push. They head to the ocean tail first, going backwards! As they float along, their sensitive noses are smelling every detail in the water. The smells and chemical changes in the different streams and rivers are remembered. They will use this scent map to help them find their way home when it is time to spawn.

Going from living in freshwater to living in saltwater is no easy feat. Saltwater and freshwater are very different habitats. To get their bodies ready

for living in saltwater, smolts go through something called smoltification (smolt-i-fi-CA-shun). Smoltification gets the fish ready for the big salt bath they are about to take.

Salt is a good thing. We all need it, but we need it in the right amounts. Too little or too much and our bodies don't function well. Salt and water need to stay balanced. Keeping this balance can be tricky for smolts.

Pacific Ocean Photo: CC-BY Tom Brown at Flickr.com



In freshwater, smolts get the salt they need from “drinking” the water. They need to drink a lot of water to get all the salt they need. All that water needs to go someplace, so they pee a lot. Smolts also pump water out of their bodies using their gills. The kidneys and gills work hard to get rid of all the extra water.

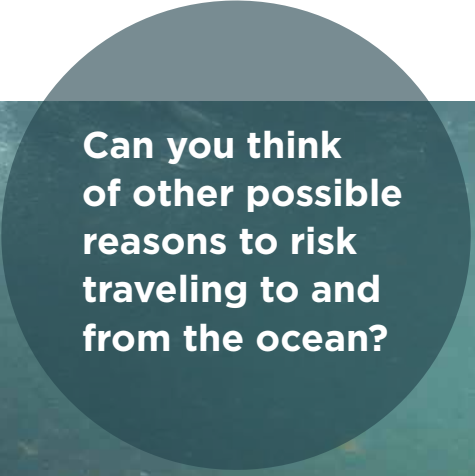
In the ocean, salmon need to do the opposite of what they did in freshwater. The salty ocean pulls water out of the fish’s body. Now, salmon need to hang on to water and get rid of salt. They don’t pee as much. When they do pee, it’s full of salt! Their gills also kick into action pumping more salt out of their bodies.

The changes needed to live in saltwater happen as smolts are traveling to the ocean. It only takes about two weeks for smolts’ bodies to make this huge change. That’s incredible!

There are other fishes in Idaho that travel to the ocean for part of their lifecycle. Steelhead are rainbow trout that travel to the ocean, and the eel-like Pacific lamprey are also anadromous. These fishes have to deal with changing habitats, just like salmon.

Anadromous fishes put their bodies through so much stress and face many dangers along the way. Predators and changing habitats are just a few of the threats they may run into. Why risk traveling so many miles?

Food is a good reason. The ocean is a huge grocery store full of nutritious goodies. There is also less competition for food and space. This may be why anadromous fishes risk such a long and perilous journey.



**Can you think
of other possible
reasons to risk
traveling to and
from the ocean?**

FIVE FINGERS FOR FIVE SALMON

The Pacific Ocean is home to five species, or kinds, of salmon: chum, sockeye, Chinook, coho and pink.

An easy, and fun, way to remember the names of these salmon is to use your hand as a guide. The thumb stands for chum. Use your pointer finger to sock your eye (sockeye). The largest finger is the king or Chinook. Coho is the ring finger Think of the "Os" as rings. Pink, the smallest salmon, is the pinkie. Now whenever you want to remember the names of the five Pacific salmon, all you have to do is look at your hand!





SALMON ANCESTORS

Have you ever made a family tree? It can be fun to discover relatives and past ancestors. With a little research and hard work, you may be able to trace back your ancestors for hundreds of years.

Scientists can trace back the ancestors of animals, too. One way is to look at fossils. Salmon are incredible fish. They travel long distances and can live in both freshwater and saltwater. How did such a fish come to be? By looking at fossils, scientists try to answer questions like these. They try to discover salmon's ancestors.

Fossils of the earliest salmon were discovered in British Columbia, Canada. This salmon lived in lakes 40 to 50 million years ago! They lived in lakes because the oceans were much warmer than they are now. The colder lakes had more food than the warmer oceans. You would not have recognized Idaho at this time. The states of Washington, Oregon and California were at the bottom of the ocean. Idaho was beach-front property! About 25 million years ago, the oceans began to cool. This was most likely the time when salmon started traveling between freshwater and saltwater.

A salmon that likely lived in rivers and the ocean was the saber-toothed salmon. It lived 10 to 15

million years ago. Fossils of this salmon have been found in the Owyhee River Canyon.

The saber-toothed salmon was huge. Some fossils have measured close to eight feet! Scientists think this salmon may have weighed over 400 pounds. The saber-toothed salmon had something in common with the saber-toothed tiger – fangs! It had two enormous, curved teeth. It may have looked frightening, but its large fangs were probably not for killing prey. The skull bones show that the saber-toothed salmon was a filter feeder. It ate plankton. Plankton are tiny microscopic plants and animals. The huge teeth were most likely used to attract mates and fight for the best spawning grounds.

During the time of the saber-toothed salmon, the land was changing. Volcanoes erupted. The ocean floor rose up to create the coastline we see today. Rivers and lakes changed. Salmon had to be strong and tough to survive. They had to adjust and adapt. It took 10 million years of change and growth to get the salmon we have today. Two million years ago salmon in the Pacific Northwest looked very similar to today's salmon.

It's hard to imagine that an enormous fish with saber-like teeth was on a branch of the salmon family tree!



SALMON

A KEYSTONE SPECIES

Salmon in the Pacific Northwest are considered a keystone species, because so many animals depend on them. A keystone is the stone at the top of an arch. It supports the other stones and keeps the whole arch from falling. Salmon are like the top stone. They keep groups of plants and animals in balance. If salmon disappear, other animals will be at risk, too.


Salmon support more than 100 different kinds of animals. Eagles, bears, otters, orca whales and people are just some of the animals that depend on salmon.

Salmon also move nutrients between the Pacific Ocean and Idaho. How do they do this? Well, salmon die after they spawn. As they decompose, their bodies are eaten by scavengers and tiny little animals called microorganisms. These tiny animals become food for small fish, like baby salmon.

Decomposing salmon also 'feed' plants. Bears, otters, and other animals

that eat salmon often drag them out of the water. Part of the salmon will be left behind to decay and become part of the soil. Fish is a great fertilizer. Tree growth rings are formed as trees grow. Growth rings can be seen in tree core samples and tree cross-sections. Each ring shows one year's growth. The bigger the distance between rings, the more the tree grew during that year. Researchers have found that trees grew more during and just after the years when a lot of salmon returned from the ocean to spawn. More decaying fish means more fertilizer and more tree growth.

Salmon are the only way to move nutrients from the ocean to Idaho. All day, every day, Idaho's rivers carry nutrients to the ocean. The nutrients feed salmon and the ocean food web. Salmon bring these nutrients back to Idaho when they return to spawn.



Can you think of other keystone species? Some may have yet to be discovered.

LET'S COOK UP SOME

SALMON

Salmon is very tasty and also good for you! Here are some recipes that will help you cook up some great salmon.

Your salmon will taste its best only if you care for it properly after you catch it. The best thing to do is put your fish in a cooler full of ice and clean your fish as soon as possible. Cook your fish within two days after you catch it or freeze it. Fish will keep for months in the freezer if vacuum packed or frozen in water in a zip top freezer bag. Here are some recipes to try. Happy cooking!

RECIPE: MARINATED GRILLED SALMON

INGREDIENTS:

4 salmon steaks,
cut $\frac{3}{4}$ to $1\frac{1}{2}$ inches thick
In a shallow baking dish combine:
 $\frac{1}{4}$ cup oil
 $\frac{1}{4}$ cup soy sauce
3 Tablespoons parsley
2 cloves minced garlic
 $\frac{1}{2}$ of a lemon cut in slices
Pepper

DIRECTIONS:

Place salmon in mixture and marinate 30 minutes to 1 hour. Remove fish and pat dry with paper towel. Save marinade to brush on fish while grilling. Grill salmon over medium-hot coals for 5-8 minutes. Turn and grill another 5-8 minutes more until salmon flakes easily.



RECIPE: OVEN-BAKED SALMON

INGREDIENTS:

8 orange or lemon slices
4 salmon fillets
Salt and pepper
2 tablespoons sun-dried tomatoes
in oil, plus 1 tablespoon
oil from jar
2 tablespoons fresh chopped dill
 $\frac{2}{3}$ cup vegetable broth



DIRECTIONS:

Preheat oven to 375 degrees. Place orange or lemon slices in the bottom of a 13 x 9 inch baking dish. Place salmon fillets on top of orange or lemon slices and sprinkle with salt and pepper. Chop 2 tablespoons sun-dried tomatoes and place in a bowl; mix in dill and 1 tablespoon of oil from tomato jar. Spoon this mixture evenly over salmon fillets and sprinkle with vegetable broth. Bake for 8-10 minutes until salmon flakes when poked with fork.

FISHING FOR SALMON IN IDAHO?

YOU BET!

Fishing for Chinook and coho can be fun and challenging. Coho are especially fun; they are known for their acrobatic jumps and flips. You may be wondering how people are allowed to fish for salmon.

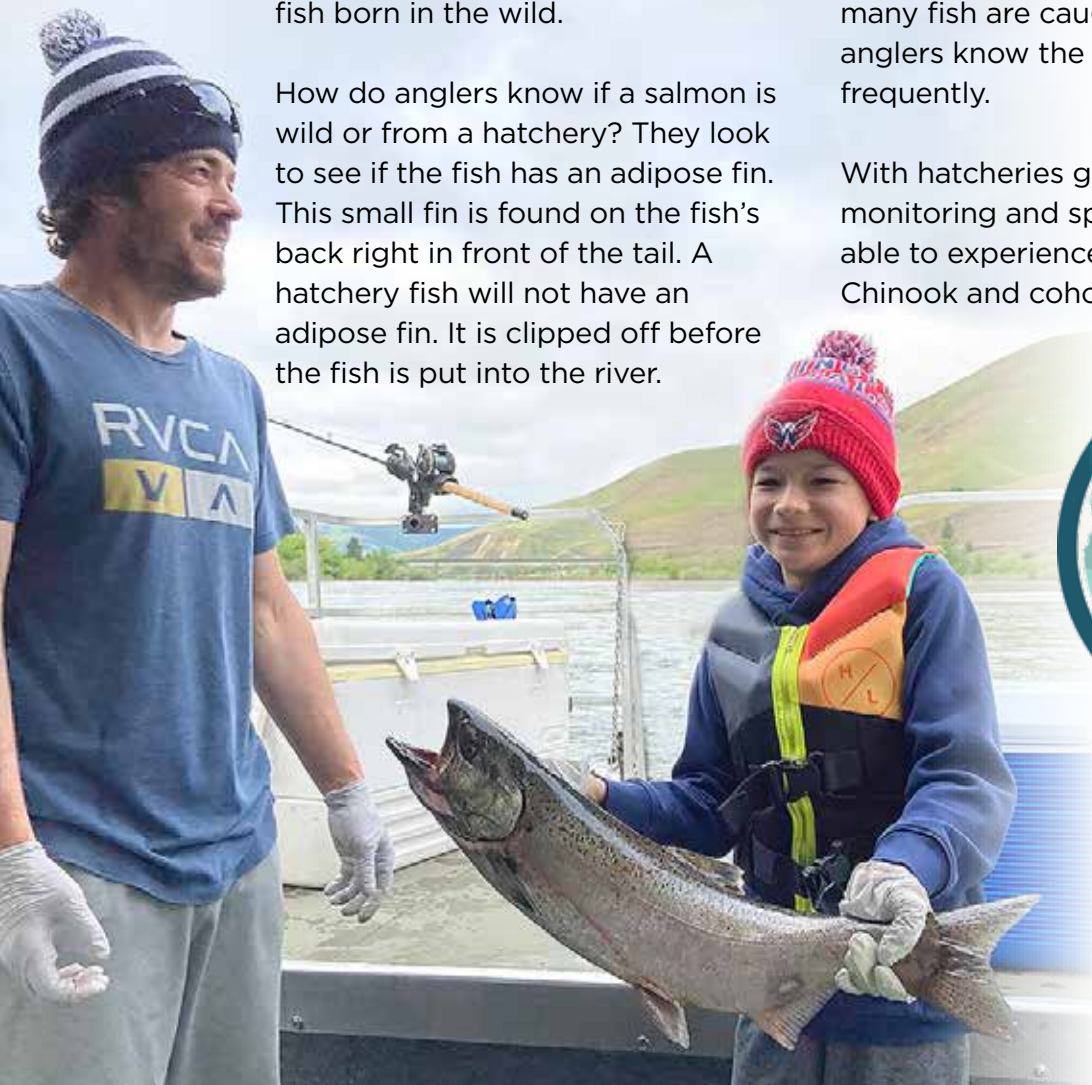
When dams were built along the Snake and Columbia Rivers, scientists knew the dams would affect salmon. They thought the dams might lower salmon numbers. To replace these fish so people would have Chinook to catch, hatcheries were built to raise salmon. Salmon are raised in hatcheries and released into the rivers when they are smolts. They travel to the ocean and then come back to Idaho to spawn. Anglers are allowed to keep salmon raised in a hatchery but usually are not allowed to keep fish born in the wild.

How do anglers know if a salmon is wild or from a hatchery? They look to see if the fish has an adipose fin. This small fin is found on the fish's back right in front of the tail. A hatchery fish will not have an adipose fin. It is clipped off before the fish is put into the river.

Anglers know that if they catch a Chinook with an adipose fin, it is wild and is protected. The fish must be released unharmed to continue its journey to spawn. If the fish doesn't have an adipose fin, it was raised in a hatchery and may be kept. Anglers are allowed to keep coho with adipose fins, because their adipose fins are not clipped at the hatchery. Anglers are not allowed to keep any sockeye.

There are strict rules when it comes to fishing for salmon. People need to buy a salmon permit along with a fishing license. Each river and even sections of a river may have different rules. Salmon fishing seasons may close at any time and often don't last very long. It all depends on how many fish come back to Idaho and how many fish are caught. It's important that salmon anglers know the rules and check for changes frequently.

With hatcheries growing salmon, and careful monitoring and special rules, people should be able to experience the excitement of catching Chinook and coho in Idaho for many years.



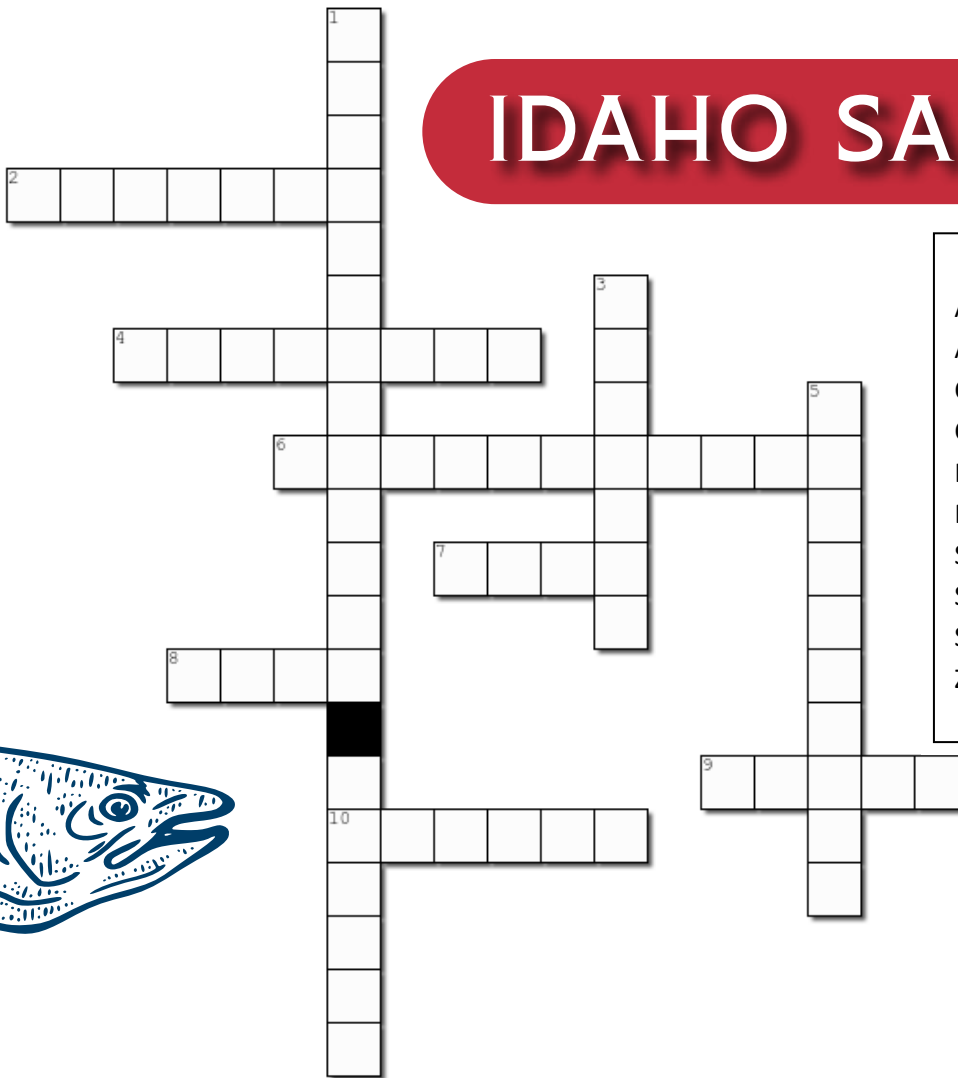
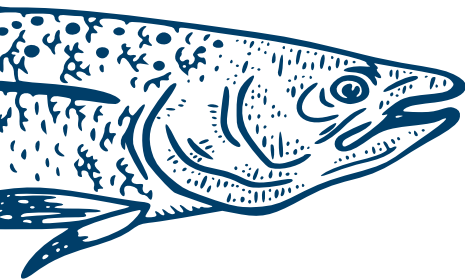
BE OUTSIDE
IDAHO CHILDREN IN NATURE

Chinook Fishing Photo: CC-BY Larry Knewbow,
Derrick with his son, Oliver Marchand,
9 years old with his first salmon caught
on the Clearwater River, Idaho!

IDAHO SALMON

Word Bank

Alevin
Anadromous
Chinook
Coho
Keystone
Redd
Saber-toothed salmon
Smolt
Sockeye
Zooplankton



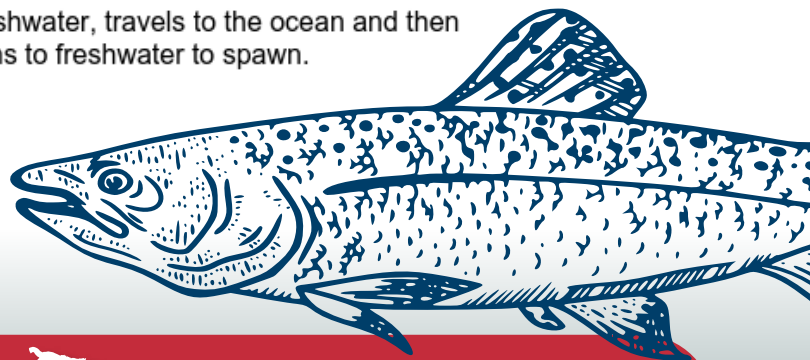
Created using the Crossword Maker on TheTeachersCorner.net

Across

2. Redfish Lake got its name because of this salmon.
4. Salmon are considered a _____ species.
6. This is what sockeye eat.
7. Idaho's wild _____ were declared extinct in 1986.
8. Female salmon make this; they lay their eggs in it.
9. The name used for a salmon traveling to the ocean.
10. The name for a newly hatched salmon.

Down

1. This is an ancestor of today's salmon.
3. The largest salmon in Idaho.
5. This word describes a fish that is hatched in freshwater, travels to the ocean and then returns to freshwater to spawn.



Salmon Illustration: CC-BY Vecteezy.com

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WE WOULD LIKE TO HEAR FROM YOU!

If you have a letter, poem or question for Wildlife Express, it may be included in a future issue! Send it to: adare.evans@idfg.idaho.gov or Wildlife Express, Idaho Fish and Game PO Box 25, Boise, ID 83707