



## Natural History Notes



### Sockeye Salmon (*Oncorhynchus nerka*)

Sockeye salmon, also known by the popular names “red salmon” or “reds” in North America and “nerka” in Russia, are found in the North Pacific Ocean from northern California and Hokkaido Island in Japan northward into the Gulf of Alaska and Bering Sea. Some individuals occasionally venture farther north into the Chukchi and Beaufort seas. Sockeyes support one of the most important commercial fisheries found along North America’s Pacific coast, and they are popular with sport fishermen. These fish also serve as an important subsistence resource for many people living in rural communities within their breeding range.

Most sockeyes, like other species of salmon, are anadromous. They divide their time between fresh and saltwater. After hatching in rivers and streams, juvenile fish remain in freshwater for as long as 1-4 years before going to sea as smolts. About 1-4 years later, they return to their natal rivers and streams to lay eggs (spawn). Some sockeye populations stay in fresh water all their lives. Where they occur, these landlocked fish are called “kokanee”, and they rarely exceed 14 inches in length and usually weigh less than a pound. Adult sockeyes returning from the sea to spawn typically weigh about 4-8 lbs, but some occasionally tip the scales at more than 15 lbs.

Close relatives include chinook (king—*O. tshawytscha*), coho (silver—*O. kisutch*), chum (dog—*O. keta*), and pink (humpback—*O. gorbuscha*) salmon. Sockeyes can be told apart from chums by the number and shape of their gill rakers, and from chinooks, cohos and pinks by the lack of large black spots on their back.

Prior to breeding, sockeyes are metallic blue green on the backs and tops of their heads, iridescent silver on their sides, and white or silvery on their bellies. Some fine black speckling may be present on their backs, but as mentioned above, large spots are absent. The males and females shown in this mobile are in prime breeding condition, the time when their backs and sides turn brilliant red and their heads become bright green. Breeding males also develop humped backs and long hooked jaws filled with sharp teeth.

After leaving freshwater, young sockeyes travel thousands of miles in the ocean as they feed and grow into adults. Little is known about how they navigate on the high seas, but some evidence suggests they may use cues from the earth’s magnetic field. Once near their natal freshwater rivers and streams, the returning fish rely on olfactory cues to guide them home.

During summer, maturing fish return to spawn in the same freshwater systems they were hatched in. The largest numbers are produced in freshwater systems containing lakes. Spawning usually takes place in streams and areas of upwelling along lakeshores. Females dig nests (redds) in the gravel bottoms by fanning their tails, and they deposit their eggs as one or more males swim alongside to fertilize them. Then the females fan their tails again to cover the fertilized eggs with thin layers of sand and gravel. One female can lay as many as 2,000-4,000 eggs. Like all Pacific salmon, sockeyes die a few weeks after spawning.

Eggs hatch during winter, and the larval fish (alevins) stay in the gravel and live off lipids stored in their yolk sacs until early spring, when they emerge and enter rearing areas typically consisting of sheltered grassy banks with gentle currents. In spawning systems containing lakes, juveniles usually stay in fresh water for 1-3 years before migrating to sea in the spring as smolts. However, in spawning systems without lakes, juveniles often enter the ocean soon after emerging from their gravel nests.

While they are in fresh water, juvenile sockeyes feed on zooplankton, amphipods, and insects. Once at sea, they continue to feed on zooplankton, but they also take larval and juvenile fish and several types of small adult forage fish, including Pacific sand lance (*Ammodytes hexapterus*). Also, they occasionally eat invertebrates, including small squid.

The largest sockeye salmon harvest in the world occurs in Bristol Bay in southwestern Alaska, where 10-30 million fish are caught annually during a short, intense fishery lasting only a few weeks. However, the first fish to reach restaurants and other commercial markets are the now-famous Copper River reds.

Protecting river and lake systems are key elements in the conservation of wild salmon populations. Pollution, building dams, and logging too close to spawning streams can detrimentally affect these economically and culturally important fish.

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