THE **HEAT** IS **ON**

Species feeling the effects of climate change

Sockeye Salmon

Oncorhynchus nerka

Region:
Pacific Northwest

Area affected:
Columbia, Snake and Fraser Rivers

Climatic change:
Warmer water

Impact:
Heat-related mortality

ABOUT THIS SPECIES

Sockeye salmon are a widespread and commercially important species in Alaska, but are imperiled in the southern part of their range, particularly in Washington's Snake River. Most sockeyes are anadromous, meaning that they hatch and spend their first one to three years in rivers, then move downstream to the ocean where they live most of their lives before making a final return journey upriver to spawn and die. Sockeyes are silver in color during the ocean phase of their life cycle, but turn a brilliant red during spawning season. Young sockeyes feed on plankton and small invertebrates, and older ocean fish live mainly on small invertebrates and fish. Sockeye salmon display tremendous fidelity to the site where they were spawned and even to the season in which spawning occurred.

DESCRIPTION OF IMPACT

Since salmon die after they spawn, they have only one chance to breed successfully. This is a risky evolutionary strategy, since the upriver migration is a perilous undertaking with predation, water pollution and encounters with dams claiming many sockeyes along the way. **Warmer stream temperatures have emerged as an additional major threat. The deaths of hundreds of thousands of migrating sockeye have been recorded during periods of high summer temperatures in the Fraser River and Weaver Creek in British Columbia.** The problem for the fish is that swimming upstream takes tremendous physiological effort, and the oxygen demand for powering swimming is very high. Warmer water holds less dissolved oxygen, and above a certain threshold sockeye simply cannot pull enough oxygen out of the water to meet their metabolic needs. The problem is particularly acute for females because they have lower cardiac capacity and are thus more sensitive to oxygen-depleted waters.

References

Cooke, S. J. et al. 2012. Conservation physiology in practice. *Philosophical Transactions of the Royal Society* B 367: 1757–1769. http://rstb.royalsocietypublishing.org/content/367/1596/1757.full.pdf+html

NOAA Fishwatch: U.S. Seafood Facts. Sockeye Salmon *(Oncorhynchus nerka).* http://www.fishwatch.gov/profiles/sockeye-salmon

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