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Human vs. Bear: Who Needs Salmon More?

Researchers have determined that the current stock of salmon in small Alaskan rivers is stable enough for both human and wildlife consumption, and no changes to management need to be made.

SOURCE: Ecological Applications

By: *Brittany Savercool* 6 April 2020

In Alaskan streams, it is common to find brown bears (*Ursus arctos*) actively hunting and feeding on sockeye salmon (*Oncorhynchus nerka*) and Pacific salmon (*Oncorhynchus* spp.). In fact, most of a bear's annual diet consists of salmon, with some bears able to eat up to 100,000 calories of salmon per day! Salmon provide bears with essential high-energy fats they need in order to survive cold Alaskan winters.

Researchers have identified a positive relationship between the body size of a bear and the reproductive productivity of bear populations related to their salmon consumption. However, in the past several decades, salmon have become an increasing component of the human diet. The harvest of salmon for human consumption contributes immensely to the economy, adding an estimated \$460 million to the U.S. economy in 2015. A new study by Lincoln and colleagues examined the balance of salmon availability between bear and human consumption in small Alaskan streams through multiple ecosystem-based management plans.

Ecosystem-based management is a management plan that takes into consideration all interactions within an ecosystem, rather than focusing on individual issues, species, or ecosystem services. As a result, ecosystem-based management requires the knowledge of all relationships within the community of interest. In this study, the researchers were assessing the availability and consumption of salmon by bears and humans. Specifically, they were asking whether increased human consumption of salmon would negatively impact bear populations. If the bears were consuming all of the salmon available to them and resorting to other prey items (i.e. berries, deer, birds, shrubs), then the management plan could be adjusted to reduce the harvest limit of salmon for humans.

From 1997 to 2018, the researchers observed three streams in Alaska. The streams were chosen for their shallow water and high salmon densities. Bears are messy eaters and leave evidence of their consumption scattered along the stream shores. Each day, the researchers would walk up and down the streams and record fish sex, body length, and percentage/body parts consumed based upon remaining carcasses. If there was a large and/or specific portion of salmon remaining after consumption, that would suggest that the amount of salmon available was greater than the bears' needs. Hair snares were also placed along the streams to snag hair from passing bears to distinguish between individuals. By collating all of the data, the researchers were able to conclude that the salmon were sufficiently available under current fishery management; the stock of salmon in small Alaskan rivers is at a stable state.

The assessment of needs between ecological ecosystems and humans in this 21 yearlong study evokes an environmentally ethical debate. Should humans harvest more of an organism (in this case, salmon) just because they are able to? Many people do not think of the impacts that could ripple through an ecosystem. Utilizing an ecosystem-based management approach to problems like these proves that a common ground can be reached for both animals and humans. Importantly, this shows that Alaska's salmon fishery plan in place for the past 15 years has been working all along.

Citation: Lincoln, A. E., R. Hilborn, A. J. Wirsing, and T. P. Quinn. 2020. Managing salmon for wildlife:

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