U.S. Fish & Wildlife Service

Mercury in Northern Pike (*Esox lucius*)

Alaska Region

Northern Pike
Dave Cannon

Background and Objectives

Contaminant burdens in fish and wildlife species can limit traditional subsistence activities on National Wildlife Refuges (NWRs) in Alaska. Although the benefits of eating most subsistence foods outweigh many risks, including from contaminants, research has shown that mercury levels can be very high in northern pike, a commonly used subsistence food and important source of protein. Because of this, we are conducting a multi-year, systematic study on mercury and methyl-mercury in northern pike in western and interior Alaska NWRs, including Yukon Delta, Selawik, Koyukuk-Nowitna, Innoko, Northern Innoko, and Yukon Flats. Managers from these refuges, and subsistence users within them, need to understand mercury issues and whether the levels found in northern pike are harmful.

Our primary goal is to create a large data set which can be used for management and consumption decisions. We will also develop a relationship between amounts of mercury and methyl-mercury (the most toxic kind) in northern pike muscle; determine the average length of pike that are likely to have mercury above consumption thresholds; look at variation in mercury concentrations over small and large geographic areas (such as between NWRs and among sites within a NWR); and determine if mercury concentrations in northern pike are enough to affect fish health and reproduction.

Sampling and Analyses

Sampling will follow a written study plan with sample locations and protocols. Fifteen northern pike will be collected at each sample site, a sample size sufficient to test spatial differences and establish length thresholds for mercury concentrations. Sample collection at most sites will occur in spring prior to spawning, a collection period which corresponds with the height of subsistence fishing, and which will also provide samples from fish in similar metabolic states. Samples from Yukon Flats NWR will be collected during June-August, because northern pike are commonly consumed during summer and fall in those areas. All northern pike muscle samples will be analyzed for mercury, and a subset for methyl-mercury, at a Fish and Wildlife Service contract laboratory. We will also collect data on the general health, appearance, size, weight, percent fat, and other characteristics of in the fish that are sampled for mercury, following established protocols. These characteristics will allow us to compare fish health to mercury concentrations in individual fish.

Public Health

The State Division of Public Health and other public health entities, such as the Alaska Native Tribal Health Consortium, have recommended that subsistence users eat unlimited quantities of fish from Alaska due to the cultural, economic, and health benefits of fish consumption and the subsistence lifestyle. However, northern pike from Alaska may contain mercury concentrations that exceed the Environmental Protection Agency critical value for human and the Food and Drug Administration action level for human consumption of fish tissue.

Using data produced by this study, the Alaska Department of Health and Social Services, Section of Epidemiology and the Alaska Native Tribal Health Consortium will evaluate the impacts to public health of northern pike consumption. This information, along with a review of published literature and advisory thresholds used by various public health agencies or organizations, will be used to assess if Service refuge managers need

to provide consumption advice to subsistence users.

Outreach and Communication

All data and our analysis of the data will be published as a peer-reviewed Service technical report and in a peer-reviewed journal such as Environmental Toxicology and Chemistry. We will present the results of this study in public gatherings at villages within the sampled area and at Bethel. In addition, we will produce a poster and a fact sheet explaining the study and the results for distribution to village schools and public places. Data, fact sheets, and any publications from this study will be available at the Fish and Wildlife Service Environmental Contaminants website, **http://alaska.fws.gov/fisheries/contaminants/**.

Cooperators

U.S. Fish and Wildlife Service Fairbanks Field Office, managers and staff at Yukon Delta, Yukon Flats, Innoko, Selawik, Northern Innoko, and Koyukuk/Nowitna National Wildlife Refuges; subsistence fishermen in villages within those refuges, the Alaska Department of Health and Social Services – Epidemiology Section, and the Alaska Native Tribal Health Consortium.

For more information, please contact:

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