Resident Lake Fish- biocontaminants

Vital Signs Monitoring- Southwest Alaska Network

Importance / Issues

Resident lake fish were selected as a SWAN vital sign because they serve an important ecological role and are important to recreational and subsistence fishers who enjoy and consume the diverse fish species they catch. They represent a variety of trophic levels (omnivores, insectivores, planktivores, and piscivores) and hence reflect changes that occur in the food chain. There is growing concern that lake fish species in some of SWAN's freshwater bodies have acquired elevated mercury levels. Mercury released from human activities can be converted in the environment to a highly toxic form called methylmercury, which can bioaccumulate and biomagnify in fish tissue, particularly in predatory species like northern pike and lake trout.

SWAN and park biologists collecting lake trout for biocontaminants analysis, Lake Clark 2005.

Objectives and Sampling Design

Are bioaccumulated contaminants increasing in fish communities in SWAN lakes? To anwser this question, biologists are collecting and analyzing tissue samples of resident lake fish every 5 years from within high priority lakes and every 10-15 years within lower priority lakes in KATM and LACL. Goals for sampling biocontaminant are to maximize representativeness and flexibility for future analysis while minimizing field sampling, processing, and sample storage. Alaska Department of Environmental Conservation (ADEC) currently collects biocontaminant data for several marine fish species, anadromous salmon, and two freshwater fish species. This work is funded by EPA and conducted in accordance with a national EPA protocol. In conjuction with resident lake fish monitoring in the SWAN parks, samples for biocontaminant analysis will be collected to supplement the ADEC database. Samples will either be of whole fish or fillets with skin, preserving the option of analyzing contaminants that accumulate in fatty (PCBs, dioxins and organochlorine compounds) and muscle (mercury) tissue.

Current Monitoring and Prelimary Results

In 2005, total mercury (THg) and methylmercury (MeHg) were examined in northern pike (*Esox lucius*), burbot (*Lota lota*), lake trout (*Salvelinus namaycush), and* Arctic grayling (*Thymallus arcticus*) from Lake Clark in Lake Clark National Park and Preserve. Analysis for total mercury has been completed, whereas analysis for PCBs, dioxins, and organochlorine compounds is pending. The greatest total mercury concentration occurred in burbot (n=3, mean 0.548 ppm) and lowest in grayling (n=5, mean 0.0892 ppm). Mean concentrations of total mercury in pike and lake trout were 0.276 (n=5) and 0.284 (n=5) ppm respectively. In comparison, the national average for total mercury in pike and lake trout is 0.35 and 0.30 ppm respectively [US EPA National Listing of Fish and Wildlife Advisory fish tissue database, 2003 www.epa.gov/waterscience/fish] Mercury concentrations in fish may vary considerably from waterbody to waterbody. Future sampling will target other lake systems in LACL and other SWAN parks.

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