Monitoring Mercury Concentrations in Alaskan Fishes

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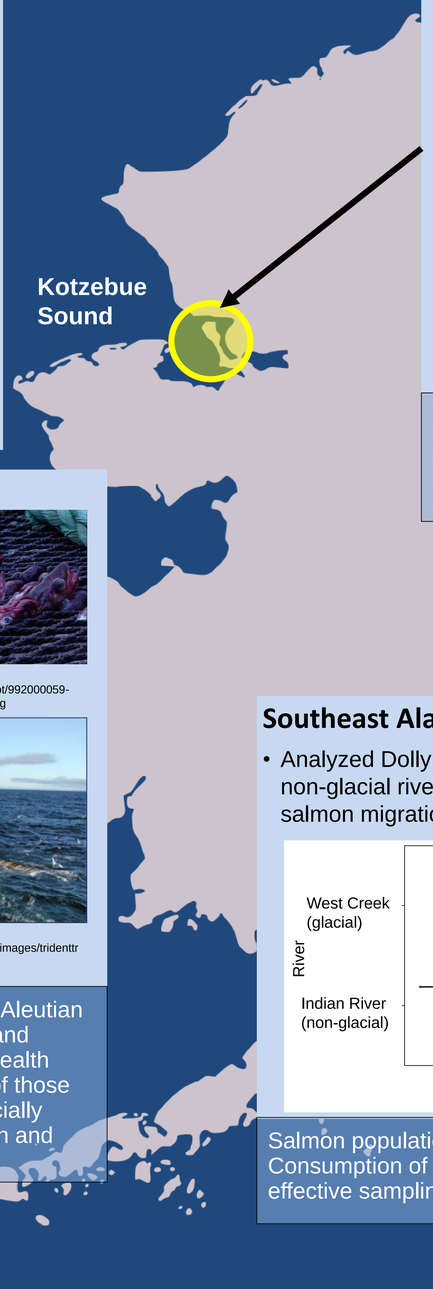
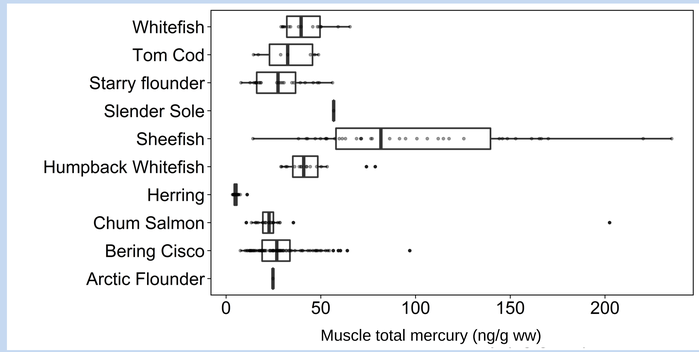
Background

- Monomethyl mercury (MeHg+) is a potent neurotoxin that can affect fish, wildlife, and humans (1).
- Mercury (Hg) concentration in animal tissues increases throughout a lifetime (bioaccumulation), and with increasing trophic level (biomagnification) (2).
- Fish (and invertebrates) are an excellent environmental tool for monitoring MeHg+ contamination in an area (3).
- Fish sometimes have total Hg concentrations ([THg]) in muscle above human health action levels (i.e. the average [THg] where consumption should be monitored and potentially limited) of 300 ppb (4), or the human health threshold of 1,000 ppb (5).
- Effective monitoring and understanding of Hg concentrations in fish can provide information for resource management, species conservation, and human consumption advisories.
- We measured [THg] in 1,500+ fish and invertebrates from 27 species from three distinct regions and ecosystems across Alaska.
- In each region we focused on different species, resource management, and ecological questions.
- The studies listed here examine key variables (size, age, trophic level, regional location) that may drive the [THg] observed in these fish, however this poster exclusively describes observed [THg].



Kotzebue Sound

- Analyzed ten species of subsistence fish from Kotzebue Sound



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Observed Hg concentrations in Kotzebue Sound fish are far below any levels of concern for human consumption. Sheefish contain the highest average [THg] likely because they are the largest fish in the study, and prey on other fish. Specimens donated by subsistence fishermen were effective for studying and monitoring Hg in fish.

Aleutian Islands

- Analyzed 1,100 fish and invertebrates (19 species) from areas of the Aleutian Islands home to wildlife populations with known high [THg].

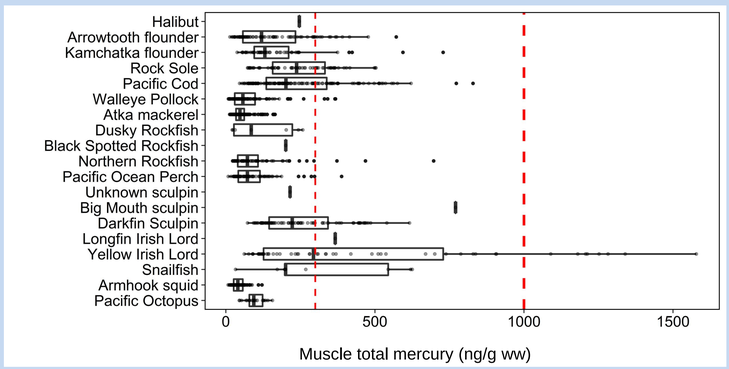

Photo credit: http://footage.framepool.com/en/shot/992000059-winch-catch-trawler-deep-sea-fishing

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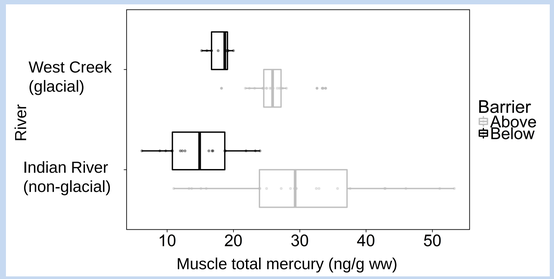
A large majority of fish caught for human consumption along the Aleutian Islands have Hg levels below EPA levels of concern to humans and wildlife (6). 13% of individual fish were above the 300 ppb EPA health action level, indicated by the thin red dashed line (4), with 36% of those being some form of sculpin (non-commercial species). Commercially donated fish represent an effective sampling method for research and monitoring of Hg.

Southeast Alaska Mercury Monitoring

- Analyzed Dolly Varden (*Salvelinus malma*) from glacial and non-glacial rivers, above and below barriers to anadromous salmon migration



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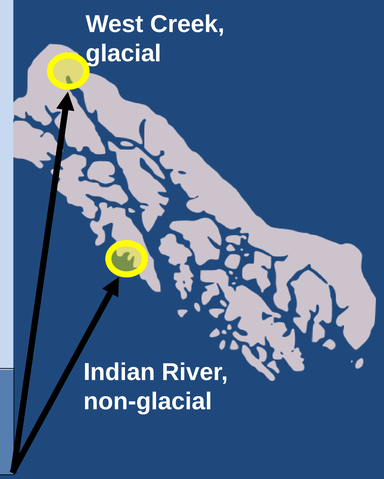

Salmon populations and river type influence Hg accumulation in Dolly Varden. Consumption of salmon eggs reduce [THg] in Dolly Varden. Minnow traps are an effective sampling method for remote areas for long term ecological monitoring.

Acknowledgements

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