Developing a Long-Term Monitoring Protocol for Assessing Freshwater Contaminants for the National Park Service In Southeast Alaska

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ABSTRACT

Taiya River Picture by the Explore North Blog

We are developing a long-term monitoring protocol for the National Park Service (NPS) through a collaboration with the University of Alaska Fairbanks (UAF) and University of Alaska Southeast (UAS). The goal is to monitor the status and trends of freshwater contaminants in the NPS Southeast Alaska Network (SEAN). The protocol will enable long term monitoring of selected chemical, and biological elements that represent the overall health or condition of park resources, the effects of stressors, and elements with important human values. The primary objective for the first phase of this multi-year project is preparing a draft protocol which articulates and adopts the specific measurable objectives of the long-term monitoring program.

INTRODUCTION

- SEAN comprises three NPS units: Glacier Bay National Park and Preserve (GLBA), Klondike Gold Rush National Historical Park (KLGO), and Sitka National Historical Park (SITK).
- The National Park Service (NPS) Inventory and Monitoring Program is charged with developing and implementing long-term ecological monitoring protocols for the specified parks.
- The primary goal for this proposal is to begin the first phase of this multi-year project in preparing a draft Protocol Outline which articulates and adopts the specific measurable objectives of the long-term monitoring program, which are to:

1. Assess the level of mercury and persistent organic pollutants (POPs) in various physical and biological components of SEAN ecosystems.
2. Compare the contaminant levels against state and federal criteria (when available) and to findings from other studies.
3. Determine temporal trends in contaminant occurrence and concentration.
4. Determine whether particular landscape types are disproportionately efficient at accumulating and/or exporting contaminants within their watersheds.

Objective: Develop a draft protocol that identifies proposed specific target sites, contaminants, and species to be monitored within NPS SEAN

Proposed Specific Target Sampling Sites

Criteria:

- Accessibility
- Glaciated vs. non glaciated
- Presence of sufficient biota
- Representation
- Hatchery Influence
- Locations with respect to Park Boundaries

Glacier Bay:

- Salmon River
- Bartlett River
- Alesk River

Sitka:

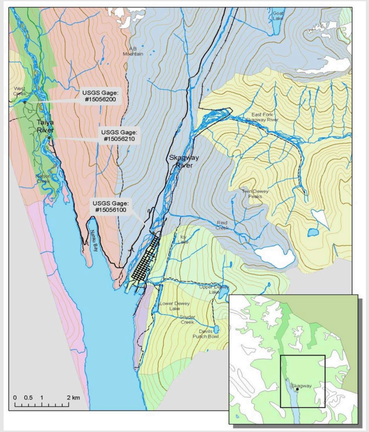
- Indian River

Klondike:

- Taiya River
- Skagway River

GLBA watersheds Nagorsk *et al.* 2009

Sitka watersheds Nagorsk *et al.* 2009



Klondike Watersheds Nagorsk *et al.* 2009

Proposed Target Species of Biota

Criteria:

- Presence in all or most locations targeted
- Age-juveniles emerging from streams
- Resident/Non Resident species

Species useful for types of contaminants tested:

- Coho Salmon- Most POPs
- Coastrange Sculpin- Lipophylic contaminants
- Threespine Stickleback- Mercury, Inorganic contaminants

Coho Salmon (*Oncorhynchus kisutch)*

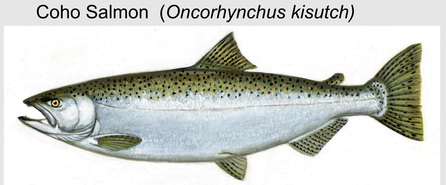


Illustration of Chinook Salmon by Virgil Beck

Coastrange Sculpin (*Cottus aleuticus*)

Picture by E.R. Keeley; University of British Columbia

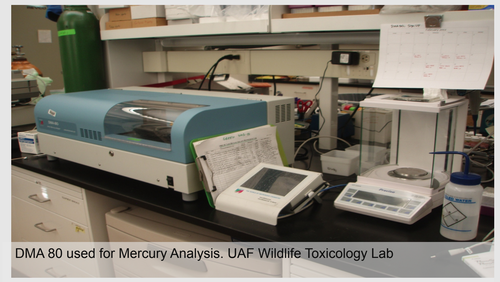
Dolly Varden (*Salvelinus malma)*

Threespine Stickleback (*Gasterosteus aculeatus)'*

Proposed Specific Contaminants

Criteria:

- Propensity to bioaccumulate and/or biomagnify
- Significance to human health
- Persistence
- Impact on ecosystem



DMA 80 used for Mercury Analysis. UAF Wildlife Toxicology Lab

Contaminants:

- Metals (Dissolved and total)
- Pesticides
- Polychlorinated biphenyls
- Polychlorinated dioxins
- Polychlorinated furans
- Brominated Flame Retardants
- Polycyclic aromatic hydrocarbons
- Perfluorinated alkyl compounds (PFAs)
- Short chain chlorinated paraffins (SCCPs)
- Polychlorinated naphthalenes (PCNs)

NEMI, AMAP, and EPA approved analytical methods have been identified in testing of contaminants

References

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