



The Impact of Shoreline Distance on the Proportion of Aquatic Insects in Arctic Wolf Spider Diets



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Introduction

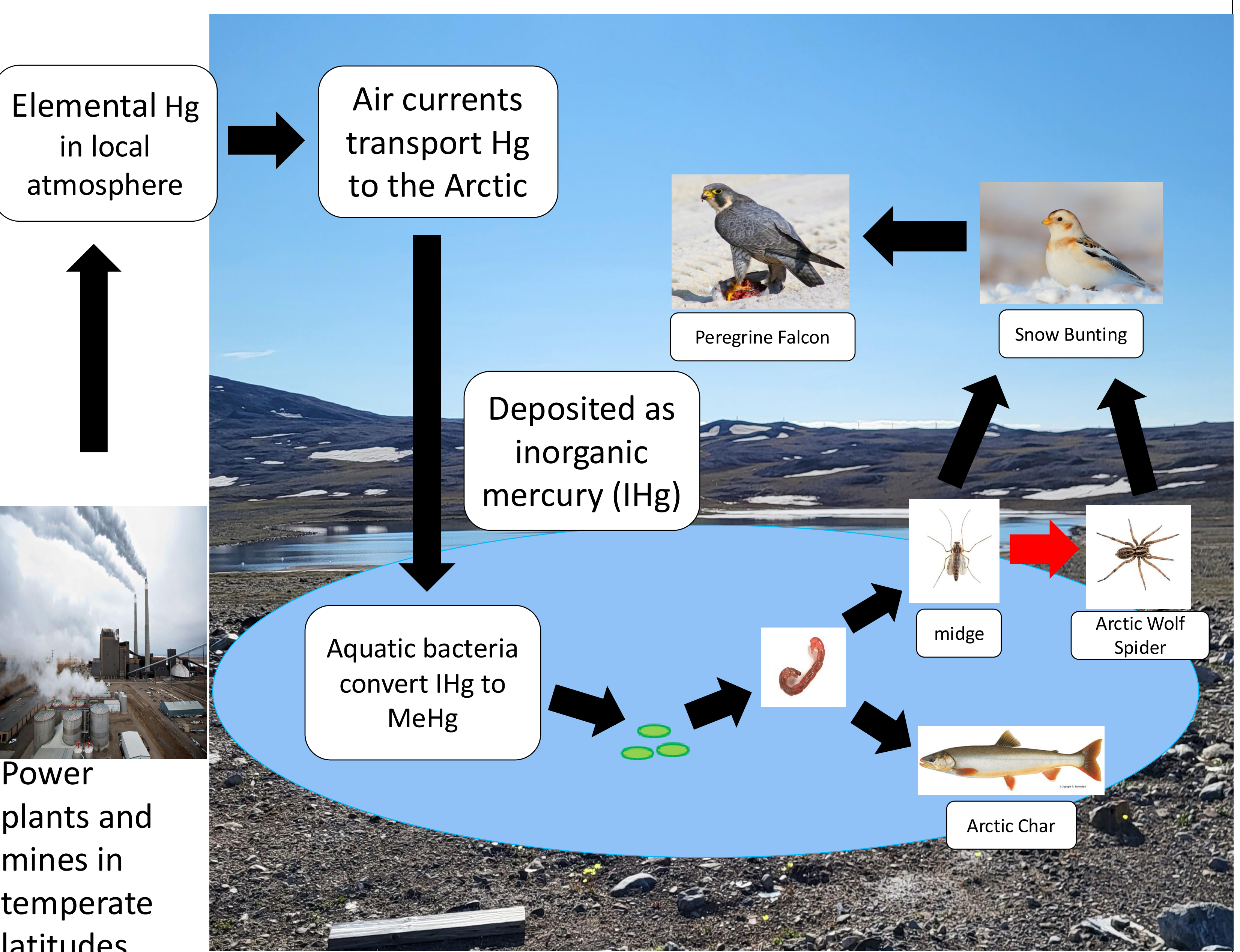


Figure 1: Arctic Freshwater Mercury Cycle

- Human emissions introduce mercury into aquatic ecosystems, which then get converted into bioavailable methylmercury (MeHg), which gets transferred through food webs
- Adult emergent aquatic insects transfer MeHg to terrestrial habitats, causing the bioaccumulation in terrestrial organisms
- In temperate regions, these insects typically disperse within 30 meters of their natal ponds, but it's unclear if this pattern holds true in arctic ecosystems
- It is thought that Nitrogen and Carbon isotopes can be used to approximate the diets of these spiders, based on trophic level and whether they have an aquatic or terrestrial based diet

Objectives

- 1) Exploring the relationship between shoreline distance and dietary patterns in Arctic wolf spiders
- 2) Investigating how shoreline proximity impacts mercury accumulation in Arctic wolf spiders

Methods

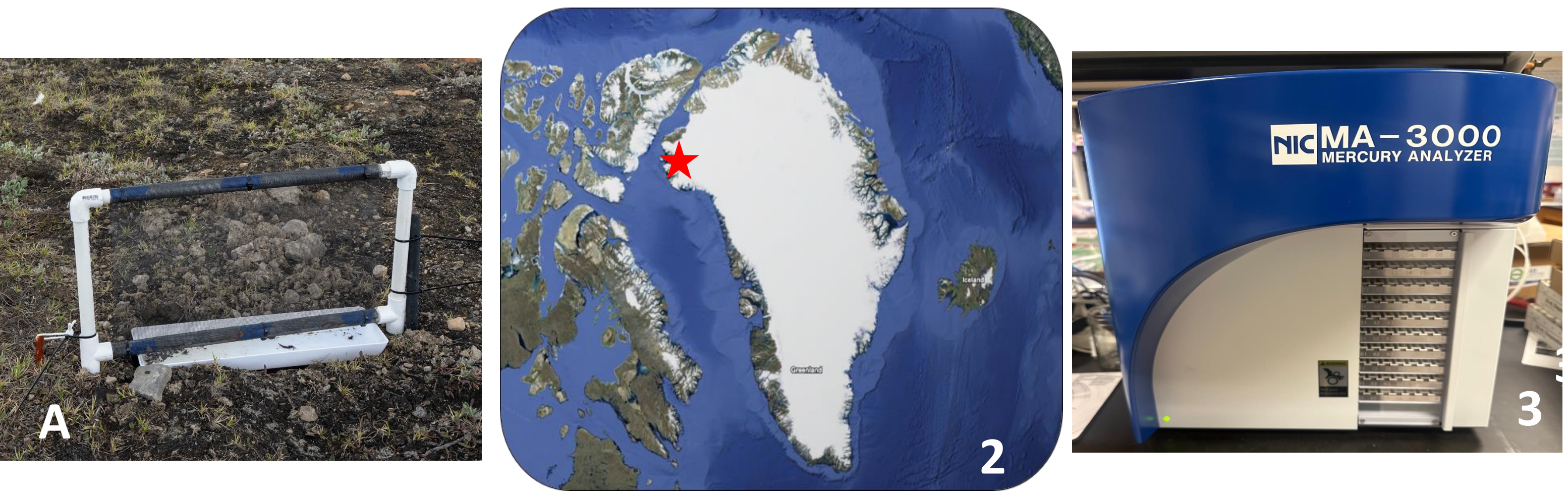
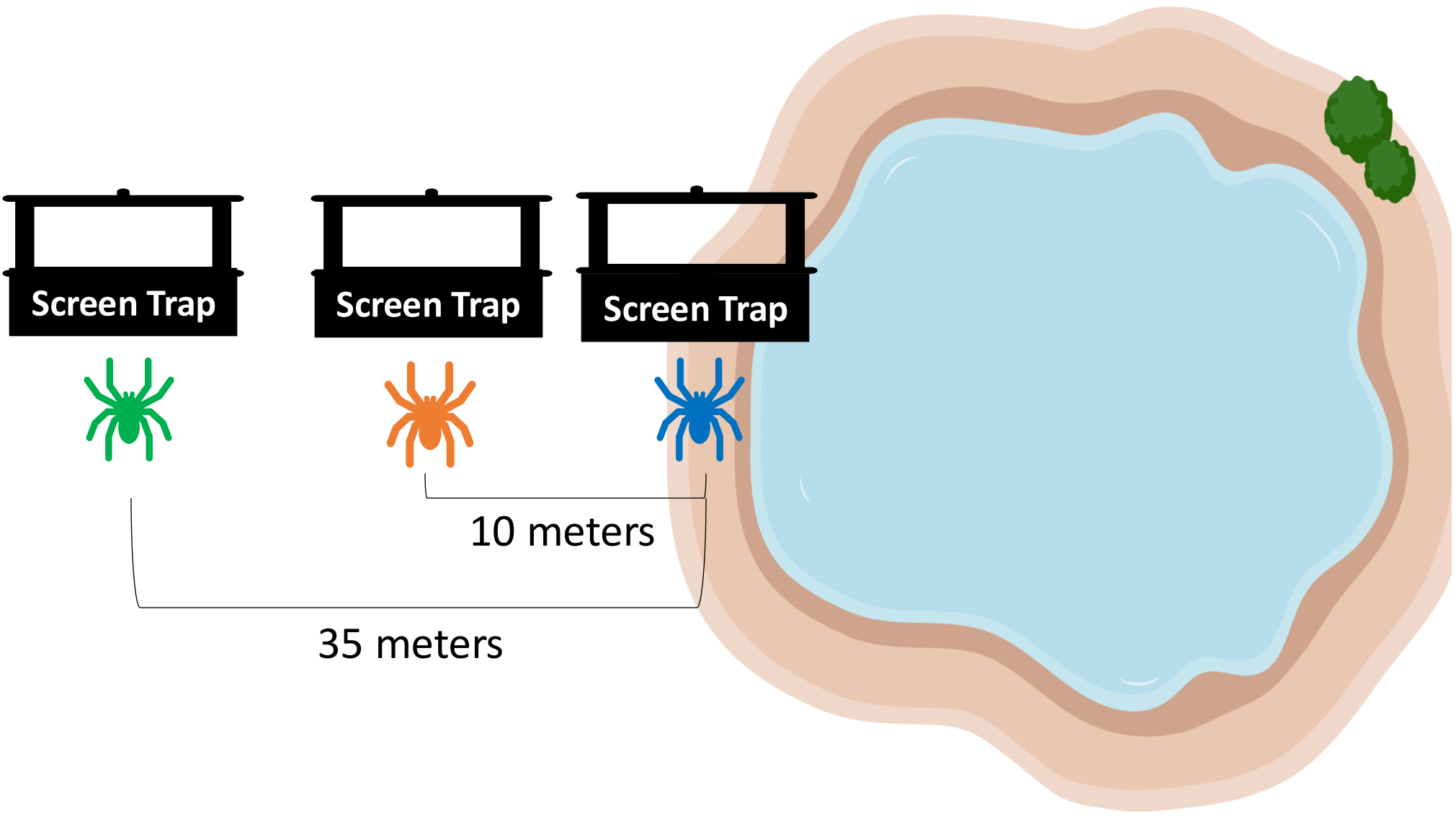


Figure 2: A) Screen trap for spider and terrestrial insect collection B) Study site in NW Greenland (Pituffik Peninsula) C) MA-3000 Total Mercury (THg) Analyzer used to test spiders for THg

Trapping Array:

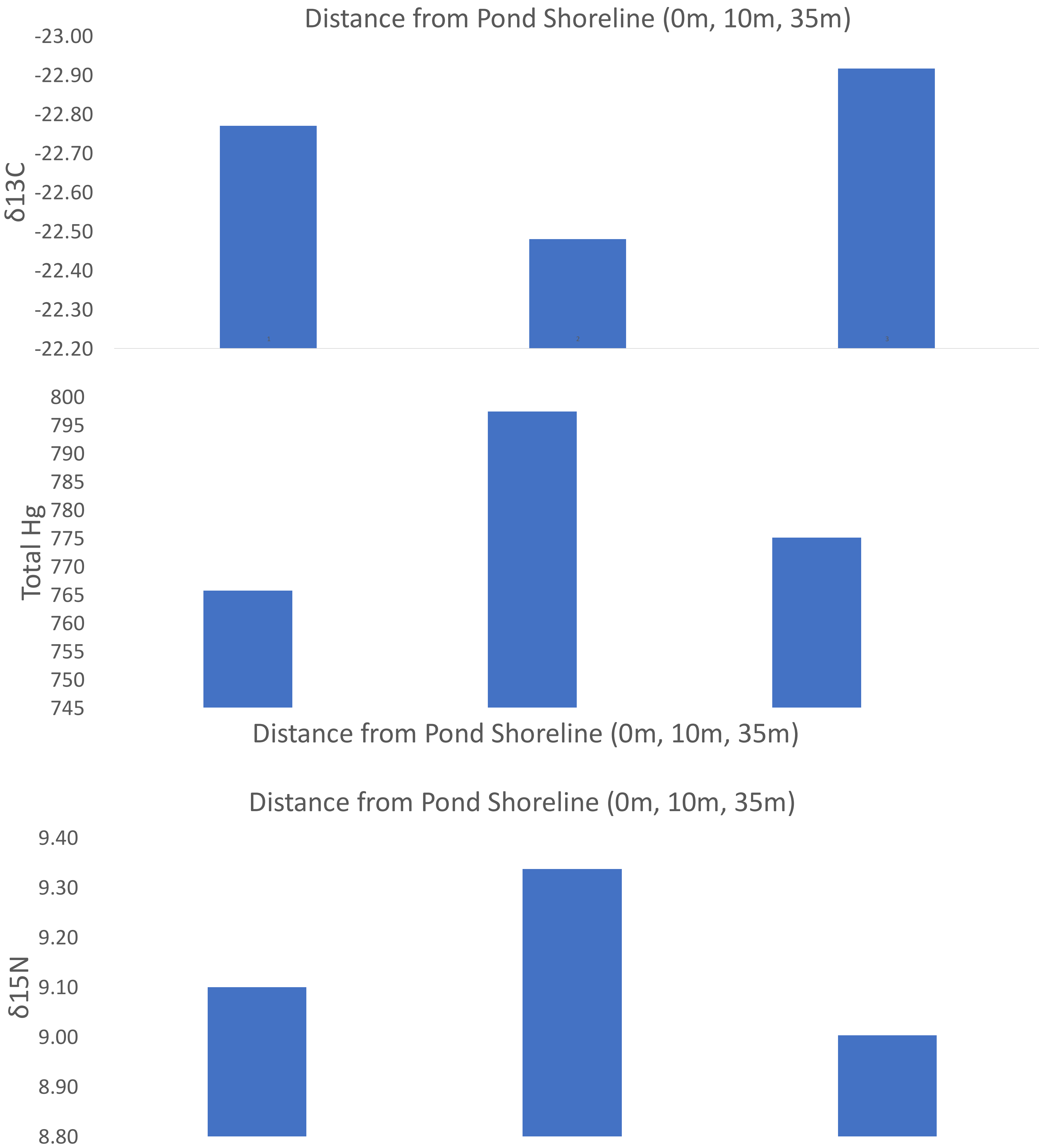
- Traps set out 0 m, 10 m, and 35 m from the shoreline of one pond
- Spiders and insects captured
- Processed and sent to UC Davis for isotopic analysis



Results

- 1) Spiders at 10m from the shoreline had higher total mercury compared to distances 0m and 35m.
- 2) Carbon isotope values increased dramatically at 10m eluding to the spiders feeding at a more aquatic diet
- 3) Nitrogen isotope values increased at 10m pointing towards a lower level on the food chain

Results Cont.



Discussion

- Spiders 0m and 35m from pond shorelines have lower MeHg contamination than those at 10m, suggesting that an aquatic diet may be a contributor to high Hg levels in *P. glacialis*.
- Our hypothesis is that due to higher lack of vegetation at 10m, terrestrial bugs will likely not be present