



Polar bear Non-invasive Genetic Sampling Method (Hair Sampling)

Objective: This is an ongoing project in which we are refining the methods used to non-invasively monitor polar bears via sampling their *hair* DNA. This work seeks to supplement existing polar bear data sets collected by USGS and others, while also addressing concerns of North Slope subsistence communities about other (more invasive) methods used to collect polar bear data. In response to these concerns, we have been developing a method that can genetically “capture” a bear from the DNA in its hair (Fig. 1).

Method: The hair is collected by portable hair collection stations, which work by attracting polar bears with a smelly “lure.” Once a bear interacts with a station, some of its fur gets plucked. Multiple approaches for collecting hair have been tested (Fig. 2a-b). Once the hair (with attached hair follicle) has been collected, it is sent for genetic analysis.

Importance: This information can then be used to add to existing data sets. For example, given enough known genetic identities, a genetic “mark-recapture” model can be used to estimate population abundance. Genetically “capturing” a bear in multiple locations can also provide information on movements and habitat use. Because these methods are relatively user-friendly, and work best when used over a wide area, this type of monitoring lends itself well to having local residents assist with data collection. This data can be used to help make wise decisions on polar bear management.

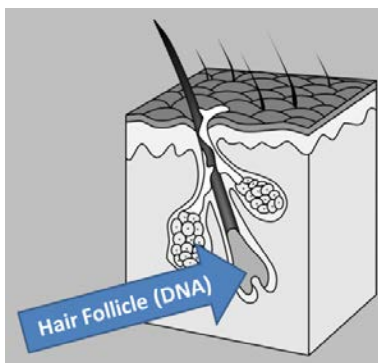


Figure 1 – Hair DNA.

The DNA found in the hair follicles can be used to genetically identify the individual bear. The hair shaft itself can also be used for other analyses, including diet (stable isotope analysis) and stress (analysis of cortisol—the stress hormone).

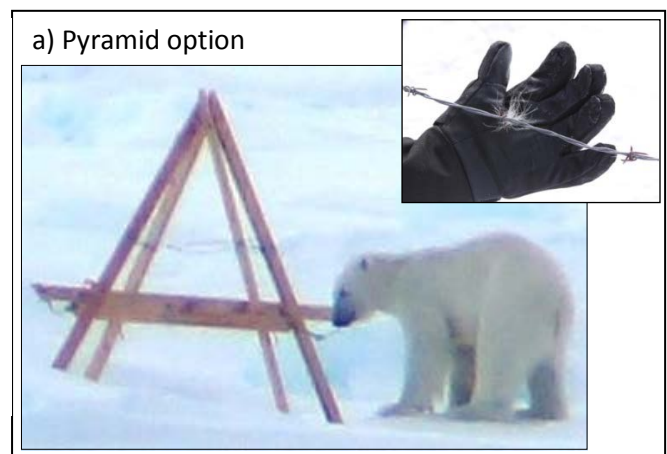


Figure 2 – Hair Collecting Stations. These are two of several options that were tested. The pyramid option (a) used a wooden frame with barbed wire wrapped around the perimeter. Smelly lures are hung inside the pyramid. Barbs on the wire plucked the hair. The box/brush option (b) used stiff wire brushes to pluck hair. Smelly attractants are placed inside the box to lure the bear.



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