GETTING OUR *BEAR*INGS: BEST METHODS FOR MONITORING POLAR BEAR POPULATIONS

April Tea*
Program on the Environment, University of Washington
@aprilptea

Site Supervisor: Erin Moreland, NOAA Alaska Fisheries Science Center
Faculty Advisor: Alex McInturff, School of Environmental and Forest Sciences, University of Washington

BACKGROUND

- Climate change poses major threat to Arctic environment

- Polar bear populations could decline with loss of habitat

- 19 polar bear subpopulations (Fig. 1)- many lack historical and/or up-to-date population estimates

- Polar bear population monitoring poses unique challenges, so analyzing the methods used is important to increase the frequency of comprehensive monitoring efforts

RESEARCH QUESTION

What are the opportunities and challenges of current polar bear population monitoring methods?

Figure 1: Map of the polar bears' Arctic habitat, broken into subpopulations, demonstrating the vast expanse of habitat that polar bears occupy (red dot indicates Seattle)

Figure 2: An aerial survey image analyzed during my internship that captured a mom and cub pair and shows the scale of the images taken from survey flights

INTERNSHIP/METHODS

INTERNSHIP WITH NOAA ALASKA FISHERIES SCIENCE CENTER

- Reviewed imagery from Beaufort Sea aerial surveys for polar bears (Fig. 2)

- Compared findings to the output of a machine learning model to review its effectiveness at detecting polar bears

LITERATURE REVIEW

- Conducted a thorough literature review of studies using various polar bear population monitoring methods

RESULTS

- Methods can be categorized as either contact (darting, collaring, tagging, etc.) or non-contact (aerial surveys, satellite imagery, passive field samples, etc.)

- Public push towards non-contact methods, as well as innovative desire to improve these methods as climate change poses greater challenges to contact methods

- Internship results: 34 sightings of 8 individual bears, computer model detected ~53% of these bears
  - Automation is difficult and not yet reliable

- There are trade-offs between either type of method (Fig. 3)

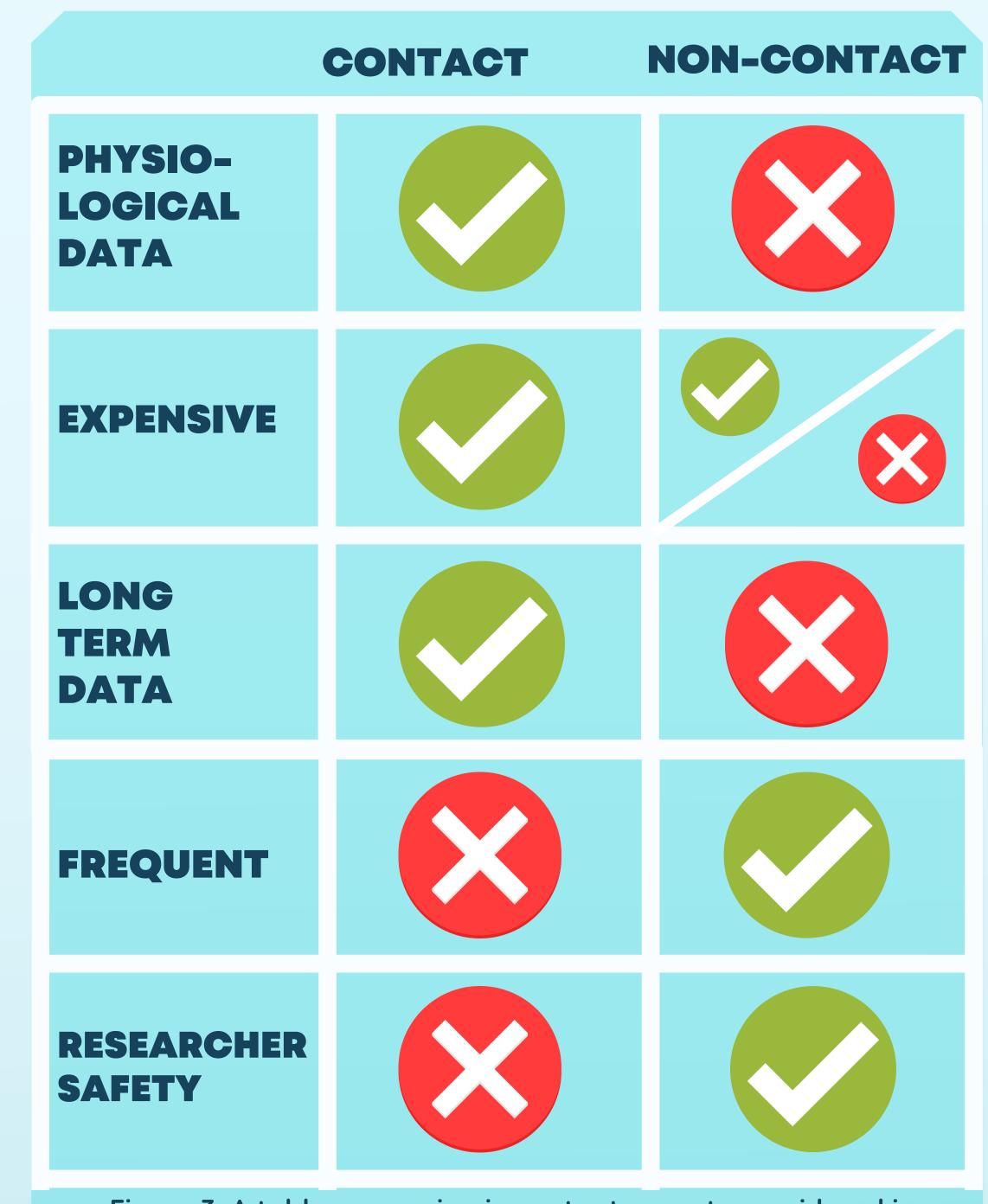|	CONTACT	NON-CONTACT
PHYSIO-LOGICAL DATA	✓	✗
EXPENSIVE	✓	✓ / ✗
LONG TERM DATA	✓	✗
FREQUENT	✗	✓
RESEARCHER SAFETY	✗	✓

Figure 3: A table comparing important aspects considered in evaluating monitoring methods. This figure has been simplified to generalize as overall yes or no answers- there are many caveats and exceptions

IMPLICATIONS

- To standardize an approach to polar bear population monitoring the trade-offs to using particular methods must be considered

- Comprehensive monitoring can help us understand how climate change is impacting polar bears

- Collaboration among agencies and countries is needed

- Methods will need to be reevaluated as the Artic environment changes with climate change