



SUBMISSION TO THE
NUNAVUT WILDLIFE MANAGEMENT BOARD
FOR

Information: X

Decision:

Issue: Development of new methods to survey polar populations

Background:

Until recently, mark-recapture has been the method used to assess polar bear populations in Nunavut. This method provides detailed, accurate and precise information which can be used to assess the status (size and trend) of a population and make recommendations on future harvest levels.

Since 2008, the Department of Environment (DOE) has been developing alternative methods for surveying polar bear populations. This initiative has been undertaken in response to:

- a) public concerns surrounding the capture and handling of bears, and
- b) the need to develop methods of monitoring that are less costly and quicker than mark-recapture, thereby facilitating more frequent or rapid assessment of populations requiring closest monitoring.

Current Status:

Three alternatives to mark-recapture have been tested to varying degrees:

- (i) aerial survey;
- (ii) biopsy marking (genetic mark-recapture); and
- (iii) radio-frequency identification (RFID) tags.

The feasibility of **aerial surveying** has so far been tested in 3 populations across Nunavut under a range of conditions differing in terrain, habitat or season.

Following pilot work in 2008, the first full aerial survey of a polar bear population in Nunavut was completed August to September of 2009 and again in 2010 in Foxe Basin. Final results from this study are anticipated in the fall of 2011. In Baffin Bay, test surveys were completed in the fall of 2009 and spring of 2010. In Western Hudson Bay a test survey was completed in August and September of 2010. Based on these test surveys, full surveys of Baffin Bay and Western Hudson Bay are currently under consideration by DOE as well as the Greenland/Canada Joint Commission for BB.

Genetic mark-recapture uses biopsy darts to obtain small samples of tissue from bears without the need for capture and handling. These samples are used to identify ('mark') individual bears based on analysis of their DNA. Biopsy

.../2

darting equipment was tested on polar bears in Foxe Basin during 2009 and appears to function well as a way of obtaining samples for genetic analysis. Initiation of a full biopsy marking study in one of Nunavut's polar bear populations is currently under consideration by DOE.

The use of **RFID ear tags** has been tested on bears in Foxe Basin as a modification to the mark-recapture method. The tags are placed on captured bears but unlike conventional mark-recapture tagged bears are not recaptured because the RFID tags can be scanned remotely to identify individuals. Based on testing in Foxe Basin, it appears the tags have a high failure rate which may be due to a weakness in the casing material which causes them to break off or other deficiencies. Consequently, the use of RFID tags is not being pursued further by DOE at present.

While mark-recapture remains the most precise and detailed method of surveying polar bear populations, future research in Nunavut may rely on a range of different methods including aerial surveying and biopsy marking. No single method will necessarily be suited to every population or circumstance. Which method is used will depend on a number of considerations including the management goal, urgency for new information, available funds, population size and density, terrain or habitat conditions and community support.

Each of the methods has pros and cons. For example, an aerial survey offers a less invasive, quicker and cheaper alternative to mark-recapture for estimating population size. However, this method is not suitable for low density populations since it tends to produce imprecise results under these conditions. More importantly, unlike mark-recapture, aerial surveying does not generate information on survival rates or reproductive output which is needed to determine if a population is increasing or decreasing. **As a result of not knowing the population trend, Total Allowable Harvest (TAH) recommendations based on the results of an aerial survey will tend to be more conservative (lower) than those derived from a mark-recapture study** in-order to minimize the risk of an overharvest. Therefore, if maximizing harvest opportunities is one of the management goals, mark-recapture may remain the method of choice for some populations. If aerial surveying is to be used in populations where maximizing harvest is a desired goal, the risks of harvesting would need to be mitigated by increasing the frequency with which surveys are conducted in-order to more closely monitor population trend and the potential effects of harvesting.