

Non-native mountain goats on Kodiak Island: an opportunity for research

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Introduction

- ❖ Eighteen mountain goats (*Oreamnus americanus*) were introduced to Kodiak Island in 1952 and 1953.
- ❖ The population has dramatically expanded in abundance and range (Figures 1 and 2).
- ❖ The current and future impacts of a high density and non-native goat population on Kodiak's biota are potentially significant, but unknown.
- ❖ Hunting is a popular and effective means of regulating mountain goat abundances, but the effects of mountain goat harvests on annual changes in population abundance on Kodiak are unclear.
- ❖ To prescribe effective harvest guidelines, wildlife managers need objective data on population dynamics and potential limiting factors.
- ❖ We propose to quantify the relationship between Kodiak mountain goats, their habitat and harvest levels by learning more about their population dynamics, resource selection patterns and diets.

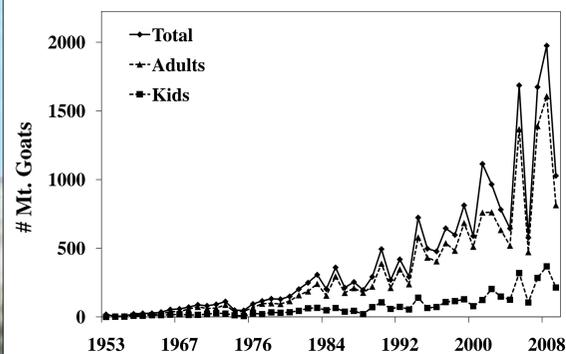


Figure 1. Number of mountain goats counted during aerial surveys conducted by the Alaska Department of Fish and Game and U.S. Fish and Wildlife Service, Kodiak Island, Alaska, 1953 - 2010. Survey results should be considered a minimum estimate of mountain goat abundance. Data from annual counts vary because of variable survey effort.

Goals and Objectives

1. Produce a repeatable and cost-effective means of estimating Kodiak mountain goat **abundances** that incorporates estimates of sightability and statistical confidence.
2. Quantify Kodiak mountain goat **population dynamics**; including survival by age class and sex, and reproductive success by age class.
3. Quantify **factors limiting** Kodiak mountain goat **population growth**. Factors to be examined include hunting, weather, malnutrition, and predation.
4. Quantify **resource selection** patterns of Kodiak mountain goats, and use results to develop predictive maps of the relative probability of mountain goat occurrence across Kodiak.
5. Quantify Kodiak mountain goat summer **diets** and **feeding site selection**.



Methods

1. **Abundance**
We propose to estimate mountain goat abundances by applying mark-resight and sightability modeling approaches to intensive aerial survey data.
2. & 3. **Population Dynamics and Limiting Factors**
We plan to estimate mountain goat survival, parturition rates, and potential limiting factors by monitoring radio telemetry and GPS collared individuals, and incorporating these data into a stage-based matrix model.
4. **Resource Selection**
We propose to quantify habitats at areas used (GPS collared goat waypoints) and available (matched case-control waypoints) to goats. We will compare used versus available habitats using case-control logistic regression models, and apply our results to a GIS to create maps of the relative probability of goat use on Kodiak.
5. **Diet and Feeding Site Selection**
We plan to collect fecal and hair samples for microhistological and stable isotopic analyses from 3 study sites across Kodiak. Sites will be selected based on the duration of goat occurrence. We plan to quantify goat feeding sites through direct observations and plant sampling.

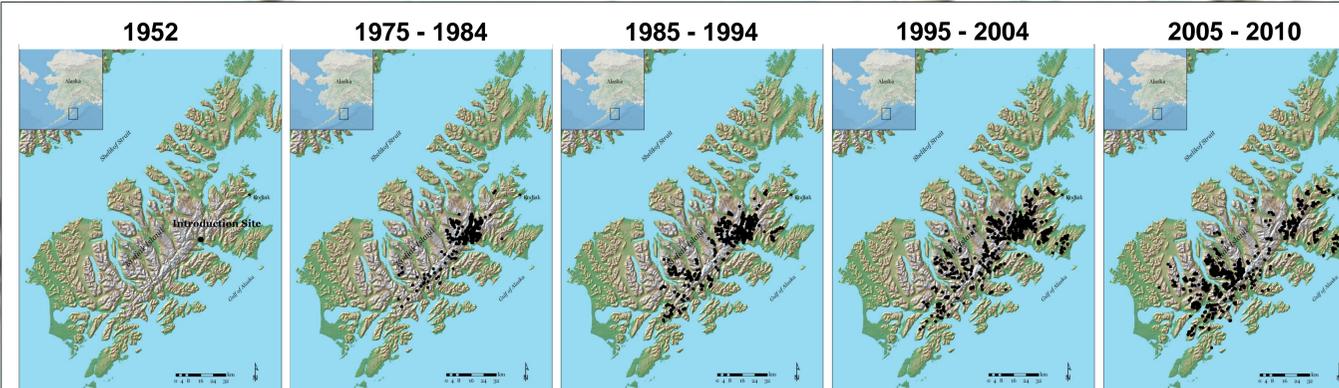


Figure 2. Distribution of mountain goat waypoints recorded during annual aerial surveys, Kodiak Island, Alaska, 1952 – 2010. Each waypoint represents an observed individual or group of mountain goats.

Anticipated Results

- ❖ Updated and improved annual estimates of mountain goat abundances on Kodiak, which include sightability corrections and confidence intervals.
- ❖ Age and sex-specific data on adult mountain goat survival and reproductive rates. A quantification of the relative impact of hunting on annual changes in goat abundance.
- ❖ An assessment of mountain goat resource selection at annual and seasonal scales. A predictive GIS map of the probability of occurrence across Kodiak Island.
- ❖ An assessment of mountain goat summer diets among regions of Kodiak at varying densities and available habitats.



For further information

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