

**ANNUAL REPORT ON VITAL SIGNS MONITORING OF DISTRIBUTION AND
ABUNDANCE OF SNOWSHOE HARES IN WRANGELL-ST. ELIAS NATIONAL
PARK & PRESERVE**

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CENTRAL ALASKA NETWORK

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List of Acronyms

CAKN—Central Alaska Network

WRST—Wrangell-St. Elias National Park and Preserve

ADFG—Alaska Department of Fish and Game

Executive Summary

The annual accumulation of fecal pellets has been found to be an accurate predictor of population trend in snowshoe hares. Using existing fixed line transects established in WRST in 1991, snowshoe hare pellet counts were conducted to determine population trends of this cyclic species. 2005 results show that the hare population is recovering from its cyclic low in 2003. These results are consistent with incidental observations (more hares seen). In addition, hare population trend data collected in WRST closely track Alaska Department of Fish and Game lynx harvest.

Key Words: *Wrangell-St. Elias National Park and Preserve, population dynamics, monitoring, snowshoe hares, Lepus americanus, pellets*

Introduction

The CAKN has adopted a holistic view of network ecosystems and will track the major physical drivers of ecosystem change and responses of the two major components of the biota: plants and animals. Thus, the CAKN has identified Fauna Distribution and Abundance as one of its top three Vital Signs. In general, the CAKN wants to know where fauna are distributed across the landscape and to track changes in both their distribution and abundance. The Fauna Distribution and Abundance Vital Sign comprises monitoring efforts for a suite of vertebrate species spanning the significant elevation gradient found in CAKN parks, and also including species of specific interest within each park. Snowshoe hares were included as a member of the low elevation suite of species and because they are typically the dominant herbivores in the boreal forest throughout Alaska and Canada. Their populations experience 8-11 year cyclic fluctuations over very large geographic areas, and densities may vary 5-25 fold. These large scale changes have widespread effects on the shrubs and trees on which they forage, on both avian and mammalian predators that eat them, and on other herbivores which compete for the same food. Populations of predatory species (including lynx, coyote, fox, wolverine, marten, fisher, goshawk and great horned owl), and small herbivores (spruce and ruffed grouse) have been found to vary synchronously with hare populations (see Hodges 1999 for a review). In Denali NP, golden eagle populations were found correlated with hare populations (McIntyre and Adams 1999). Changes in hare populations also affect other prey species by providing a highly variable food source to predators. Coyote predation rates on white-tailed deer have been correlated with hare abundance (Patterson and Messier 2000). Coyotes are important predators of Dall sheep in the Alaska Range (Scotton 1998), and thus sheep and hare populations may be linked. The linkage between hare and lynx populations is such that Alaska Department of Fish and Game (ADFG) manages lynx in interior Alaska using a

"harvest tracking strategy" where seasons and bag limits are adjusted based on hare cycles (Golden 1999).

Our specific objectives are to:

- Determine annual trends in abundance of snowshoe hares.
- Provide this information to ADFG for use in developing lynx harvest strategies.

Methods and Materials

Study Area:

Four study areas were selected to represent snowshoe hare trends within WRST north of the Chugach mountains: the McCarthy Road, May Creek, the Nabesna Road, and Chisana (Fig. 1). Study area selections were based on access (logistics and cost of obtaining samples), land ownership, and the availability of representative snowshoe hare habitat. Both May Creek and Chisana require aircraft access, while the McCarthy Road and Nabesna Road sites are short walks from the roads.

Field techniques follow the procedures described in Route (1995) and following the work of Krebs et al. (1987, 2001), whereby fecal pellets are counted along permanent transects. Ten, 1.5km permanent transects were installed in WRST near Chisana (2), the Nabesna Road (2), the McCarthy Road (3) and May Creek (3). Each transect contains 50 quadrats, each 0.155m² (5.08 x 305 cm, or 2 x 120 in.) in size and aligned perpendicular to the transect. Transects and quadrats are marked with permanent 2x5cm wood stakes or with metal rod. Transects are visited in late June to July annually. At each quadrat, an elastic band is placed around 5cm wooden spacers placed on markers at each end of the plot. All hare pellets within the plot (pellets half-in and half-out are tallied as "in") are counted, and totals recorded on standardized data forms. All pellets counted are removed from the plot, and therefore only pellets from the previous year are tallied.

Statistical analysis was performed in Statistix (ver. 7, Analytical Software, Inc., Tallahassee, FL.) using the Wilcoxon signed rank test, with a significance level of $p < 0.05$.

Results

Hare pellet counts were conducted at 10 sites distributed at 4 locations within WRST. Sites at May Creek, McCarthy and the Nabesna Road were visited 28 June – 1 July. Due to scheduling conflicts, the Chisana sites could not be visited until 7 August.

Pellet counts show a slight, but not significant (Wilcoxon signed rank, $p=0.08$, $n=500$), increase from 2004 to 2005 (Fig. 2). The increase was evident in the northern area (Nabesna-Chisana, $p=0.019$, $n=193$) but there was no difference in counts in the southern area (McCarthy-May Creek, $p=0.9$, $n=298$). The slight

increase in hare pellets is consistent with personal observations and incidental reports of an increasing hare population. Recent observations and reports suggest an even higher population of hares this winter.

The dramatic drop in 2000 pellet counts in the McCarthy/May Creek area cannot be explained. There is no evidence for observer error or other likely causes of error. Counts along the Nabesna/Chisana area during 2000 only showed a small decrease.



Figure 1. Snowshoe hare pellet transect areas, Wrangell-St. Elias National Park and Preserve, Alaska.

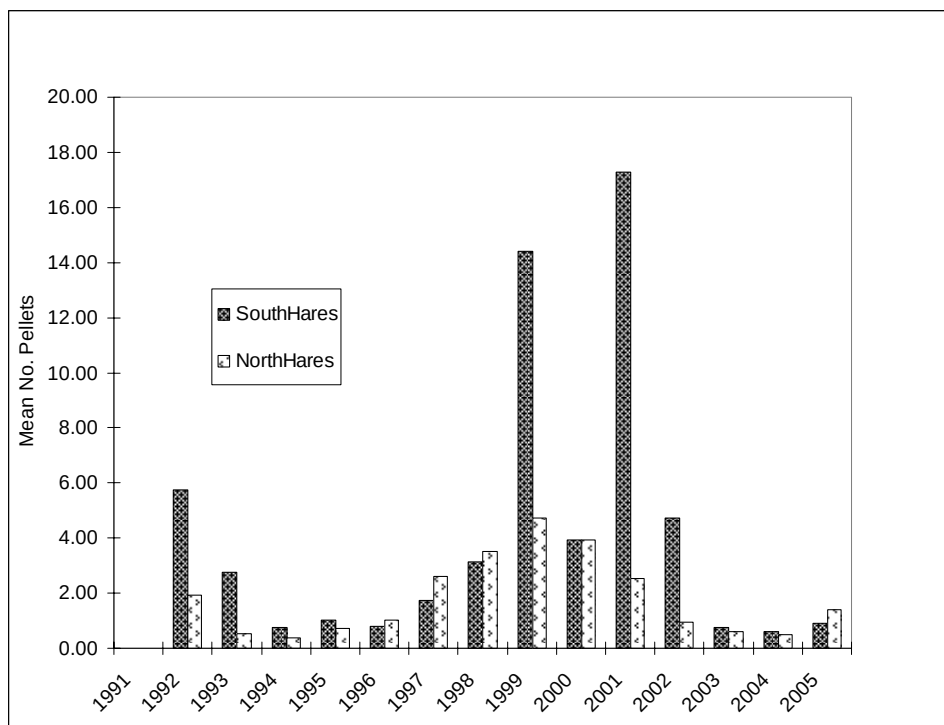


Figure 2. Mean number of snowshoe hare fecal pellets counted at two survey areas in Wrangell-St. Elias National Park and Preserve, Alaska. Results are averaged among 6 transects (south) and 5 transects (north).

Results from the long-term WRST hare surveys were compared to ADFG fur sealing records for lynx (Fig. 3). Lynx harvest data contain harvest for Game Management Units 11 and 12—the McCarthy-May Creek-Nabesna sites are located in Unit 11, and the Chisana site is located in Unit 12.

Progress

This effort is part of a continuing effort to monitor hare populations in WRST using existing plots and methodology established in 1991. Thus, 2005 was the 15th year of data collection.

This long-term dataset shows the expected cycles of snowshoe hare abundance (e.g. Keith 1990, Hodges 1999). The data also show the expected relationship between hare and lynx abundance (Boutin et. al 1995). This information will be provided to ADFG to assist them in managing lynx harvest (Golden 1999).

Plans for Coming Year

Ken Wilson, Colorado State University, has been contracted by CAKN to develop methodology to integrate hare monitoring into the WRST mini-grid system. The current direction is to develop hare pellet transects using a distance estimator for abundance as outlined in Marques et al. (2001). The advantage of this technique is that these transects do not have to be repeatedly sampled, as is the case for

the current technique, and so would be better applicable for the mini-grid. In July 2006, two of his graduate students will arrive in WRST to test the new techniques in association with the existing pellet counts. Monitoring of the existing fixed transects will continue for the new future while the new methodology is being developed.

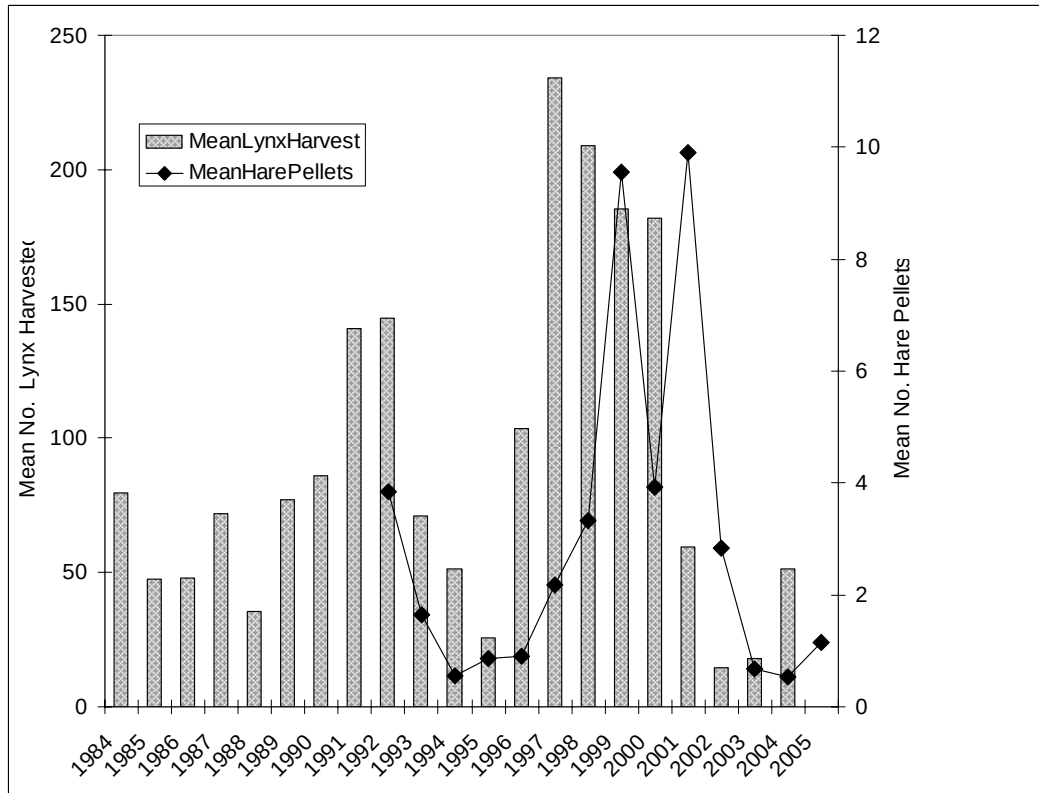


Figure 3. Mean number of snowshoe hare fecal pellet counts (combined North and South) with mean number of lynx harvested in Units 11 and 12 (harvest data from ADFG)

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