

Wolverine Survey Plan for Upper Turnagain Arm and Kenai Mountains, Alaska

Interagency Collaborative Project
Progress Report
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Summary

Project cooperators conducted a SUPE survey of the wolverine population in upper Turnagain Arm and the Kenai Mountains, Alaska in March 2004. We surveyed 4,340 km² of the 9,900 km² planned. Snow and weather conditions were not favorable for completing a survey of the entire area. We conducted the SUPE on 6 and 17 March 2004, using 5 pilot/observer teams on the 6th and 2 teams on the 17th. We sampled 87 SUs from among 171 quadrats during the survey of the 4,340 km². We observed 11 individual wolverine tracks among 10 track groups, resulting in a population estimate of 12.80 (SE = 1.54) wolverines (80% CI = 11.00, 14.93) and a density of 2.95 (SE = 0.36) wolverines/1000 km² (80% CI = 2.53, 3.44). Plans are to continue the SUPE survey in winter 2005.

Introduction

Wolverines (*Gulo gulo*) function as scavengers and predators in the ecosystem of southcentral Alaska. They are generally not present at high densities anywhere within their range but are important as a furbearer for human use and as a potential indicator of ecosystem health. The Alaska Department of Fish and Game (ADF&G) is responsible for management of furbearer populations throughout southcentral Alaska. The U. S. Forest Service, U. S. Fish and Wildlife Service, and the National Park Service are responsible for subsistence harvest management on federal lands and for management of other human uses that could affect wildlife resources. Because wolverine population density and reproductive potential is low relative to other furbearers, it is important for management agencies to closely monitor wolverine populations and those human activities that could adversely affect them. Wolverines seem to prefer foothills and mountainous areas (Magoun 1996), which usually are lightly developed by humans but are often favored areas for hunting, trapping, snowmachining, and other outdoor activities. In the Upper Turnagain Arm and Kenai Mountains, wolverines can be harvested under hunting and trapping regulations. This area also is used heavily for recreational snowmachining and skiing, which have both increased rapidly in popularity in recent years. In particular, operators who drop off skiers by helicopter, known as heli-skiing, have expanded their areas of use and increased their permit requests to include much of the ski-able terrain within the Chugach National Forest (CNF). The potential effect of winter recreational activities on wolverine populations is unknown. To obtain baseline data on wolverine populations in the affected areas, ADF&G, CNF, Kenai National Wildlife Refuge (KNWR), and Kenai Fjords National Park (KFNPN) began a survey in March 2004 to estimate the wolverine population and density. We used the sample unit probability estimation (SUPE) technique, which is based on wolverine track counts in winter (Becker et al. 1998). Beyond providing a statistically reliable estimate of wolverine numbers in the areas of concern, results of this survey effort will give an indication of wolverine distribution.

Methods

The total survey area in upper Turnagain Arm and the Kenai Mountains is 9,900 km² and contains 386 quadrats, each approximately 25 km². We divided the entire area into 207 high and 179 medium-low strata, based upon their likelihood of containing wolverine tracks, among 5 smaller areas (Figure 1). The areas were prioritized to meet agency needs and for orderly progression of the survey. Out of the 386 quadrats, we selected 188 (134 high and 54 medium-low) sample units (SUs) to survey, which was an overall sampling rate of 48.7% (65% of the high and 30% of the medium-low strata).

We were able to survey 4,340 km², which included Upper Turnagain Arm and the northern two-thirds of the west side of the Kenai Mountains (Figure 1). Snow and weather conditions were not favorable for completing a survey of the entire area. We conducted the SUPE on 6 and 17 March 2004, using 5 pilot/observer teams on the 6th and 2 teams on the 17th. We attempted to survey with 2 teams on 1 April but cloud cover and fog obscured visibility too much to conduct it. On 6 March we used 4 charter aircraft as well as the KNWR plane. All other flights were with charter aircraft. Survey flights required 59.3 hours (including ferry time) for charter aircraft and cost \$10,000. Actual time on-survey for all aircraft totaled 32.5 hours. The average rating for the survey was good, with complete snow cover, fresh snow within 1 to 2 days, and good light type and intensity.

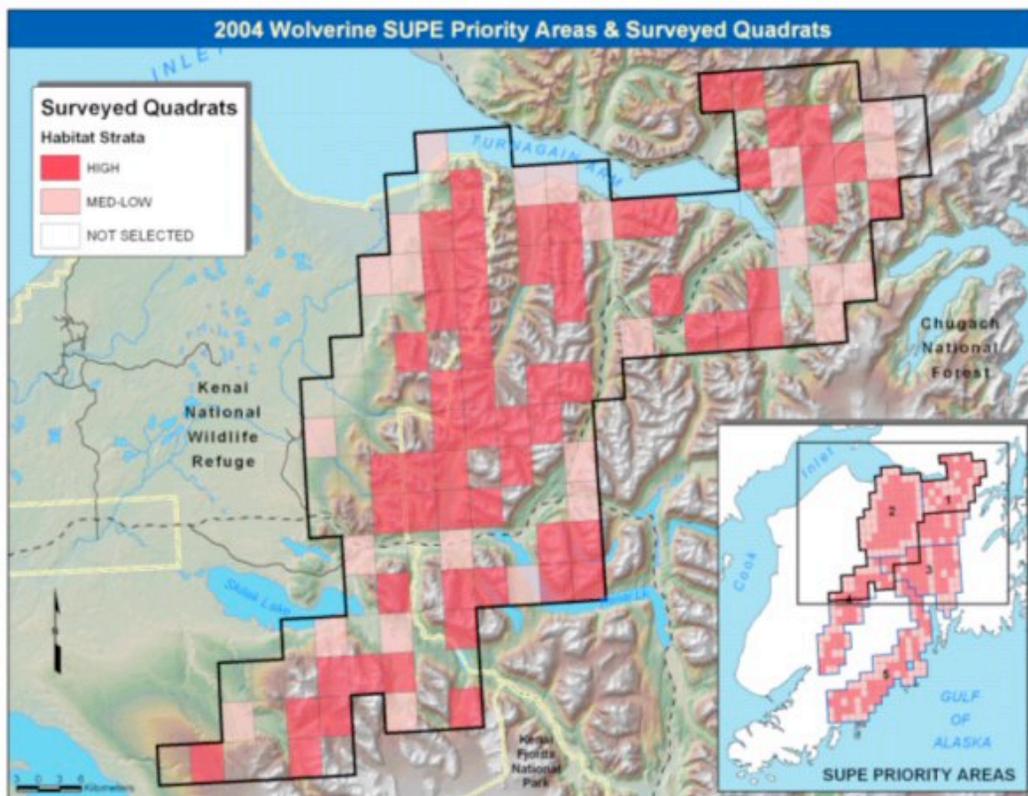


Figure 1. Sample unit probability estimation (SUPE) priority areas and quadrats surveyed for wolverines on Upper Turnagain Arm and the Kenai Peninsula, 6 and 17 March 2004.

Results and Discussion

We sampled 87 SUs from among 171 quadrats during the survey of the 4,340 km² in March 2004 (Table 1). This reduction in sampling from the entire area as planned required recalculating the sampling effort of the selected quadrats.

Table 1. Sample unit distribution and sample effort allocation in the portion of the Kenai study area surveyed 6 and 17 March 2004.

Strata	N	n	Sampling %
High	94	62	66
Medium-Low	77	25	32
Total	171	87	51

During the survey we observed 11 individual wolverine tracks among 10 track groups (Figure 2). All tracks remained within the boundaries of the survey area. Results of the survey are summarized in Table 2. Observed values for individuals were used for the lower confidence interval (CI) if they were greater than the estimated lower CI.

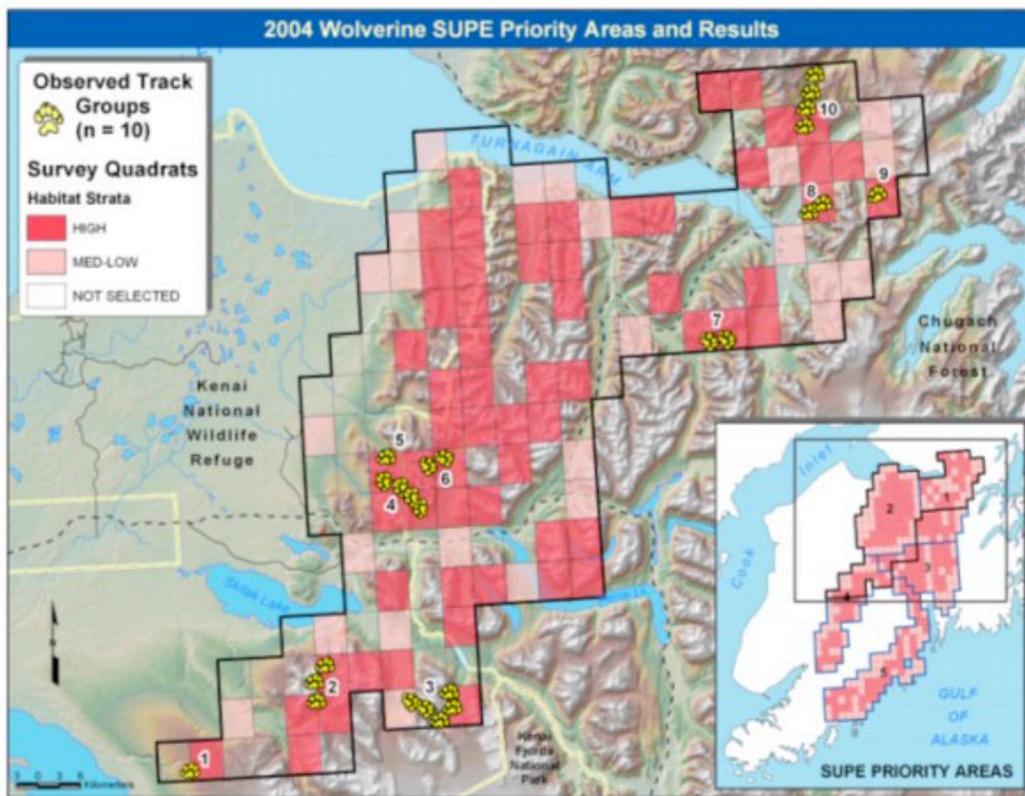


Figure 2. Wolverine track groups (i.e., one or more individual tracks) observed during SUPE survey in Upper Turnagain Arm and Kenai Mountains, 6 and 17 March 2004.

Table 2. Estimated population size and density (number/1000 km²) of wolverines in the SUPE area in the Upper Turnagain Arm and Kenai Mountains, 6 and 17 March 2004.

Parameter	Estimate	SE	80% CI	+/- %	90% CI	+/- %
Wolverine Population	12.80	1.54	11.00, 14.93	16.65	11.00, 15.62	22.07
Wolverine Density	2.95	0.36	2.53, 3.44	16.65	2.53, 3.60	22.07

The estimated density of 2.95 wolverines/1000 km² was lower than density estimates derived from the transect probability intercept sampling (TIPS) technique for wolverine populations in the Chugach Mountains (5.2/1000 km²) (Becker 1991) and in the Talkeetna Mountains (4.7/1000 km²) (Becker and Gardner 1992). It also was lower than a SUPE survey of 2,050 km² in the northwestern portion of the Kenai Mountains in 1995 that used smaller SUs (10.4 km²) sampled at a much lower intensity of 23.7%. That survey resulted in an estimate of 10.7 wolverines (80% CI = 5.0, 17.5) and a density of 5.2 wolverines/1000 km² (Golden 1996). However, the coefficient of variation (CV) for the current Kenai population estimate was 12.2%, which was lower than the CVs of 13.0% and 20.3% reported for the TIPS surveys above (Becker et al. In press). It also was substantially lower than the CV of 39.2% for the 1995 Kenai SUPE survey. The relatively low CV of the current population estimate indicates it was the most precise of any wolverine estimate conducted in southcentral Alaska. Because of the low sampling effort and high variability of the 1995 results, it is not advisable to compare them with those of the current effort, which clearly had a much higher degree of precision.

The cooperators of the current project plan to continue the SUPE survey in winter 2005 and will attempt to survey all remaining areas before replicating any portion of the survey.

Literature Cited:

Becker, E. F. 1991. A terrestrial furbearer estimator based on probability sampling. *Journal of Wildlife Management* 55:730-737.

Becker, E. F., and C. Gardner. 1992. Wolf and wolverine density estimation techniques. Alaska Department of Fish and Game and Federal Aid in Wildlife Restoration, Research Progress Report, Grant W-23-5, Juneau, Alaska, USA.

Becker, E. F., M. A. Spindler, and T. O. Osborne. 1998. A population estimator based on network sampling of tracks in the snow. *Journal of Wildlife Management* 62: 968–977.

Becker, E. F., H. N. Golden, and C. L. Gardner. *In press*. Using probability sampling of animal tracks in snow to estimate population size. Pages 000-000 in W. L. Thompson, editor. *Sampling rare or elusive species: concepts and techniques for estimating population parameters*. Island Press, Washington, D. C., USA.

Golden, H. N. 1996. Furbearer management technique development. Alaska Department of Fish and Game and Federal Aid in Wildlife Restoration, Research Progress Report, Grants W-24-3 and W-24-4, Juneau, Alaska, USA.

Magoun, A. J. 1996. Wolverines head for the hills on the Kenai Peninsula, Alaska. Pages 23-41 in H. N. Golden. Furbearer management technique development. Alaska Department of Fish and Game and Federal Aid in Wildlife Restoration, Research Progress Report, Grants W-24-3 and W-24-4, Juneau, Alaska, USA.

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