

Terrestrial Animals

Protocol: Wolverine

Parks Where Protocol Will Be Implemented: ALAG, ANIA, KATM, KEFJ, LACL

Justification/Issues Being Addressed: Wolverines (*Gulo gulo*) serve an important ecological role as scavengers and predators in SWAN parks and are a significant economic resource to fur trappers. Moreover, they are effective indicators of the cumulative effects of changes in human harvest and other activities, habitat, and prey populations. Wolverines typically occur at low population densities and are sparsely distributed across the landscape. Their reproductive potential is low relative to other furbearers; hence they take much longer to rebound from population declines. Overharvesting is the greatest potential threat to wolverine populations (Banci 1994), but they also are susceptible to displacement from prime habitats due to human disturbances such as snowmobiling, climate-induced reductions in habitat, and declines in prey populations, such as caribou. For instance, recent declines and shifts in spatial distribution of the Mulchatna Caribou Herd (Woolington and McDonald 2003) could have a detrimental effect on wolverine abundance and distribution in LACL and KATM.

Specific Monitoring Questions and Objectives to be Addressed by the Protocol:

Question:

- What are the trends in wolverine populations within SWAN parks?

Objective:

- Estimate long-term trends in abundance and distribution of wolverines from randomly sampled areas in SWAN parks.

Basic Approach: The sample unit probability estimator (SUPE; Becker et al. 1998) design will be used to estimate abundance of wolverines in SWAN parks. SUPE is a stratified network (or snowball) sampling design based on aerially detecting and following fresh animal tracks in the snow from beginning to end. The length of a track is used to calculate its encounter probability during the survey, which then is used in a Horvitz-Thompson estimator (Horvitz and Thompson 1952) to estimate abundance. The assumptions of this design are: (i) all wolverines move during the period of interest; (ii) wolverine tracks are easily identifiable from a slow, low-flying aircraft; (iii) tracks are continuous; (iv) track lengths (movements) are not influenced by the survey aircraft; (v) fresh tracks can be distinguished from old tracks; (vi) all fresh tracks are detected within searched units; (vii) fresh tracks can be followed from beginning to end; and (viii) group size of detected wolverines is correctly recorded (Becker et al. 1998).

Each park is divided into 9.7 mi² (25 km²) rectangular or square quadrats (sampling units) that are assigned to one of three strata. Strata represent areas of low, medium, and high perceived probability of detecting wolverine tracks based on previous experience. Sampling units are randomly chosen to be surveyed within each stratum based on the approximate percentages of 65, 40, and 20 for high, medium, and low strata, respectively, which will focus survey effort in those strata where tracks have the highest probability of detection. Each selected unit is aerially surveyed for wolverine tracks by a pilot and experienced observer in a Super Cub within 24–36 hr after snowfall (2–3.9 in [5–10 cm]) or after strong winds have subsided after a snowfall. Detected tracks are followed until wolverines or their dens are located (Becker et al. 1998, Becker et al. 2004). ADF&G used the SUPE design to estimate wolverine abundance in the Kenai Mountains during 1995 (Golden 1996) and in the upper Turnagain Arm and the Kenai Mountains during 2004 (ADF&G and NPS, unpublished data). Results of abundance surveys also will provide an estimate of spatial distribution.

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Development Schedule, Budget, and Expected Interim Products: SWAN provided \$23,000 to ADF&G and LACL personnel to test the SUPE design for estimating wolverine abundance in LACL during FY2005, but weather conditions did not allow the survey to be performed, so field testing has been rescheduled for FY2006.

- 2008 Draft SOPs (\$ to be determined).
2009 Test protocols (\$ to be determined).
2010 Implement protocol (\$ to be determined).

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