FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

PROJECT TITLE: Population ecology and spatial dynamics of wolves under intensive management in the Nelchina Basin, Alaska

PRINCIPAL INVESTIGATOR: Howard N. Golden

COOPERATORS: Layne Adams and Kyle Jolly, Biological Resource Division, U.S. Geological Service

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR.: W-27-5

PROJECT NR.: 14.21

WORK LOCATION: Nelchina Basin, Game Management Unit 13

STATE: Alaska

PERIOD: 1 July 2001–30 June 2002

I. PROGRESS ON PROJECT OBJECTIVES

OBJECTIVE 1: Determine the year-round prey selection patterns and kill rates of wolf packs relative to varying densities and distributions of prey (i.e., functional response), primarily moose and caribou in and near core calving areas.

We continued monitoring kill rates and diet using VHF telemetry and GPS telemetry systems, stable isotope analysis, and body composition measurements. Two to four wolves from each of several packs were radiocollared. During the year, we regularly located all collared wolves and backtracked the movements of the GPS-collared animals to determine their use of different prey items. We sampled blood for stable isotope analysis and conducted deuterium water dilution for analysis of body condition before and after calving.

OBJECTIVE 2: Investigate wolf movements and spatial relationships with prey.

We used VHF and GPS radio collars to monitor the movements of 2–4 wolves in each of several packs regularly during the year. We investigated spatial analysis techniques to measure wolf movements relative to the availability of moose and caribou.

OBJECTIVE 3: Evaluate diet and body composition of wolves relative to prey availability.

Stable isotope and body condition analysis focused on 3 periods relative to prey (moose and caribou) availability: (1) April — pre-calving and before caribou arrive in the area, (2) July — post-calving for both prey species, and (3) October — autumn/early winter after caribou have left the area. We concentrated on developing field techniques and on obtaining paired samples.

OBJECTIVE 4: Estimate wolf density relative to varying prey densities (i.e., numerical response).

We conducted a density estimate using a sample-unit probability estimator (SUPE) of wolves in western Unit 13 and small portions of 13B and 13C. Cooperators and other department staff conducted estimates of moose and caribou density.

OBJECTIVE 5: Estimate production, survival, and recruitment of wolves relative to varying prey densities.

During April captures we used ultrasound techniques to examine pregnancy and the number of fetuses in female wolves. We also monitored den sites to estimate pup production, and we documented loss of wolves from dispersal and harvest by humans.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 2: Capture and handling

During this performance period, we captured 18 wolves (9 females, 9 males) a total of 31 times (16 for females, 15 for males) among 5 packs: Big Bend (6), B-S Lakes (5), Goose Creek (9), Moore Lake (7), and Old Man Lake (4). Captures took place on 3–5 August 2001, 23–24 October 2001, and 2–4 April 2002. Of the 31 wolves captured, 11 were new captures and 20 were study animals that had been captured previously. We deployed GPS collars (Televilt/Telemetry Solutions) on 14 wolves (1–4/pack) for varying lengths of time and collared the remaining wolves with conventional VHF collars (Telonics). For each wolf we measured weight (with an electronic load cell) and body size, estimated age (based on tooth wear), applied ear tags and a radio collar, extracted blood for stable isotope analysis as well as for potential DNA and disease analysis, biopsied a fat sample for fatty acid analysis, and noted general physical condition. We conducted deuterium water dilution tests on 15 wolves.

JOB 3: Prey selection patterns and kill rates

Location data collected by the GPS collars was remotely downloaded from the air and used to backtrack the movements and kill-site use by the wolves during the previous week. Collars deployed from August to October 2001 and April through June 2002 were set to gather locations every ½ hour. Collars deployed between October 2001 and April 2002 were set to record GPS locations every hour. We were able to backtrack the movements of collared wolves with relatively few gaps in their travel routes, particularly with the ½-hour intervals. We followed wolf travel routes and recorded their visits to sites of freshly killed or older carcasses of moose or caribou. We also recorded kill sites discovered during telemetry flights of the VHF collars. Remote download of GPS data was done weekly during calving and at 2–4-week intervals at other times. GPS download and backtracking flights took 1–2 days to complete. Conventional VHF locations were obtained nearly daily for most wolves during calving and up to 2–4-week intervals at other times.

JOB 4: Movements and spatial relationships with prey

The GPS data downloaded remotely or directly from collars and data gathered through conventional VHF collars were compiled for comparative analyses with the movements of radiocollared moose and caribou. Data were collected on the schedule described above.

JOB 5: Diet and body composition

We collected blood and hair samples from each of the wolves when captured. Samples were prepared in the lab for analysis of the presence of carbon and nitrogen isotopes that have specific signatures for moose, caribou, and other potential prey. We also analyzed body composition through deuterium water dilution tests on blood sampled from 7 females and 8 males captured in August and October 2001. Each sample period took approximately 2 hours to complete. After injection of the deuterated water, blood samples were taken at ½-hour intervals for up to 120 minutes. Blood samples were preserved for analysis to estimate water, lipid, protein, and ash content of each animal. We prepared a manuscript of the results of this research (see Job 8 and section IV).

JOB 6: Density estimation

We conducted a SUPE to estimate wolf density in an area spanning 8329-km^2 in western Unit 13 on 5–6 March 2002. The sampled area was the southern 2/3 portion of an 11,810-km^2 area, which included western Unit 13A and small portions of southwestern Unit 13B and eastern Unit 13E. The northern portion of the study area could not be surveyed due to unacceptable snow and weather conditions. We surveyed 201 samples units (SUs), each of which was 41.4 km^2 or 16 mi^2. This survey took 39.45 flight hours in Super Cubs for an average of 13.15 hours/plane. During the survey we observed 48 wolves (based on direct sightings of the animals or their tracks) among 11 groups or packs. Pack sizes ranged from 2 to 9 wolves. We derived estimates of 61.62 ± 9.19 wolves for the area at a density of 7.40 ± 1.10 wolves/1000 km^2. The estimated number of packs was 12.32 ± 1.79 at a density of 1.48 ± 0.21 packs/1000 km^2. The estimated size of wolf packs in the area was 4.57 ± 0.27 wolves.

JOB 7: Production, survival and recruitment

We used ultrasound techniques to examine 6 female wolves for pregnancy during captures on 2–4 April 2002. We detected fetuses in only one of the females. She had 2 embryos on each side. Subsequently, 4–6 pups were observed in each of the 5 packs, indicating the need to revise our detection techniques. We will conduct April captures and ultrasound examinations later in April to improve our chances of seeing embryos. Out of 19 wolves monitored during this performance period, 6 were harvested by trappers. An additional collared male died 2 weeks after capture, but the cause of death could not be determined. Two other wolves are missing and presumed to have dispersed. We removed the collar from an adult male in the Big Bend pack that had a snare deeply embedded in its neck muscle but was still alive. It was released with ear tags and was later seen with the Goose Creek pack. It appears that the Big Bend pack has dissolved and its members dispersed. An old, uncollared female wolf died during capture. Cause of death was determined through autopsy to be from blood loss due to tearing of an adhesion on the liver that appeared to result from an old injury.

JOB 8: Publications and meetings

I coauthored a paper that we prepared and submitted for publication and another that was accepted for publication (see below).

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

I supervised the Fish and Wildlife Technician (FWT) positions for the Region II Research Section assigned to the Anchorage office. These positions provide support to all research biologists in Region II. This duty, which I have conducted since March 1995, involves hiring, supervising, and coordinating the work of a FWT IV and FWT III. Both positions are 11-month permanent-seasonal (P-S). In addition, I am responsible for hiring and supervising other temporary technicians or interns to assist seasonally as needed. During this performance period, I hired 2 P-S FWT III positions, rewrote position descriptions, and upgraded 2 FWT IIIs to FWT IV positions. I also hired and supervised 2 non-permanent FWT IIIs to assist with short-term fieldwork needs. I wrote evaluations and handled all personnel issues for these positions.

IV. PUBLICATIONS

White, K. S., H. N. Golden, K. J. Hundertmark, and G. R. Lee. *In press*. Predation by wolves, *Canis lupus*, on wolverines, *Gulo gulo*, and an American marten, *Martes americana*, in Alaska. Canadian Field-Naturalist 000: 000–000.

Hilderbrand, G. V., and H. N. Golden. *In review*. Body composition of free-ranging wolves. Journal of Mammalogy 000: 000–000.

V. RECOMMENDATIONS FOR THIS PROJECT

I recommend continuing with the objectives and jobs specified in this report for the next performance period.

VI. APPENDIX

White, K. S., H. N. Golden, K. J. Hundertmark, and G. R. Lee. *In press*. Predation by wolves, *Canis lupus*, on wolverines, *Gulo gulo*, and an American marten, *Martes americana*, in Alaska. Canadian Field-Naturalist 000: 000–000.

Abstract: We report three instances of wolf predation on mustelids in Alaska; two involved wolverines and another involved an American marten. Such observations are rare and in previous studies usually have been documented indirectly. This account provides insight into the potential role of wolves in influencing mesocarnivore communities in northern environments.

Hilderbrand, G. V., and H. N. Golden. *In review*. Body composition of free-ranging wolves. Journal of Mammalogy 000: 000–000.

Abstract: We used deuterium water dilution to determine body composition of free-ranging wolves (*Canis lupus*) in the Nelchina Basin, Alaska. Body mass differed between sexes throughout the year but did not vary within sex. Mean fat mass and mean

energy content were highest in both sexes in the spring. Mean lean mass was lowest in both sexes in the spring. Body mass and lean body mass were positively related to animal age in males. There was no relationship between body fat content and animal age in either sex. Thus, growth in males beyond age 2 consists primarily of lean mass. Deuterium should be allowed to circulate in the wolf for at least 120 minutes to ensure complete equilibration regardless of season, sex, age, or reproductive status.

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $ 85,436 STATE SHARE $ 28,479 = TOTAL $ 113,915

VIII. PREPARED BY:

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