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**A WINTER SURVEY FOR WOLVERINES (GULO GULO) ON THE
SAWTOOTH AND CHALLIS NATIONAL FORESTS, IDAHO**

BY

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ABSTRACT

A winter field survey for wolverines (Gulo gulo) was conducted from January - April 1990 on the Challis and Sawtooth National Forests. Wolverine sign was searched for in remote portions of these forests via snowmobile, skis and snowshoes. Bait and scent stations were used in an attempt to draw wolverines into areas where previous wolverine activity had been recorded. Hair traps and remote cameras were used to document animal visits to bait stations. Fourteen confirmed track sightings and three probable track sightings were located. Wolverines used mixed conifer habitat types with a preference for spruce/fir stands along stream bottoms. Activity was also observed in mature stands of lodgepole pine. Ten sighting reports were added to the existing network of information gathered from 1985 -1989 survey. Results from this survey suggest that wolverines use the same winter areas from year to year. We recommend that further studies on wolverine ecology be initiated to understand the population dynamics, distribution, density and habitat preferences of this solitary and elusive predator.

Section conducted a winter survey for wolverines on the Sawtooth National Forest (SNF) and to a lesser extent, the Challis National Forest (CNF) (Groves and Gadwa 1989). Two confirmed and two probable sets of wolverine tracks were located during their limited survey. Twenty-four additional reports of wolverine sightings or tracks were also collected during this survey period. Based on the positive results obtained from the limited surveys in 1989, plans were made to conduct more intensive and extensive surveys in 1990. The purpose of this report is to summarize the results of our 1990 survey efforts.

METHODS

Specific drainage basins for our surveys were selected on the basis of previous field observations of wolverine activity and sighting reports. The manner in which we traveled over snow was dictated by weather, terrain, avalanche conditions and the Forest Service Travel Plan. Field reconnaissance was conducted primarily on snowmachine. When we couldn't use snowmachines, we skied or snowshoed.

The date and locations of sightings of wolverine tracks were recorded. Tracks were measured for length, width and distance between strides. We also recorded habitat types, other species and sign observed, weather, and snow conditions. All wolverine tracks were followed to determine direction of travel, age of track and whether the animal scent marked, cached food, or

dened. The age of the track was estimated by the time that had lapsed since the last snowfall and/or the last survey as well as the day to day temperature changes. Tracks were determined to be either probable or confirmed. Confirmed tracks showed claw marks in more than one print and were consistent with track size and patterns as recorded by Forrest (1988) and Murie (1954).

Probable tracks showed claw marks in one print or less and revealed typical wolverine track patterns but were less distinct due to age and weathering. USGS 7.5' topographic maps were used to record track locations and direction of travel.

Several attempts were made to attract wolverines to bait piles and scent stations. All baits used in this study were road-killed mule deer. Scents included a bobcat-lynx lure, a fetid fish composite and an amalgamation of beaver castor, fish and coyote urine. Bait was hauled behind the snowmachine on a sled and left in areas where wolverine activity had been recorded or was likely. Bait piles and nearby trees were scented with mustelid lure.

Cameras and hair traps were used to document wolverine visits to bait stations. Two remote cameras were set out under the guidelines offered by Mace et al. (1989) at baits in two locations: Beaver Creek in the upper Sawtooth Valley (SNF) and on Beaver Creek in the Marsh Creek drainage (CNF). Triggered by an infrared sensor and wired to a 35 mm Olympus Infinity camera, the camera outfit was housed in an ammunition can and attached to a tree. Cameras faced north and were positioned 2 m off the ground

at Beaver Creek (CNF) and 3 m off the ground at Beaver Creek (SNF). Distance between the bait piles and remote camera was approximately 3.5 m.

Hair traps constructed of wire hardware cloth into cylinders (2' in length x 1' in diameter) with strands of barb wire running through the interior (Halfpenny 1981) were employed in two drainages: Baker Creek in the Big Wood River drainage (SNF), and on Beaver Creek in the upper Marsh Creek drainage. Traps were set out on snowmachine transects, 0.5 mi apart for a distance of 5 miles on Baker Creek and for 1.5 mi on Beaver Creek (CNF). Traps were baited with road-killed mule deer, and hung on trees approximately 0.5 m off the snow surface. Scent was spread on trees and bait. Return visits to check baits, cameras, and hair traps for animal activity occurred periodically throughout the winter study period.

In addition to field surveys, sighting reports generated by the wolverine poster campaign (Groves and Gadwa 1989) were followed up with a telephone interview. According to the methodology established by Groves (1987), individuals were asked for a description of the animal, the distance and amount of time of their observation, whether they had previously seen a wolverine, how confident they felt that they had seen a wolverine and their experience as a wildlife observer. Sighting reports were added to the Idaho Natural Heritage Program data base.

RESULTS AND DISCUSSION

Field Surveys

Fourteen confirmed and three probable sets of wolverine tracks were recorded at 10 sites as a result of field surveys conducted between January 15 and April 15, 1990 (Table 1 and Figure 1). Areas inventoried are summarized in Table 2. Wolverine tracks observed on January 15 in Beaver Creek (SNF) and again on January 21 in the adjacent drainage, Smiley Creek, were of the same size and age and were assumed to be the same individual. The tracks we followed went down a gully on the west side of Beaver Creek, and then meandered along the creek bottom in a southerly and upstream direction for approximately 2 miles. The animal scent marked frequently on trees and partially exposed stumps. Tracks appeared to be 2-3 days old, measured 4.5" (w) x 4.5" (l), with a straddle width of 9", print group of four tracks measuring 31" and intergroup distance of 6". At the Silver King mine, the tracks headed in an easterly direction up a tributary toward the west side of Vienna Peak.

On January 21, tracks were detected along a small stream on the east side of Vienna Peak and dropping into Smiley Creek. The wolverine meandered along the riparian zone in a downstream and northerly direction through small and large meadows and timber stands. Again, tracks left the creek bottom in an easterly direction via a tributary towards a low pass that divides Smiley Creek from Frenchman Creek. Tracks and scent marking were

observed around a domestic sheep carcass in Smiley Creek on March 7. Tracks found here as well as in Beaver Creek on this day were greater than 10 days old.

Tracks encountered in Beaver Creek on January 15 and March 7 were in the same locations as those observed by Groves and Gadwa (1989). Beaver Creek has a history of wolverine use over the last 14 years as evidenced by two confirmed reports (both carcasses) and numerous probable sightings. A resident population of mountain goats occurs in the upper reaches of Smiley and Beaver Creeks. Elk and deer also occur here in the spring, summer and fall seasons. Domestic sheep are grazed in this area. All are potential carrion for wolverines.

Wolverine tracks were detected near the Methodist Camp on the South Fork Boise River on February 28 and March 1. Tracks started from above the S. Fk. Boise River - Bear Creek confluence and were observed traveling in a southerly and downstream direction for 3.5 miles. Warm temperatures, snow conditions, and older age of tracks prevented detection of scent marking and impaired the tracking. Tracks measured 4.5" (w) x 4.5" (l) with a straddle distance of 8" and 15-19" between footsteps. The wolverine crossed back and forth across the stream through small openings on the edge of timber. Elk tracks were observed in the willow bottom near the bridge and the wolverine appeared to be following them.

Wolverine tracks in the Beaver, Winnemucca, and Knapp Creeks area (CNF) were first observed on Knapp Creek on February 25.

These tracks were old (greater than 10 days) and partially melted. They meandered along the creek bottom and led to a den in the snow-covered limbs of a down tree. The circular opening measured approximately 12" in diameter. Tracks measured 5" (w) x 5" (l) with a 7" straddle distance. The wolverine then left the riparian area and headed into the timber in an easterly direction.

Subsequent track observations were made in this area on March 3, March 6, March 28, and April 5. Tracks observed on March 6 came down Cliff Creek into Beaver Creek and traversed easterly toward Winnemucca and Knapp Creeks. This travel pattern is nearly identical to the wolverine route that was followed by researchers in January 1989 (Groves and Gadwa 1989). A third repetition of this travel pattern was observed on March 28. On this day, however, we observed a set of wolverine tracks greater than 10 days old and a fresher set of tracks, approximately 2-3 days old which revealed a pair of wolverines traveling together.

All three track sets observed on this day, plus the previous track sightings (including those of January 1989) were in the vicinity of marten trap lines set by Tim Kemery. Kemery has been trapping in this area since 1984 and has repeatedly reported track sightings near his marten sets. No wintering big game tracks were observed in this area, although snowshoe hare (Lepus americanus), red squirrel (Tamiasciurus hudsonicus) and pine marten (Martes americana) tracks were observed. Tracks that were greater than 10 days old found on April 5 near the Bradley Scout

Camp were the same size and age of tracks observed further upstream on March 28 and are assumed to be the same individual.

We suspect that at least three to four wolverines exist in the three geographic areas where confirmed sets of tracks were found: two individuals in the Beaver-Knapp Creeks area (CNF), one in the Beaver-Smilely Creeks Area (SNF), and one in the headwaters of the South Fork Boise River (SNF). Because of large home range size of wolverines (163 mi² for males, 150 mi² for females: Hornocker and Hash 1981) the tracks observed in the South Fork Boise area and the Beaver-Smilely Creeks area may be of the same individual.

On March 21, a set of probable tracks was observed in Fishhook Creek (SNF) approximately 1 mile below the outlet of the tarn below Thompson Peak. Elk sign was also observed near the probable wolverine tracks. The second set of probable wolverine tracks was observed on March 29 on Slate Creek (SNF) about one mile below the hot spring. Again tracks were old and distorted by melt and old snow. However, one track under a tree well showed claw marks, and the track pattern and size suggested a wolverine. A third set of probable wolverine tracks was observed on the Yankee Fork (CNF) near Tenmile Creek on April 4. These tracks were greater than 14 days old, were partially melted out and covered with snow. However, their size, shape and the presence of claw marks in one print indicated that the tracks were likely those of a wolverine.

Probable tracks observed suggest that three additional

wolverines may occur on the Sawtooth and Challis National Forest bringing a minimum total of 6-7 wolverines suspected on these lands. All track sightings occurred in mixed conifer habitats dominated by lodgepole pine (Pinus contorta) cover types.

Wolverine tracks were most often found in spruce and fir stands along stream bottoms and in adjacent meadows. Elevations where wolverine sign was found ranged from 5800' in the South Fork Boise River drainage to 7800' near the Silver King Mine in Beaver Creek (SNF). Hornocker and Hash (1981) found that wolverines occupied lower elevation home ranges in winter than in spring, summer, or fall. Our findings on the Challis and Sawtooth National Forests support this trend. All tracks observed during survey efforts, with the exception of the probable tracks on Slate Creek, occurred in areas where wolverine sightings had previously been reported (Groves 1987, Groves and Gadwa 1989)

Hair traps

No wolverine hair was collected from hair traps in Baker Creek (Smoky Mtn. Range, SNF) or in Beaver Creek (CNF). Of 14 traps, five collected pine marten (Martes americana) hair. Hair traps may be a useful tool for censusing marten populations. Baker Creek receives daily commercial snowmachine use which may prohibit wolverine activity. The four hair traps set in Beaver Creek where wolverine sign had been observed were in place for 12 days. Pine martens may have eaten trap baits before wolverines had moved through this area. It's premature to say that hair traps are not useful for censusing wolverines. However, they are

time consuming to tend and we felt our time was better spent surveying for tracks, using large baits to attract wolverines and testing remote cameras.

Bait-scent stations

Three bait and scent stations on the Sawtooth NF and one on the Challis NF were established during the field survey and checked periodically for wolverine sign. Locations of these stations and dates established are recorded in Table 3. Stations set out in both Beaver Creek drainages (Sawtooth & Challis NFs) were associated with remote camera efforts to photograph wolverines. Stations set out in the Warm Springs drainage of the Smokies (SNF) and S.Fk. Boise River drainage were not associated with remote camera efforts. Animals attracted to baits were apparent by tracks and included: coyote (Canis latrans), red fox (Vulpes vulpes), marten, and bobcat (Felis rufus).

Remote cameras

Two remote cameras were used during survey efforts: one on the Challis NF at Beaver Creek and the other on the Sawtooth NF at Beaver Creek. Locations, number of camera nights, and results are summarized in Table 4. Red fox, golden eagle (Aquila chrysaetos), ravens (Corvus corax), Clark's nutcracker (Nucifraga columbiana) and wolverine photos were taken. Remote cameras have been used to census grizzly bear (Ursus arctos) populations in Montana (Mace et al. 1990) and are currently being

used on a gray wolf (Canis lupus) study in portions of northern Idaho and Montana. Initial success with 17 photos of a wolverine on Beaver Creek (CNF) on April 13 suggest that remote cameras may be useful for monitoring wolverine populations. All wolverine photos were taken during full daylight hours and it appeared that that the wolverine was unperturbed by shutter noise.

Sighting reports

Eleven wolverine sighting reports were followed up with telephone interviews to yield 10 additional probable sightings (Table 5). Reports were obtained from the Sawtooth and Challis National Forests and from a poster campaign initiated by Groves (1988). No confirmed sightings were added.

Other field observations

Observations of animal sign other than wolverine and habitat comments on areas surveyed were recorded in a field journal. Of particular interest are moose (Alces alces) tracks in the Warm Springs drainage of the Salmon River (SNF), possible lynx (Felis lynx) tracks in the Warm Springs drainage of the Big Wood River (SNF) and probable fisher (Martes pennanti) tracks along Jordan Creek (CNF). Other animal sign included otter (Lutra canadensis), marten, long and short tailed weasel (Mustela frenata and Mustela vison), mountain lion (Felis concolor), bobcat, coyote, red fox, snowshoe hare, red squirrel, mice and shrews, beaver (Castor canadensis), elk (Cervus elaphus), mule

deer (Odocoileus hemionus) and mountain goat (Oreamnos americana). Bird sightings include mature golden and bald eagles (Haliaeetus leucocephalus), and pileated woodpeckers (Dryocopus pileatus).

CONCLUSIONS

Results of our more extensive wolverine surveys in 1990 corroborated our 1989 field survey results and confirmed the presence of wolverines in areas where we had previously only suspected their occurrence. As in 1989, our surveys indicated that in winter wolverines are using mixed conifer habitats with a preference for spruce-fir stands along stream bottoms; a similar result was obtained from a Montana wolverine study. In addition, it appears from our surveys in 1989 and 1990 as well as previous probable sightings that wolverines in the Sawtooth and adjacent mountains are consistently using the same areas from one winter to the next.

Several important questions regarding the ecology of the wolverine in central and southern Idaho remain unanswered. Answering these questions will be important in maintaining a long-term viable population of this Sensitive Species and state Species of Special Concern. Previous studies of wolverines have concluded that human activities pose the only significant threat to wolverines. In our study area, these potential threats are in the form of timber harvest and motorized recreation. Both represent forms of habitat disturbance that may indirectly or directly reduce the viability of the Sawtooth wolverine population.

In January 1990, representatives of the USFS, IDFG, Wildlife Research Institute, and the U. S. Fish and Wildlife Service met to discuss the need for a wolverine study in the Sawtooth area.

All participants at the meeting were in agreement that biological information on the wolverine was lacking and that a study was needed to obtain the information necessary to manage this Sensitive Species. A study prospectus was prepared (see Appendix A) and submitted by the Natural Heritage Section of IDFG to the Forest Service. The objectives of this prospectus were to determine the population size and density of the wolverine population, determine seasonal home ranges and habitat use, and develop management recommendations with regard to forest management activities such as timber harvest, road building, and motorized recreation.

Our 1989 and 1990 surveys have laid the groundwork for a wolverine study. With considerable preliminary information on where wolverines can be located in winter, we are now in a good position to conduct a live trapping and radiotelemetry investigation. Furthermore, the study area being considered (Sawtooth, Smoky, Boulder, White Clouds, Pioneer, Salmon River Mountain Ranges) comprises a region of diverse habitats and land management policies. Additionally, it presents the first opportunity to study wolverines in an area where they are not being harvested legally by trappers.

RECOMMENDATION

We recommend that the Forest Service fund and proceed with the investigation outlined in the prospectus. Short of conducting this proposed study, we would recommend expanding the use of remote cameras/bait stations for conducting wolverine surveys.

ACKNOWLEDGMENTS

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Table 1. Confirmed (C) and probable (P) wolverine tracks resulting from field surveys, January - April 1990

<u>Location</u>	<u>Date</u>	<u>P/C</u>
1. Beaver Creek T6NR13E S1,11,12 (SNF)	1-15-90 3-7-90	C C
2. Smiley Creek T6NR14E S8 (SNF)	1-21-90 3-7-90	C C
3. South Fork Boise River (SNF) T5NR13E S27,28,34 T4NR13E S3,10	2-28-90 3-1-90	C C
4. Beaver Creek T13NR12E S14,11,22 (CNF)	3-6-90 3-28-90	C C
5. Winnemucca Creek T13NR12E S23 (CNF)	3-6-90 3-28-90	C C
6. Knapp Creek T13NR13E S31 (CNF)	2-25-90 3-6-90 3-28-90	C C C
7. Bradley Scout Camp T13NR11E S2 (CNF)	4-5-90	C
8. Fishhook Creek T9NR13E S5 (SNF)	3-21-90	P
9. Slate Creek T10NR16E S30 (SNF)	3-29-90	P
10. Yankee Fork T13NR16E S16	4-4-90	P

Table 2. Areas surveyed for wolverine tracks during January - April 1990.

SAWTOOTH NATIONAL FOREST

<u>Location</u>	<u>Date</u>
Beaver Cr.	1-15, 2-19, 3-7, 3-23, 3-28, 3-29, 3-31, 4-2, 4-5, 4-7, 4-9, 4-15
Smiley Cr.	1-21, 2-19
Warm Springs (Big Wood)	1-25, 2-21, 2-26, 3-6
Redfish Moraine	2-3, 2-18
Stanley Cr.	2-5
Baker Cr.	1-24, 2-6, 2-12, 3-6, 3-31
Slate Cr.	2-11, 3-29
Owl Cr.	2-13
Fourth of July Cr.	2-18, 3-9
Decker Flat	2-18
Elk Meadow	2-20
Big Smoky Cr.	2-27
South Fork Boise River	2-28, 3-1
Bear Cr.	2-28
Lick Cr.	3-1
Little Smoky Cr.	3-1
Paradise Cr.	3-1
Frenchman Cr.	3-7
Fisher Cr.	3-9
Pigtail Cr.	3-9
Warm Springs Meadow (White Cloud Mountains)	3-9
Prairie Cr.	3-20
West Fk. Prairie Cr.	3-20
Fishhook Cr.	3-21
Warm Springs Cr. (Salmon R.)	3-24
East Fk. Baker Cr.	3-26
Pole Cr.	3-30
Grand Prize Gulch	3-30
Germania Cr.	3-30
Big Boulder Cr.	4-14
East Fk. Salmon	4-14

Table 2 (cont.). Areas surveyed for wolverine tracks during
January - April 1990.

CHALLIS NATIONAL FOREST

Kelly Cr.	2-5
Jordon Cr.	2-11
Yankee Fork	2-11, 4-4
Dry Cr.	2-25
Ash Cr.	2-25
Knapp Cr.	2-25
Beaver Cr.	3-6, 3-8, 3-28, 4-3, 4-5, 4-8, 4-12, 4-15
Cliff Cr.	3-6
Winnemucca Cr.	3-6
Feltham Cr.	3-6
Bear Cr.	3-8, 3-28
Vanity Cr.	3-8
Float Cr.	3-8

Table 3. Location of bait-scent stations and dates established.

<u>Location</u>	<u>Date</u>
Warm Springs Creek (Big Wood River, SNF) T13NR15E S12	2-21-90
South Fork Boise River (SNF) T4NR13E S3	3-1-90
Beaver Creek (SNF) T6NR13E S1	3-7-90
Beaver Creek (CNF) T13NR12E S11	3-28-90

Table 4. Summary of remote camera efforts includes dates that camera was employed and species recorded.

<u>Location</u>	<u>Dates</u>	<u>Species</u>
Beaver Creek T6NR13E S1 (SNF)	3/28 - 4/5 4/7 - 4/15	red fox clark's nutcracker raven
Beaver Creek T13NR12E S14 (CNF)	4/5 - 4/15	golden eagle red fox wolverine

Table 5. Probable reports of wolverines on the Sawtooth and Challis National Forests and adjacent regions generated by wolverine poster campaign.

<u>Observer</u>	<u>Location</u>	<u>Date</u>
Ron Yates	Croy Cr. (SNF) T2NR18E S19	12-88
Doug Clark	Rough Cr. (SNF) T10NR14E S1	10-28-90
Jim Steward	Marten Lk. Rd. T11NR11E S1	11-10-89
Kirk Bachman	Fishhook Cr. (SNF) T9NR13E S6 (tracks only)	3-17-90
Ron Yates	East Fk. Fish Cr. (private) west of Craters of the Moon Nat'l Monument T1NR22E S10	5-86
Denis Norton	Katherine Lake (SNF) Upper Redfish Lakes T9NR12E S10	8-6-81
Calvin Jones	Four Lakes Basin (SNF) T8NR16E S5	7-14-89
Lane Holdeman	Wood River Campground (SNF) T5NR17E S5	5-4-90
Larry Kerr	Boulder Cr. (SNF) T5NR17E S12	4-9-90
John Pryor	Big Boulder Cr. (SNF) White Cloud T9NR16E S18	8-89

APPENDIX A

PROSPECTUS FOR A WOLVERINE INVESTIGATION ON THE SAWTOOTH, CHALLIS, AND BOISE NATIONAL FORESTS

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INTRODUCTION

Little information is available on the biology of the wolverine (Gulo gulo) in North America. Only three major studies of the wolverine have been conducted, one in western Montana (Hornocker and Hash 1981) and two in Alaska (Gardner 1985; Magoun 1985). Dean Carrier of the U.S. Forest Service's Old Growth Habitat Program has recently been trying to coordinate inventory, monitoring, and research on furbearers (pine marten, lynx, wolverine, fisher) in old growth habitats in the West. His efforts are necessary largely due to a lack of biological information on these species.

The wolverine is classified in Idaho as a state Species of Special Concern, a U.S. Fish and Wildlife Service candidate species for listing as Threatened or Endangered under the Endangered Species Act, and a BLM and Forest Service Sensitive Species. In 1985, Groves (1987) conducted a statewide survey via mail questionnaire to determine the status and distribution of wolverines. He concluded that wolverines were still present in at least three areas in the state: Selkirk Mountains, Lochsa and Kelly Creek drainages, and the Sawtooth Mountains/Smoky Mountains complex. There were more confirmed and probable sightings on and adjacent to the Sawtooth National Forest than anywhere else in Idaho. Not coincidentally, appellants of the Sawtooth NF Management and Travel Plans have raised the wolverine as an issue with regard to wilderness designation and forest management of motorized and nonmotorized travel.

In 1989, the Natural Heritage Section initiated field surveys to determine the extent of the wolverine's distribution in the Sawtooth and Smoky Mountains area (Groves and Gadwa 1989). They located fresh sign of at least two and possibly three different wolverines, and obtained several additional probable sightings. Field inventory for wolverines in the area is continuing in 1990 and is employing such techniques as scent stations, hair traps, and remote infrared-triggered cameras established at bait stations.

In mid-January, 1990, representatives of the Idaho Fish and Game Department, Sawtooth NF, Challis NF, Boise NF, and Dr. Maurice Hornocker (Wildlife Research Institute) met to discuss the need, logistics, and funding for a wolverine study. All participants in the meeting were in agreement that biological information on the wolverine is lacking and that a study of wolverines was needed in order to properly manage wolverines as a Sensitive Species and address the impacts of the wilderness/nonwilderness and motorized/nonmotorized issues on wolverines. There was also a general agreement that results of a wolverine investigation in the Sawtooths would be useful information to the Forest Service and state fish and game agencies throughout the range of the wolverine in the western coterminous United States.

STEERING COMMITTEE

As a result of the January meeting, an interagency steering committee was formed to guide and oversee a future wolverine study. The steering committee consists of Bert Webster and Howard Hudak for the Sawtooth NF, John Erickson for the Boise NF, Dave Reeder for the Challis NF, Jay Gore for the U. S. Fish and Wildlife Service, Maurice Hornocker of the Wildlife Research Institute, Craig Groves of the Idaho Department of Fish and Game, and a still-to-be-named representative from a conservation organization. Bert Webster agreed to be the lead representative for the Forest Service. Craig Groves agreed to take lead responsibility in coordinating and conducting the study.

OBJECTIVES

The steering committee was in agreement that any investigation of wolverine biology should be management-oriented and should incorporate a substantial public relations element. The committee agreed to the following broad objectives:

1. Determine the population size and density of the wolverine population on the Sawtooth NF and adjacent parts of the Boise and Challis NFs.
2. Determine what size of an area individual wolverines are using on a seasonal basis (i.e., home range).
3. Determine what different types of habitats wolverines are using on a seasonal basis.
4. Develop management recommendations with regard to the impacts of forest management activities (timber sales, road building, motorized recreation, etc.) on wolverines.
5. Extensively promote a positive image of a wolverine study through the news media and conservation community. As an example, an "adopt-a-wolverine" program modeled after the

successful similar program on caribou in northern Idaho might be initiated. The fact that the local high school for the Wood River Valley is named the Wood River Wolverines should be capitalized on.

METHODS AND PROJECT DURATION

Studying wolverines is not a small undertaking from a logistical standpoint. Wolverines naturally occur at low densities and are known to have large home ranges encompassing a variety of habitats from low to high elevations. Wolverines will be studied with radiotelemetry techniques in a livetrapping/mark-recapture project. Trapping will be conducted primarily in winter because wolverines are known to occupy lower elevations at this time and more readily be drawn into baits. It's envisioned that two teams of people will be needed for at least half of the year when wolverines are being trapped. For the other half of the year, only one team of people should be needed, primarily for tracking animals and collecting habitat data. It's estimated that the project will need to last three years in order to sufficiently address the objectives outlined above.

PRODUCTS

Annual project reports will be submitted to the Forest Service and any other granting agencies, institutes, or foundations supporting the project. At the end of the 3-year study, a detailed final report will be prepared and submitted to the Forest Service and other entities involved in the study. It's anticipated that portions of this final report would be submitted for publication in refereed scientific journals. Data from this study and others would be used to develop a habitat capability model on wolverines for use by Forest Service land managers. Popular articles for Idaho Wildlife magazine and similar Forest Service publications would also be prepared.

REFERENCES

- Gardner, C. L. 1985. The ecology of wolverines in southcentral Alaska. M. S. Thesis, Univ. Alaska-Fairbanks. 82 pp.
- Groves, C. R. 1988. Distribution of the wolverine in Idaho as determined by mail questionnaire. Northwest Science 62:181-185.
- Groves, C. R. and G. Gadwa. 1989. Status survey for wolverines (Gulo gulo) on the Sawtooth National Forest and adjacent areas. Challenge Cost Share Report to Sawtooth National Forest, Idaho Department of Fish and Game. 23 pp.

Hornocker, M. G. and J. S. Hash. 1981. Ecology of the wolverine in northwestern Montana. Can. J. Zool. 59:1286-1301.

Magoun, A. J. 1985. Population characteristics, ecology, and management of wolverines in northwestern Alaska. Ph.D. Thesis, Univ. Alaska-Fairbanks. 211 pp.

ANNUAL BUDGET (*)

Personnel

Salary and Benefits

Wildlife Research Biologist (12 mos.)	\$28,000
Bio - aide (12 mos.)	\$15,500
1 Bio - Aides (6 mos.)	\$ 7,500

Total	\$51,000
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Capital Outlay

Radiocollars	\$ 4,500
Receivers and antennas	\$ 4,500
Traps	\$ 3,000
2 snowmobiles (**)	\$ 8,000
Drugs and incidental Supplies	\$ 1,000
Total	\$21,000

Operating Expenses

Airplane Time	\$20,000
4-wd truck mileage	\$ 2,000
Snowmobile mileage	\$ 2,000
Perdiem and travel	\$ 4,000
Miscellaneous Expenses	\$ 1,000
Total	\$29,000

<u>SUBTOTAL</u>	<u>\$101,000</u>
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Overhead @ 5%	5,000
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<u>GRAND TOTAL</u>	<u>\$106,000</u>
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* This budget is for year one. The second and third year budgets will be significantly less due to less capital outlay.

** These items may be donated to the project.

BUDGET NOTES

The above proposed budget is a general estimate. It is a conservative budget - it is unlikely to cost more than the proposed budget to conduct the project, and may cost less.

The following agencies and organizations will be asked to contribute to the project:

U.S. Forest Service - \$ 60,000 per year (minimum)

Idaho Fish and Game - \$ 10,000 per year plus in-kind salary
contribution of project coordinator

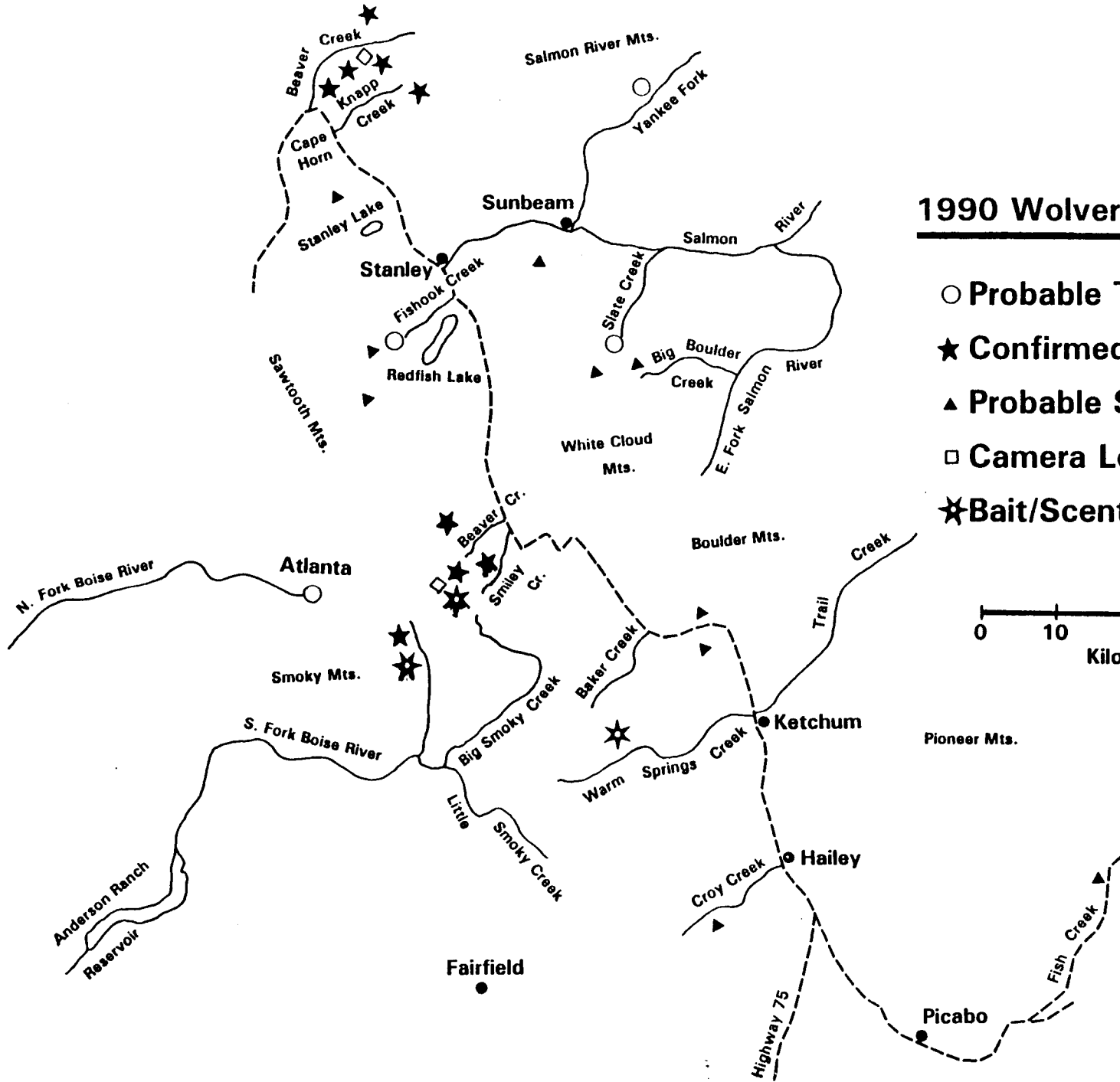
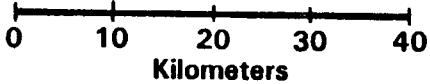
U.S. Fish and Wildlife Service - \$ (?)

Conservation Organizations (ICL, Wilderness Society) - \$ (?)

The Wildlife Research Institute (monies raised privately) - \$ (?)

1990 Wolverine Survey

- Probable Tracks
- ★ Confirmed Tracks
- ▲ Probable Sighting
- Camera Locations
- ✱ Bait/Scent Stations



Submitted by:

Craig Groves
Craig Groves
Wildlife Staff Biologist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Jerry M. Conley
Jerry M. Conley, Director

Tom Reinecker
Tom Reinecker, Chief
Bureau of Wildlife

Wayne Melquist 7/26/90
Wayne Melquist
State Nongame Manager