

Wolverine Research Program

A Component of the Northern Rockies Carnivore and Conservation Initiative

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WOLVERINE ECOLOGY IN THE NORTHERN ROCKY MOUNTAINS

REPORT SUMMARY

Wolverine ecology in the lower 48 United States is not well documented. Populations typically exist at low densities, and there is concern over population status and the potential for decline. Many land management decisions require consideration of wolverine ecology and habitat needs, thus state and federal natural resource agencies need more specific information. Wolverines are also an important component of the carnivore guild in the Greater Yellowstone Ecosystem (GYE). A comprehensive land management plan for the GYE will benefit from knowledge of the relationship that wolverines have with other carnivore populations, prey species, and ecosystem dynamics. We are initiating a comprehensive wolverine study at two sites in the GYE in order to determine population status, vital rates, and the impacts of human land uses. We will also attempt to design and verify methods for surveying population status, and document inter-specific relationships and ecological influences of wolverines in the GYE. Accomplishments during 2000-2001 included progress with inter-agency coordination, development of a study plan, preliminary field assessments in the Madison Range and on the eastern slope of the Teton Range, and a capture effort on the western slope of the Teton Range. The preliminary field efforts proved valuable for logistical and equipment assessments. We documented 12 wolverine visits to bait-sites, and learned of techniques that appear to enhance wolverine visitation. Two wolverines were captured, radio-implanted, and relocated 31 times. The upcoming year will provide the first full effort, and promises to be both challenging and exciting.

INTRODUCTION

The wolverine (*Gulo gulo*) is a medium size carnivore that inhabits the most remote areas of the Northern Hemisphere and is arguably one of the least understood carnivores in the world. Wolverine habitat normally encompasses large areas of rugged, remote terrain, and populations naturally exist at relatively sparse densities. In the lower 48 United States, the wolverine's unobtrusive nature and the difficulties associated with studying such an inaccessible and uncommon creature has resulted in a lack of documentation of wolverine status and ecology.

This void of available information is hindering state and federal natural resource managers who face a number of difficult decisions. Wolverines are currently on the U.S. Fish and Wildlife Service list for consideration as a threatened or endangered species. This determination will be a particularly difficult task. Even in historically occupied range that has not been subjected to human encroachment, wolverines naturally exist at very low densities. Therefore, an assessment of a "low number" of individuals in the Northern Rockies will not be conclusive evidence of a population in danger of extinction. To ensure adequate protection of wolverine populations and that limited endangered species funding is being used most effectively, careful assessment of wolverine status and viability is required. Many other decisions impact land-use policies, and managers are required by law to consider wolverine ecology and sustainable population management in their decisions. Agencies charged with the sustainable management of wolverine populations on multiple-use land are currently wrestling with issues such as the impacts of winter recreation on wolverine reproduction, habitat management, sustainable trapping quotas, and methodology for assessing population status and trend. In all cases, the paucity of information regarding wolverine ecology limits the ability of managers to make well-informed decisions.

The goal of this study is to provide managers with the information necessary to make informed decisions. All documentation provided by this study in regard to population size, reproductive rates, survival rates, habitat use, dispersal, and genetic viability will be relevant to these management decisions. The study will serve as an example of cooperative, scientifically based stewardship and meet immediate management needs. In addition, the wolverine program is designed as part of an established, multi-species initiative in the Greater Yellowstone Ecosystem, collectively identified as the Northern Rockies Carnivore and Conservation Initiative (NRCCI). The purpose of NRCCI is to further understanding of the ecology of carnivore assemblages, their influence on ecological systems, and the management and conservation strategies necessary to allow humans and carnivores to co-exist.

ACKNOWLEDGEMENTS

We wish to acknowledge the generous support that was provided during this preliminary field season in the Madison Range study area by Kurt Alt, Keith Aune, Brian Giddings, Ray Heagney, and Mike Ross of Montana Department of Fish, Wildlife, and Parks; and Claude Coffin of the US Forest Service's Hebgen Lake District on the Gallatin National Forest. In the Teton Range, many people contributed to the success of this past field season. The Alta 4- H Exploring Natural Resources Club checked and maintained three traps, doubling the trapping effort on the western slope of the Tetons. Dr. Don Betts and Dr. John Bigley of Driggs Veterinary Clinic surgically implanted wolverines with radio-transmitters. The Wolverine Foundation provided radio implants. Grand Targhee Resort, Alta Wyoming, granted access for capture efforts. Wyoming Department of Game and Fish provided permits and bait. Bob Schiller and Steve Cain of Grand Teton National Park provided permits and access on the eastern slope of the

Tetons. Idaho Department of Fish and Game provided support as well.

STUDY AREAS

The wolverine program currently consists of two study sites within the Greater Yellowstone Ecosystem (GYE). The GYE is a natural laboratory for studying carnivore populations; it contains the most complete native carnivore community in the lower 48 states, includes extensive tracts of public lands, supports a tremendous amount of outdoor recreation, and contains human developments whose economy is a mixture of extractive resource industries and eco-tourism. Intensive fieldwork will occur in the Madison Range of southwestern Montana and in the Teton Range of northwestern Wyoming. The Madison Range Study Area (MRSA) encompasses sections of the Lee Metcalf Wilderness and the Gallatin National Forest between Big Sky and West Yellowstone, Montana. The Teton Range Study Area (TRSA) encompasses large portions of Grand Teton National Park, the Jedediah Smith Wilderness, and the Targhee National Forest, Wyoming. The two study areas offer excellent opportunities for wolverine research, including important variability in land classification and human influences.

OBJECTIVES

The goal of the program is to document wolverine population status, vital rates, and ecology; determine impacts of human land-use practices on wolverine populations; and develop population monitoring techniques. Specific objectives are to: 1). Document the ecological characteristics of two wolverine populations in the GYE, including population size and demographics, reproductive biology, survival rates, cause-specific mortality patterns, home range size, and dispersal patterns; 2). Identify wolverine habitat components and habitat use patterns for incorporation into an integrated habitat management plan for the GYE; 3). Measure and evaluate the availability, use, and importance of both hunter-wounded deer and elk carcasses and black bear baits on wolverine habitat use, movement patterns, survival rates, and reproductive performance; 4). Assess the influence of human recreation and commercial activities on wolverine recruitment rates, activity patterns, movements, and habitat use; and 5). Test and validate survey methods for monitoring wolverine population status and trend.

ACTIVITIES/PROGRESS

Madison Range Study Area

This winter the Hornocker Wildlife Institute (HWI) and the Montana Department of Fish, Wildlife, and Parks (MTFWP) began a cooperative effort to study wolverine ecology in the Madison Range of southwestern Montana. Objectives during this preliminary field season included logistical assessment, determination of equipment needs, and bait-site track surveys to determine trap locations.

Bait-site Surveys. -- Seven bait-sites were placed in the Madison Range area to

document wolverine presence and determine the best potential trap locations. Brian Giddings and Mike Ross of MTFWP provided knowledge of common wolverine track locations that were documented during past annual furbearer surveys. Baits were placed close to these locations and at other locations chosen based on topographical features. Baits placed at the sites included deer and elk carcasses along with scent lures. Portions of carcasses were suspended from tree branches and placed on the ground at each site. At one site, a deer carcass was anchored to the ground using a small metal fencepost driven through the carcass. Each bait-site was marked with signs that were inconspicuous at a distance, but in plain view at close proximity. Signs contained information on the purpose of the bait-station and HWI contact information. Two sites were established on February 7, four sites on February 14, and one site on February 20. Elevation at bait-sites ranged from 2,303 – 2,788 meters. All sites were checked for wolverine presence (tracks in snow) and re-baited once per week through March 13. All remaining baits were removed on March 13 as a precaution against grizzly bear activity.

Snow conditions proved favorable for determining wolverine presence during weekly visits. Wolverine presence was documented at four of the seven bait-sites. Ten separate "weeks of visitation" occurred during 30 opportunities (33% visitation rate). Interestingly, at three of the four sites visited by wolverines, the wolverine visit occurred one week after coyotes (*Canis latrans*) began feeding on the bait that had been placed on the ground; the fourth site was visited by wolverines and coyotes during the same week. Thus, no site was visited by a wolverine without evidence of coyote presence prior to or during the week of wolverine visitation. Of the three sites that were not visited by wolverines, coyotes either had not been to the site (2 cases) or had been to the site but had not eaten any of the carcass (1 case). Significant bird activity at the bait-site was also highly correlated with wolverine visitation. Wolverine visits occurred from 2,515 – 2,788 meters, but not exclusively at the highest elevations. Edible portions of the one deer carcass that was staked to the ground remained at the site for 6 weeks after being fed upon by coyotes. By comparison, ground baits at other sites were generally devoured or completely removed from the area within 1-2 weeks. On two occasions, a wolverine climbed the tree, chewed through the rope, and acquired the bait suspended above the ground. Given the extensive movements that wolverines make, it is possible that all wolverine visits could have been made by one individual. We suspect 2-4 individuals were responsible for the 10 wolverine visits. By conducting the bait-site surveys this winter, we were able to establish several potentially productive trap locations and learn of factors and methods that may increase trapping success.

Logistics. -- This preliminary season also yielded valuable information regarding logistical obstacles. A mosaic of vehicular access restrictions (snowmobile or ATV) exist within the area, and will greatly affect our ability to conduct the study. Study animals of the Madison Range area will likely utilize an area that is approximately 500 square miles; in this area only about 22% will be accessible by vehicle during the entire year, 18% will be accessible for 9 months of the year, 17% accessible for 6 months, and 43% is designated wilderness with no vehicular access at any time during the year. Even within those areas open to vehicular travel, access is available on a limited

number of trails. Obviously, such common and important tasks such as ground triangulation, timely mortality investigations, reproductive den locations and habitat measurements, will be impacted by access. Good logistical planning (especially equipment and personnel needs) regarding access will be absolutely essential to effectively collecting appropriate data. Snowmobile travel within the desired trapping area is virtually unlimited, however, early establishment and maintenance of a packed trail to each trap-site will be essential to insure timely access to a captured wolverine. Given the long-range movements and circuitous routes of wolverines, we theorize that capture efforts will be most effective if we disperse traps throughout the area and leave them in place for the duration of the winter rather than saturating a smaller area and changing areas within the winter. Utilizing wolverine research protocol proven effective in the Teton Range (traps equipped with telemetry transmitters set to detect captures are monitored daily; traps are visited every four days), a solid trapping effort that includes expanded coverage (Beaver Creek and Taylor Fork drainages) will likely require 2 additional personnel (November – April, 6 months). These personnel will also be valuable aids in collecting ground locations of radio-implanted wolverines, collection of winter-use data, mortality investigations, and many other tasks. Summer access will be equally, or more, restrictive as winter access.

Equipment. -- We "field tested" several different types of equipment that will be utilized during winter trapping efforts. The moderately extreme terrain of the area made use of "powder" snowmobiles more practical than the larger utility sleds. Although the powder machines are unable to transport as much equipment or conceal bait carcasses as well, their capabilities are adequate and most appropriate for our needs. We spoke with several groups of winter recreationists who saw our baits (deer carcasses) as we transported them to the bait-sites. All groups seemed interested in and supportive of the research effort. One group, whom we did not speak with, called MTFWP and reported poaching. However, in general, we believe that use of the powder machines, which prevents concealment of the carcasses, should not be problematic from a public relations standpoint. Some sort of visible identification (truck and jacket emblems) would probably help limit suspicion and time-consuming calls.

We also attempted to set remote cameras at each bait site for photographs that might reveal visits by different wolverines during the week. However, our cameras were not functional, and because of other priorities for project personnel in conjunction with the fact that photographs were not necessary to achieve our objectives, attempts to remedy the camera problems were abandoned for this field season. As the study develops and budgets become adequate, remote cameras will be an important component of the project and will be properly implemented. Some progress was made in equipment acquisition, literature review, professional and business contacts, and creating workable data forms and databases.

Teton Range Study Area

This winter HWI became the primary investigators on the Teton study area. This winter's trapping effort remained highly coordinated with the initial investigators. Objectives during this field season included a capture effort on the western slope of the

Teton Range, bait-site track and camera surveys to determine trap-site locations on the eastern slope of the Teton Range, logistical assessments, and monitoring radio-implanted wolverines for survival, movements, and home range estimation.

Capture Effort. -- Six log box-traps were placed on the western slope of the Teton Range to capture and radio-instrument wolverines. Previously established trap sites were re-used during this capture season. Deer, moose, and elk were used as bait and blood trails were used as a scent lure. Two trap sites were established on January 4, three sites on January 6, and one site on February 7. Traps were monitored daily for captures via radio-telemetry. A radio-collar was mounted to each trap and the radio-collar activated when the trap was sprung. All traps were visited by biologists or 4-H club members each time the radio was activated and/or every 4 days to re-bait and checked for wolverine visits (tracks in snow). All traps were closed by March 25 due to snow conditions and presence of bear tracks. Two wolverines were captured 5 times in 373 trap-nights, resulting in a capture rate of 1/75 trap-nights. On three additional occasions, wolverines were captured but chewed through the log box-trap and escaped. M561, an adult male who had been radio-implanted during 1999, was captured and fitted with a new radio-implant. M561 was also recaptured three more times this winter. M621, a yearling male, was captured for the first time and was fitted with a radio-implant.

Bait-site and Camera Surveys. -- Four bait and camera sites were placed on the eastern slope of the Teton Range to document wolverine presence and determine the best potential trap locations. Locations of bait sites were based on topographical features, past records of wolverine sightings or tracks, past telemetry locations of radio-instrumented wolverines, accessibility, and elevation. Deer carcasses were used as bait and portions of carcasses were suspended from tree branches at each site. To maximize life of the film, cameras were set to trigger a minimum of 30 minutes after each preceding photo. Each bait-site was marked with signs that were inconspicuous at a distance, but in plain view at close proximity. Signs contained information on the purpose of the bait-station and HWI contact information. One site was established on February 8, one site on February 11, and two sites on February 16. Elevations at bait sites ranged from 2,133 – 2,167 meters. All sites were visited to replace camera battery and film, to check for wolverine presence (tracks in snow), and re-baited every 7 to 10 days through March 26. All baits and cameras were removed by March 26 due to snow conditions.

Wolverine tracks were observed near two of the bait sites (approximately 40-60 meters from the bait sites). A total of 133 camera-days resulted in 109 photographs. Species detected via camera included marten (*Martes martes*), raven (*Corvus corax*), weasel (*Mustela spp.*), bobcat (*Lynx rufus*), and coyote. However, no wolverines were photographed.

Logistics-Eastern Slope. -- Once leaving the truck, travel time to bait/camera sites averaged 4 hrs/site under good snow conditions. Access to sites was most efficient by crossing Jackson Lake via snowmobiles. However, not all sites were accessible via

Jackson Lake. By February 28, mild temperatures resulted in soft snow or slush on Jackson Lake, at which point snowmobile travel became very difficult. In the near future, snowmobile travel within GTNP may become more restricted or eliminated.

Home-range. -- Both radio-instrumented wolverines were located via aerial telemetry beginning in late January. M561 was located on 19 occasions and M621 was located on 11 occasions. Extensive searches have been made for M621, a yearling, missing since May 2nd. M561 used an area of 618 km² and M621 used an area of 185 km² (Table 1)(Figure 1).

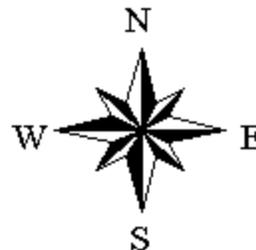
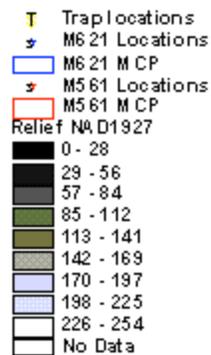
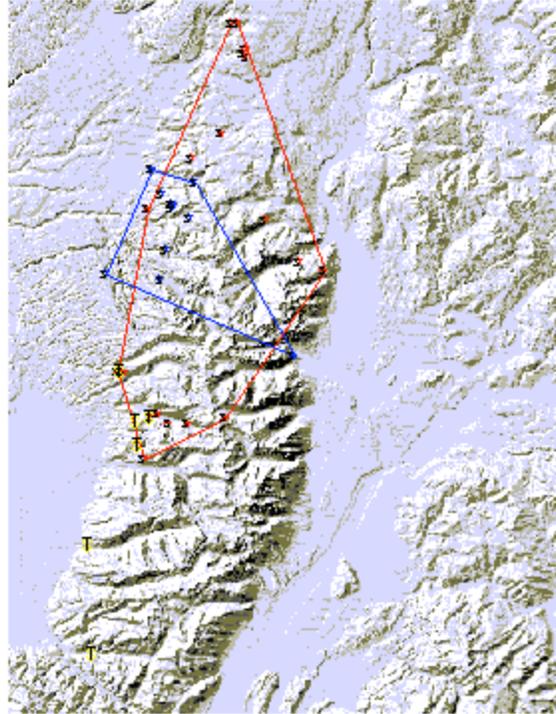
Table 1.

One-hundred percent, minimum convex polygon home-range estimates for two wolverines on the Teton Range Study Area, Wyoming, January, 2001 - July 1, 2001.

<u>ID</u>	<u>Age</u>	<u>Locations</u>	<u>Home Range Size (km²)</u>
M561	5	19	617.80
M621	1	11	184.75
		Average	401.27

Figure 1.

Minimum Convex Polygons for M561 and M621 on the Teton Range Study Area, Wyoming, January, 2001 - July 1, 2001.



GOALS & ACTIVITIES FOR THE NEXT YEAR

During the upcoming summer and early fall, project personnel will continue to proceed toward full implementation of the study. Initial goals include: 1) Incorporate collaborator comments on the initial study plan into the research methodologies; 2) Run preliminary analyses to check power of analyses, add or eliminate objectives based on budget considerations, and fine-tune methodologies and data collection protocols; 3) Determine personnel needs; 4) Create and organize databases; 5) Purchase equipment; 6) Hire and train additional personnel; and, 7) Build and place traps.

Intensive field efforts will begin during late autumn, personnel will capture, radio-instrument, and monitor wolverines in both study areas. Data for all aspects of the research effort will be collected.

PROJECT PERSONNEL

Permanent Personnel

The wolverine program falls under Dr. Howard Quigley's duties as Director of the Global Carnivore Program at the Wildlife Conservation Society. Dr. Quigley oversees program development, coordinates multi-species efforts as part of the Northern Rockies Carnivore and Conservation Initiative, and secures funding for the project.

The wolverine program falls under Dr. John Beecham's duties as the Hornocker Wildlife Institute's/Wildlife Conservation Society's Western Field Coordinator. Dr. Beecham directs study design, coordinates multi-agency interests, regulates budgets, and authors and reviews reports and publications

Kristine Inman, M.S., and Robert Inman, M.S., are the Senior Research Biologists for HWI's wolverine program and will lead the research on the MRSA and coordinate research efforts between the MRSA and TRSA. Their duties also include study design; protocol development; budget development and monitoring monthly expenditures; data collection on the MRSA; database management; authoring reports and scientific publications; selecting, training, and directing personnel on the MRSA and TRSA; and representing WCS at meetings and conferences.

Dr. Kathy Quigley is the veterinarian coordinator for HWI and is responsible for providing all aspects of veterinarian oversight and surgical immobilization of radio-implanted animals on the Wolverine Program.

Rachel Wigglesworth, M.S. will begin on the wolverine program in mid-September to lead the research on the TRSA. Her duties will include monitoring monthly expenditures; data collection on the TRSA; database management, authoring reports and scientific publications; selecting, training, and directing temporary personnel on the TRSA; and representing WCS at meetings and conferences.

Temporary Personnel

Ted Chu, as project biologist on the TRSA, coordinated and conducted trapping efforts on the western slope of the Teton Range.

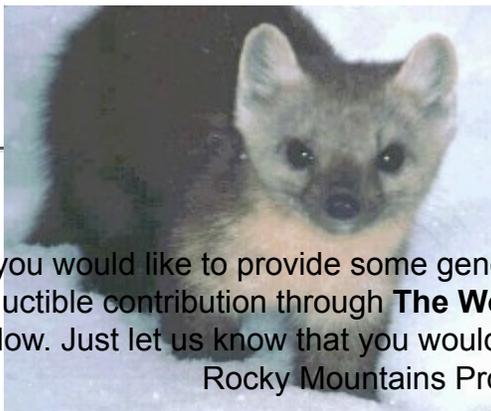
Craig Burr conducted trapping efforts on the western slope of the TRSA.

Sanjay Pyare established camera sites/bait stations on the eastern slope of the TRSA to determine wolverine presence and potential trap sites for next years trapping efforts.

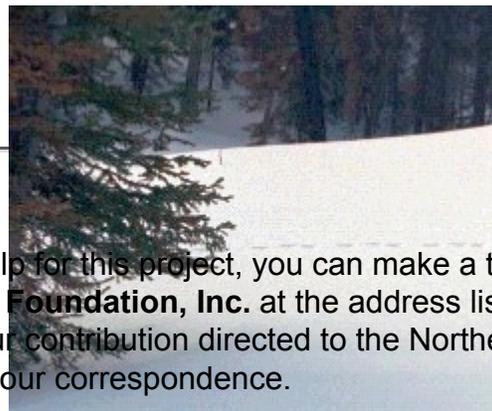


R. M. Inman

1.) Wolverine tracks in the typical 2-2 gait pattern displayed by members of the *Mustelidae* family.



2.) Marten photographed at camera/bait site.



3.) Typical 3-4 gait pattern of the wolverine.

If you would like to provide some generous help for this project, you can make a tax deductible contribution through **The Wolverine Foundation, Inc.** at the address listed below. Just let us know that you would like your contribution directed to the Northern Rocky Mountains Project in your correspondence.

S. Pyare

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