18

ASSESSMENT OF SNOW-TRACKING AND REMOTE CAMERA SYSTEMS TO DOCUMENT PRESENCE OF WOLVERINES AT CARRION BAIT STATIONS

By

Jeff Copeland
Nongame and Endangered Wildlife Program
Bureau of Wildlife

April 1993

Idaho Department of Fish and Game
600 S. Walnut St. Box 25
Boise, Idaho 83707
Jerry M. Conley Director

Cooperative Wildlife Research Project
Idaho Department of Fish and Game
University of Idaho
Sawtooth National Forest
Challis National Forest
Boise National Forest

Abstract

The feasibility of assessing wolverine (Gulo gulo) presence at carrion bait sites by snow-tracking and remote camera systems was examined on the Sawtooth and Challis National Forests during the winter of 1992-93. This investigation was conducted in conjunction with an ongoing study of wolverine ecology and habitat use in central Idaho.

Wolverine visits to baited live-traps were recorded by documentation of tracks and photos from remote camera systems. Seven traps were visited by wolverines 32 times in a 5-month period. Tracking documented 10 wolverine visits that were missed by cameras. Cameras documented 5 wolverine visits that were missed by tracking. Wolverine visits documented by both tracks and cameras were recorded 17 times. Although tracking provided a reliable method of detecting wolverine presence, it provided little in terms of identifying individuals. Seven individual wolverines were identifiable through camera photos.

Introduction

Assessing the status of uncommon species is becomming a focal point for wildlife management agencies. As a result, it will become increasingly important to develop methodologies that will provide the manager with simple, inexpensive, survey tools.

Surveying tracks has been used to document presense and assess trends of wildlife species (Van Dyke et al. 1986, Thompson et al. 1988). Remote camera technology has been employed (Carthew and Slater 1991, Copeland and Groves 1992), but it is still a relatively new science in the wildlife field. Both appear to provide broad application potential for assessing uncommon species.

The wolverine appears to be a species well suited to these types of assessment techniques. Due to generally low population densities, it is not an animal routinely observable. On the other hand, it's propensity for carrion during winter months, and tendency to travel long distances, leaves the wolverine suceptable to detection at carrion bait stations.

A study of wolverine ecology and habitat use in central Idaho provided an opportunity to compare the suitability of snow-tracking and remote cameras for documenting wolverine presence. Data was recorded as to the function of a remote camera system and a comparison made of recorded wolverine visits to trap sites as documented by tracks and photos.

Methods

Seven log live-traps were baited with road-killed deer, fish, and lure. Trap placement was based upon providing adequate coverage throughout the study area, our ability to access trap sites, the ability to monitor transmitters at each site indicating sprung traps, and an intuitive feel for the trap site's attractiveness to wolverines. Traps were no closer than 5 km and no farther apart than 20 km. Baits were placed inside traps and hung in trees near traps. Manley system remote cameras with 36 exposure Kodak Tri-X pan 400 ASA black and white film, were mounted in trees within 3 meters of, and aimed at, trap doors. Camera data-backs imprinted the exposure date on each photo.

Traps were equipped with transmitters to remotely monitor their condition. Movement of the trap door resulted in activation of the transmitter requiring subsequent physical inspection of the trap by field personnel. Trap transmitters were monitored daily, and a physical check of the trap and camera was attempted at least every 4 days.

During a check any tracks associated with traps or baits were recorded and cameras checked for battery and film condition. Film was replaced only if less than 6 exposures were left on a roll. Exposed film was developed into proof sheets for comparison with track data. Attempts were made to separate individual wolverines by morphological characteristics identifiable in photographs (size, pelage coloration and patterns). Data was reviewed to evaluate the effectiveness of attracting wolverines to carrion bait stations, documenting their presence by track and camera, and the function of Manley camera systems.

Results

Bait and camera monitoring periods varied by site from 63 to 118 days ($\bar{x}$ = 104). Physical checks of traps varied from a mean of 3.6 days to 5.0 days per trap site with an overall mean of 4.0 days between visits for all traps (Table 1).

The effectiveness of camera systems appeared to be dependent upon primarily 2 factors: mechanical reliability of the camera systems, and the longevity of a roll of film. Camera systems were in place and presumed functional for 739 <u>trap</u> nights (Table 1). System breakdowns resulting from dead batteries and malfunctioning cameras reduced coverage to 556 <u>camera</u> nights (Table 1). Further, rolls of film used up prior to a check day, and the inability to read imprinted dates on photos, reduced coverage to 421 <u>photo</u> nights (Table 1). As a result, actual camera coverage, or the period when cameras were functioning with unexposed film available, was 57% of the total monitoring period.

Seventy-three rolls of film were used through the monitoring period. Duration of coverage by a roll of film ranged from 1 day to 22 days. The mean and median duration for a roll of film was 4 days. The data was skewed right with a mode of 2 days (Fig.1).

Thirty-two wolverine visits were recorded by track and camera. Tracks were the sole means of documentation in 10 instances. Cameras alone recorded wolverine visits 5 times. In 17 cases wolverine visits were recorded by both track and camera (Table 2).

Individual wolverines could not be identified by track alone. Photographs provided identification of 5 individual wolverines from 22 photo-nights. Three other photographed wolverines, although inseparable visually as individuals, are probably distinct individuals due to separation in time and space.

Discussion

Monitoring winter carrion bait stations appears to be effective for documenting wolverine presence. Wolverine tracks are distinguishable from those of associated carnivores and therefore provide an easily definable record of visitation. However, in this case, tracks alone were not a definitive means to identify individual wolverines except in instances of multiple individuals traveling together. In these cases, the presence of multiple animals was generally determined by tracks leading to a trap rather than those at a trap. In addition, frequent snow storms and crusted snow can obliterate or make tracks difficult to see. These factors resulted in non-detection of 5 of 32 wolverine visits to our traps.

Although remote cameras did not provide the consistency of detection as did tracks, 22 of 32 wolverine visits were recorded by camera. Periods of non-coverage resulting from camera malfunctions were not always readily detected. Weakened batteries, wiring inadvertently damaged during camera and battery reloading, and mechanical failures within sensors and cameras were the primary failures.

Lack of coverage due to film used up prior to scheduled checks reduced photo coverage equal to that of malfunctions and is more difficult to address. Thirty-one of 73 rolls of film lasted less than 4 days. The majority of these photos were of pine marten (*Martes americana*) and red fox (*Vulpes vulpes*). Their presence at the sites was probably enhanced by constantly available baits inside traps. Increased coverage could be attained by checking cameras at intervals less than 4 days, or replacing film at 20 or 25 photos, but not without increased cost.

I believe the advantages of the cameras greatly outweigh the problems. If the manager is interested in documenting more than just the presence of wolverines, the camera system provides a window into the population unattainable by tracking alone.

Costs

The only costs addressed here are those relative to the camera systems.

7 Manley Camera Systems at 475.00 ea.	$3325.00
Film - 73 rolls at 3.75 ea.	273.75
- Processing at 7.00 ea.	511.00
Total	$4109.75

Table 1. Remote camera system data on the Challis and Sawtooth National Forests, November 1992 through March 1993.

Trap	Mays	Elk	Iron	Shake	Cape	Kahuna	Beaver	Total
Trap nights[a]	95	72	104	111	128	119	110	739
Camera nights[b]	81	52	77	98	77	103	68	556
Photo nights[c]	69	29	67	61	50	90	55	421
% Coverage[d]	73	40	64	55	39	76	50	57
$\bar{x}$ days to check	3.7	4.8	3.6	3.7	4.5	3.7	5.0	4.0
$\bar{x}$ days/roll film	6.3	3.6	13.4	4.4	4.2	5.6	7.8	4.0

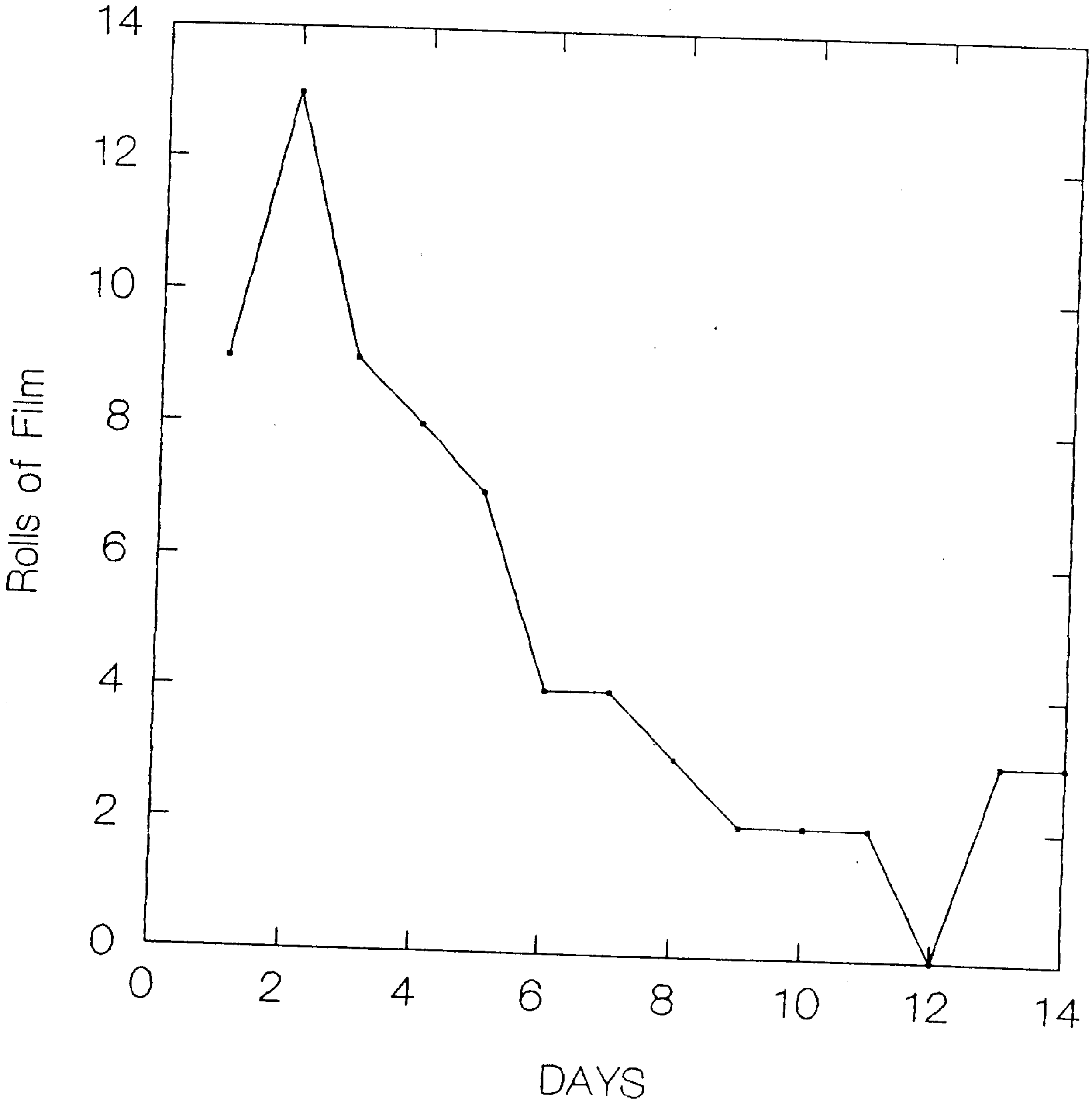
[a]Camera in place, presumed functional.
[b]Camera in place minus periods of malfunction.
[c]Camera functional with unexposed film available for photos.
[d]Photo nights/Trap nights.

Table 2. Documentation of wolverine presence by track and remote camera on the Challis and Sawtooth National Forests, November 1992 through March 1993.

	Mays	Elk	Iron	Shake	Cape	Kahuna	Beaver	Total
Tracks[a]	1		1	1	1	5	1	10
Photos[b]				2			3	5
Both[c]	3			3	1	6	4	17
Total	4		1	6	2	11	8	32

[a]Documented wolverine presence by track alone.
[b]Documented wolverine presence by photo alone.
[c]Documented wolverine presence by track and photo.

Figure 1. Roll of film period of coverage for remote cameras on Sawtooth and Challis National Forests, 1993.



Literature Cited

Carthew, S. M. and E. Slater. 1991. Monitoring animal activity with automated photography. J. Wildl. Manage. 55:689-692.

Copeland, J. P. and C. R. Groves. 1992. Wolverine ecology and habitat use in central Idaho. Progress Report, Idaho Depart. Fish and Game. 26pp.

Thompson, I. D., J. Davidson, S. O'Donnell, and F. Brazeau. 1988. Use of track transects to measure the relative occurrence of boreal mammals. Can. J. Zool. 67:1816-1823.

Van Dyke, F. G., R. H. Brocke, and H. G. Shaw. 1986. Use of track counts as indices of mountain lion presence. J. Wildl. Manage. 50:102-109.

Morphological characteristics of wolverines captured on the Challis (CNF), Sawtooth (SNF), and Boise (BNF) National Forests, 1992-1993.

Catalog number	F502	F822	F602	F703	F803	M003	M913	M333	M423	M123	M403
Date Captured	2-4-92 /93	3-12-92 /93	3-28-92	2-8-93	2-14-93	2-8-93	2-12-93	2-14-93	3-3-93	4-8-93	4-15-93
Location	CNF	SNF	BNF	CNF	CNF	SNF	CNF	CNF	SNF	CNF	SNF
Sex	Female	Female	Female	Female	Female	Male	Male	Male	Male	Male	Male
Age	Adult	Adult	Adult	Adult	Yearling	Adult	Yearling	Adult	Yearling	Adult	Adult
Weight (kg)	8.6/9	7.3/8.3	7.0	8.6	8.2	–	11.5	13.6	12.0	12.2	13.8
Tot. length (cm)	90	84	88	88	89.5	99	96.5	98.5	96	101.5	100
Tail length (cm)	19	20	17	–	18.5	19.5	19	17	21	18.5	19.5
Chest girth (cm)	41/37.5	41.5	38	40.5	44	49	46	51	46.5	44.2	49.5
Neck girth (cm)	29/28	24	28	30	29	36	35	35	36	32.8	37
Hind foot (cm)		16.5	15.5	16	16	14.5	16.1	18.3	15.5	18	17.5