CASCADE CITIZENS WILDLIFE MONITORING PROJECT
WINTER 2009-2010 FIELD SEASON REPORT
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ABSTRACT

During winter months, the Cascade Citizen Wildlife Monitoring Project (CCWMP) uses trained volunteers to record the presence and movement of wildlife, through snow tracking surveys in the vicinity of proposed wildlife crossing structures along Interstate-90 in the Washington Cascades between Snoqualmie Pass and Easton.

This winter, we also piloted snowtracking and remote camera efforts to detect the presence of wolverine in the Cascades. Informal tracking surveys were carried out in remote habitat above Interstate 90 and Washington Highway 2, an educational effort targeting winter recreationalists was launched, and a focused remote camera effort was conducted in the Highway 2 corridor.

The fourth field season of the project continued to meet the projects several goals including training over 80 volunteers in wildlife tracking and road ecology and adding a fourth season of data on wildlife along Interstate 90. Construction on the first crossing structure began during this season with no noticeable impact on data collection activities. Data collected from this years transects along Interstate 90 generally mirrors findings from the previous seasons.

PROJECT OVERVIEW AND SUMMARY OF FIELD SEASON

CCWMP is a joint project of I-90 Wildlife Bridges Coalition (a campaign that fiscally sponsors the program), Wilderness Awareness School (WAS), an environmental education organization, and Conservation Northwest (CN), a conservation organization. CCWMP uses trained volunteers to monitor the location and movement of wildlife in the vicinity of proposed wildlife crossing sites along Interstate-90 in the Washington Cascades between Snoqualmie Pass and Easton. This report documents the winter field work for 2009-20010. A complete description of the projects goals and methods is available online at: http://www.i90wildlifebridges.org/monitoring.htm.

Pervious years' reports are available at:

2006-2007: http://www.i90wildlifebridges.org/CWMP%202006-2007%20Final%20Report.pdf.

2007-2008: http://www.i90wildlifebridges.org/CCWMP%202007-2008%20Winter%20Report%20Final.pdf

2008-2009: http://www.wildernessawareness.org/pdfs/ccwmp_2008-2009_winter_report.pdf

Winter 2009-2010 Summary

Interstate 90 snow tracking transects:

The winter of 2009-20010 was the fourth field season for CCWMP. Snow-tracking conditions this winter were relatively poor. The weather was unseasonably warm with much of the precipitation falling as rain, rather than snow. Many teams encountered snow conditions where it had recently rained and/or was actively raining. Because temperatures often rose above freezing during the day, only to fall below freezing at night, on many days, teams arrived at their sites to find a solid melt-freeze

crust that had prevented tracks from registering during the previous night, and temperatures that rose to the point that any older tracks frozen into the snow were melting or melted by the afternoon. That being said, few transects were cancelled due to dangerous driving conditions. Nearly all transects were visited every week up until the field season was brought to an early close due to lack of snow.

Several teams encountered navigation problems due to either inadequate flagging, conflicting flagging, or different written descriptions for the start and end points for a transect. Attempts were made to resolve these issues in season with mixed results. Stream crossings were a notable safety concern this winter. Many of the transects cross waterways that in an average winter would have been frozen and snowed over, however, were open and running this winter. Several team-leaders reported problems acquiring GPS readings from their handheld devises (MIO P550). Also, battery life was also a challenge for several units.

Teams found cougar tracks at Easton South, Easton North, Price Noble East and Price Noble West. With the exception of Easton South, teams found cougar tracks at each of these locations on two separate occasions. No cougar trails were found to cross the highway. Of the 4 cougar trails that were observed to approach I-90, all turned away from the highway without crossing. One scat was collected from a cougar trail and sent in for DNA analysis along with other specimens collected during monitoring work underway in the area by the Western Transportation Institute. No American marten (*Martes Americana*) were detected at Hyack/Silver Fir or any other transect. This species has now been detected two of four seasons of field work at Hyack/Silver Fir.

Highway 2 corridor remote camera effort

Between January and March of 2010, a pilot study was performed with the goal of capturing wolverines on motion sensitive digital cameras. Cameras were placed in locations north and south of Highway 2 near Stevens Pass. Five sites were selected based on their accessibility, habitat value to wolverines, and proximity to known recent wolverine sightings: Rainy Pass, Icicle Creek, Lanham Lake, Mill Creek, and Lake Wenatchee.

At each of these locations, chicken baiting and scented lure were used to draw animals to the site. Volunteers set up the sites by placing the raw chicken carcass on a tree and securing it with nails and chicken wire.

Animals were detected at four of the five sites, but no wolverines were detected at any of the sites. Marten and Gray Jays were seen at three of the sites. Icicle creek had the only bobcat and coyote sightings. Pine martens were recorded at three of the four locations. At the Mill Creek location, several photos of two marten together were taken.

Informal wolverine detection protocol

Winter recreation enthusiasts traveling in the backcountry of the Cascades were targeted for their assistance to identify signs of wolverines. Their participation enabled the possibility of wolverine detection across a remote mountainous range otherwise hard to monitor. Outreach efforts aimed to educate and encourage this audience to document and collect signs of wolverines including tracks, scat, and hair samples. Events were hosted in both Bellingham and Seattle in December and January accordingly to share information about mammal tracking as well as review the protocol for data collection. Both trainings presented the same recommended guidelines for participants based on the study protocol. Data sheets, documentation guidelines, and further contact details were disseminated to approximately 40 people.

The guidelines recommended for track, hair, or scat data collection were designed to streamline standard scientific procedures (see Appendix 2). First, the potential of any sign being from a wolverine was assessed by inspection and/or trailing. If the sign (tracks, hair, or scat) is determined to be

potentially from a wolverine, measurements, sketches, and photographs are to be collected. Measurements included paw length and width, stride, straddle, and trough. Photographs documented individual tracks as well as trail patterns with their map coordinates. Any samples collected were not to be touched directly, and either dried or frozen accordingly after returning from the field. Reports received were then processed for quality assurance and observation reliability. All findings contributed to the monitoring activities of the project.

DATA

I-90 Transect Data

Data Analysis Methods

All observations associated with poor track quality (Snow Track Quality equal to 1) were not considered reliable and thus are not included among the data presented. Similarly treated were observations where species were recorded as ambiguous or unknown. To account for unequal sampling effort, detection rates were standardized between sites, using visits (or completed transects) as the base unit of effort by which to index detections. The Easton Hill transect is twice as long as the other transects. Numbers of detections per visit were divided in half to provide an even comparison with other transects. Additionally, Shannon's Diversity Index (H' = -_pilnpi) metrics were constructed for each site to facilitate comparison between sites (Magurran 1988). It is important to note that detection frequency would be best regarded primarily as an indicator of presence, and secondarily as an index of intensity of use. Detection frequency is not an index of population size, or of density. Even in the imaginary situation in which all species were distributed at equal densities across the landscape, it is unreasonable to assume equal probability of encountering sign of all species, due to ecological differences among them.

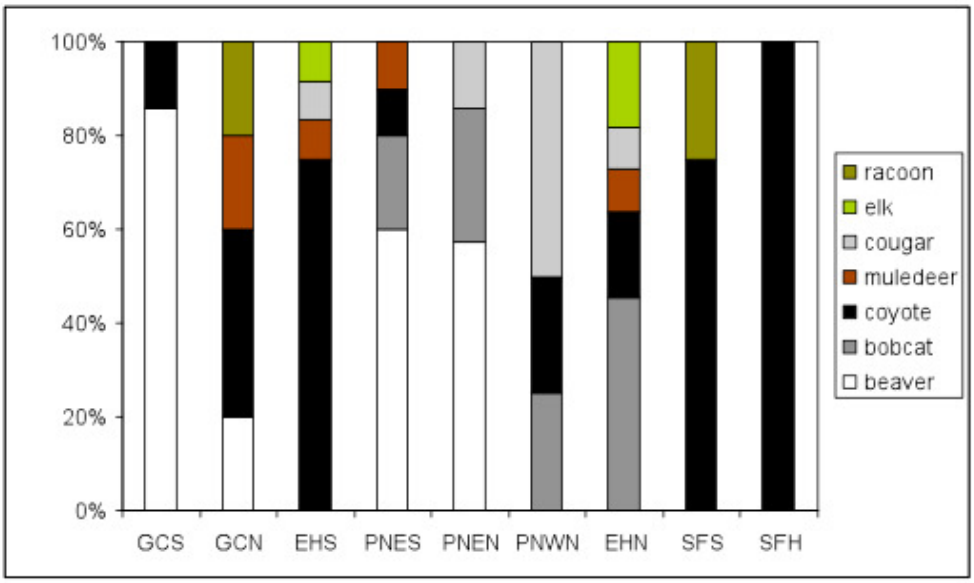


Figure 1. Distribution of species per location. GCS (Gold Creek South), GCN (Gold creek north), EHS (Easton Hill South), PNES (Price Noble East South), PNEN (Price Noble East North), PNWN(Price Noble West South) EHN (Easton Hill North), SFS (Silver Fir), SFH (Hyak).

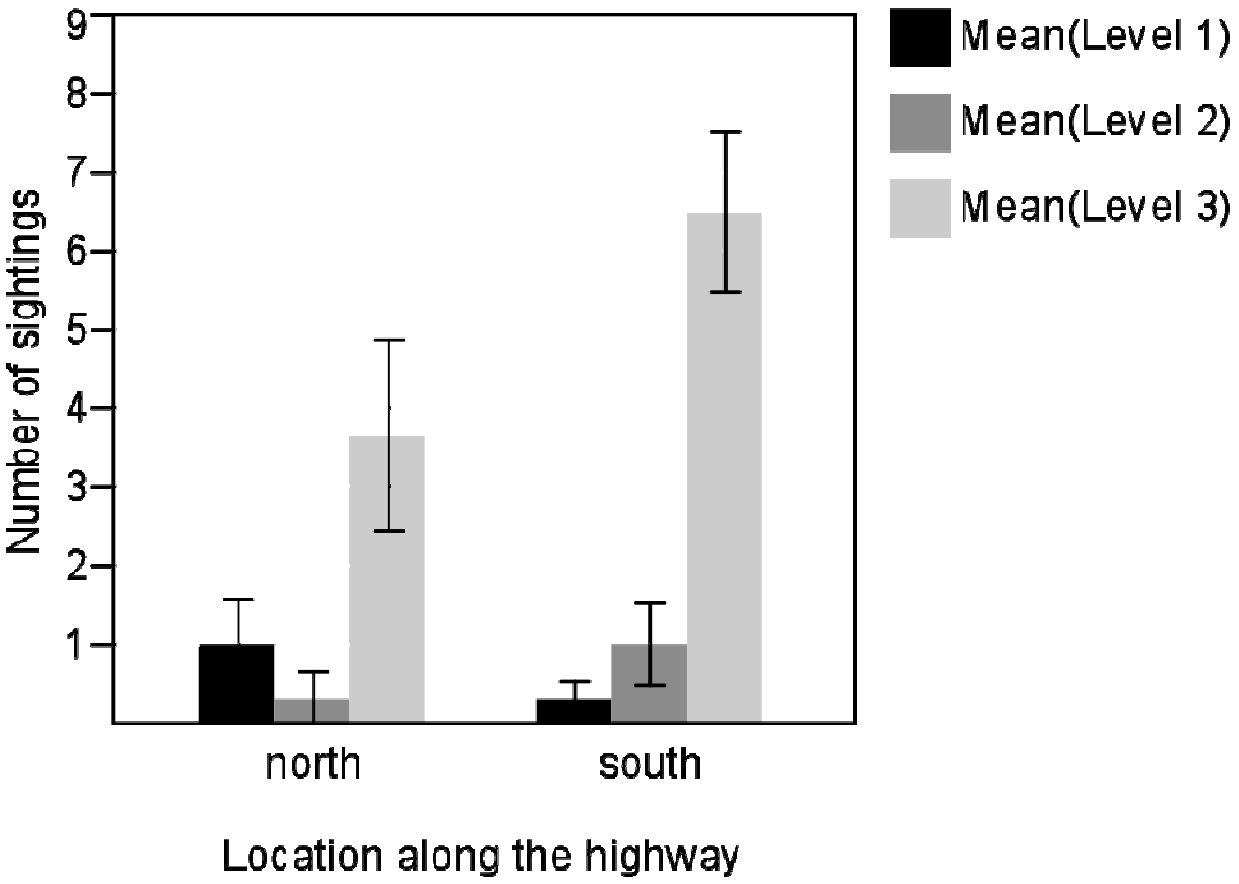


Figure 2. Distribution of species of concern along the north and south sides of I-90. A One-way ANOVA was used to test significance, with no significance for level one ($P=0.214_{(1,1.88)}$) or level two ($P=0.42_{(1,0.717)}$) or level three species ($P=0.1383_{(1,2.79)}$).

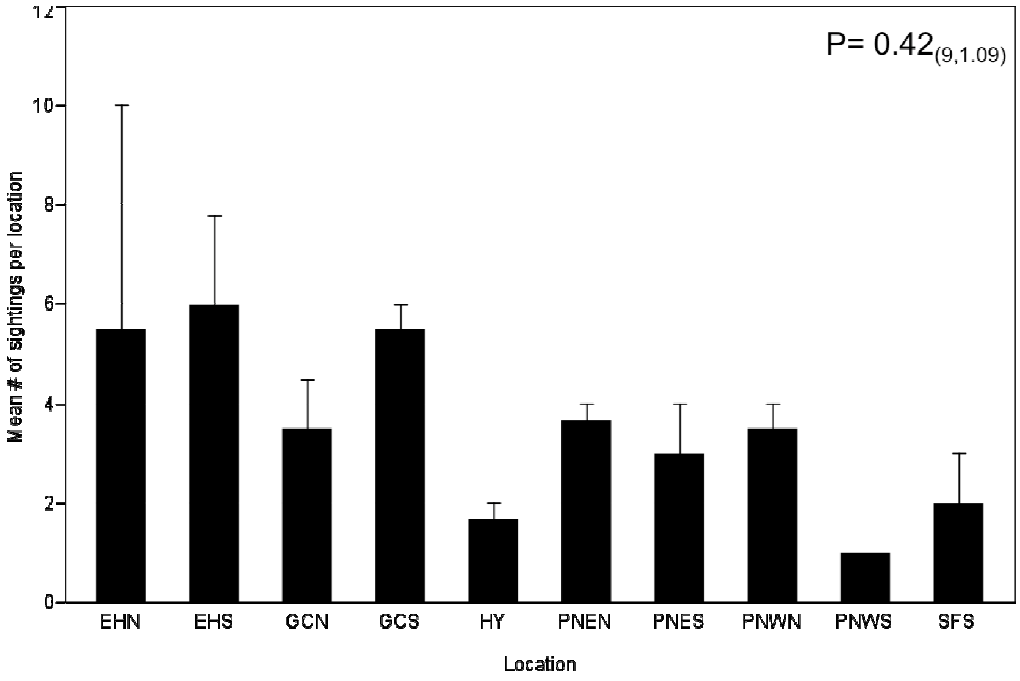


Figure 3. Distribution of track and sign sightings per transect location. A One-Way ANOVA was used and found no significant difference in detections among plots P= $0.42_{(9,1.09)}$.

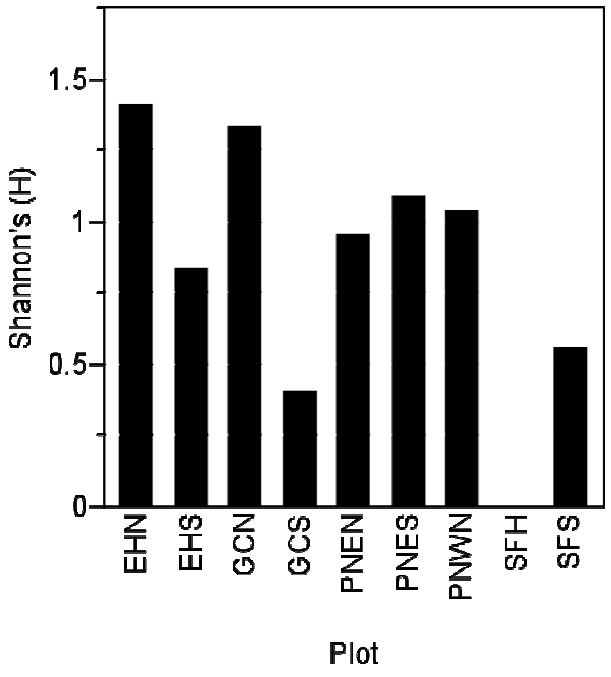


Figure 4. Shannon's H (diversity) per location. Silver Fir only had one species positive ID, so has no H value.

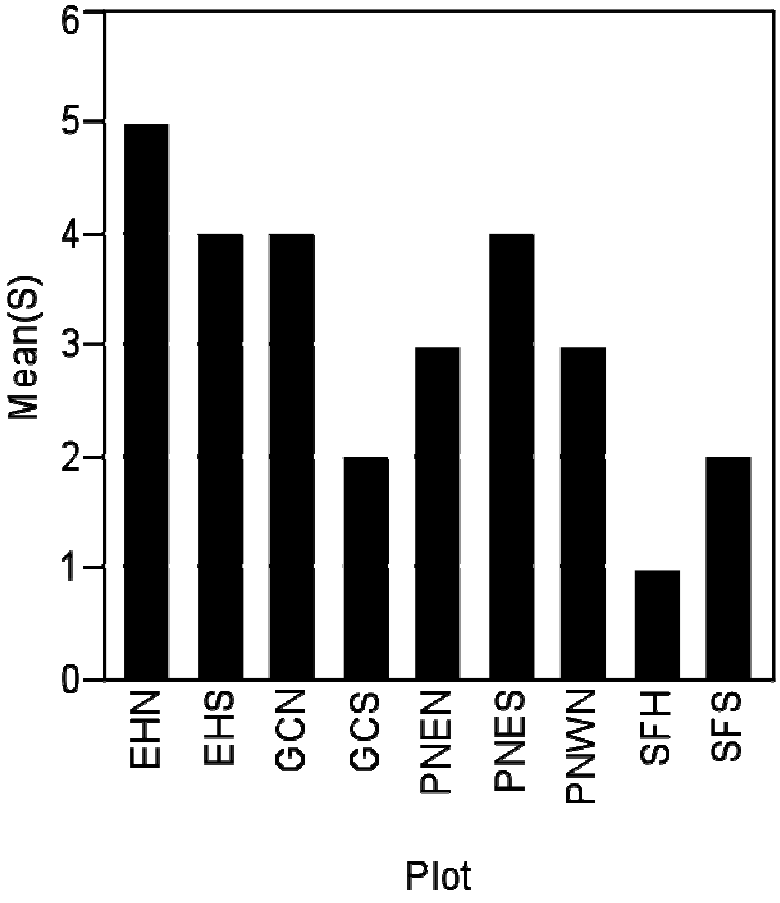


Figure 5. Species richness (S) per plot.

I-90 Trailing Data

Species	Transect	Number of Trailing Events
Cougar (see comments bellow)	Easton Hill S	1
	Price Noble East N	1
	Price Noble West N	1
Mule deer	Gold Creek North	1
Coyote	Easton Hill S	1
	Price Noble East N	1
	Price Noble East S	1
	Gold Creek N	1
Bobcat	Easton Hill N	1
	Price Noble East N	1

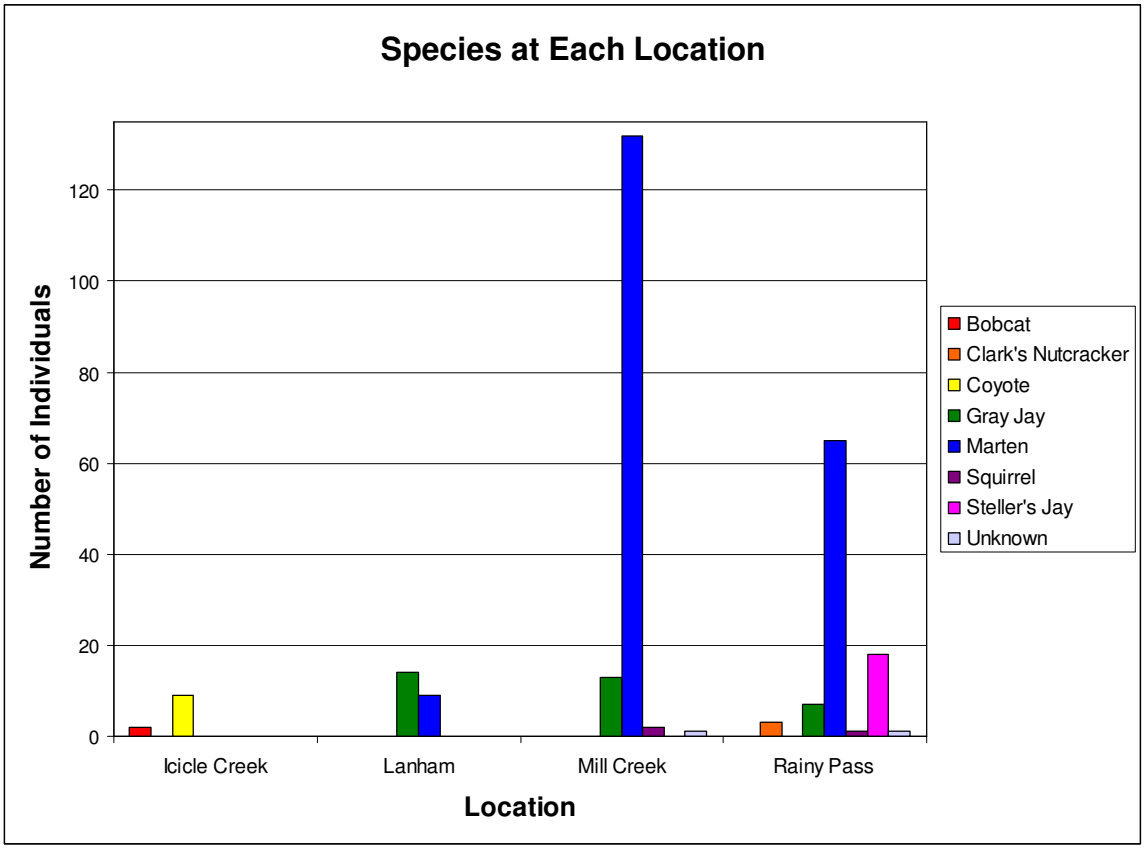
Figure 6. Summary of trailing events for field season

Cougar was the only level 1 species detected and trailed this field season. All three trailing events documented the cougar traveling towards the interstate to within sight of traffic and then either turning away from the road and moving continuously away from it or, in two instances, traveling parallel in proximity to the road and then approaching the road again before turning away. This pattern of movement has been recorded for cougars in previous seasons as well.

One trailing event, at Easton Hill South, recorded this pattern of movement repeatedly while following the animal. It is also interesting to note that this transect is located between the east and west bound lanes of the interstate. While the observers didn't detected where/how the animal had crossed into the median, it clearly had and the section of its trail which was documented likely was a record of the cougar either attempting to re-cross the lanes it had previously crossed or cross the other half of the interstate.

Highway 2 Corridor Remote Camera Data

A total of 8368 photos of wild animals were captured at four of the five locations. When an animal walks into the view of the camera, the camera was set to take three rapid fire shots. After retrieving the data, the number of individual animal visits is counted. A set of photographs is determined to be an individual visit by an animal if there has not been a consecutive photo of the same species within ten minutes. The same individual animal may return to the camera location repeatedly, so the data below only reflects the individual visits made by a species to the camera not the number of individuals recorded by the camera.



While checking remote cameras, the snowtrack of an American marten on the Lanham Lake trail east of Stevens Pass was recorded which matches the results of this species presence on our camera.

Informal Wolverine Detection Data

As mentioned earlier, the snow conditions for this 2009 – 2010 monitoring survey season limited data collection. A sample size of five track reports was collected from the volunteers that we trained through our educational effort on wolverines targeted to winter backcountry enthusiasts; no data was received from trailing or scat. Forty percent, or two of five reports received indicated strong evidence of wolverine presence. These submissions only included photographs which did not fulfill the recommended guidelines for data collection. Interestingly, these submissions were noted to be in proximity to one another in the vicinity of Table Mountain to the northeast of Mt Baker (see map bellow). Though, the timing of these observations differed. One observation was collected in the spring of 2009 and reported after attending the training offered in the fall of 2009. The second observation was submitted in February of 2009 (see appendix 1). The likelihood of wolverine presence in nearby areas suggests additional monitoring there in the Mount Baker backcountry ski area would be beneficial. As such, a remote sensing camera was installed by volunteers in January of 2010. The camera was monitored and remained in place for approximately two months with no significant findings of tracks or photos. Overall, the observation reliability assessment of these reports indicates a likely presence of wolverines in the northeast area of Mt Baker and the project will continue to dedicate resources to definitive documentation of the species presence there.

Other data submissions for the season included a possible domestic dog on the Chain Lakes trail northeast of Mt Baker, and a cougar in Chatter Creek within Wenatchee National Forest. All of these

observations were recorded in January of 2010.

Of the reports completed all referenced individual tracks that were recorded, no trailing or scat reports were submitted. All reports included multiple photographs of individual tracks and track patterns though none included rulers or information about their location. Only one report included a data sheet with sketches and measurements, along with photographs taken specifically following project protocols (vertical and horizontal scale, along with location information on a card in the photo). The limited submissions of complete data sheets along with a suite of photos indicates a potentially unwieldy protocol for public participation and/or the need to revisit the training provided. In sum, these findings suggest refining the type and method of data collected to meet the audience of participants. For example, an emphasis on track measurements, photo documentation standards, and further education about mammal tracking could serve beneficial.

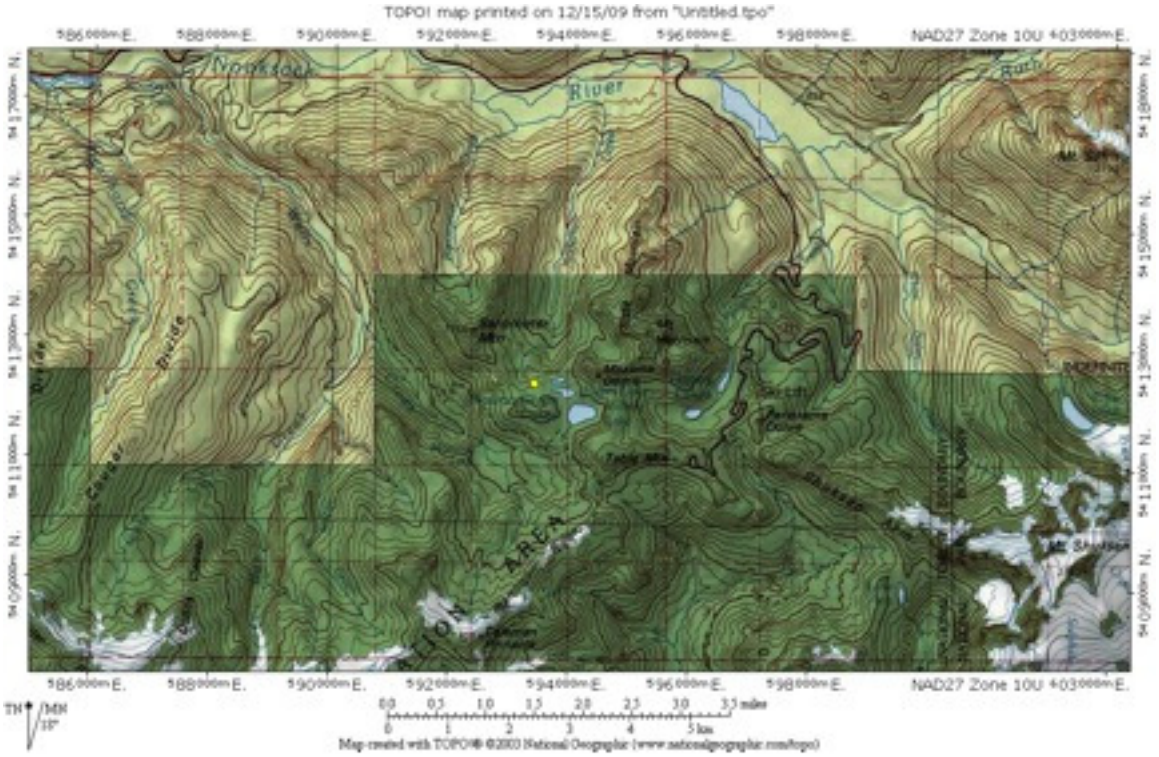


Figure 7. Map of location of potential wolverine tracks detected in the Mount Baker area, and location of remote camera installation.

Volunteer Effort

Total number of volunteers and total volunteer hours both increased significantly from the previous winter season. Specific to our ongoing snowtracking work along I-90, the ratio of volunteer hours to paid hours also increased from slightly over 5:1 in 2008-2009 to over 9:1 this season. 28 transects were completed, significantly more than any other season (20 were completed last season which was the previous highest level of effort). As in the previous year, volunteers participated in every aspect of the project from planning to implementation with an expanded role in remote cameras.

Activity	# of People	Hours
Project Leadership Team (volunteer)	4	158
Training (volunteer)	67	440
Snowtracking Transects (volunteer)	67	1620
Hwy 2 Wolverine Remote Cameras (Intern and volunteer)	5	200
Project manager (paid)	1	245

Table 3. Summary of volunteer and paid hours for the project. Transect hours based on an average field day including travel to and from study area.

DISCUSSION

Transects

Field implementation of transect protocol was generally smooth, likely due to returning volunteers and increased efficiency of project leadership gained from multiple seasons of experience. No exceptional detections or absences of species were noted this field season.

Trailing

The project documented the presence of cougar and specifically their presence and travel up to and along the edge of Interstate 90. Though multiple trailing events were recorded for this species there is no evidence that this represents the presence of more than one individual animal recorded in multiple locations in the study area. In one instance, the presence of a cougar on transect between east and west bound lanes indicates at least an attempt to cross the road (it is unclear whether the animal successfully crossed both directions of travel or that this was the intention of the animal in question).

A pattern of travel involving traveling to within sight of traffic on the interstate on multiple occasions and traveling adjacent to the road intermixed with repeated movements towards the road and backing off was documented. One interpretation for this pattern of movement is that the cougar was attempting to find a suitable location to cross the interstate. This pattern of movement is distinctly different than the pattern of travel described in last years report for bobcats which have been observed to travel to the edge of the forest along the roadway and then weave in and out of the forest in a pattern of movement more consistent with hunting behaviour.

Highway 2 Corridor Remote Camera

Although wolverines were not recorded this winter, this project provided important information on the feasibility of a winter remote camera program focused on wolverine detection and detection of pine martens.

Due to the scarcity of food and wide ranging movements of wolverine in the winter, the snowy months are an ideal time to monitor for this species in Washington's Cascades. There are several factors which make winter camera monitoring more difficult than summer monitoring for this species. The accessibility of remote habitats presents a much greater challenge in winter than in summer.

Closures of roads and uncertain conditions during winter increase the duration and length of each camera trip. The snow level often changes throughout the season inbetween camera checks, altering the effectiveness of the camera and bait placement in capturing a quality photograph. If future work is to continue during winter, the skills of volunteers and frequency of visits will have to reflect the lessons learned this season.

The detection of pine martens in the Highway 2 corridor at locations both north and south of the highway is valuable as this species is an indicator of functioning late successional habitat. For management decisions in this vicinity, it is important to know that the forest structure is providing habitat for this species to either live or move through.

Informal Wolverine Detection

The results of the 2009-2010 field season present valuable project information regarding education, outreach, training, staffing, data collection, and documentation standards. Educating snow travelers about wildlife tracking is a valuable method to increase general awareness of the CCWMP. Initial outreach through two informational sessions in Bellingham and Seattle were presented to a broad audience of snow travelers in December and January accordingly. The trainings evoked curiosity and discussion proving both education and outreach beneficial. A leadership team of three was stationed in Bellingham, Seattle, and Duvall Washington. The greater participation and volunteer turnout in Bellingham as compared to Seattle is correlated to a local intern supporting the program. Similarly, the reports received by geographic area were proportional to the attendance at each training session. This demonstrates both the constraint of a regional project and the importance of local support. When assessing the impact of increased trainings offered and/or trainings expanding into new geographic areas, the relative amount of regional and local staff and their time should be considered.

These considerations also possibly influenced the seasons sample size of reports, along with the audience targeted and snow conditions as previously mentioned. The response of attendees represented a broad range of winter backcountry enthusiasts. However, not all backcountry travelers encounter wolverine habitat in remote wilderness areas. Therefore, targeting a more specific audience likely to enter wolverine habitat could prove beneficial. These specific audiences include mountaineers, avalanche organizations, ski patrollers, and gear shops. Potentially offering training sessions to these groups may generate a higher rate or frequency of reported wolverine sign. Another option to consider is preparing a supplementary curriculum available for in-house use by these other groups. This would serve to limit staffing needs, but might require detailed oversight to ensure accurate trainings are provided. Overall, refining the target audience for outreach and education efforts suggests a beneficial strategy to increase reporting.

An additional consideration regarding sample size might also be the calendar dates open for data collection. During the winter months, there are limited hours of available daylight and snow conditions merit greater avalanche precautions. Therefore, accessing remote wolverine habitat becomes challenging. As spring approaches the days are longer and the snow tends to stabilize, allowing more access to wolverine habitat. Increasing the focus of training and awareness during the spring skiing/mountaineering season might increase the number of submissions.

The quality and content of trainings grew from the previous year. The trainings included more information about the biology, behaviour, and signs of wolverines as compared to other mammals. The information aimed to help participants rule out tracks obviously not from a wolverine while in the field. This also served as a pre-filter for staff to assess received reports. This strategy offers both advantages and disadvantages as the number of potential track reports may have been limited due to volunteer field assessments.

The trainings emphasized the techniques and importance of written as well as photographic documentation procedures. However as indicated through the data, no submissions included a full suite of data sheets and photos. This suggests the need to amend and/or simplify the incoming documentation structure. The protocol therefore should be reviewed to set minimum standards for documentation which achieve the appropriate balance between the quantity and quality of casual reports versus scientific reports. Once this is complete, adjustments to the training can be made accordingly. Additionally, conducting a post-training assessment of content, quality, and self-reported likelihood of data collection would indicate the level of training goals and objectives achieved.

Similarly, developing guidelines for analyzing track forms and photography by staff would improve overall reporting of project results. Currently, the data forms and track photos are assessed by expert staff and given a value indicating the likelihood of wolverine presence. How that likelihood is evaluated could be standardized with perhaps the creation of a dichotomous key. Together, these considerations regarding the methods of receiving data and the handling of received data suggest areas for improvement to the project quality.

Citizen Science

The ratio of volunteer hours to paid hours continues to grow as volunteers gain more experience and we expand the components of the project. Team leaders who have lead teams for more than one season contribute to this rise in efficiency.

For transects along Interstate 90, as in previous years, the use of a leadership team composed of a small number of volunteers and a single paid staff member has proven to be both efficient and highly effective at meeting the project's goals. Using the field team structure of highly trained team leaders working with several entry level volunteers, the project has continued to maintain a high degree of quality in data collection while also providing excellent educational experiences and recruiting future team leaders. Several problems relating to multiple observers and use/care of equipment on transects arose this seasons: problems locating transect ends and route along several transects and showing up to transect starts with hand held units fully charged (problematic as team leaders share these units and might not pick them up until the morning of their field work.

As noted in the discussion of the wolverine detection part of the project, the current protocol may be too labor intensive to get complete material from volunteers and revisions to the protocol will be looked into for next field season.

Changes for the next field season

I-90 Transects and Trailing:

1. Recruit returning team leaders to carryout a systematic and thorough re-flagging of all transects at the beginning of the next field season.
2. Investigate strategies for ensuring team leaders have access to handhelds in time to fully charge them prior to field work. Replace units that are not holding a charge.
3. Move up starting time for transects to December if snow conditions allow to account for potentially poor conditions in March.

Remote Cameras:

Informal Wolverine Detection:

1. Continue to offer training sessions, however refine the audience to specialty snow travelers
2. Outreach to existing groups of backcountry travelers, i.e. ski patrollers, mountain guides, gear shops, avalanche safety organizations, etc.
3. Prepare educational materials available for in-house use among the targeted audiences mentioned above
4. Expand education and outreach through social media and community forums for skiers
5. Simplify documentation structure of data reports and set minimum standards
6. Prepare a flowchart for received reports to identify the likelihood of wolverine presence
7. Consider more staff, intern, or volunteer help in Seattle and any other sites potentially targeted
8. Consider expanding the areas where trainings are offered

Acknowledgements:

Mallory Clarke, Kate Porter, Matt Monjello donated many many hours to prepare for and run this winters snow tracking surveys at Snoqualmie Pass. Randy Leventhal volunteered her time to help write and revise the wolverine detection protocol and then develop, outreach for, and deliver trainings this winter. Adam Martin, along with being a team leader, donated his time and expertise to produce our maps for this years report.

Thank you to all of this winter's volunteers who donated their time, energy, and enthusiasm to this project in many large and small ways: Thomas Murphy, Kerrie Murphy, Anna Simpson, Kaitlin Aaker, Helen Anderson, Stephanie Archambeault, Sean Bigelow, Zachary Bigelow, Kaila Casper, Jim Clarke, Alyssa Endacott, Jennifer Jones-Moore, Isabel Lemos, Mitchell Lohr, Joel Miller, Alexandria Molina, Corbin Powell, Valeria Quezada, Carissa Quisenberry, Garrett Santora, Valerie Topacio, Karin Youngberg, Kate Porter, David Illig, Jack Shambo, Paul Zoba, Matt Zoba, Mallory Clarke, Tyson Wine, Atiya Holyer, Tasha Loz, Keith Harlow, Ruth Woods, Riley Fleet, Katie Tretanero, Delayney White, Dan Gusset, Abi Marshall, Charlien Behnke, Joe Kiegal, Chris Byrd, Frankie Allen, Kathryn Jordan, Annie Thoe, Levi Old, Jonathan Goff, Eric Himmelfarb, Bob Holzman, Marion Dulude, Joan Golston, David Snair, Tom Hagedorn, Ben Hagedorn, Scott Mitchell, Maureen Corlas, Kari Hiser, Cathy Macchio, Jenn Wolfe, Amy Witt, Kelly Staples, Tracy Durnell, Tim Gibbons, Chris Dawkins, Michelle Van Naerssen, Brian Booth, Peter McGlenn, Saralynn Finn, Doug Beeman, Caitlin Caldwell, Allen Kearney, Tana Beus, Julie Meneely, and Forest McBrian.

We give a special thanks to the Starbucks in North Bend for once again donating the use of their closet space for storing equipment during the winter field season and our Advisory Council members for providing guidance on our overall program and logistics.

Sources:

Johnson, RE, KM Cassidy. 1997. Mammals of Washington State: Location data and modeled distributions. Washington Cooperative Fish and Wildlife Research Unit, Seattle, WA.

Magurran, AE. Ecological diversity and its measurement. Princeton University Press: Princeton, NJ; 1988.

Appendix 1: Photographs

Photo 1. Bobcat (*Lynx rufus*) scent marking scrape on Price-Noble East (north side of interstate) transect. Photo by Kate Porter.

Photo 2. Left front track of a cougar. Price Noble East (north) transect. Photo by Kate Porter.

Photo 3. Cougar tracks going in opposite directions from trailing event on Price Noble East (north). Photo by Kate Porter.

Photo 4. Cougar tracks going it both directions. Price Noble East (north). Photo by Kate Porter.

Photo 5. Potential wolverine tracks discovered northeast of Mt. Baker. Photo by Tana Beus.

Photo 6. Potential wolverine tracks discovered northeast of Mt. Baker. Lack of scales and distortion from the orientation the photo was taken limit the value of the photograph and illustrate a problem encountered with numerous photographs submitted this field season. See also photo on cover page from this series. Photos by Forest McBrian.

Photo 7. Pine marten recorded by remote camera at Mill Creek station.

Photo 8. Two pine martens recorded by remote camera at Mill Creek station.

Photo 9. Bobcat recorded by remote camera at Icicle Creek station.

Photo 10. Pine marten recorded at bait at Lanham Lake station.

Photo 11. Pine marten recorded with remote camera at Lanham Lake station.

Photo 12. Pine marten recorded with remote camera at Rainy Pass station.

Appendix 2: Wolverine Detection Protocol

Wolverine Track and Sign Identification, Documentation, and Collection for Winter Backcountry Travelers

FIELD METHODS AND MATERIALS

GOALS

This document is designed to provide the tools necessary for novices to recognize, document and collect potential wolverine tracks and sign while pursuing winter outdoor activities in the mountains of the Pacific Northwest. Documentation and collected specimens of such sign can be analyzed out of the field by qualified personnel and help guide decisions about future efforts to document wolverines in the region through remote cameras, DNA sample collection, or further tracking efforts. Casual contributions of this manner support ongoing structured monitoring activities of the project.

METHODS

The following description of methods assumes the reader has discovered a set of tracks which he or she believes may have been made by a wolverine. A sheet with key features of wolverine tracks and trail patterns is included below. It is beyond the scope of this document to exhaustively cover techniques for finding and identifying such tracks. Trainings are available through CCWMP and Wilderness Awareness School (project partner).

Field Materials Needed

Paperwork:	Equipment: (NOT PROVIDED HERE)
❑ 2 Target Species track datasheets ❑ 2 Trailing datasheets ❑ 2 Target Species specimen datasheets ❑ Wolverine Track Identification sheet ❑ Photo-documentation guidelines ❑ Measurement guidelines ❑ CCWMP contact information	❑ 5 index cards ❑ 6” ruler ❑ Notebook ❑ Pencil ❑ permanent marker ❑ Camera ❑ GPS unit ❑ 4 quart sized ziplock bags ❑ 2 small brown paper bags ❑ Topographic Map ❑ field guide to northwest wildlife tracks (recommended)

TRACKS

Procedure for Potential Target Species, Ambiguous or Unclear Tracks or Sign:

1) Select the clearest tracks for measurements and photographs. Consider photographing tracks in a variety of locations if possible.

2) When ambiguous or unidentifiable tracks are found, the first step is to search the area for better tracks of the same animal. If there is a trail you can follow, this is one way you may discover clearer tracks for that individual. In general, look for where the creature has entered more sheltered areas away from direct sunlight, wind, further snowfall, or whatever has likely obscured the tracks.

3) If clearer identifiable tracks cannot be found, then ambiguous tracks, which could be wolverine, should be documented with care. Unclear tracks that are clearly NOT the target species do not need to be documented.

4) Photograph tracks, trail patterns, and other signs as per photo-documentation procedures below.

Photographic Documentation Procedure: (see appendix for diagrams and further instructions)

General:

- Take at least one picture of the track that includes a card in the picture with: Date, Location, GPS coordinates and datum used (UTM NAD 83 preferred), observer name.
- Take multiple photographs to ensure you get a quality shot.

Individual tracks:

- Take photo looking directly down on track to reduce distortion.
- Include two scales, preferably rulers, one running lengthwise, the second widthwise.

Track patterns, trails, other signs:

- Include a scale of some sort. Often this may be leaving the scale you used for an individual track on the ground by that track (thus also giving a reference for where the individual track sits in the pattern).
- Try to take picture looking straight down on trail to reduce distortion. If this is impossible due to size of trail, include scales both near and far to account for distortion.
- Including a person in a photo can help with scale for larger frames.

Sketches and Measurements Procedures:

Fill out the TARGET SPECIES DATASHEET as completely as possible. Attempt to make all drawings either life size or to scale (note what scale is). The more completely this sheet is filled out the more likely the information collected will be of use to the project. Use the "Measurement Guidelines" sheet, below, for determining what to measure in tracks and track patterns.

TRAILING AND SPECIMEN COLLECTION

Assuming time and safety permit, attempt to follow the animals trail in both directions for as long as possible. Trailing is carried out for two reasons:

- To collect more geographic information on the potential wolverine trail.
- To search for and collect specimens that can be used for DNA analysis (e.g. hairs or scats).

Collectable specimens include hairs and scats. Hairs may be collected out of individual tracks, beds in the snow, or from course objects the animal brushed against during its travels. Hairs are more difficult to detect than scats and require a high degree of attention to locate. This method is based on the methods described in Ulizio et al (2006). This study found hair samples on average within .49 km (.30 miles) while trailing likely wolverine tracks. The average distance between scat collections was 1.43 km (.88 miles).

Record trailing observations and UTM points on the TRAILING DATASHEET (see appendix). For any specimens collected, fill out the SPECIMIN DATASHEET.

Trailing Procedure

1.) Attempt to follow the trail for at least ¼ mile (preferably ½ mile to increase likelihood of finding hair or scat sample, see below) in each direction from the point of discovery. Ideally the trail will be followed as far as possible to gather as much information about the animal as you can and to increase the likelihood of obtaining a specimin for DNA analysis.

2.) On the trailing datasheet, record any discernable behaviors, notable changes or characteristics of the trail.

3.) Record the path of the animal by documenting frequent UTM coordinates (obtained from your GPS unit or topographic map) with associated commentary in notes, where appropriate.

Searching for and collecting specimens:

4.) While trailing scan individual tracks and disturbed snow for sloughed hairs. When first starting this search take some time to study several tracks in detail from several angles to help develop your attention to the types of details that will help you notice hairs. As you follow further along the trail looking for hairs you should be able to increase your speed and efficiency.

5.) Stop at any beds, lays or other disturbances in the snow to scan carefully for hairs. Of particular interest are beds where the animal laid long enough to allow snow to melt and then refreeze as these conditions often snag high quality hairs. Kneel or lie down with your eyes about 30 cm (12 inches) from the snow surface. Scan each bed from several different angles as hairs may pop out more clearly depending on lighting and background.

6.) Carefully look for hairs on any branches, tree bark or other material that the animal may have brushed against (either intentionally or unintentionally) on its travel route.

7.) Every effort should be made not to touch the hairs directly as this can contaminate them for DNA analysis. Ideally a sterilized tweezers would be used to extract the hair(s). Deposit the hairs in a coin envelop (included in field kits provided at trainings). Label the container clearly with the location, date, coordinates, and your name (observer). Fill out a specimen collection datasheet.

NOTE: In the event that a tweezers or paper envelope are not available to collect hairs, a clean ziplock bag can be used in the field for a short period of time. Plastic bags, which hold in moisture, can cause specimens to mold. As soon as possible transfer the hairs to a dry envelop and store it in a dry location until they can be delivered to one of the project managers (see below).

8.) Scats are relatively more easily located than hairs along trails, though less frequently occurring. If it will not be possible to keep a scat frozen it should be collected in a brown paper bag or transferred to one from a plastic bag once out of the field to reduce the chance of mold developing. As with hairs do not touch the specimen directly both to reduce chance of contamination as well as to prevent transmission of disease or parasite that may be present in the specimen to you. Label container and fill out datasheet clearly as above. Once out of the field either store the scat in a freezer to preserve it until it can be delivered to a project associate or allow to dry in a paper bag stored in a dry location.

9.) Once out of the field a project associate as soon as possible to arrange for delivery of specimens to an appropriate location for analysis (see below).

OUT OF THE FIELD

Once you come out of the field contact one of the individuals below for specific instructions on how to handle delivery of materials (paperwork, photographs, specimins). Immediate communication is highly valued as strong evidence may solicit a hasty follow up response in the area of discovery that might include setting up remote cameras, hair snags or follow up tracking surveys.

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Works Cited

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